PDRSF
11.3.245.1V78

DEPARTMENT OF THE ARMY
PORTLAND DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 2946
PORTLAND, OREGON 97208-2946

February 13, 2004

REPLY TO
ATTENTION OF:

Operations Division
Regulatory Branch
Corps No.: 199100099

Mr. James L. Jakubiak
Schnitzer Investment Corporation
International Terminal
PO Box 10047
Portland, Oregon 97296-0047

Dear Mr. Jakubiak:

Enclosed are two unsigned copies of your requested permit.

In order to make this permit valid, please read the conditions of the permit carefully, complete both copies including signature, printed name and title, and return both copies to the Regulatory Branch, Permits Section, at the letterhead address along with a check in the amount of $100.00, payable to Finance and Accounting Officer, USAED, Portland. Your copy of the fully executed permit will then be returned to you.

You are cautioned, however, not to begin work under the terms of this permit until you receive the fully executed document, as such action would be in violation of Federal law.

Recent changes in the U.S. Army Corps of Engineers regulations have established a process through which you may object to certain terms and conditions of the enclosed permit, and ask that the permit be modified accordingly. Please see the enclosed Notification of Administrative Appeal Options and Process and Request for Appeal for further information about that process.

If you have any questions regarding this permit, please contact Ms. Mary J. Headley at the letterhead address or telephone (503) 808-4392.

Sincerely,

Donald Sorda
for
Lawrence C. Evans
Chief, Regulatory Branch

Enclosures

USEPA SF
1336545
SCHN00317369

Applicant: Schnitzer Steel Industries, Inc.	File Number: 199100099	Date: 13FEBN04
Attached is:		See Section below
XX	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice. Also, see Section II.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record. If you believe you have additional information pertinent to an approved jurisdictional determination {see Part D} with which you disagree, that new information should first be sent to the Portland District for reconsideration. Following the District's reconsideration, the approved jurisdictional determination can still be appealed as noted in Part D)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

If you have questions regarding this decision and/or the appeal process you may contact: U.S. Army Corps of Engineers Portland District Office CENWP-OP-GP (ATTN: Jim Goudzwaard) Post Office Box 2946 Portland, Oregon 97208-2946	If you decide to appeal an action under Parts B, C or D above, send a copy of each page to: U.S. Army Corps of Engineers Northwestern Division Attn: Mores Bergman, Appeal Review Officer 12565 West Center Road Omaha, Nebraska 68144-3869 Telephone (402) 697-2533

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:

DEPARTMENT OF THE ARMY PERMIT

Permittee: Schnitzer Steel Industries, Inc.

Permit No: 199100099

Issuing Office: U.S. Army Corps of Engineers, Portland District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: Schnitzer Steel Industries, Inc. (SSI) proposes to conduct maintenance dredging of Berths 1, 2, and 3 at the International Terminals slip. The project involves dredging the area to a maximum depth of -42 feet Columbia River Datum (CRD), -38 feet CRD, or -24 feet CRD depending on location within the slip. The proposed dredge footprint covers about 9.6 acres with a maximum length of 2,250 feet and maximum width of 270 feet. The proposed dredge footprint lies entirely within the previously permitted dredge area and covers less area than authorized in previous permits. The initial dredge volume associated with the proposed dredge prism is 77,000 cubic yards (cy). Over the remainder of the permit duration, SSI proposes to dredge another 50,000 cy as needed for ongoing maintenance (e.g. 25,000 cy every other year, on average, in years two through five). Dredging will be by clamshell bucket, with transport to approved upland facilities or locations by barge, truck or rail.

Purpose: To maintain safe navigation access and berthing for the dock facilities at the SSI International Terminals slip by conducting periodic maintenance dredging, as needed. The slip and associated berths have been maintained under previous maintenance dredging permits (Department of the Army Permit 199100099 and Oregon Division of State Lands Removal-Fill Permit No. 1055). Shoaling at the mouth of the slip and within the berths has created a critical and urgent need to maintain these facilities.

Project Location: Willamette River, River Mile 3.5, Section 35, Township 2 North, Range 1 West, Portland, Multnomah County, Oregon

Drawing: Three (3) Sheets identified as COE No. 199100099 (Enclosure 1)

General Conditions:

1. The time limit for completing the work authorized ends on **January 31, 2009**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted

activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the

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Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. A conditioned water quality certification has been issued for your project. You must comply with the conditions specified in the certification as special conditions to this Department of the Army permit. For your convenience, a copy of the certification is attached (Enclosure 2).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. **In-water Work Windows:** All in-water work, including temporary fills or structures, shall occur between July 1-October 31 and December 1-January 31 (timeframes are specific to the Willamette River, from the mouth to Willamette Falls). Exceptions to these time periods require specific approval from the Corps.

2. The following special condition is a part of all Department of the Army permits that provide authorization under Section 10 of the Rivers and Harbors Act, regardless whether the permit provides such authorization under Section 10 alone, or in combination with authorization under other laws:

• The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the U.S Army Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

3. The Environmental Protection Agency (EPA) is presently evaluating the Willamette River between the mouth of the river and Willamette Falls (river miles 0-26). This is the reach of the river that EPA has identified as an "area of interest" pursuant to a National Priorities Listing under the Comprehensive Environmental Response, Compensation, and Liability Act, the Resource Conservation and Recovery Act, and the Federal Water Pollution Control Act. The following statement is provided at the request of EPA:

• "This permit does not exclude the permittee from liability or any requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (42 U.S.C 9601 et. Seq.), the Resource Conservation and Recover Act of 1978 as amended (42 USC 6901 et. Seq.), the Federal Water Pollution Control Act as amended (33 USC 1251 et. Seq.) and any and all requirements of the State of Oregon under Revised Statures or Administrative Rules. The Protection Agency and the Oregon Department of Environmental Quality pursuant to a National priorities Listing relative to the Willamette River. Granting of this permit by the Portland District, US Army Corps of Engineers should in no way be construed as approval of this project as being in compliance with the above cited authorities. Neither should the permittee consider this permit as absolving the permittee from any liability or damages from any party whomsoever."

4. The permittee (Schnitzer Steel Industries, Inc) will comply with the terms and conditions of the US Fish and Wildlife Service letter of concurrence (Enclosure 3). Your authorization under this Department of the Army permit is conditional upon your compliance with these mandatory terms and conditions in order to minimize adverse affects on listed Bald Eagle under the Federal Endangered Species Act. Specifically:

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a. A close-lipped clamshell bucket will be used to dredge the project sites with all dredged material transported to approved upland facilities or location by barge, truck, or rail. Any incidences when the close-lipped bucket is not used will be described in a post-dredging report, with copies provided to the Corps and FWS. Include when, where, and the length of time the close-lipped dredge was out of service.

b. A turbidity management plan will be developed using guidelines established by the Oregon Department of Environmental Quality (ODEQ).

c. Dredging depths, including overdrafts, will be kept to a minimum.

5. Endangered Species Act and Magnuson Stevens Act Requirements. This Corps permit does not authorize you to take a listed species. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a Biological Opinion under ESA Section 7, with "incidental take" provisions with which you must comply). "Incidental take" is take of listed species that results from, but is not the purpose of, the Federal agency or the Permittee carrying out an otherwise lawful activity. Take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of an endangered or threatened species is prohibited without a specific permit or exemption.

The Biological Opinion which the Corps used to evaluate your proposal for compliance with the ESA and the Magnuson-Stevens Act, is a programmatic procedure developed with National Marine Fisheries Service (NOAA Fisheries) for specific activities requiring a Corps permit entitled *Standard Local Operating Procedures for Endangered Species (Slopes) for Certain Regulatory and Operations Activities Carried Out by the Department of the Army Permits in Oregon and the North Shore of the Columbia River*, dated July 8, 2003. The Corps recommends that you review the SLOPES opinion in its entirety, which you may obtain on-line at https://www.nwp.usace.army.mil/op/g/notices/Slopes.pdf.

The enclosed SLOPES document (in part) (Enclosure 4) contains mandatory terms and conditions to implement the reasonable and prudent measures (RPM) that are associated with incidental take specified in SLOPES.

Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached SLOPES conditions, which are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of SLOPES, where a take of the listed species occurs, constitutes an unauthorized take, and constitutes non-compliance with your Corps permit. The NOAA Fisheries is the appropriate authority to determine compliance with the terms and conditions of SLOPES, ESA, and MSA.

The Corps hereby requires the Permittee to adhere to the following Special Conditions in order to minimize adverse affects on ESA listed Chinook salmon, and Steelhead trout, and MSA listed Chinook and Coho salmon, and Starry flounder:

a. To satisfy the requirements of SLOPES RPM #1, the Corps requires that the Permittee comply with the following:

1. Project Access. The Permittee shall ensure that landowner(s) provide reasonable access to the project area for monitoring the use and effectiveness of permit conditions. Reasonable access means, with prior notice to the Permittee, the Corps and NOAA Fisheries may at reasonable times and in a safe manner, enter and inspect the permitted project to ensure compliance with the reasonable and prudent measures and terms and conditions in this Opinion.

2. Salvage Notice. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360-418-4246. The finder must take care in the handling of sick or injured specimens to ensure effective treatment, and in handling dead

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specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

b. General Conditions. To satisfy the requirements of general conditions for surveying, exploration, construction, operation, and maintenance under SLOPES, the Permittee shall fully implement all conditions, as applicable to the permitted activity, in RPM #2 (Enclosure 4a). Please note that the general terms and conditions of Measure 2 cover an array of diverse activities such that not all requirements may apply to your particular project.

c. Activity-Specific Conditions. To satisfy the requirements of maintenance dredging under SLOPES, the Permittee shall fully implement all conditions, as applicable to the permitted activity in RPMs 11 & 12 Enclosure 4b).

d. Monitoring. To satisfy the monitoring requirements of SLOPES the Permittee shall fully implement RPM #13,(a) Regulatory program implementation monitoring (Enclosure 4c). Please note that RPM #13(a) requires the submittal of an implementation report, photo documentation, and additional project-specific data within 120 days of "project completion". Project completion, for the purposes of this report,

is defined as the date when work in waters of the U.S. is complete, which may differ from the date when the entire project is complete. In addition to the implementation report, Measure 13(a)(iv) requires an annual report submitted to the Corps by December 31st of each monitoring year for projects requiring restoration or mitigation. The monitoring period begins with the first growing season after project completion.

e. The Permittee shall provide all documentation and reports as required for submittal by this Opinion to the following address:

U.S. Army Corps of Engineers
Regulatory Branch
Compliance & Enforcement Section (Multnomah – 199100099)
P.O. Box 2946
Portland, Oregon 97208

6. The permittee will evaluate sediment quality before each dredging occurrence, and comply with requirements of the *Dredge Maintenance Evaluation Framework for the Lower Columbia River Management Area* (DMEF) (November 1998). Sediment quality reports will be submitted to the Corps for coordination, and determination of compliance with DMEF, with the Regional Management Team (RMT). At times this process can be lengthy, so please allow sufficient time for the Corps to complete coordination with the RMT (6 months recommended). Provide 4 complete copies of the report to the following address:

U.S. Army Corps of Engineers
Regulatory Branch
Permit Section (Multnomah – 199100099)
P.O. Box 2946
Portland, Oregon 97208

7. The permittee will dispose of dredge spoils at an approved upland facility. Any temporary dredge spoil area (e.g. on a barge) will be fully-contained so as to limit return flows to the river to less than 4-feet per second.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

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(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

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6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE SIGNATURE) (DATE)

(PRINTED NAME) (TITLE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

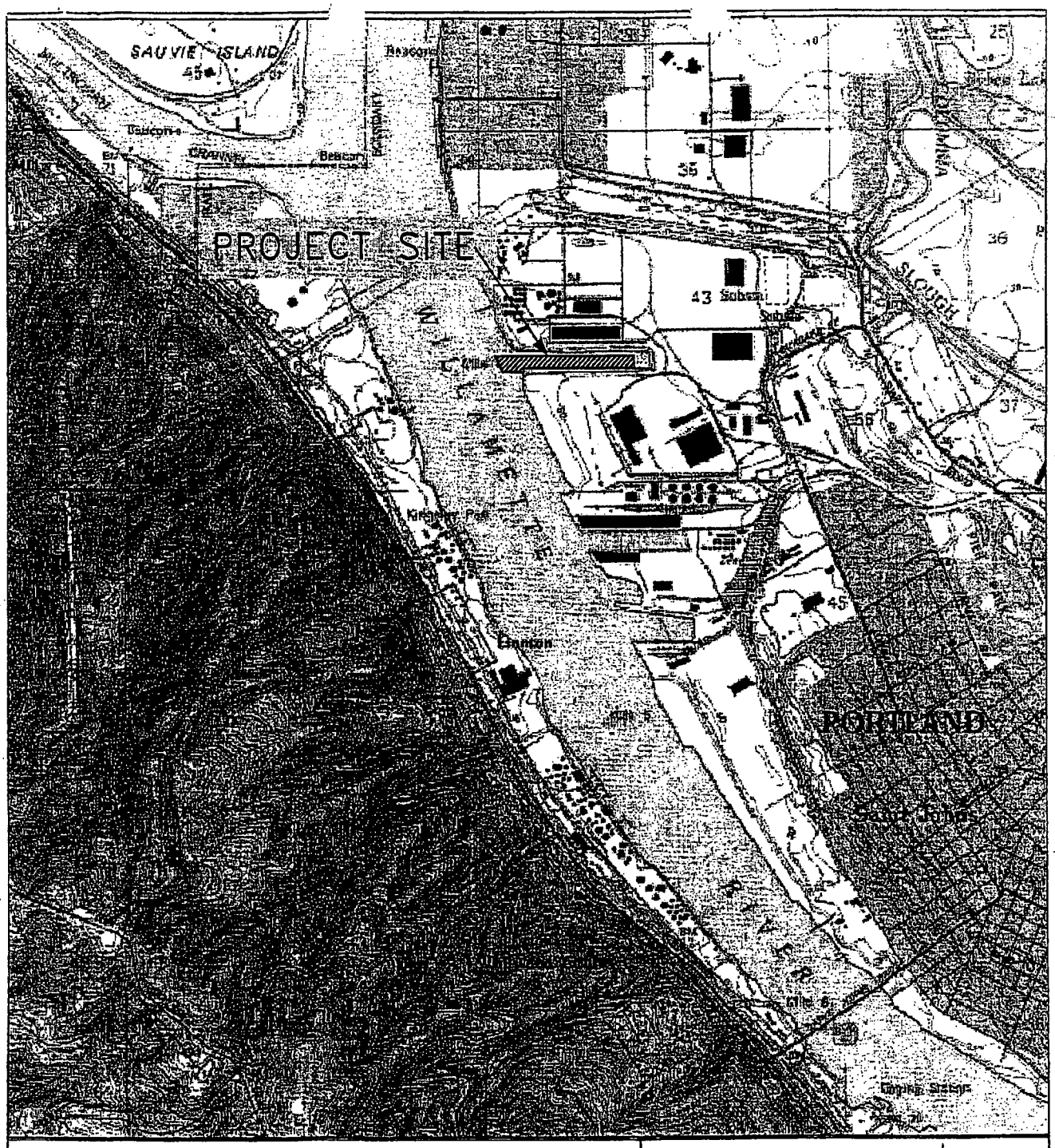
(DISTRICT ENGINEER) (DATE)
FOR
Richard W. Hobernicht
Colonel, Corps of Engineers
District Engineer

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

(PRINTED NAME) (TITLE)

SCHN00317377



NOTE 1. LOCATION MAP OBTAINED FROM US GEOLOGICAL SURVEY QUAD SHEET FOR LINNTON, OR

Scale in Feet
0 1000 2000

PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES
VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6
ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 41" N
LONGITUDE: 122° 46' 42" W

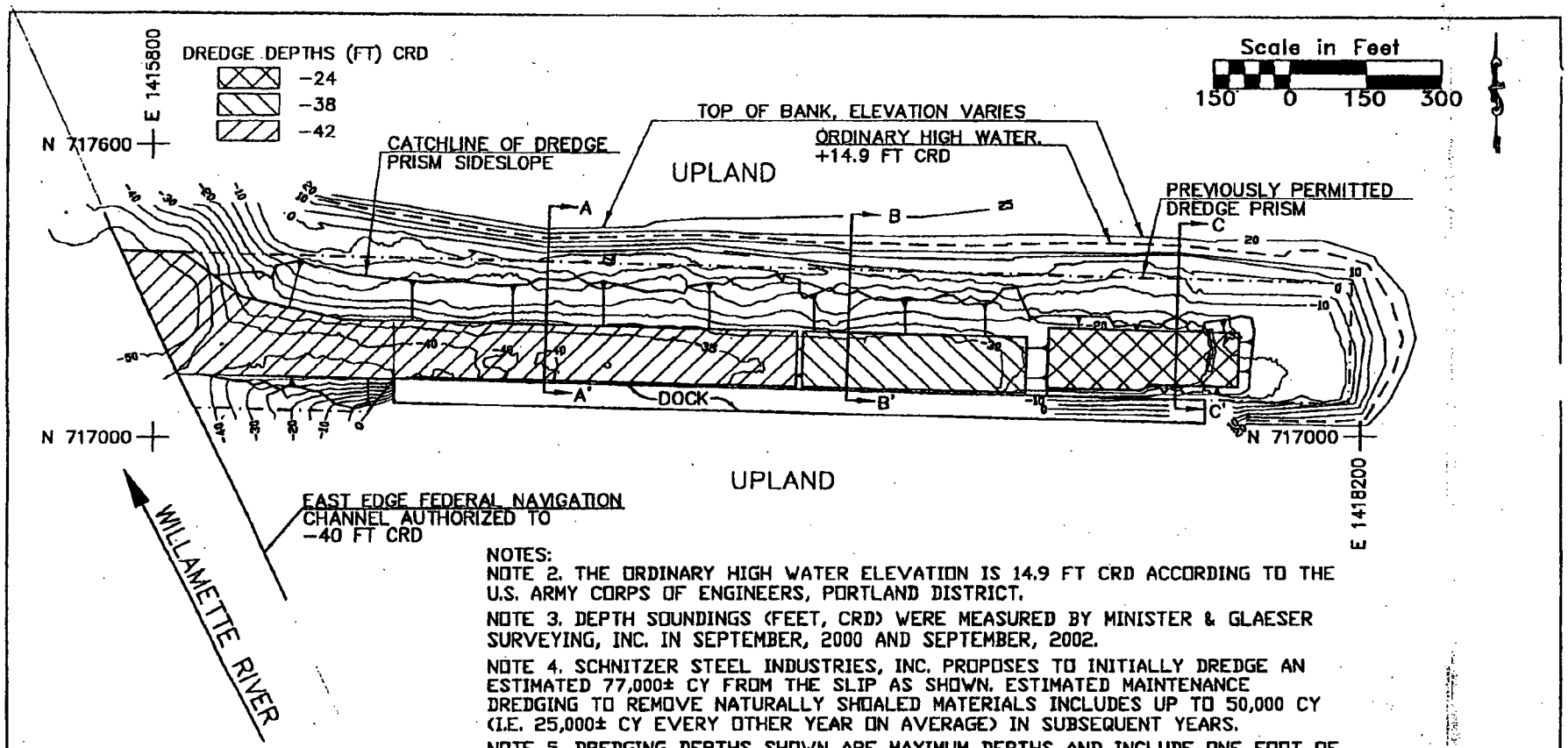
COE NO. 199100099

ENCLOSURE 1

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 3.6
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.
SHEET 1 OF 3 DATE: 5/29/03

SCHN00317378



NOTES:

NOTE 2. THE ORDINARY HIGH WATER ELEVATION IS 14.9 FT CRD ACCORDING TO THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT.

NOTE 3. DEPTH SOUNDINGS (FEET, CRD) WERE MEASURED BY MINISTER & GLAESER SURVEYING, INC. IN SEPTEMBER, 2000 AND SEPTEMBER, 2002.

NOTE 4. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO INITIALLY DREDGE AN ESTIMATED 77,000± CY FROM THE SLIP AS SHOWN. ESTIMATED MAINTENANCE DREDGING TO REMOVE NATURALLY SHOALED MATERIALS INCLUDES UP TO 50,000 CY (I.E. 25,000± CY EVERY OTHER YEAR ON AVERAGE) IN SUBSEQUENT YEARS.

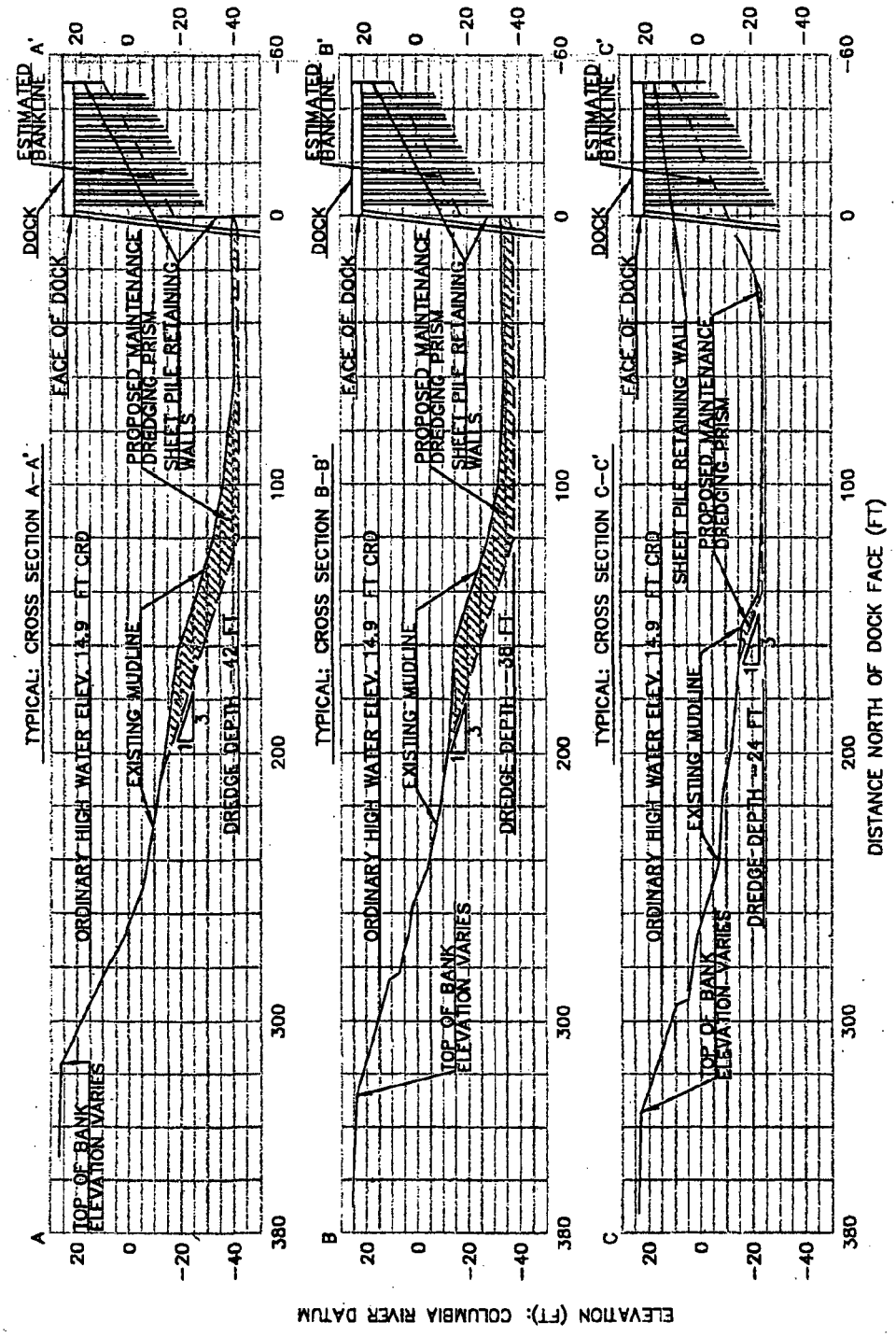
NOTE 5. DREDGING DEPTHS SHOWN ARE MAXIMUM DEPTHS AND INCLUDE ONE FOOT OF ADVANCED MAINTENANCE AND ONE FOOT OF ALLOWABLE OVERDEPTH DUE TO DREDGING INACCURACY.

NOTE 6. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO DREDGE THE MATERIAL USING A CLAMSHELL BUCKET OPERATED FROM A FLOATING CRANE. DREDGED MATERIAL WILL BE PLACED IN APPROVED UPLAND LOCATIONS.

COE NO. 199100099

	PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 41" N LONGITUDE: 122° 46' 42" W HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD-27), U.S. SURVEY FEET	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 3.6 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 2 OF 3 DATE: 5/29/03

SCHN0031379



PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.6 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 41" N LONGITUDE: 122° 46' 42" W SCALE: AS SHOWN COE NO. 199100099	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 3.6 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 3 OF 3 DATE: 5/29/03

SCHN00317380

Appendix

WQC Encl 2
TO FOLLOW
THIS IS THE
ASSOCIATED
APPENDIX TO THE
WQC.

ENCLOSURE 2

International Terminals Water Quality Monitoring Plan

Prepared for

SCHNITZER STEEL INDUSTRIES, INC

Prepared by

Floyd Snider McCarthy, Inc.
83 South King Street
Suite 614
Seattle, Washington 98104

October 17, 2003

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1.0 Introduction

This document presents the Water Quality Monitoring Plan (WQMP) for maintenance dredging of Berths 1 through 3[1], and Berths 4 and 5[2], of the International Terminals. The site is adjacent to Schnitzer Steel's facility, located in Portland, Oregon. This WQMP has been prepared to ensure compliance with Section 401 of the Clean Water Act and Oregon State Water Quality Standards (OAR 340-41).

Schnitzer Steel Industries, Inc. (Schnitzer) operates the International Terminals and associated berths. Berths within the project area currently support metal recycling operations and are also used to import bulk cargo such as manganese, pig iron, steel coils, and steel slabs.

[1] Corps Project Number 199100099.

[2] Corps Project Number 199200812.

2.0 Purpose

The WQMP was developed to evaluate water quality and ambient (background) conditions during maintenance dredging in order to ensure that turbidity will remain within acceptable limits outside of the project area and, if necessary, implement corrective actions to mitigate impacts to water quality. The project area includes multiple potential discharge points from the dredge and receiving barge (filtered return water).

This document defines the monitoring procedures that will be followed for water quality monitoring during maintenance dredging within the project area and provides a description of the Best Management Practices (BMPs) that will be implemented to ensure that potential water quality impacts will be minimized.

3.0 Best Management Practices

Maintenance dredging activities will be conducted during the Oregon Department of Fish and Wildlife's (ODFW) agreed upon in-water work windows as follows:

- July 1 through October 31 (any year with valid permits);
- January 1 through January 31, 2004; and
- During other times as needed. Activities will be coordinated with the ODFW and approved by the Oregon Division of State Lands.

In addition, the following BMPs will be used to minimize potential water quality impacts. Activities that occur during maintenance dredging with the potential to impact water quality include dredging, barge dewatering of sediments, and sediment offloading at a transload facility. BMPs that will be implemented during each of these activities to minimize potential water quality impacts are described below.

3.1 Dredging BMPs

Mechanical dredging of sediment has the potential to cause sediment resuspension, which can impact water quality and the aquatic environment. The following BMPs will be implemented to minimize potential impacts to the aquatic environment during dredging operations:

- The construction contractor will ensure that no fuel, garbage, or debris enters the waterway from the dredge, receiving barge, other vessels associated with the project.
- Dredging will be conducted using an environmental clamshell bucket that is closed, vented, and sealed in order to minimize the release and redistribution of dredged material to the water column during dredging. In the event that large woody debris or other obstructions must be removed from the dredge prism, the environmental bucket may be replaced by a bucket suitable for the removal.
- Dredging will be conducted using procedures that will minimize potential impacts to water and sediment quality to the extent practicable. These procedures include the following:
    - Slow dredge bucket deployment and retrieval will be required. The maximum rate of retrieval of the dredge bucket will be 2 feet per second for the first 20 feet off the bottom (where the highest potential for bottom sediment disturbance exists). For the remainder of the bucket ascent, the rate may increase up to a maximum of 4 feet per second.
    - The maximum rate of bucket descent will be 10 feet per second and the descent rate will decrease significantly until stopped at the designated depth of digging penetration.
    - "Sweeping" the post-dredge surface to smooth contours will not be allowed.

- Stockpiling of material on the bottom will not be allowed (i.e., each time the bucket is closed it will be brought to the surface).
- The bucket will be required to pause for several seconds at the water surface during retrieval to release excess water.

- Barges and other floating equipment shall be operated to avoid grounding on the riverbed or banks at any time.

3.2 Sediment Dewatering BMPs

Dredging efforts are required to be accomplished in a manner that minimizes the amount of water added to recovered sediment. In practice this is accomplished by taking full depth cuts whenever possible so that the dredge bucket is completely full of sediment and by pausing as the dredge bucket breaks the water surface during bucket retrieval to allow excess water to drain before sediment is discharged onto the receiving barge.

Dredged sediment placed onto the receiving barge will be allowed to passively dewater within the project area prior to being transferred upland. During barge dewatering activities, the following BMPs will be implemented to minimize potential water quality impacts:

- Return water draining from the receiving barge will be treated by filtering water through straw bales and/or geotextile fabric before returning to the waterway.
- Straw bales and geotextile fabric will be changed regularly to ensure efficient filtration of the return water.
- Barges will not be overfilled to the point where recovered material, including both sediment and water, overflows directly back to the waterway.
- During sediment dewatering, the receiving barge will remain within the project area.
- Return water from the barge will not be allowed to discharge to the waterway outside the project area (e.g., during transport to, or while stationed at the transload facility).

3.3 Dredged Material Offloading BMPs

The following BMPs will be implemented to prevent potential release of sediment at the transload facility and to prevent potential water quality impacts to the waterway:

- The clamshell bucket used during sediment offloading will not be allowed to swing directly over open water. A protective "capture barge", temporary structure, or spill apron will be placed along the swing pathway of the bucket to prevent material from entering the waterway.
- Railcars or containers used to transport dredged sediment will be lined with impermeable liners prior to being filled.
- The transload facility will be swept regularly to prevent potential spreading or release of sediment.

- Sediment will be removed from the outside of equipment and railcars by brushing or sweeping prior to leaving the transload facility.

4.0 Water Quality Monitoring Locations

Compliance water quality monitoring will be conducted at the compliance boundary located downstream of project area. Ambient water quality monitoring will also be conducted upstream from the project area to establish background conditions for the river.

Water quality compliance monitoring will be conducted at one location 150 feet directly downstream of the project area, as shown in Figure 4.1. The water quality monitoring station will be relocated, based on field conditions, in order to intercept any visible turbidity plumes originating from dredging operations. Monitoring stations will be located in the field using a Differential Global Positioning System (DGPS) on board the sampling vessel.

Ambient water quality monitoring will also be conducted at one station located within the waterway but at least 100 feet outside the influence of dredging operations (upstream from project area), as shown in Figure 4.1. Ambient monitoring stations will also be located in the field based on field conditions.

At each compliance or ambient monitoring location, turbidity will be measured and recorded at three depths:

- Shallow to within one meter of the water surface
- Mid depth
- Deep to within one meter of the mudline

Measurements from all three depths will be recorded separately, but will be averaged to determine the turbidity concentration.

Turbidity thresholds were developed in 2001 by Ellis Ecological Services, Inc. (EES) and adopted by the Port of Portland (2001) for maintenance dredging at Terminal 2 and Terminal 5 on the Willamette River. These threshold levels were approved by the Oregon Department of Environmental Quality (ODEQ), the Oregon Division of State Lands, and the U.S. Army Corps of Engineers and were incorporated as a condition of the Terminal 2 and Terminal 5 maintenance dredging permits. The following threshold levels, developed by EES, are proposed for maintenance dredging at the International Terminals (Berths 1-5).

Table 4.1
Turbidity Threshold Levels for Maintenance Dredging at the International Terminals during the Allowed In-Water Work Periods

Turbidity Level (NTU)	July 1 – October 31	January 1 – January 31
Action Level (48 – hour average)	35	44
Stop Work Level (8-hour average)	135	144

Compliance monitoring results will be compared to the turbidity thresholds presented in Table 4.1 to evaluate water quality compliance. In the event that natural background turbidity exceeds the action level or stop work level in Table 4.1, then these levels will be 10 percent above background turbidity in accordance with Oregon State water quality standard (OAR 340-041-0445) for turbidity for the Willamette Basin. An exceedance of the threshold occurs only if

the average turbidity exceeds the action level for a consecutive 48-hour period or the stop work level for a contiguous 8-hour period and the monitoring supervisor identifies the dredging operation as the cause of elevated turbidity.

5.0 Water Quality Monitoring Schedule

Turbidity will be monitored visually approximately every 4 hours during dredging operations. If visible turbidity observations indicate a potential problem then the *in situ* compliance-monitoring schedule will be adjusted to sample sooner than the next scheduled monitoring event.
In situ compliance monitoring for turbidity will be conducted twice daily for 3 days (intensive monitoring), at the water quality monitoring station located 150 feet downstream from the project area. Compliance monitoring results will be compared to turbidity thresholds (shown in Table 4.1) and ambient concentrations.
If exceedances are measured, another round of compliance monitoring and ambient monitoring will be initiated to verify the exceedance and ODEQ will be notified. If turbidity is consistently found to be acceptable during "intensive" monitoring, the frequency of monitoring will be reduced to a frequency of once daily. Any exceedance that is verified will trigger a return to intensive monitoring.

6.0 Water Quality Monitoring Equipment and Methodology

Turbidity measurements will be collected using a turbidity meter. Prior to each use, the turbidity meter will be calibrated according to the manufacturer's instructions. When the interface screen shows no significant change in the readings, the probe will be considered calibrated and ready for monitoring. Turbidity readings will be measured at each of the three depths specified in Section 4.0. All water quality monitoring field data, as described in Section 8.0, will be documented in the Water Quality Monitoring Report.

To satisfy QA/QC procedures, all field analyses will be conducted in duplicate at least 10 percent of the time. A significant difference (± 3 percent) in the replicate analyses will result in a recalibration of the field instrument. All field analyses will be recorded in logbooks and will be traceable to the specific person conducting the calibration.

7.0 Field Equipment Calibration and Preventative Maintenance

Field instruments will be properly operated, calibrated, and maintained by qualified personnel according to the manufacturer's guidelines and recommendations. Documentation of routine and special preventive maintenance and calibration information will be maintained in the appropriate field or laboratory logbook, and will be available upon request. Each maintenance and calibration logbook entry will include the date and initials of the individual performing the activity.

8.0 Documentation of Water Quality Monitoring Data

Field personnel will prepare daily field water quality monitoring reports detailing monitoring data collection activities and results. These field reports will include the following information:

- Depth of water at monitoring locations.
- Results of water quality monitoring instrumentation.
- Calibration sheets and notes for all daily instrument calibration.
- List of personnel on board vessel.
- Problems encountered that might affect data results.
- Weather at time of water quality monitoring.
- Date and time of exceedances, if any have occurred, and associated corrective actions.
- Station coordinates, including exact time and date of monitoring data documentation.

A Water Quality Monitoring Report will be prepared and submitted to ODEQ after maintenance dredging activities have been completed. This report will include:

- Depth of water at monitoring locations.
- Record of compliance and ambient monitoring results.
- Description of maintenance dredging activities occurring during water quality monitoring activities.
- Description of any monitoring results that exceeded compliance criteria including time and date of the exceedance.
- Description of corrective actions implemented to mitigate water quality impacts.
- Maps indicating water quality monitoring locations.
- Maps showing construction activity locations during water quality monitoring activities.

9.0 Corrective Action and Notification

If compliance monitoring data indicates a turbidity exceedance of the water quality criteria at the compliance boundary, ODEQ will be notified immediately after the exceedance is confirmed and corrective actions will be evaluated. Corrective actions will include confirming that environmental buckets are properly functioning, modifying dredge procedures (such as changing dredge buckets, slowing or otherwise revising dredge rates, etc.) and/or modifying barge-dewatering procedures (e.g., replacing filter materials or increasing settling time). ODEQ will be informed of potential corrective actions.

10.0 References

Oregon Department of Environmental Quality (ODEQ). Statewide Water Quality Management Plan. Beneficial Uses, Polices, Standards and Treatment Criteria for Oregon. OAR 340-041, Water Pollution.

Port of Portland. 2001. Water Quality Management Plan for Maintenance Dredging. August 31.

Ellis Ecological Services, Inc. 2001. Preliminary Assessment of Potential Effects on Salmonids Associated with Turbidity Caused by Dredging in the Columbia and Willamette Rivers. Memorandum prepared for the Port of Portland. August 30.

International Terminals
Water Quality Monitoring Plan

Figures

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
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TAKE PRIDE IN AMERICA

Reply To: 8330.06454 (03)
File Name: Schnitzer dredging informal s7.wpd
TS Number: 04-1070

Mr. Lawrence C. Evans
Chief, Regulatory Branch
Portland District, Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208-2946
Attn: Ms. Mary J. Headley

Re: Informal Consultation Request Regarding Maintenance Dredging at Berths 1, 2, 3, 4, and 5, Schnitzer Steel Industries, International Terminal Docks, Willamette River, Portland, Oregon (1-7-03-I-645, Corp Public Notices 1991-00099 and 1992-00812)

Dear Mr. Evans:

The Fish and Wildlife Service (Service) has reviewed the biological assessments (BAs) for the proposed maintenance dredging by Schnitzer Steel Industries (SSI) at its International Terminal docks in the Willamette River between River Miles 3.8 and 4.1, Multnomah County, Oregon. We received your letter on August 19, 2003. Of interest to the Service is your evaluation of impacts to bald eagles (*Haliaeetus leucocephalus*) and the plant, Howellia (*Howellia aquatilis*), both listed as threatened. A "no effect" determination has been made for Howellia; therefore, this species will not be considered further in this consultation. The BAs also address impacts to a number of fish species under the jurisdiction of NOAA Fisheries (formerly the National Marine Fisheries Service). The Federal nexus for the proposed project is the Army Corps of Engineers' (Corps) dredge and fill permits that would be issued under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Our review and comments are provided pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1536 *et seq.*) (Act). The BAs for maintenance dredging of Berths 1, 2, 3, 4 and 5 reached a determination of "may effect, but not likely to adversely affect" for bald eagles in the project area.

Consultation History

On September 22, 2003, the Service responded to your request for informal consultation with a letter stating that we did not concur with the above determination because of project contaminant concerns and possible exposure of bald eagles to contaminant levels that could adversely affect the species. We recommended that a close-lipped clamshell dredge be used to minimize the

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ENCLOSURE 3

exposure of eagles and aquatic organisms, particularly salmonids, to such contaminants during dredging. On October 7, 2003, Jerald Ramsden of Parsons, Brinckerhoff, Quade, and Douglas (Parsons Brinckerhoff), consultants for the project applicant, responded via email to the Service's letter stating that dredging would occur using a close-lipped clamshell dredge and that, based on recommendations made in our review of the public notices for these dredging projects, they would develop a turbidity management plan, keep dredging depths to a minimum, and conduct maintenance dredging during the preferred inwater work period as approved by the Oregon Division of State Lands (ODSL). On October 9, 2003, the Service responded to Mr. Ramsden via email that we believed that the latter conditions described for dredging would help to minimize impacts on fish and wildlife resources, including bald eagles, but that we still believed it necessary to monitor for contaminants levels during and after dredging as recommended in our review of public notices 1991-00099 and 1992-00812. The Service received another letter from Parsons Brinckerhoff via the Corps on December 11, 2003, in which Parsons Brinckerhoff questioned the need for post-dredge sampling in light of their decision to use a close-lipped clamshell dredge and their belief that sediment sampling and analysis showed only minor exceedances of Dredged Material Evaluation Framework (DMEF) screening levels. The question of and need for monitoring will be addressed later in this letter.

Project Description

The project involves maintenance dredging at the SSI International Terminal docks on the Willamette River, Berths 1, 2, 3, 4, and 5. Berths 1, 2, and 3 would be dredged to a maximum depth of -42 feet Columbia River Datum (CRD), -38 feet CRD, or -24 feet CRD depending on the location of the berths within the slip. The initial dredged volume would be 77,000 cubic yards (cy) with another 50,000 cy being dredged in years two through five (25,000 cy every other year on average over the life of the permit). The proposed dredge footprint would cover about 9.6 acres with a maximum length of 2,250 feet and a maximum width of 270 feet. SSI Berths 4 and 5 would be dredged to a maximum depth of -42 feet CRD at Berth 4 and to -36 feet CRD at Berth 5. The initial dredged volume would be 61,000 cy with another 40,000 cy being dredged in years two through five (20,000 cy every other year on average over the life of the permit). For Berths 4 and 5, the dredge footprint would cover about 6.6 acres with a maximum length of 1,600 feet and maximum width of 220 feet. All dredging would be accomplished using a close-lipped clamshell bucket (as recently agreed to by Parsons Brinckerhoff) with transport of the dredged material to approved upland facilities or locations by barge, truck, or rail.

Species Account

Bald eagles nest in the tops of large trees and are strongly associated with aquatic habitats, rarely nesting in Oregon further than one mile from water and their primary prey of fish (Fish and Wildlife Service 1995). Foraging bald eagles require perch trees with an unobstructed view that are adjacent to the water, a dependence that makes bald eagles specifically vulnerable to aquatic-associated disturbance (Fish and Wildlife Service 1995).

In Oregon, the bald eagle breeding season can start as early as January 1 and may extend until August 31 each year. Bald eagles are particularly sensitive to human disturbance during the breeding season, sometimes resulting in the abandonment of nests (Fish and Wildlife Service 1986). Incubation lasts approximately 35 days, and the young are ready to fledge at about 11 to 12 weeks of age (Fish and Wildlife Service 1999). Parental care, however, may continue 4 to 11 weeks after the young have fledged. Wintering bald eagles use the Columbia and Willamette Rivers from November 15 to March 15.

Both adult and juvenile bald eagles are known to use the lower Willamette River and the Willamette/Columbia Rivers confluence area throughout the year. However, since the closest bald eagle nest is over 3 miles from the project site, construction is not expected to directly disrupt nesting activities or the rearing of young. No communal night roosts or perch trees are near the proposed dredging site; therefore, wintering bald eagles would not be affected by dredging that may occur during the wintering season. Your analysis finds that bald eagle foraging activities may be disrupted due to noise levels from the operation of heavy equipment but such disruptions are expected to be temporary in nature. Further, the BAs state that contaminant issues are minimal, do not exceed DMEF screening levels, and would not have significant effects on bald eagles or salmonids. The BA concludes that the project may affect bald eagles, but it is unlikely to affect them adversely.

Based on information provided in the BAs and subsequent correspondence with the Corps and the consultants for the project applicant, the Service concurs with the "may affect, not likely to adversely affect" determination for bald eagles. Our concurrence with this determination was made for the following reasons:

- A close-lipped clamshell bucket will be used to dredge the project sites with all dredged material transported to approved upland facilities or locations by barge, truck, or rail. Any incidences when the close-lipped bucket is not used (breakdowns, etc.) will be provided in a post-dredging report to the Service describing when, where, and the length of time the close-lipped dredge was out of service.
- A turbidity management plan will be developed using guidelines established by the Oregon Department of Environmental Quality (ODEQ).
- Dredging depths, including overdrafts, will be kept to a minimum.
- All inwater work will occur only during the preferred inwater work periods specified by the Oregon Department of Fish and Wildlife (ODFW) or at other times, as needed and coordinated with ODFW and the ODSL.

The requirements established under section 7(a)(2) and 7(c) of the Act have been met, thereby concluding the consultation process. If, however, over the life of the project, information becomes available that reveals effects of project construction that may affect listed species or critical habitat in a manner or to an extent not originally considered in this consultation process, we request reinitiation of consultation.

Clean Water Act and Fish and Wildlife Coordination Act Issues

The Service still considers that there is a need to conduct monitoring of the dredging activities at the SSI International Terminal docks to evaluate 1) the movement of surrounding contaminants into the project site and downstream as a result of dredging; 2) the effectiveness of the close-lipped clamshell dredge in removing contaminated material and minimizing dispersal of contaminated suspended sediment; and 3) the stability of the side-slope materials at the site during the dredging activity. This information will provide a more accurate picture of the impacts of dredging activities in contaminated sites on fish and wildlife resources, including anadromous fish and other listed species. This monitoring effort will directly address the Service's remaining concerns at the site, which are described below:

Overview of concerns

The sediment in the area to be dredged contains contaminants elevated above guidance values derived to protect aquatic life, and the Service is concerned that dredging will result in a contaminated layer at the surface of the dredge cut area. Specifically, removing material from the slips could cause contaminated surface material immediately adjacent to the slip to fall into the hole created during dredging and increase the availability of contaminants to anadromous and resident fish and their prey. The degree of contamination resulting from this "sideslope adjustment" is dependent on the current contamination concentrations in the surface layer and the stability of the sideslopes. Even small concentrations of contaminants such as DDT and its metabolites and polychlorinated biphenyls (PCBs) can bioaccumulate into higher organisms and result in adverse effects. The sampling effort (Floyd Snider McCarthy 2003) conducted to characterize the sediments at the site did not sufficiently address these concerns.

Specific concerns related to the sediment characterization (Floyd Snider McCarthy 2003)

1) It is unclear from the sediment characterization report for the site (Floyd Snider McCarthy 2003) what specific depth the surface samples collected represent. The characterization report states that "The first core segment reached from the top of the sediment to a depth corresponding to an elevation of -38 feet CRD . . . ." Therefore, it is unknown if most of the contamination is within the biologically active zone (e.g., up to 10 to 30 cm) or within a couple of feet of the surface. Materials sliding into the hole after dredging could result in contaminated sediment being exposed at the surface of the dredge cut and more available to organisms than prior to the dredge event.

2) The quality control (QC) information for DDT and its metabolites and PCBs is not sufficient to conclude that these chemicals would not pose a hazard to fish and wildlife if present in surface sediments. This concern is based on the following: 1) reporting limits were elevated for DDT, DDE, DDD, and PCBs; 2) matrix spike recoveries were reported as a range and could be below 30 percent for DDT, DDE, and DDD; and 3) unresolved matrix effects were noted in many surface samples for DDT (samples SS01..07, SS02..13, SS04..08, SS05..12) and once for DDE (sample SS05..12). Based on review of the QC information presented in Floyd Snider McCarthy

(2003), it is likely that DDT and its metabolites are higher in the surface sediments than actually reported. Specific information on these QC problems follows below:

- **Reporting limits**: As stated in section 8.3 of Floyd Snider McCarthy (2003), "Reporting limits for DDT re-analysis ranged from 3.4 to 6.3 µg/kg versus 1.0 µg/kg." The 1.0 µg/kg reporting limit is specified in the sampling protocol. The guidance value for DDT and its metabolites is listed as 6.9 µg/kg in the DMEF. This value represents a *summation* of DDT plus metabolites DDD and DDE. For most sample results, the reporting limits were not sufficient to quantify all three compounds, so only two where summed and the other excluded. Therefore, it is likely that most surface samples actually exceeded DMEF guidelines for DDTs. This is contrary to what is indicated in Floyd Snider McCarthy (2003).

- **Matrix spike recoveries**: Section 8.7 of the report indicates that matrix spike and matrix spike duplicate recoveries were 16 to 175 percent for DDT, 30 to 170 percent for DDD, and 12 to197 percent for DDE. However, the recoveries specific to these analyses for each sample are not mentioned. Therefore, we can assume that DDT, DDD, and DDE may have had recoveries as low as 12 to 30 percent. This is unacceptable and indicates that these compounds could be much higher in the samples than reported.

- **Unresolved matrix effects**: Four surface sediment samples (noted above) had DDT or DDE results flagged with a "UM." This flag is defined in Table 3.1 of Floyd Snider McCarthy (2003) as "indicates an analyte was not detected, and where a matrix effect was present." The Service is concerned that the detection limit was already elevated for this compound, and a matrix effect can mask the actual presence of the expected compound. The presence and concentration of the contaminant cannot be resolved without further analysis, yet it is likely present at a much higher concentration than the 1.0 µg/kg required reporting limit which was not achieved in the results. In Floyd Snider McCarthy (2003), the DDT and DDE concentrations flagged with UM were not included in the summation value used to compare to the total DDT guidance value. Therefore, the results from the collected sediment likely under-represent contamination in surface sediments at the site.

3) The use of background values in the sediment characterization report (section 3.4.3 and Table 3.5 of Floyd Snider McCarthy 2003) was inappropriate. The ODEQ would not consider sediment results from a large Superfund site as background concentrations for site specific needs as was done in the above analysis. Included in the Superfund site results are highly contaminated sediment concentrations resulting from a specific hazardous waste source. It is not appropriate or meaningful to use these samples to represent "background" or "baseline" contamination. Any comparison samples, if collected, should be taken immediately adjacent to the area to be dredged.

4) The Service does not consider the bioaccumulation triggers listed in the DMEF as representative of sediments in the lower Columbia and Willamette Rivers, where

bioaccumulation of compounds such as DDT and PCBs has been associated with reproductive problems for some species. The Service does not use the DMEF triggers as guidance values. Bioaccumulation of contaminants such as DDT and PCBs is a result of numerous factors, and any concentration of these contaminants has the potential to bioaccumulate. In addition, the bioaccumulation triggers listed in the DMEF (as well as all DMEF guidance) are currently under review and will likely be revised. The Service uses site specific information when making an assessment of bioaccumulation.

5) A letter dated December 4, 2003, from Parsons Brinckerhoff engineers to Mr. Lawrence Evans of the Corps makes comparisons to the Port of Portland turbidity monitoring efforts during a similar dredge event by the Port of Portland. The Service cooperated with the Port of Portland during the dredge events at Terminals 2 and 4. The Port conducted both turbidity measurements as NTUs and as total suspended solids as part of their monitoring plan. In addition, the Port of Portland conducted follow-up sampling to evaluate contaminants at the surface of the dredgecut after dredging at Terminal 4. The Service wishes to maintain consistency at all sites dredged within the Portland Harbor Superfund area when it is possible that surface contaminants could recontaminate a dredgecut, or when the dredgecut surface lies near a contaminated layer.

Recommendations

To rectify these unresolved issues, the Service recommends the collection of surface samples from the exposed surface of the dredgecut immediately after dredging, using the sampling protocols and tiered approach as described by the DMEF. If grain size indicates very little fines present and is representative of the native materials expected at that depth, then no further chemical testing would be necessary (as per Tier IIa of the DMEF). If fines are present, the Service recommends following the Tier IIb approach of the DMEF to determine contaminant concentrations, including meeting the specified minimum reporting limit for each analyte. For the compounds DDT, DDE, and DDD, minimum reporting limits should be 1.0 µg/kg for each compound. Follow-up analysis is necessary if unresolved matrix effects are noted in QC information.

If you have any questions or need more information, please contact Kathi Larson or Jeremy Buck at (503) 231-6179.

Sincerely,

for Kemper M. McMaster
State Supervisor

cc:
EPA
NOAA Fisheries
ODFW
ODEQ
ODSL

LITERATURE CITED

Fish and Wildlife Service. 1986. Recovery Plan for the Pacific Bald Eagle. Fish and Wildlife Service, Portland, Oregon 160 pp.

Fish and Wildlife Service. 1995. Final rule to reclassify the bald eagle from endangered to threatened in all of the lower 48 states. Federal Register 60 (133):36000-36010.

Fish and Wildlife Service. 1999. Proposed rule to remove the bald eagle in the Lower 48 States from the list of endangered and threatened wildlife. Federal Register 64 (128):36454-36464.

Floyd Snyder McCarthy. 2003. International Terminal Sediment Data Report. Final report prepared for Schnitzer Steel Industries, Inc., June 26. Floyd Snyder McCarthy, Inc., Seattle, Washington.

Programmatic Biological Opinion (Opinion) issued by the National Marine Fisheries Service (NOAA Fisheries) on July 8, 2003, for Standard Local Operating Procedures for Endangered Species (SLOPES) for Certain Activities Requiring Department of the Army Permits in Oregon and the North Shore of the Columbia River.

To be exempt from the prohibitions of section 9 of the Endangered Species Act (ESA), the permittee must comply with the following terms and conditions, which implement the reasonable and prudent measures. These terms and conditions are non-discretionary, and in relevant part apply equally to proposed actions in all categories of activity.

2. **To implement reasonable and prudent measure #2** (general conditions for surveying, exploration, construction, operation and maintenance), the Corps shall ensure that:

a. Exclusions. The following types of exploration and construction actions are not authorized, unless otherwise approved in writing by NOAA Fisheries.

i. Exploration and construction actions, including release of construction discharge water, within 300 feet upstream of active spawning areas or areas with native submerged aquatic vegetation as determined by a preconstruction survey.

ii. Exploration actions in estuaries that cannot be conducted from an existing bridge, dock, or wharf.

b. Hydraulic surveys. Hydraulic measurements that require access to the wetted channel will be done outside of the spawning season, or will have a fisheries biologist verify that there are no redds present at the site. If dye must be used, only non-toxic vegetable dyes is authorized; use of short pieces of plastic ribbon to determine flow patterns is not authorized.

c. Minimum area. Confine construction impacts to the minimum area necessary to complete the project.

d. Timing of in-water work. Work below the bankfull elevation[1] will be completed using the most recent ODFW or the Corps Seattle District preferred in-water work period, as appropriate for the project area, unless otherwise approved in writing by NOAA Fisheries.

[1] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits.

ENCLOSURE 4
(4a)

Cessation of work. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

f. Fish screens. Have a fish screen installed, operated and maintained according to NOAA Fisheries' fish screen criteria[2] on each water intake used for project construction, including pumps used to isolate an in-water work area. Screens for water diversions or intakes that will be used for irrigation, municipal or industrial purposes, or any use besides project construction are not authorized.

g. Fish passage. Provide passage for any adult or juvenile salmonid species present in the project area during construction, unless otherwise approved in writing by NOAA Fisheries, and after construction for the life of the project. Upstream passage is not required during construction if it did not previously exist.

h. Pollution and Erosion Control Plan. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by surveying or construction operations. The plan must be available for inspection on request by Corps or NOAA Fisheries.

i. Plan Contents. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) The name and address of the party(s) responsible for accomplishment of the pollution and erosion control plan.

(2) Practices to prevent erosion and sedimentation associated with access roads, stream crossings, drilling sites, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.

(3) Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

(4) A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

(5) A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response

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[2] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(6) Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

ii. Inspection of erosion controls. During construction, monitor instream turbidity and inspect all erosion controls daily during the rainy season and weekly during the dry season, or more often as necessary, to ensure the erosion controls are working adequately.[3]

(1) If monitoring or inspection shows that the erosion controls are ineffective, mobilize work crews immediately to make repairs, install replacements, or install additional controls as necessary.

(2) Remove sediment from erosion controls once it has reached 1/3 of the exposed height of the control.

i. Construction discharge water. Treat all discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows.

i. Water quality. Design, build and maintain facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions. Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. Discharge velocity. If construction discharge water is released using an outfall or diffuser port, velocities may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

iii. Pollutants. Do not allow pollutants including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours to contact any wetland or the 2-year floodplain.

iv. Drilling discharge. All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, will be completely isolated to prevent drilling fluids or other wastes from entering the stream.

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[3] 'Working adequately' means that project activities do not increase ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity causing activity.

(1) All drilling fluids and waste will be completely recovered then recycled or disposed to prevent entry into flowing water.

(2) Drilling fluids will be recycled using a tank instead of drill recovery/recycling pits, whenever feasible.

(3) When drilling is completed, attempts will be made to remove the remaining drilling fluid from the sleeve (e.g., by pumping) to reduce turbidity when the sleeve is removed.

j. Piling installation. Install temporary and permanent pilings as follows.

i. Minimize the number and diameter of pilings, as appropriate, without reducing structural integrity.

ii. Repairs, upgrades, and replacement of existing pilings consistent with these terms and conditions are allowed.

iii. In addition to repairs, upgrades, and replacements of existing pilings, up to five single pilings or one dolphin consisting of three to five pilings may be added to an existing facility per in-water construction period.

iv. Drive each piling as follows to minimize the use of force and resulting sound pressure.

(1) Hollow steel pilings greater than 24 inches in diameter, and Hpiles larger than designation HP24, are not authorized under this Opinion.

(2) When impact drivers will be used to install a pile, use the smallest driver and the minimum force necessary to complete the job. Use a drop hammer or a hydraulic impact hammer, whenever feasible and set the drop height to the minimum necessary to drive the piling.

(3) When using an impact hammer to drive or proof steel piles, one of the following sound attenuation devices will be used to reduce sound pressure levels by 20 decibels.

(a) Place a block of wood or other sound dampening material between the hammer and the piling being driven.

(b) If currents are 1.7 miles per hour or less, surround the piling being driven by an unconfined bubble curtain that will distribute

small air bubbles around 100% of the piling perimeter for the full depth of the water column.[4]

(c) If currents greater than 1.7 miles per hour, surround the piling being driven by a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or metal sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.

(d) Other sound attenuation devices as approved in writing by NOAA Fisheries.

k. Piling removal. If a temporary or permanent piling will be removed, the following conditions apply.

i. Dislodge the piling with a vibratory hammer.

ii. Once loose, place the piling onto the construction barge or other appropriate dry storage site.

iii. If a treated wood piling breaks during removal, either remove the stump by breaking or cutting 3 feet below the sediment surface or push the stump in to that depth, then cover it with a cap of clean substrate appropriate for the site.

iv. Fill the holes left by each piling with clean, native sediments, whenever feasible.

l. Treated wood.

i. Projects using treated wood[5] that may contact flowing water or that will be placed over water where it will be exposed to mechanical abrasion or where leachate may enter flowing water are not authorized, except for pilings installed following NOAA Fisheries' guidelines.[6] Treated wood pilings must incorporate

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[4] For guidance on how to deploy an effective, economical bubble curtain, see, Longmuir, C. and T. Lively, *Bubble Curtain Systems for Use During Marine Pile Driving*, Fraser River Pile and Dredge LTD, 1830 River Drive, New Westminster, British Columbia, V3M 2A8, Canada. Recommended components include a high volume air compressor that can supply more than 100 pounds per square inch at 150 cubic feet per minute to a distribution manifold with 1/16 inch diameter air release holes spaced every 3/4 inch along its length. An additional distribution manifold is needed for each 35 feet of water depth.

[5] 'Treated wood' means lumber, pilings, and other wood products preserved with alkaline copper quaternary (ACQ), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), copper naphthenate, chromated copper arsenate (CCA), pentachlorophenol, or creosote.

[6] Letter from Steve Morris, National Marine Fisheries Service, to W.B. Paynter, Portlamd District, U.S. Army Corps of Engineers (December 9, 1998) (transmitting a document titled *Position Document for the Use of*

design features to minimize abrasion of the treated wood from vessels, floats or other objects that may cause abrasion of the piling.

ii. Visually inspect treated wood before final placement to detect and replace wood with surface residues and/or bleeding of preservative.

iii. Projects that require removal of treated wood will use the following precautions.

(1) Treated wood debris. Take care to ensure that no treated wood debris falls into the water. If treated wood debris does fall into the water, remove it immediately.

(2) Disposal of treated wood debris. Dispose of all treated wood debris removed during a project, including treated wood pilings, at an upland facility approved for hazardous materials of this classification. Do not leave a treated wood piling in the water or stacked on the stream bank.

m. Preconstruction activity. Complete the following actions before significant[7] alteration of the project area.

i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[8]).

(2) An oil-absorbing, floating boom whenever surface water is present.

iii. Temporary erosion controls. All temporary erosion controls will be inplace and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

Treated Wood in Areas within Oregon Occupied by Endangered Species Act Proposed and Listed Anadromous Fish Species, National Marine Fisheries Service, December 1998).

[7] 'Significant' means an effect can be meaningfully measured, detected, or evaluated.

[8] When available, certified weed-free straw or hay bales will be used to prevent introduction of noxious weeds.

n. Temporary access roads and drilling pads. All temporary access roads and drilling pads will be constructed as follows.

i. Existing ways. Use existing roadways, travel paths, and drilling pads whenever possible, unless construction of a new way or drilling pad would result in less habitat take. When feasible, eliminate the need for an access road by walking a tracked drill or spider hoe to a survey site, or lower drilling equipment to a survey site using a crane.

ii. Steep slopes. Temporary roads or drilling pads built mid-slope or on slopes steeper than 30% are not authorized.

iii. Minimizing soil disturbance and compaction. Minimize soil disturbance and compaction whenever a new temporary road or drill pad is necessary within 150 feet[9] of a stream, water body or wetland by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NOAA Fisheries.

iv. Temporary stream crossings.

(1) Minimize the number of temporary stream crossings.

(2) Design temporary road crossings as follows.

(a) Survey and map any potential spawning habitat within 300 feet downstream of a proposed crossing.

(b) Do not place a stream crossing at known or suspected spawning areas, or within 300 feet upstream of such areas if spawning areas may be affected.

(c) Design the crossing to provide for foreseeable risks (*e.g.*, flooding and associated bedload and debris, to prevent the diversion of streamflow out of the channel and down the road if the crossing fails).

(d) Vehicles and machinery will cross riparian areas and streams at right angles to the main channel wherever possible.

v. Obliteration. When the project is complete, obliterate all temporary access roads that will not be in footprint of a new bridge or other permanent structure, stabilize the soil, and revegetate the site. Abandon and restore temporary roads in wet or flooded areas by the end of the inwater work period.

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[9] Distances from a stream or water body are measured horizontally from, and perpendicular to, the bankfull elevation, the edge of the channel migration zone, or the edge of any associated wetland, whichever is greater. 'Channel migration zone' means the area defined by the lateral extent of likely movement along a stream reach as shown by evidence of active stream channel movement over the past 100 years (e.g., alluvial fans or floodplains formed where the channel gradient decreases, the valley abruptly widens, or at the confluence of larger streams).

o. Heavy Equipment. Restrict use of heavy equipment as follows:

i. Choice of equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (*e.g.*, minimally sized, low ground pressure equipment).

ii. Vehicle and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows.

(1) To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on-site.

(2) Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage in a vehicle staging area placed 150 feet or more from any stream, water body or wetland, unless otherwise approved in writing by NOAA Fisheries.

(3) Inspect all vehicles operated within 150 feet of any stream, water body or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by Corps or NOAA Fisheries.

(4) Before operations begin and as often as necessary during operation, steam clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.

(5) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within 150 feet of any stream, waterbody or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

p. Site preparation. Conserve native materials for site restoration.

i. If possible, leave native materials where they are found.
ii. If materials are moved, damaged or destroyed, replace them with a functional equivalent during site restoration.

iii. Stockpile any large wood[10], native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site restoration.

[10] For purposes of this Opinion only, 'large wood' means a tree, log, or rootwad big enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull channel width of the stream in which the

q. Isolation of in-water work area. If adult or juvenile fish are reasonably certain to be present, or if the work area is 300 feet upstream of spawning habitats, completely isolate the work area from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials, unless otherwise approved in writing by NOAA Fisheries.

r. Capture and release. Before and intermittently during pumping to isolate an inwater work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

i. The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.

ii. Do not use electrofishing if water temperatures exceed 18°C.

iii. If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines.[11]

iv. Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

v. Transport fish in aerated buckets or tanks.
vi. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

vii. Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

viii. Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.

ix. Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

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wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

[11] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

s. Earthwork. Complete earthwork (including drilling, excavation, dredging, filling and compacting) as quickly as possible.

i. Drilling and sampling. If drilling, boring or jacking is used, the following conditions apply.

(1) Isolate drilling operations in wetted stream channels using a steel pile, sleeve or other appropriate isolation method to prevent drilling fluids from contacting water.

(2) If it is necessary to drill through a bridge deck, use containment measures to prevent drilling debris from entering the channel.

(3) If directional drilling is used, the drill, bore or jack hole will span the channel migration zone and any associated wetland.

(4) Sampling and directional drill recovery/recycling pits, and any associated waste or spoils will be completely isolated from surface waters, off-channel habitats and wetlands. All waste or spoils must be covered if precipitation is falling or imminent. All drilling fluids and waste will be recovered and recycled or disposed to prevent entry into flowing water.

(5) If a drill boring conductor breaks and drilling fluid or waste is visible in water or a wetland, all drilling activity will cease pending written approval from NOAA Fisheries to resume drilling.

ii. Site stabilization. Stabilize all disturbed areas, including obliteration of temporary roads, following any break in work unless construction will resume within four days.

iii. Source of materials. Obtain boulders, rock, woody materials and other natural construction materials used for the project outside the riparian area.

t. Stormwater management. Prepare and carry out a stormwater management plan for any project that will produce a new impervious surface or a land cover conversion that slows the entry of water into the soil. The plan must be available for inspection on request by Corps or NOAA Fisheries.

i. Plan contents. The goal is to avoid and minimize adverse effects due to the quantity and quality of stormwater runoff for the life of the project by maintaining or restoring natural runoff conditions. The plan will meet the following criteria and contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) A system of management practices and, if necessary, structural facilities, designed to complete the following functions:

(a) Minimize, disperse and infiltrate stormwater runoff onsite using sheet flow across permeable vegetated areas to the maximum extent possible without causing flooding, erosion impacts, or long-term adverse effects to groundwater.

(b) Pretreat stormwater from pollution generating surfaces, including bridge decks, before infiltration or discharge into a freshwater system, as necessary to minimize any nonpoint source pollutant (*e.g.*, debris, sediment, nutrients, petroleum hydrocarbons, metals) likely to be present in the

volume of runoff predicted from a 6-month, 24-hour storm.[12]

(c) Ensure that the duration of post project discharge matches the pre-developed discharge rates from 50% of the 2-year peak flow up to the 50-year peak flow.

(2) For projects that require engineered facilities to meet stormwater requirements, use a continuous rainfall/runoff model, if available for the project area, to calculate stormwater facility water quality and flow control rates.

(3) Use permeable pavements for load-bearing surfaces, including multiple-use trails, to the maximum extent feasible based on soil, slope, and traffic conditions.

(4) Install structural facilities outside wetlands or the riparian buffer area[13] whenever feasible, otherwise, provide compensatory mitigation to offset any long-term adverse effects.

(5) Document completion of the following activities according to a regular schedule for the operation, inspection and maintenance of all structural

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[12] A 6-month, 24-hour storm may be assumed to be 72% of the 2-year, 24-hour amount. See, Washington State Department of Ecology (2001), Appendix I-B-1.

[13] For purposes of this Opinion only, 'riparian buffer area' means land: (1) Within 150 feet of any natural water occupied by listed salmonids during any part of the year or designated as critical habitat; (2) within 100 feet of any natural water within 1/4 mile upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system such that water, sediment, or woody material delivered to such waters will eventually be delivered to water occupied by listed salmon or designated as critical habitat; and (3) within 50 feet of any natural water upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system such that water, sediment, or woody material delivered to such waters will eventually be delivered to water occupied by listed salmon or designated as critical habitat. 'Natural water' means all perennial or seasonal waters except water conveyance systems that are artificially constructed and actively maintained for irrigation.

facilities and conveyance systems, in a log available for inspection on request by the Corps and NOAA Fisheries.

(a) Inspect and clean each facility as necessary to ensure that the design capacity is not exceeded, heavy sediment discharges are prevented, and whether improvements in operation and maintenance are needed.

(b) Promptly repair any deterioration threatening the effectiveness of any facility.

(c) Post and maintain a warning sign on or next to any storm drain inlet that says, as appropriate for the receiving water, 'Dump No Waste - Drains to Ground Water, Streams, or Lakes.'

(d) Only dispose of sediment and liquid from any catch basin in an approved facility.

ii. Runoffs/discharge into a freshwater system. When stormwater runoff will be discharged directly into fresh surface water or a wetland, or indirectly through a conveyance system, the following requirements apply.

(1) Maintain natural drainage patterns and, whenever possible, ensure that discharges from the project site occur at the natural location.

(2) Use a conveyance system comprised entirely of manufactured elements (*e.g.*, pipes, ditches, outfall protection) that extends to the ordinary high water line of the receiving water.

(3) Stabilize any erodible elements of this system as necessary to prevent erosion.

(4) Do not divert surface water from, or increase discharge to, an existing wetland if that will cause a significant adverse effect to wetland hydrology, soils or vegetation.

(5) The velocity of discharge water released from an outfall or diffuser port may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

u. Site restoration. Prepare and carry out a site restoration plan as necessary to ensure that all streambanks, soils and vegetation disturbed by the project are cleaned up and restored as follows. Make the written plan available for inspection on request by the Corps or NOAA Fisheries.

i. General considerations.

(1) Restoration goal. The goal of site restoration is renewal of habitat access, water quality, production of habitat elements (*e.g.*, large woody debris), channel conditions, flows, watershed conditions and other ecosystem processes that form and maintain productive fish habitats.

(2) Streambank shaping. Restore damaged streambanks to a natural slope, pattern and profile suitable for establishment of permanent woody vegetation, unless precluded by pre-project conditions (*e.g.*, a natural rock wall).

(3) Revegetation. Replant each area requiring revegetation before the first April 15 following construction. Use a diverse assemblage of species native to the project area or region, including grasses, forbs, shrubs and trees. Noxious or invasive species may not be used.

(4) Pesticides. Take of ESA-listed species caused by any aspect of pesticide use is not included in the exemption to the ESA take prohibitions provided by this incidental take statement. Pesticide use must be evaluated in an individual consultation, although mechanical or other methods may be used to control weeds and unwanted vegetation.

(5) Fertilizer. Do not apply surface fertilizer within 50 feet of any stream channel.

(6) Fencing. Install fencing as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

ii. Plan contents. Include each of the following elements.

(1) Responsible party. The name and address of the party(s) responsible for meeting each component of the site restoration requirements, including providing and managing any financial assurances and monitoring necessary to ensure restoration success.

(2) Baseline information. This information may be obtained from existing sources (*e.g.*, land use plans, watershed analyses, subbasin plans), where available.

(a) A functional assessment of adverse effects, *i.e.*, the location, extent and function of the riparian and aquatic resources that will be adversely affected by construction and operation of the project.

(b) The location and extent of resources surrounding the restoration site, including historic and existing conditions.

(3) Goals and objectives. Restoration goals and objectives that describe the extent of site restoration necessary to offset adverse effects of the project, by aquatic resource type.

(4) Performance standards. Use these standards to help design the plan and to assess whether the restoration goal is met. While no single criterion is sufficient to measure success, the intent is that these features should be present within reasonable limits of natural and management variation.

(a) Bare soil spaces are small and well dispersed.
(b) Soil movement, such as active rills or gullies and soil deposition around plants or in small basins, is absent or slight and local.
(c) If areas with past erosion are present, they are completely stabilized and healed.
(d) Plant litter is well distributed and effective in protecting the soil with few or no litter dams present.
(e) Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site.
(f) Vegetation structure is resulting in rooting throughout the available soil profile.
(g) Plants have normal, vigorous growth form, and a high probability of remaining vigorous, healthy and dominant over undesired competing vegetation.
(h) High impact conditions confined to small areas necessary access or other special management situations.
(i) Streambanks have less than 5% exposed soils with margins anchored by deeply rooted vegetation or coarse-grained alluvial debris.

(j) Few upland plants are in valley bottom locations, and a continuous corridor of shrubs and trees provide shade for the entire streambank.

(5) Work plan. Develop a work plan with sufficient detail to include a description of the following elements, as applicable.

(a) Boundaries for the restoration area.
(b) Restoration methods, timing, and sequence.
(c) Water supply source, if necessary.
(d) Woody native vegetation appropriate to the restoration site[14]. This must be a diverse assemblage of species that are native to the

[14] Use references sites to select vegetation for the mitigation site whenever feasible. Historic reconstruction, vegetation models, or other ecologically-based methods may also be used as appropriate.

project area or region, including grasses, forbs, shrubs and trees. This may include allowances for natural regeneration from an existing seed bank or planting.
(e) A plan to control exotic invasive vegetation.
(f) Elevation(s) and slope(s) of the restoration area to ensure they conform with required elevation and hydrologic requirements of target plant species.
(g) Geomorphology and habitat features of stream or other open water.
(h) Site management and maintenance requirements.

(6) Five-year monitoring and maintenance plan.

(a) A schedule to visit the restoration site annually for 5 years or longer as necessary to confirm that the performance standards are achieved. Despite the initial 5-year planning period, site visits and monitoring will continue from year-to- year until the Corps certifies that site restoration performance standards have been met.

(b) During each visit, inspect for and correct any factors that may prevent attainment of performance standards (*e.g.*, low plant survival, invasive species, wildlife damage, drought).

(c) Keep a written record to document the date of each visit, site conditions and any corrective actions taken.

v. Long-term adverse effects. Prepare and carry out a compensatory mitigation plan as necessary to ensure the proposed action meets the goal of 'no net loss' aquatic functions by offsetting unavoidable long-term adverse effects to streams and other aquatic habitats. Make the plan available for inspection on request by Corps or NOAA Fisheries.

i. Actions of concern. The following actions require a Compensatory Mitigation Plan to offset long-term adverse effects.

(1) Riparian and aquatic habitats displaced by construction of structural stormwater facilities, new boat ramp, or scour protection

(*e.g.*, a footing facing, head wall, or other protection necessary to prevent scouring or downcutting of a culvert, water intake, utility line, or bridge support).
(2) Maintenance dredging in water closer than 50 feet from shore, or in waters less than 20 feet deep.[15]

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[15] Depth in tidal waters is measured from mean lower low water (MLLW).

(3) Other activities that prevent development of properly functioning condition of natural habitat processes.

ii. General considerations.

(1) Make mitigation plans compatible with adjacent land uses or, if necessary, use an upland buffer to separate mitigation areas from developed areas or agricultural lands.

(2) Base the level of required mitigation on a functional assessment of adverse effects of the proposed project, and functional replacement (*i.e.*, 'no net loss of function'), whenever feasible, or a minimum one-to-one linear foot or acreage replacement.

(3) Acceptable mitigation includes reestablishment or rehabilitation of natural or historic habitat functions when self-sustaining, natural processes are used to provide the functions. Actions that require construction of permanent structures, active maintenance, creation of habitat functions where they did not historically exist, or that simply preserve existing functions are not authorized, unless otherwise approved in writing by NOAA Fisheries.

(4) Whenever feasible, complete mitigation before, or concurrent with, project construction to reduce temporal loss of aquatic functions and simplify compliance.

(5) When project construction is authorized before mitigation is completed, the applicant will show that a mitigation project site has been secured and appropriate financial assurances in place.

(a) Complete all work necessary to carry out the mitigation plan no later than the first full growing season following the start of project construction, whenever feasible.

(b) If beginning the initial mitigation actions within that time is infeasible, then include other measures that mitigate for the consequences of temporal losses in the mitigation plan.

(6) Actions to complete a mitigation plan that require a Corps permit will also meet all applicable terms and conditions for this Opinion, or complete a separate consultation.

iii. Plan contents. Include all pertinent elements of a site restoration plan, outlined above, and the following elements.

(1) Consideration of the following factors during mitigation site selection and plan development.

(a) Watershed considerations related to specific aquatic resource needs of the affected area.

(b) Existing technology and logistical concerns.

(2) A description of the legal means for protecting mitigation areas, and a copy of any legal instrument relied on to secure that protection.

11. **To implement reasonable and prudent measure #11** (maintenance dredging), the Corps shall ensure that:

a. Exclusions.

i. The economic loading method[1] of placing dredged material on a barge as part of a dredging operation is not allowed.

ii. Dredging in the following places is not allowed.

(1) Salmonid spawning habitat in tributaries or upstream of those habitats.

(2) Any channel for a water intake that does not have a fish screen that is installed, operated and maintained according to NOAA Fisheries' fish screen criteria.[2]

(3) The Columbia River, above Bonneville Dam, in backwater sloughs, silted-in lateral channels, alcoves, side channels, or other shallow-water areas less than 20 feet deep, measured from mean lower low water in the Columbia River in areas downstream of Jim
Crow Sands (river mile 27) and in estuarine areas with mean annual salinity greater than 0.5 parts per thousand and measured from ordinary high water in all other areas.

b. Dredge Material Evaluation Framework. Evaluate sediment quality before dredging begins using the most recent version of NOAA Fisheries' approved criteria for evaluation of contaminated sediments.[3] Only sediments approved for in-water disposal using those criteria are authorized for maintenance dredging.

c. Dredge operation. Operate dredges as follows:

i. Keep hydraulic dredge intakes at or just below the surface of the material being removed, although the intake may be raised for brief periods of purging or flushing.

ii. Use clamshell dredges with a finishing type bucket with flaps, whenever feasible.

d. Spoil disposal. Place dredge spoil in an approved upland area where it cannot reenter the water body and that is large enough to allow settling, or an in-water disposal area approved by the Corps.

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[1] 'Economic loading' means pumping dredged material with a high water content into the containment area of a hopper dredge or barge, and allowing highly turbid water to overflow over the holding area so that more consolidated material may be collected in the dredge containment area. This process results in a large turbidity plume from the dredge and is often preferred by the contractor performing the dredging because it saves time and money by increasing loads.

[2] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

[3] See, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Oregon Department of Environmental Quality, Washington Department of Ecology, and Washington Department of Natural Resources, *Dredged Material Evaluation Framework: Lower Columbia River Management Area* (DMEF) (November 1998) (procedures to determine sediment quality for dredging activity) (http://www.nwp.usace.army.mil/ec/h/hr/Final/).

(4b)

12. To implement reasonable and prudent measure #12 (return water from upland disposal sites), the Corps shall ensure that:

a. This only applies to dredging actions permitted under this Opinion.

b. Return flows do not exceed 4 feet per second at either the outfall or diffuser port, the maximum size of any aperture does not exceed one inch, and stream flows are not otherwise altered in a way that significantly impairs spawning, rearing, migration, feeding or other essential behaviors.

c. Return flows will not increases ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the discharge.

13. **To implement reasonable and prudent measure #13** (monitoring), the Corps shall:

a. Regulatory program implementation monitoring. Ensure that each applicant submits a monitoring report to the Corps within 120 days of project completion describing the applicant's success meeting his or her permit conditions. Each project level monitoring report will include the following information.

i. Project identification

(1) Applicant name, permit number, and project name.
(2) Type of activity.
(3) Project location, including any compensatory mitigation site(s), by
5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
(4) Corps contact person.
(5) Starting and ending dates for work completed.

ii. Photo documentation. Photos of habitat conditions at the project and any compensation site(s), before, during, and after project completion.[1]

(1) Include general views and close-ups showing details of the project and project area, including pre and post construction.
(2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

iii. Other data. Additional project-specific data, as appropriate for individual projects.

(1) Work cessation. Dates work ceased due to high flows, if any.

(2) Fish screen. Evidence of compliance with NOAA Fisheries' fish screen criteria.

(3) Pollution control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.

(4) Drilling. A description of the drilling technology used, required access roads, and methods used to isolate all drilling operations and fluids from flowing water.

[1] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

4c

~~(5) Pilings.~~

(a) Number and type of pilings removed, including the number of pilings (if any) that broke during removal.

(b) Number, type, and diameter of any pilings installed (*e.g.*, untreated wood, treated wood, hollow steel).

(c) Description of how pilings were installed and any sound attenuation measures used..

(6) Site preparation.

(a) Total cleared area – riparian and upland.
(b) Total new impervious area.

(7) Isolation of in-water work area, capture and release.

(a) Supervisory fish biologist – name and address.
(b) Methods of work area isolation and take minimization.
(c) Stream conditions before, during and within one week after completion of work area isolation.
(d) Means of fish capture.
(e) Number of fish captured by species.
(f) Location and condition of all fish released.
(g) Any incidence of observed injury or mortality of listed species.

(8) Streambank protection.

(a) Type and amount of materials used.
(b) Project size – one bank or two, width and linear feet.

(9) Road construction, repairs and improvements. The justification for any new permanent road crossing design (*i.e.*, road realignment, full span bridge, streambed simulation, or no-slope design culvert).

(10) Water dependent structures and related features.

(a) Area of new over-water structure.
(b) Streambank distance to nearest existing water dependent structure -- upstream and down.

(11) Minor discharge and excavation/maintenance dredging.

(a) Volume of dredged material.
(b) Water depth before dredging and within one week of completion.
(c) Verification of upland dredge disposal.

(12) Site restoration. Photo or other documentation that site restoration performance standards were met.

(13) Long-term habitat loss. The same elements apply as for monitoring site restoration.

iv. Site restoration or compensatory mitigation monitoring. In addition to the 120-day implementation report, each applicant will submit an annual report by December 31 that includes the written record documenting the date of each visit to a restoration site or mitigation site, and the site conditions and any corrective action taken during that visit. Reporting will continue from year to year until the Corps certifies that site restoration or compensatory mitigation performance standards have been met.

DEPARTMENT OF THE ARMY
PORTLAND DISTRICT, CORPS OF ENGINEERS
POST OFFICE BOX 2946
PORTLAND, OREGON 97208-2946

REPLY TO
ATTENTION OF:

February 13, 2004

Operations Division
Regulatory Branch
Corps No.: 199200812

Mr. James L. Jakubiak
Schnitzer Investment Corporation
International Terminal
PO Box 10047
Portland, Oregon 97296-0047

RECEIVED
MAR 0 3 2004
BY:

Dear Mr. Jakubiak:

Enclosed are two unsigned copies of your requested permit.

In order to make this permit valid, please read the conditions of the permit carefully, complete both copies including signature, printed name and title, and return both copies to the Regulatory Branch, Permits Section, at the letterhead address along with a check in the amount of $100.00, payable to Finance and Accounting Officer, USAED, Portland. Your copy of the fully executed permit will then be returned to you.

You are cautioned, however, not to begin work under the terms of this permit until you receive the fully executed document, as such action would be in violation of Federal law.

Recent changes in the U.S. Army Corps of Engineers regulations have established a process through which you may object to certain terms and conditions of the enclosed permit, and ask that the permit be modified accordingly. Please see the enclosed Notification of Administrative Appeal Options and Process and Request for Appeal for further information about that process.

If you have any questions regarding this permit, please contact Ms. Mary J. Headley at the letterhead address or telephone (503) 808-4392.

Sincerely,

Donald Borden
for
Lawrence C. Evans
Chief, Regulatory Branch

Enclosures

Applicant: Schnitzer Steel Industries, Inc.	File Number: 199200812	Date: 13FEB04
Attached is:		See Section below
XX	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice. Also, see Section II.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record. If you believe you have additional information pertinent to an approved jurisdictional determination {see Part D} with which you disagree, that new information should first be sent to the Portland District for reconsideration. Following the District's reconsideration, the approved jurisdictional determination can still be appealed as noted in Part D)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

If you have questions regarding this decision and/or the appeal process you may contact: U.S. Army Corps of Engineers Portland District Office CENWP-OP-GP (ATTN: Jim Goudzwaard) Post Office Box 2946 Portland, Oregon 97208-2946	If you decide to appeal an action under Parts B, C or D above, send a copy of each page to: U.S. Army Corps of Engineers Northwestern Division Attn: Mores Bergman, Appeal Review Officer 12565 West Center Road Omaha, Nebraska 68144-3869 Telephone (402) 697-2533

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

DEPARTMENT OF THE ARMY PERMIT

Permittee: Schnitzer Steel Industries, Inc.

Permit No: 199200812

Issuing Office: U.S. Army Corps of Engineers, Portland District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: Schnitzer Steel Industries, Inc. (SSI) proposes to conduct maintenance dredging of Berths 4 and 5 at the International Terminals slip. The project involves dredging the area to a maximum depth of -42 feet Columbia River Datum (CRD) in Berth 4, and -36 feet CRD in Berth 5, as shown on the attached drawings. The proposed dredge footprint covers about 6.6 acres with a maximum length of 1,600 feet and maximum width of 220 feet. The proposed dredge footprint lies entirely within the previously permitted dredge area and covers less area than authorized in previous permits. The initial dredge volume associated with the proposed dredge prism is 61,000 cubic yards (cy). Over the remainder of the permit duration, SSI proposes to dredge another 40,000 cy as needed for ongoing maintenance (e.g. 20,000 cy every other year, on average, in years two through five). Dredging will be by clamshell bucket, with transport to approved upland facilities or locations by barge, truck or rail.

Purpose: To maintain safe navigation access and berthing for the existing facilities associated with Berths 4 and 5 at the International Terminals by conducting maintenance dredging, as needed. The two berths have been maintained under previous maintenance dredging permits (Department of the Army Permit 199200812 and the Oregon Division of State Lands Permit No. 3701). Berth 4 is currently used to export bulk metal products with a conveyor system. Berth 5 has a floating dock with a crane and is used for temporary moorage. The site is primarily used to support metal recycling and vessel dismantling operations. Due to shoaling within each of the berths, there is a critical and urgent need to maintain water depth at these facilities to prevent disruption of routine operations.

Project Location: Willamette River, River Mile 4.1, Section 35, Township 2 North, Range 1 West, Portland, Multnomah County, Oregon

Drawings: Three (3) Sheets identified as *COE No. 199200812* (Enclosure 1)

General Conditions:

1. The time limit for completing the work authorized ends on **January 31, 2009**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity

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authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. A conditioned water quality certification has been issued for your project. You must comply with the conditions specified in the certification as special conditions to this Department of the Army permit. For your convenience, a copy of the certification is attached (Enclosure 2).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. **In-water Work Windows:** All in-water work, including temporary fills or structures, shall occur between July 1-October 31 and December 1-January 31 (timeframes are specific to the Willamette River, from the mouth to Willamette Falls). Exceptions to these time periods require specific approval from the Corps.

2. The following special condition is a part of all Department of the Army permits that provide authorization under Section 10 of the Rivers and Harbors Act, regardless whether the permit provides such authorization under Section 10 alone, or in combination with authorization under other laws:

- The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the U.S Army Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

3. The Environmental Protection Agency (EPA) is presently evaluating the Willamette River between the mouth of the river and Willamette Falls (river miles 0-26). This is the reach of the river that EPA has identified as an "area of interest" pursuant to a National Priorities Listing under the

Comprehensive Environmental Response, Compensation, and Liability Act, the Resource Conservation and Recovery Act, and the Federal Water Pollution Control Act. The following statement is provided at the request of EPA:

- "This permit does not exclude the permittee from liability or any requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (42 U.S.C 9601 et. Seq.), the Resource Conservation and Recover Act of 1978 as amended (42 USC 6901 et. Seq.), the Federal Water Pollution Control Act as amended (33 USC 1251 et. Seq.) and any and all requirements of the State of Oregon under Revised Statures or Administrative Rules. The Protection Agency and the Oregon Department of Environmental Quality pursuant to a National priorities Listing relative to the Willamette River. Granting of this permit by the Portland District, US Army Corps of Engineers should in no way be construed as approval of this project as being in compliance with the above cited authorities. Neither should the permittee consider this permit as absolving the permittee from any liability or damages from any party whomsoever."

4. The permittee (Schnitzer Steel Industries, Inc) will comply with the terms and conditions of the US Fish

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and Wildlife Service letter of concurrence (Enclosure 3). Your authorization under this Department of the Army permit is conditional upon your compliance with these mandatory terms and conditions in order to minimize adverse affects on listed Bald Eagle under the Federal Endangered Species Act. Specifically:

a. A close-lipped clamshell bucket will be used to dredge the project sites with all dredged material transported to approved upland facilities or location by barge, truck, or rail. Any incidences when the close-lipped bucket is not used will be described in a post-dredging report, with copies provided to the Corps and FWS. Include when, where, and the length of time the close-lipped dredge was out of service.

b. A turbidity management plan will be developed using guidelines established by the Oregon Department of Environmental Quality (ODEQ).

c. Dredging depths, including overdrafts, will be kept to a minimum.

5. Endangered Species Act and Magnuson Stevens Act Requirements. This Corps permit does not authorize you to take a listed species. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a Biological Opinion under ESA Section 7, with "incidental take" provisions with which you must comply). "Incidental take" is take of listed species that results from, but is not the purpose of, the Federal agency or the Permittee carrying out an otherwise lawful activity. Take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of an endangered or threatened species is prohibited without a specific permit or exemption.

The Biological Opinion which the Corps used to evaluate your proposal for compliance with the ESA and the Magnuson-Stevens Act, is a programmatic procedure developed with National Marine Fisheries Service (NOAA Fisheries) for specific activities requiring a Corps permit entitled *Standard Local Operating Procedures for Endangered Species (Slopes) for Certain Regulatory and Operations Activities Carried Out by the Department of the Army Permits in Oregon and the North Shore of the Columbia River*, dated July 8, 2003. The Corps recommends that you review the SLOPES opinion in its entirety, which you may obtain on-line at https://www.nwp.usace.army.mil/op/g/notices/Slopes.pdf.

The enclosed SLOPES document (in part) (Enclosure 4) contains mandatory terms and conditions to implement the reasonable and prudent measures (RPM) that are associated with incidental take specified in SLOPES.

Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached SLOPES conditions, which are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of SLOPES, where a take of the listed species occurs, constitutes an unauthorized take, and constitutes non-compliance with your Corps permit. The NOAA Fisheries is the appropriate authority to determine compliance with the terms and conditions of SLOPES, ESA, and MSA.

The Corps hereby requires the Permittee to adhere to the following Special Conditions in order to minimize adverse affects on ESA listed Chinook salmon, and Steelhead trout, and MSA listed Chinook and Coho salmon, and Starry flounder:

a. To satisfy the requirements of SLOPES RPM #1, the Corps requires that the Permittee comply with the following:

1. Project Access. The Permittee shall ensure that landowner(s) provide reasonable access to the project area for monitoring the use and effectiveness of permit conditions. Reasonable access means, with prior notice to the Permittee, the Corps and NOAA Fisheries may at reasonable times and in a safe manner, enter and inspect the permitted project to ensure compliance with the reasonable and prudent measures and terms and conditions in this Opinion.

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2. Salvage Notice. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify the Vancouver Field Office of NOAA Fisheries Law Enforcement at 360-418-4246. The finder must take care in the handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

b. General Conditions. To satisfy the requirements of general conditions for surveying, exploration, construction, operation, and maintenance under SLOPES, the Permittee shall fully implement all conditions, as applicable to the permitted activity, in RPM #2 (Enclosure 4a). Please note that the general terms and conditions of Measure 2 cover an array of diverse activities such that not all requirements may apply to your particular project.

c. Activity-Specific Conditions. To satisfy the requirements of maintenance dredging under SLOPES, the Permittee shall fully implement all conditions, as applicable to the permitted activity in RPMs 11 & 12 Enclosure 4b).

d. Monitoring. To satisfy the monitoring requirements of SLOPES the Permittee shall fully implement RPM #13,(a) Regulatory program implementation monitoring (Enclosure 4c). Please note that RPM #13(a) requires the submittal of an implementation report, photo documentation, and additional project-specific data within 120 days of "project completion". Project completion, for the purposes of this report, is defined as the date when work in waters of the U.S. is complete, which may differ from the date when the entire project is complete. In addition to the implementation report, Measure 13(a)(iv) requires an annual report submitted to the Corps by December 31st of each monitoring year for projects requiring restoration or mitigation. The monitoring period begins with the first growing season after project completion.

e. The Permittee shall provide all documentation and reports as required for submittal by this Opinion to the following address:

U.S. Army Corps of Engineers
Regulatory Branch
Compliance & Enforcement Section (Multnomah – 199200812)
P.O. Box 2946
Portland, Oregon 97208

6. The permittee will evaluate sediment quality before each dredging occurrence, and comply with requirements of the *Dredge Maintenance Evaluation Framework for the Lower Columbia River Management Area* (DMEF) (November 1998). Sediment quality reports will be submitted to the Corps for coordination, and determination of compliance with DMEF, with the Regional Management Team (RMT). At times this process can be lengthy, so please allow sufficient time for the Corps to complete coordination with the RMT (6 months recommended). Provide 4 complete copies of the report to the following address:

U.S. Army Corps of Engineers
Regulatory Branch
Permit Section (Multnomah – 199200812)
P.O. Box 2946
Portland, Oregon 97208

7. The permittee will dispose of dredge spoils at an approved upland facility. Any temporary dredge spoil area (e.g. on a barge) will be fully-contained so as to limit return flows to the river to less than 4-feet per second.

SCHN00317434

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR

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326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE SIGNATURE) (DATE)

(PRINTED NAME) (TITLE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

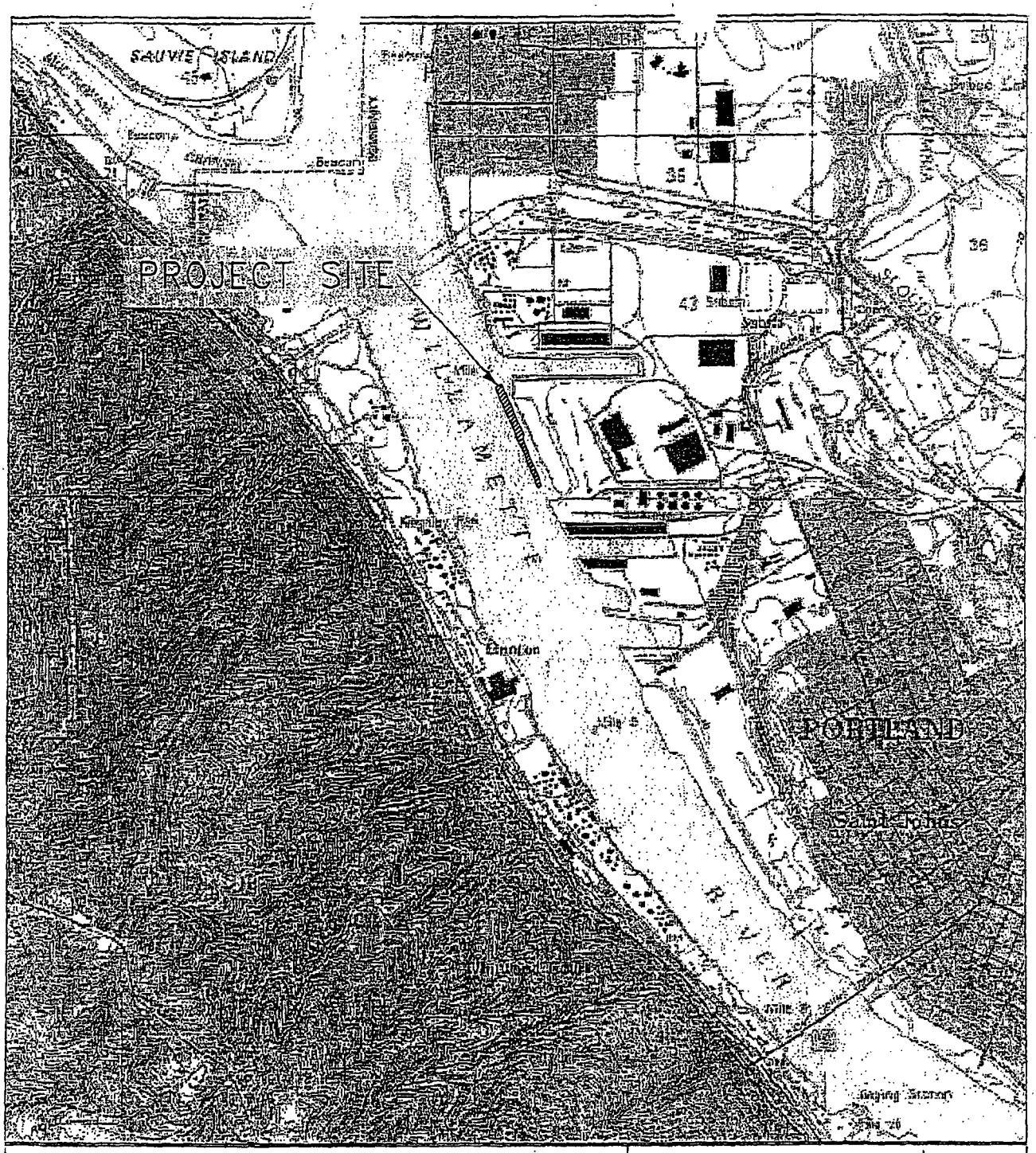
(DISTRICT ENGINEER) (DATE)
FOR
Charles S. Markham
Lieutenant Colonel, Corps of Engineers
Acting Commander

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)

(PRINTED NAME) (TITLE)

SCHN00317436



NOTE 1. LOCATION MAP OBTAINED FROM US GEOLOGICAL SURVEY QUAD SHEET FOR LINNTON, OR

PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES

VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8

ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 30" N
LONGITUDE: 122° 46' 52" W

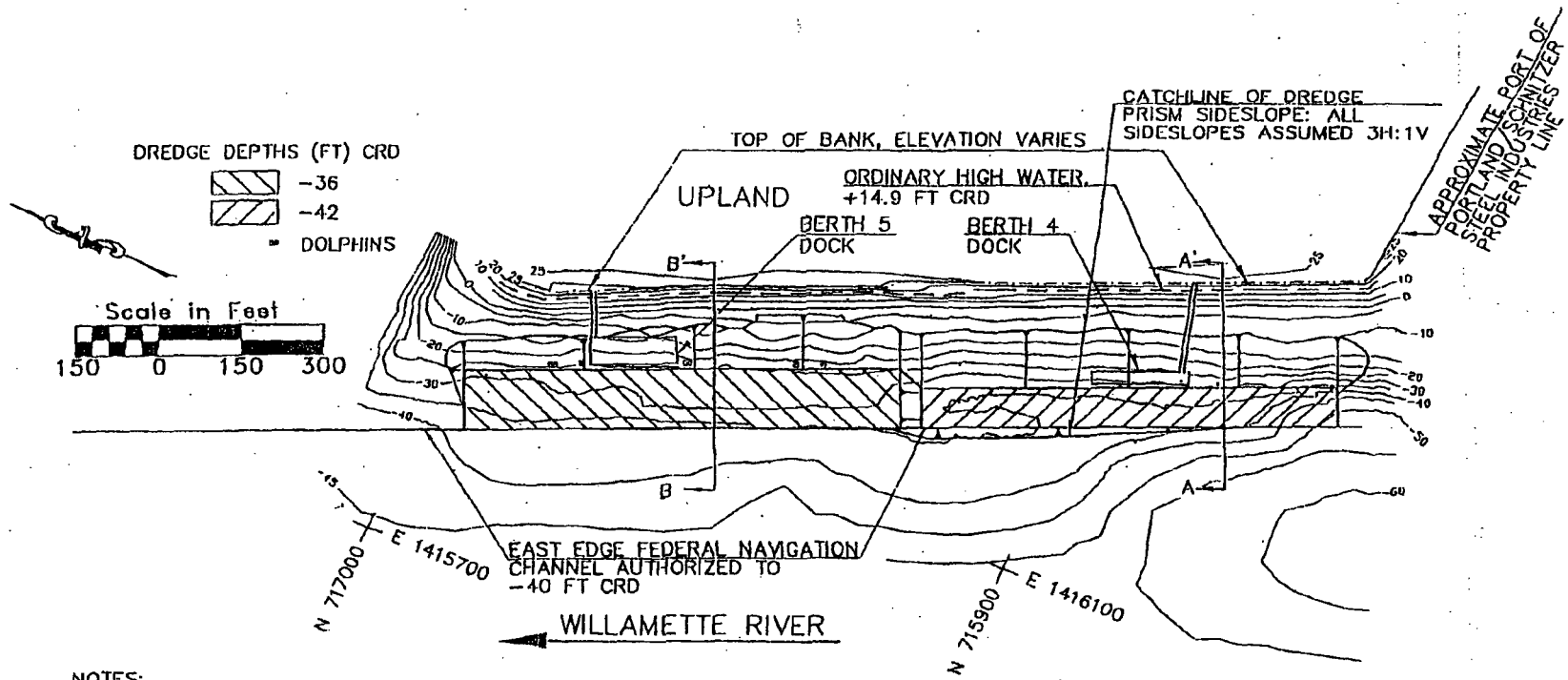
ENCLOSURE 1

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 4.1
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.

SHEET 1 OF 3 DATE: 6/03/03

SCHN00317437



NOTES:

NOTE 2. THE ORDINARY HIGH WATER ELEVATION IS 14.9 FT CRD ACCORDING TO THE U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT.

NOTE 3. DEPTH SOUNDINGS (FEET, CRD) WERE MEASURED BY MINISTER & GLAESER SURVEYING, INC. IN SEPTEMBER, 2002.

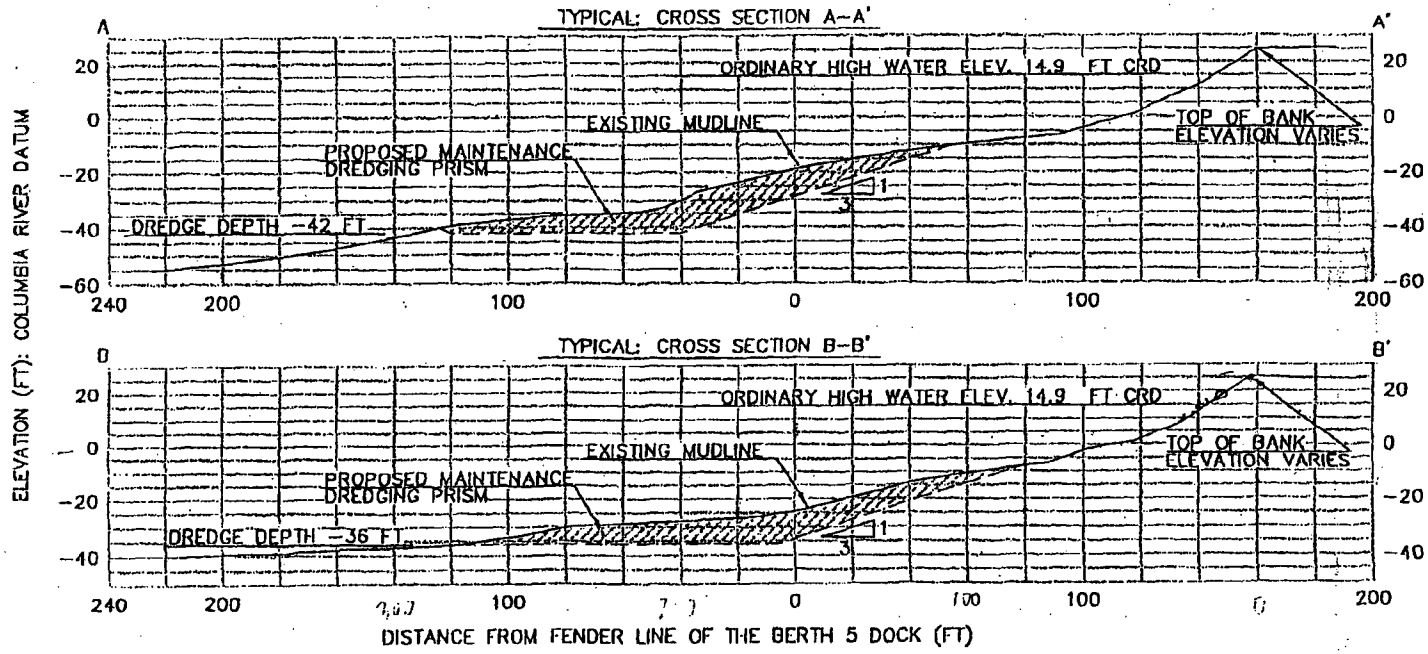
NOTE 4. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO INITIALLY DREDGE AN ESTIMATED 61,000± CY AS SHOWN. ESTIMATED MAINTENANCE DREDGING TO REMOVE NATURALLY SHOALED MATERIALS INCLUDES UP TO 40,000 CY (I.E. 20,000± CY EVERY OTHER YEAR ON AVERAGE) IN SUBSEQUENT YEARS.

NOTE 5. DREDGING DEPTHS SHOWN ARE MAXIMUM DEPTHS AND INCLUDE ONE FOOT OF ADVANCED MAINTENANCE AND ONE FOOT OF ALLOWABLE OVERDEPTH DUE TO DREDGING INACCURACY.

NOTE 6. SCHNITZER STEEL INDUSTRIES, INC. PROPOSES TO DREDGE THE MATERIAL USING A CLAMSHELL BUCKET OPERATED FROM A FLOATING CRANE. DREDGED MATERIAL WILL BE PLACED IN APPROVED UPLAND LOCATIONS.

	PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD), CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8 ADJACENT PROPERTY OWNERS: 1. NORTHWEST TERMINAL COMPANY 2. PORT OF PORTLAND	LATITUDE: 45° 36' 30" N LONGITUDE: 122° 46' 52" W HORIZONTAL DATUM: OREGON STATE PLANE COORDINATE SYSTEM, NORTH ZONE (NAD-27), U.S. SURVEY FEET	PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS IN: WILLAMETTE RIVER AT: RIVER MILE 4.1 COUNTY OF: MULTNOMAH APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC. SHEET 2 OF 3 DATE: 6/03/03

SCHN00317438



PURPOSE: MAINTAIN NAVIGATION ACCESS AND BERTHS FOR SHIPS AND BARGES

VERTICAL DATUM: COLUMBIA RIVER DATUM (CRD). CRD IS 1.6' ABOVE NGVD AT WILLAMETTE RIVER MILE 3.8

ADJACENT PROPERTY OWNERS:
1. NORTHWEST TERMINAL COMPANY
2. PORT OF PORTLAND

LATITUDE: 45° 36' 30" N
LONGITUDE: 122° 46' 52" W

SCALE: AS SHOWN

PROPOSED MAINTENANCE DREDGING AT INTERNATIONAL TERMINALS

IN: WILLAMETTE RIVER
AT: RIVER MILE 4.1
COUNTY OF: MULTNOMAH
APPLICATION BY: SCHNITZER STEEL INDUSTRIES, INC.

SHEET 3 OF 3 DATE: 6/03/03

SCHN00317439

Encl. 2

NOC

TO FOLLOW

THIS IS THE

ASSOCIATED

APPENDIX

ENCLOSURE 2

International Terminals Water Quality Monitoring Plan

Prepared for

SCHNITZER STEEL INDUSTRIES, INC

Prepared by

Floyd Snider McCarthy, Inc.
83 South King Street
Suite 614
Seattle, Washington 98104

October 17, 2003

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Figure 4.1 Water Quality Monitoring Locations

1.0 Introduction

This document presents the Water Quality Monitoring Plan (WQMP) for maintenance dredging of Berths 1 through 3[1], and Berths 4 and 5[2], of the International Terminals. The site is adjacent to Schnitzer Steel's facility, located in Portland, Oregon. This WQMP has been prepared to ensure compliance with Section 401 of the Clean Water Act and Oregon State Water Quality Standards (OAR 340-41).

Schnitzer Steel Industries, Inc. (Schnitzer) operates the International Terminals and associated berths. Berths within the project area currently support metal recycling operations and are also used to import bulk cargo such as manganese, pig iron, steel coils, and steel slabs.

[1] Corps Project Number 199100099.

[2] Corps Project Number 199200812.

2.0 Purpose

The WQMP was developed to evaluate water quality and ambient (background) conditions during maintenance dredging in order to ensure that turbidity will remain within acceptable limits outside of the project area and, if necessary, implement corrective actions to mitigate impacts to water quality. The project area includes multiple potential discharge points from the dredge and receiving barge (filtered return water).

This document defines the monitoring procedures that will be followed for water quality monitoring during maintenance dredging within the project area and provides a description of the Best Management Practices (BMPs) that will be implemented to ensure that potential water quality impacts will be minimized.

3.0 Best Management Practices

Maintenance dredging activities will be conducted during the Oregon Department of Fish and Wildlife's (ODFW) agreed upon in-water work windows as follows:

- July 1 through October 31 (any year with valid permits);
- January 1 through January 31, 2004; and
- During other times as needed. Activities will be coordinated with the ODFW and approved by the Oregon Division of State Lands.

In addition, the following BMPs will be used to minimize potential water quality impacts. Activities that occur during maintenance dredging with the potential to impact water quality include dredging, barge dewatering of sediments, and sediment offloading at a transload facility. BMPs that will be implemented during each of these activities to minimize potential water quality impacts are described below.

3.1 Dredging BMPs

Mechanical dredging of sediment has the potential to cause sediment resuspension, which can impact water quality and the aquatic environment. The following BMPs will be implemented to minimize potential impacts to the aquatic environment during dredging operations:

- The construction contractor will ensure that no fuel, garbage, or debris enters the waterway from the dredge, receiving barge, other vessels associated with the project.
- Dredging will be conducted using an environmental clamshell bucket that is closed, vented, and sealed in order to minimize the release and redistribution of dredged material to the water column during dredging. In the event that large woody debris or other obstructions must be removed from the dredge prism, the environmental bucket may be replaced by a bucket suitable for the removal.
- Dredging will be conducted using procedures that will minimize potential impacts to water and sediment quality to the extent practicable. These procedures include the following:
    - Slow dredge bucket deployment and retrieval will be required. The maximum rate of retrieval of the dredge bucket will be 2 feet per second for the first 20 feet off the bottom (where the highest potential for bottom sediment disturbance exists). For the remainder of the bucket ascent, the rate may increase up to a maximum of 4 feet per second.
    - The maximum rate of bucket descent will be 10 feet per second and the descent rate will decrease significantly until stopped at the designated depth of digging penetration.
    - "Sweeping" the post-dredge surface to smooth contours will not be allowed.

- Stockpiling of material on the bottom will not be allowed (i.e., each time the bucket is closed it will be brought to the surface).
- The bucket will be required to pause for several seconds at the water surface during retrieval to release excess water.

- Barges and other floating equipment shall be operated to avoid grounding on the riverbed or banks at any time.

3.2 Sediment Dewatering BMPs

Dredging efforts are required to be accomplished in a manner that minimizes the amount of water added to recovered sediment. In practice this is accomplished by taking full depth cuts whenever possible so that the dredge bucket is completely full of sediment and by pausing as the dredge bucket breaks the water surface during bucket retrieval to allow excess water to drain before sediment is discharged onto the receiving barge.

Dredged sediment placed onto the receiving barge will be allowed to passively dewater within the project area prior to being transferred upland. During barge dewatering activities, the following BMPs will be implemented to minimize potential water quality impacts:

- Return water draining from the receiving barge will be treated by filtering water through straw bales and/or geotextile fabric before returning to the waterway.
- Straw bales and geotextile fabric will be changed regularly to ensure efficient filtration of the return water.
- Barges will not be overfilled to the point where recovered material, including both sediment and water, overflows directly back to the waterway.
- During sediment dewatering, the receiving barge will remain within the project area.
- Return water from the barge will not be allowed to discharge to the waterway outside the project area (e.g., during transport to, or while stationed at the transload facility).

3.3 Dredged Material Offloading BMPs

The following BMPs will be implemented to prevent potential release of sediment at the transload facility and to prevent potential water quality impacts to the waterway:

- The clamshell bucket used during sediment offloading will not be allowed to swing directly over open water. A protective "capture barge", temporary structure, or spill apron will be placed along the swing pathway of the bucket to prevent material from entering the waterway.
- Railcars or containers used to transport dredged sediment will be lined with impermeable liners prior to being filled.
- The transload facility will be swept regularly to prevent potential spreading or release of sediment.

- Sediment will be removed from the outside of equipment and railcars by brushing or sweeping prior to leaving the transload facility.

4.0 Water Quality Monitoring Locations

Compliance water quality monitoring will be conducted at the compliance boundary located downstream of project area. Ambient water quality monitoring will also be conducted upstream from the project area to establish background conditions for the river.

Water quality compliance monitoring will be conducted at one location 150 feet directly downstream of the project area, as shown in Figure 4.1. The water quality monitoring station will be relocated, based on field conditions, in order to intercept any visible turbidity plumes originating from dredging operations. Monitoring stations will be located in the field using a Differential Global Positioning System (DGPS) on board the sampling vessel.

Ambient water quality monitoring will also be conducted at one station located within the waterway but at least 100 feet outside the influence of dredging operations (upstream from project area), as shown in Figure 4.1. Ambient monitoring stations will also be located in the field based on field conditions.

At each compliance or ambient monitoring location, turbidity will be measured and recorded at three depths:

- Shallow to within one meter of the water surface
- Mid depth
- Deep to within one meter of the mudline

Measurements from all three depths will be recorded separately, but will be averaged to determine the turbidity concentration.

Turbidity thresholds were developed in 2001 by Ellis Ecological Services, Inc. (EES) and adopted by the Port of Portland (2001) for maintenance dredging at Terminal 2 and Terminal 5 on the Willamette River. These threshold levels were approved by the Oregon Department of Environmental Quality (ODEQ), the Oregon Division of State Lands, and the U.S. Army Corps of Engineers and were incorporated as a condition of the Terminal 2 and Terminal 5 maintenance dredging permits. The following threshold levels, developed by EES, are proposed for maintenance dredging at the International Terminals (Berths 1-5).

Table 4.1
Turbidity Threshold Levels for Maintenance Dredging at the International Terminals during the Allowed In-Water Work Periods

Turbidity Level (NTU)	July 1 – October 31	January 1 – January 31
Action Level (48 – hour average)	35	44
Stop Work Level (8-hour average)	135	144

Compliance monitoring results will be compared to the turbidity thresholds presented in Table 4.1 to evaluate water quality compliance. In the event that natural background turbidity exceeds the action level or stop work level in Table 4.1, then these levels will be 10 percent above background turbidity in accordance with Oregon State water quality standard (OAR 340-041-0445) for turbidity for the Willamette Basin. An exceedance of the threshold occurs only if

the average turbidity exceeds the action level for a consecutive 48-hour period or the stop work level for a contiguous 8-hour period and the monitoring supervisor identifies the dredging operation as the cause of elevated turbidity.

5.0 Water Quality Monitoring Schedule

Turbidity will be monitored visually approximately every 4 hours during dredging operations. If visible turbidity observations indicate a potential problem then the *in situ* compliance-monitoring schedule will be adjusted to sample sooner than the next scheduled monitoring event.
In situ compliance monitoring for turbidity will be conducted twice daily for 3 days (intensive monitoring), at the water quality monitoring station located 150 feet downstream from the project area. Compliance monitoring results will be compared to turbidity thresholds (shown in Table 4.1) and ambient concentrations.
If exceedances are measured, another round of compliance monitoring and ambient monitoring will be initiated to verify the exceedance and ODEQ will be notified. If turbidity is consistently found to be acceptable during "intensive" monitoring, the frequency of monitoring will be reduced to a frequency of once daily. Any exceedance that is verified will trigger a return to intensive monitoring.

6.0 Water Quality Monitoring Equipment and Methodology

Turbidity measurements will be collected using a turbidity meter. Prior to each use, the turbidity meter will be calibrated according to the manufacturer's instructions. When the interface screen shows no significant change in the readings, the probe will be considered calibrated and ready for monitoring. Turbidity readings will be measured at each of the three depths specified in Section 4.0. All water quality monitoring field data, as described in Section 8.0, will be documented in the Water Quality Monitoring Report.

To satisfy QA/QC procedures, all field analyses will be conducted in duplicate at least 10 percent of the time. A significant difference (± 3 percent) in the replicate analyses will result in a recalibration of the field instrument. All field analyses will be recorded in logbooks and will be traceable to the specific person conducting the calibration.

7.0 Field Equipment Calibration and Preventative Maintenance

Field instruments will be properly operated, calibrated, and maintained by qualified personnel according to the manufacturer's guidelines and recommendations. Documentation of routine and special preventive maintenance and calibration information will be maintained in the appropriate field or laboratory logbook, and will be available upon request. Each maintenance and calibration logbook entry will include the date and initials of the individual performing the activity.

8.0 Documentation of Water Quality Monitoring Data

Field personnel will prepare daily field water quality monitoring reports detailing monitoring data collection activities and results. These field reports will include the following information:

- Depth of water at monitoring locations.
- Results of water quality monitoring instrumentation.
- Calibration sheets and notes for all daily instrument calibration.
- List of personnel on board vessel.
- Problems encountered that might affect data results.
- Weather at time of water quality monitoring.
- Date and time of exceedances, if any have occurred, and associated corrective actions.
- Station coordinates, including exact time and date of monitoring data documentation.

A Water Quality Monitoring Report will be prepared and submitted to ODEQ after maintenance dredging activities have been completed. This report will include:

- Depth of water at monitoring locations.
- Record of compliance and ambient monitoring results.
- Description of maintenance dredging activities occurring during water quality monitoring activities.
- Description of any monitoring results that exceeded compliance criteria including time and date of the exceedance.
- Description of corrective actions implemented to mitigate water quality impacts.
- Maps indicating water quality monitoring locations.
- Maps showing construction activity locations during water quality monitoring activities.

9.0 Corrective Action and Notification

If compliance monitoring data indicates a turbidity exceedance of the water quality criteria at the compliance boundary, ODEQ will be notified immediately after the exceedance is confirmed and corrective actions will be evaluated. Corrective actions will include confirming that environmental buckets are properly functioning, modifying dredge procedures (such as changing dredge buckets, slowing or otherwise revising dredge rates, etc.) and/or modifying barge-dewatering procedures (e.g., replacing filter materials or increasing settling time). ODEQ will be informed of potential corrective actions.

10.0 References

Oregon Department of Environmental Quality (ODEQ). Statewide Water Quality Management Plan. Beneficial Uses, Polices, Standards and Treatment Criteria for Oregon. OAR 340-041, Water Pollution.

Port of Portland. 2001. Water Quality Management Plan for Maintenance Dredging. August 31.

Ellis Ecological Services, Inc. 2001. Preliminary Assessment of Potential Effects on Salmonids Associated with Turbidity Caused by Dredging in the Columbia and Willamette Rivers. Memorandum prepared for the Port of Portland. August 30.

International Terminals
Water Quality Monitoring Plan

Figures

United States Department of the Interior

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TAKE PRIDE IN AMERICA

Reply To: 8330.06454 (03)
File Name: Schnitzer dredging informal s7.wpd
TS Number: 04-1070

Mr. Lawrence C. Evans
Chief, Regulatory Branch
Portland District, Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208-2946
Attn: Ms. Mary J. Headley

Re: Informal Consultation Request Regarding Maintenance Dredging at Berths 1, 2, 3, 4, and 5, Schnitzer Steel Industries, International Terminal Docks, Willamette River, Portland, Oregon (1-7-03-I-645, Corp Public Notices 1991-00099 and 1992-00812)

Dear Mr. Evans:

The Fish and Wildlife Service (Service) has reviewed the biological assessments (BAs) for the proposed maintenance dredging by Schnitzer Steel Industries (SSI) at its International Terminal docks in the Willamette River between River Miles 3.8 and 4.1, Multnomah County, Oregon. We received your letter on August 19, 2003. Of interest to the Service is your evaluation of impacts to bald eagles (*Haliaeetus leucocephalus*) and the plant, Howellia (*Howellia aquatilis*), both listed as threatened. A "no effect" determination has been made for Howellia; therefore, this species will not be considered further in this consultation. The BAs also address impacts to a number of fish species under the jurisdiction of NOAA Fisheries (formerly the National Marine Fisheries Service). The Federal nexus for the proposed project is the Army Corps of Engineers' (Corps) dredge and fill permits that would be issued under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Our review and comments are provided pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1536 *et seq.*) (Act). The BAs for maintenance dredging of Berths 1, 2, 3, 4 and 5 reached a determination of "may effect, but not likely to adversely affect" for bald eagles in the project area.

Consultation History

On September 22, 2003, the Service responded to your request for informal consultation with a letter stating that we did not concur with the above determination because of project contaminant concerns and possible exposure of bald eagles to contaminant levels that could adversely affect the species. We recommended that a close-lipped clamshell dredge be used to minimize the

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exposure of eagles and aquatic organisms, particularly salmonids, to such contaminants during dredging. On October 7, 2003, Jerald Ramsden of Parsons, Brinckerhoff, Quade, and Douglas (Parsons Brinckerhoff), consultants for the project applicant, responded via email to the Service's letter stating that dredging would occur using a close-lipped clamshell dredge and that, based on recommendations made in our review of the public notices for these dredging projects, they would develop a turbidity management plan, keep dredging depths to a minimum, and conduct maintenance dredging during the preferred inwater work period as approved by the Oregon Division of State Lands (ODSL). On October 9, 2003, the Service responded to Mr. Ramsden via email that we believed that the latter conditions described for dredging would help to minimize impacts on fish and wildlife resources, including bald eagles, but that we still believed it necessary to monitor for contaminants levels during and after dredging as recommended in our review of public notices 1991-00099 and 1992-00812. The Service received another letter from Parsons Brinckerhoff via the Corps on December 11, 2003, in which Parsons Brinckerhoff questioned the need for post-dredge sampling in light of their decision to use a close-lipped clamshell dredge and their belief that sediment sampling and analysis showed only minor exceedances of Dredged Material Evaluation Framework (DMEF) screening levels. The question of and need for monitoring will be addressed later in this letter.

Project Description

The project involves maintenance dredging at the SSI International Terminal docks on the Willamette River, Berths 1, 2, 3, 4, and 5. Berths 1, 2, and 3 would be dredged to a maximum depth of -42 feet Columbia River Datum (CRD), -38 feet CRD, or -24 feet CRD depending on the location of the berths within the slip. The initial dredged volume would be 77,000 cubic yards (cy) with another 50,000 cy being dredged in years two through five (25,000 cy every other year on average over the life of the permit). The proposed dredge footprint would cover about 9.6 acres with a maximum length of 2,250 feet and a maximum width of 270 feet. SSI Berths 4 and 5 would be dredged to a maximum depth of -42 feet CRD at Berth 4 and to -36 feet CRD at Berth 5. The initial dredged volume would be 61,000 cy with another 40,000 cy being dredged in years two through five (20,000 cy every other year on average over the life of the permit). For Berths 4 and 5, the dredge footprint would cover about 6.6 acres with a maximum length of 1,600 feet and maximum width of 220 feet. All dredging would be accomplished using a close-lipped clamshell bucket (as recently agreed to by Parsons Brinckerhoff) with transport of the dredged material to approved upland facilities or locations by barge, truck, or rail.

Species Account

Bald eagles nest in the tops of large trees and are strongly associated with aquatic habitats, rarely nesting in Oregon further than one mile from water and their primary prey of fish (Fish and Wildlife Service 1995). Foraging bald eagles require perch trees with an unobstructed view that are adjacent to the water, a dependence that makes bald eagles specifically vulnerable to aquatic-associated disturbance (Fish and Wildlife Service 1995).

In Oregon, the bald eagle breeding season can start as early as January 1 and may extend until August 31 each year. Bald eagles are particularly sensitive to human disturbance during the breeding season, sometimes resulting in the abandonment of nests (Fish and Wildlife Service 1986). Incubation lasts approximately 35 days, and the young are ready to fledge at about 11 to 12 weeks of age (Fish and Wildlife Service 1999). Parental care, however, may continue 4 to 11 weeks after the young have fledged. Wintering bald eagles use the Columbia and Willamette Rivers from November 15 to March 15.

Both adult and juvenile bald eagles are known to use the lower Willamette River and the Willamette/Columbia Rivers confluence area throughout the year. However, since the closest bald eagle nest is over 3 miles from the project site, construction is not expected to directly disrupt nesting activities or the rearing of young. No communal night roosts or perch trees are near the proposed dredging site; therefore, wintering bald eagles would not be affected by dredging that may occur during the wintering season. Your analysis finds that bald eagle foraging activities may be disrupted due to noise levels from the operation of heavy equipment but such disruptions are expected to be temporary in nature. Further, the BAs state that contaminant issues are minimal, do not exceed DMEF screening levels, and would not have significant effects on bald eagles or salmonids. The BA concludes that the project may affect bald eagles, but it is unlikely to affect them adversely.

Based on information provided in the BAs and subsequent correspondence with the Corps and the consultants for the project applicant, the Service concurs with the "may affect, not likely to adversely affect" determination for bald eagles. Our concurrence with this determination was made for the following reasons:

- A close-lipped clamshell bucket will be used to dredge the project sites with all dredged material transported to approved upland facilities or locations by barge, truck, or rail. Any incidences when the close-lipped bucket is not used (breakdowns, etc.) will be provided in a post-dredging report to the Service describing when, where, and the length of time the close-lipped dredge was out of service.
- A turbidity management plan will be developed using guidelines established by the Oregon Department of Environmental Quality (ODEQ).
- Dredging depths, including overdrafts, will be kept to a minimum.
- All inwater work will occur only during the preferred inwater work periods specified by the Oregon Department of Fish and Wildlife (ODFW) or at other times, as needed and coordinated with ODFW and the ODSL.

The requirements established under section 7(a)(2) and 7(c) of the Act have been met, thereby concluding the consultation process. If, however, over the life of the project, information becomes available that reveals effects of project construction that may affect listed species or critical habitat in a manner or to an extent not originally considered in this consultation process, we request reinitiation of consultation.

Clean Water Act and Fish and Wildlife Coordination Act Issues

The Service still considers that there is a need to conduct monitoring of the dredging activities at the SSI International Terminal docks to evaluate 1) the movement of surrounding contaminants into the project site and downstream as a result of dredging; 2) the effectiveness of the close-lipped clamshell dredge in removing contaminated material and minimizing dispersal of contaminated suspended sediment; and 3) the stability of the side-slope materials at the site during the dredging activity. This information will provide a more accurate picture of the impacts of dredging activities in contaminated sites on fish and wildlife resources, including anadromous fish and other listed species. This monitoring effort will directly address the Service's remaining concerns at the site, which are described below:

Overview of concerns

The sediment in the area to be dredged contains contaminants elevated above guidance values derived to protect aquatic life, and the Service is concerned that dredging will result in a contaminated layer at the surface of the dredge cut area. Specifically, removing material from the slips could cause contaminated surface material immediately adjacent to the slip to fall into the hole created during dredging and increase the availability of contaminants to anadromous and resident fish and their prey. The degree of contamination resulting from this "sideslope adjustment" is dependent on the current contamination concentrations in the surface layer and the stability of the sideslopes. Even small concentrations of contaminants such as DDT and its metabolites and polychlorinated biphenyls (PCBs) can bioaccumulate into higher organisms and result in adverse effects. The sampling effort (Floyd Snider McCarthy 2003) conducted to characterize the sediments at the site did not sufficiently address these concerns.

Specific concerns related to the sediment characterization (Floyd Snider McCarthy 2003)

1) It is unclear from the sediment characterization report for the site (Floyd Snider McCarthy 2003) what specific depth the surface samples collected represent. The characterization report states that "The first core segment reached from the top of the sediment to a depth corresponding to an elevation of -38 feet CRD . . . ." Therefore, it is unknown if most of the contamination is within the biologically active zone (e.g., up to 10 to 30 cm) or within a couple of feet of the surface. Materials sliding into the hole after dredging could result in contaminated sediment being exposed at the surface of the dredge cut and more available to organisms than prior to the dredge event.

2) The quality control (QC) information for DDT and its metabolites and PCBs is not sufficient to conclude that these chemicals would not pose a hazard to fish and wildlife if present in surface sediments. This concern is based on the following: 1) reporting limits were elevated for DDT, DDE, DDD, and PCBs; 2) matrix spike recoveries were reported as a range and could be below 30 percent for DDT, DDE, and DDD; and 3) unresolved matrix effects were noted in many surface samples for DDT (samples SS01..07, SS02..13, SS04..08, SS05..12) and once for DDE (sample SS05..12). Based on review of the QC information presented in Floyd Snider McCarthy

(2003), it is likely that DDT and its metabolites are higher in the surface sediments than actually reported. Specific information on these QC problems follows below:

- **Reporting limits:** As stated in section 8.3 of Floyd Snider McCarthy (2003), "Reporting limits for DDT re-analysis ranged from 3.4 to 6.3 µg/kg versus 1.0 µg/kg." The 1.0 µg/kg reporting limit is specified in the sampling protocol. The guidance value for DDT and its metabolites is listed as 6.9 µg/kg in the DMEF. This value represents a *summation* of DDT plus metabolites DDD and DDE. For most sample results, the reporting limits were not sufficient to quantify all three compounds, so only two where summed and the other excluded. Therefore, it is likely that most surface samples actually exceeded DMEF guidelines for DDTs. This is contrary to what is indicated in Floyd Snider McCarthy (2003).

- **Matrix spike recoveries:** Section 8.7 of the report indicates that matrix spike and matrix spike duplicate recoveries were 16 to 175 percent for DDT, 30 to 170 percent for DDD, and 12 to197 percent for DDE. However, the recoveries specific to these analyses for each sample are not mentioned. Therefore, we can assume that DDT, DDD, and DDE may have had recoveries as low as 12 to 30 percent. This is unacceptable and indicates that these compounds could be much higher in the samples than reported.

- **Unresolved matrix effects:** Four surface sediment samples (noted above) had DDT or DDE results flagged with a "UM." This flag is defined in Table 3.1 of Floyd Snider McCarthy (2003) as "indicates an analyte was not detected, and where a matrix effect was present." The Service is concerned that the detection limit was already elevated for this compound, and a matrix effect can mask the actual presence of the expected compound. The presence and concentration of the contaminant cannot be resolved without further analysis, yet it is likely present at a much higher concentration than the 1.0 µg/kg required reporting limit which was not achieved in the results. In Floyd Snider McCarthy (2003), the DDT and DDE concentrations flagged with UM were not included in the summation value used to compare to the total DDT guidance value. Therefore, the results from the collected sediment likely under-represent contamination in surface sediments at the site.

3) The use of background values in the sediment characterization report (section 3.4.3 and Table 3.5 of Floyd Snider McCarthy 2003) was inappropriate. The ODEQ would not consider sediment results from a large Superfund site as background concentrations for site specific needs as was done in the above analysis. Included in the Superfund site results are highly contaminated sediment concentrations resulting from a specific hazardous waste source. It is not appropriate or meaningful to use these samples to represent "background" or "baseline" contamination. Any comparison samples, if collected, should be taken immediately adjacent to the area to be dredged.

4) The Service does not consider the bioaccumulation triggers listed in the DMEF as representative of sediments in the lower Columbia and Willamette Rivers, where

bioaccumulation of compounds such as DDT and PCBs has been associated with reproductive problems for some species. The Service does not use the DMEF triggers as guidance values. Bioaccumulation of contaminants such as DDT and PCBs is a result of numerous factors, and any concentration of these contaminants has the potential to bioaccumulate. In addition, the bioaccumulation triggers listed in the DMEF (as well as all DMEF guidance) are currently under review and will likely be revised. The Service uses site specific information when making an assessment of bioaccumulation.

5) A letter dated December 4, 2003, from Parsons Brinckerhoff engineers to Mr. Lawrence Evans of the Corps makes comparisons to the Port of Portland turbidity monitoring efforts during a similar dredge event by the Port of Portland. The Service cooperated with the Port of Portland during the dredge events at Terminals 2 and 4. The Port conducted both turbidity measurements as NTUs and as total suspended solids as part of their monitoring plan. In addition, the Port of Portland conducted follow-up sampling to evaluate contaminants at the surface of the dredgecut after dredging at Terminal 4. The Service wishes to maintain consistency at all sites dredged within the Portland Harbor Superfund area when it is possible that surface contaminants could recontaminate a dredgecut, or when the dredgecut surface lies near a contaminated layer.

Recommendations

To rectify these unresolved issues, the Service recommends the collection of surface samples from the exposed surface of the dredgecut immediately after dredging, using the sampling protocols and tiered approach as described by the DMEF. If grain size indicates very little fines present and is representative of the native materials expected at that depth, then no further chemical testing would be necessary (as per Tier IIa of the DMEF). If fines are present, the Service recommends following the Tier IIb approach of the DMEF to determine contaminant concentrations, including meeting the specified minimum reporting limit for each analyte. For the compounds DDT, DDE, and DDD, minimum reporting limits should be 1.0 µg/kg for each compound. Follow-up analysis is necessary if unresolved matrix effects are noted in QC information.

If you have any questions or need more information, please contact Kathi Larson or Jeremy Buck at (503) 231-6179.

Sincerely,

Michael R. Combs

for Kemper M. McMaster
State Supervisor

cc:
EPA
NOAA Fisheries
ODFW
ODEQ
ODSL

LITERATURE CITED

Fish and Wildlife Service. 1986. Recovery Plan for the Pacific Bald Eagle. Fish and Wildlife Service, Portland, Oregon 160 pp.

Fish and Wildlife Service. 1995. Final rule to reclassify the bald eagle from endangered to threatened in all of the lower 48 states. Federal Register 60 (133):36000-36010.

Fish and Wildlife Service. 1999. Proposed rule to remove the bald eagle in the Lower 48 States from the list of endangered and threatened wildlife. Federal Register 64 (128):36454-36464.

Floyd Snyder McCarthy. 2003. International Terminal Sediment Data Report. Final report prepared for Schnitzer Steel Industries, Inc., June 26. Floyd Snyder McCarthy, Inc., Seattle, Washington.

Programmatic Biological Opinion (Opinion) issued by the National Marine Fisheries Service (NOAA Fisheries) on July 8, 2003, for Standard Local Operating Procedures for Endangered Species (SLOPES) for Certain Activities Requiring Department of the Army Permits in Oregon and the North Shore of the Columbia River.

To be exempt from the prohibitions of section 9 of the Endangered Species Act (ESA), the permittee must comply with the following terms and conditions, which implement the reasonable and prudent measures. These terms and conditions are non-discretionary, and in relevant part apply equally to proposed actions in all categories of activity.

2. **To implement reasonable and prudent measure #2** (general conditions for surveying, exploration, construction, operation and maintenance), the Corps shall ensure that:

a. Exclusions. The following types of exploration and construction actions are not authorized, unless otherwise approved in writing by NOAA Fisheries.

i. Exploration and construction actions, including release of construction discharge water, within 300 feet upstream of active spawning areas or areas with native submerged aquatic vegetation as determined by a preconstruction survey.

ii. Exploration actions in estuaries that cannot be conducted from an existing bridge, dock, or wharf.

b. Hydraulic surveys. Hydraulic measurements that require access to the wetted channel will be done outside of the spawning season, or will have a fisheries biologist verify that there are no redds present at the site. If dye must be used, only non-toxic vegetable dyes is authorized; use of short pieces of plastic ribbon to determine flow patterns is not authorized.

c. Minimum area. Confine construction impacts to the minimum area necessary to complete the project.

d. Timing of in-water work. Work below the bankfull elevation [1] will be completed using the most recent ODFW or the Corps Seattle District preferred in-water work period, as appropriate for the project area, unless otherwise approved in writing by NOAA Fisheries.

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[1] 'Bankfull elevation' means the bank height inundated by a 1.5 to 2-year average recurrence interval and may be estimated by morphological features such average bank height, scour lines and vegetation limits.

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e. Cessation of work. Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

f. Fish screens. Have a fish screen installed, operated and maintained according to NOAA Fisheries' fish screen criteria[2] on each water intake used for project construction, including pumps used to isolate an in-water work area. Screens for water diversions or intakes that will be used for irrigation, municipal or industrial purposes, or any use besides project construction are not authorized.

g. Fish passage. Provide passage for any adult or juvenile salmonid species present in the project area during construction, unless otherwise approved in writing by NOAA Fisheries, and after construction for the life of the project. Upstream passage is not required during construction if it did not previously exist.

h. Pollution and Erosion Control Plan. Prepare and carry out a pollution and erosion control plan to prevent pollution caused by surveying or construction operations. The plan must be available for inspection on request by Corps or NOAA Fisheries.

i. Plan Contents. The pollution and erosion control plan will contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) The name and address of the party(s) responsible for accomplishment of the pollution and erosion control plan.

(2) Practices to prevent erosion and sedimentation associated with access roads, stream crossings, drilling sites, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations, staging areas, and roads being decommissioned.

(3) Practices to confine, remove and dispose of excess concrete, cement, grout, and other mortars or bonding agents, including measures for washout facilities.

(4) A description of any regulated or hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

(5) A spill containment and control plan with notification procedures, specific cleanup and disposal instructions for different products, quick response

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[2] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

containment and cleanup measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(6) Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

ii. Inspection of erosion controls. During construction, monitor instream turbidity and inspect all erosion controls daily during the rainy season and weekly during the dry season, or more often as necessary, to ensure the erosion controls are working adequately.[3]

(1) If monitoring or inspection shows that the erosion controls are ineffective, mobilize work crews immediately to make repairs, install replacements, or install additional controls as necessary.

(2) Remove sediment from erosion controls once it has reached 1/3 of the exposed height of the control.

i. Construction discharge water. Treat all discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows.

i. Water quality. Design, build and maintain facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions. Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. Discharge velocity. If construction discharge water is released using an outfall or diffuser port, velocities may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

iii. Pollutants. Do not allow pollutants including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours to contact any wetland or the 2-year floodplain.

iv. Drilling discharge. All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, will be completely isolated to prevent drilling fluids or other wastes from entering the stream.

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[3] 'Working adequately' means that project activities do not increase ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity causing activity.

(1) All drilling fluids and waste will be completely recovered then recycled or disposed to prevent entry into flowing water.

(2) Drilling fluids will be recycled using a tank instead of drill recovery/recycling pits, whenever feasible.

(3) When drilling is completed, attempts will be made to remove the remaining drilling fluid from the sleeve (e.g., by pumping) to reduce turbidity when the sleeve is removed.

j. Piling installation. Install temporary and permanent pilings as follows.

i. Minimize the number and diameter of pilings, as appropriate, without reducing structural integrity.

ii. Repairs, upgrades, and replacement of existing pilings consistent with these terms and conditions are allowed.

iii. In addition to repairs, upgrades, and replacements of existing pilings, up to five single pilings or one dolphin consisting of three to five pilings may be added to an existing facility per in-water construction period.

iv. Drive each piling as follows to minimize the use of force and resulting sound pressure.

(1) Hollow steel pilings greater than 24 inches in diameter, and Hpiles larger than designation HP24, are not authorized under this Opinion.

(2) When impact drivers will be used to install a pile, use the smallest driver and the minimum force necessary to complete the job. Use a drop hammer or a hydraulic impact hammer, whenever feasible and set the drop height to the minimum necessary to drive the piling.

(3) When using an impact hammer to drive or proof steel piles, one of the following sound attenuation devices will be used to reduce sound pressure levels by 20 decibels.

(a) Place a block of wood or other sound dampening material between the hammer and the piling being driven.

(b) If currents are 1.7 miles per hour or less, surround the piling being driven by an unconfined bubble curtain that will distribute

small air bubbles around 100% of the piling perimeter for the full depth of the water column.[4]

(c) If currents greater than 1.7 miles per hour, surround the piling being driven by a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or metal sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.

(d) Other sound attenuation devices as approved in writing by NOAA Fisheries.

k. Piling removal. If a temporary or permanent piling will be removed, the following conditions apply.

i. Dislodge the piling with a vibratory hammer.

ii. Once loose, place the piling onto the construction barge or other appropriate dry storage site.

iii. If a treated wood piling breaks during removal, either remove the stump by breaking or cutting 3 feet below the sediment surface or push the stump in to that depth, then cover it with a cap of clean substrate appropriate for the site.

iv. Fill the holes left by each piling with clean, native sediments, whenever feasible.

l. Treated wood.

i. Projects using treated wood[5] that may contact flowing water or that will be placed over water where it will be exposed to mechanical abrasion or where leachate may enter flowing water are not authorized, except for pilings installed following NOAA Fisheries' guidelines.[6] Treated wood pilings must incorporate

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[4] For guidance on how to deploy an effective, economical bubble curtain, see, Longmuir, C. and T. Lively, *Bubble Curtain Systems for Use During Marine Pile Driving*, Fraser River Pile and Dredge LTD, 1830 River Drive, New Westminster, British Columbia, V3M 2A8, Canada. Recommended components include a high volume air compressor that can supply more than 100 pounds per square inch at 150 cubic feet per minute to a distribution manifold with 1/16 inch diameter air release holes spaced every 3/4 inch along its length. An additional distribution manifold is needed for each 35 feet of water depth.

[5] 'Treated wood' means lumber, pilings, and other wood products preserved with alkaline copper quaternary (ACQ), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), copper naphthenate, chromated copper arsenate (CCA), pentachlorophenol, or creosote.

[6] Letter from Steve Morris, National Marine Fisheries Service, to W.B. Paynter, Portland District, U.S. Army Corps of Engineers (December 9, 1998) (transmitting a document titled *Position Document for the Use of*

design features to minimize abrasion of the treated wood from vessels, floats or other objects that may cause abrasion of the piling.

ii. Visually inspect treated wood before final placement to detect and replace wood with surface residues and/or bleeding of preservative.

iii. Projects that require removal of treated wood will use the following precautions.

(1) Treated wood debris. Take care to ensure that no treated wood debris falls into the water. If treated wood debris does fall into the water, remove it immediately.

(2) Disposal of treated wood debris. Dispose of all treated wood debris removed during a project, including treated wood pilings, at an upland facility approved for hazardous materials of this classification. Do not leave a treated wood piling in the water or stacked on the stream bank.

m. Preconstruction activity. Complete the following actions before significant[7] alteration of the project area.

i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[8]).

(2) An oil-absorbing, floating boom whenever surface water is present.

iii. Temporary erosion controls. All temporary erosion controls will be inplace and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

Treated Wood in Areas within Oregon Occupied by Endangered Species Act Proposed and Listed Anadromous Fish Species, National Marine Fisheries Service, December 1998).

[7] 'Significant' means an effect can be meaningfully measured, detected, or evaluated.

[8] When available, certified weed-free straw or hay bales will be used to prevent introduction of noxious weeds.

n. Temporary access roads and drilling pads. All temporary access roads and drilling pads will be constructed as follows.

i. Existing ways. Use existing roadways, travel paths, and drilling pads whenever possible, unless construction of a new way or drilling pad would result in less habitat take. When feasible, eliminate the need for an access road by walking a tracked drill or spider hoe to a survey site, or lower drilling equipment to a survey site using a crane.

ii. Steep slopes. Temporary roads or drilling pads built mid-slope or on slopes steeper than 30% are not authorized.

iii. Minimizing soil disturbance and compaction. Minimize soil disturbance and compaction whenever a new temporary road or drill pad is necessary within 150 feet[9] of a stream, water body or wetland by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NOAA Fisheries.

iv. Temporary stream crossings.

(1) Minimize the number of temporary stream crossings.

(2) Design temporary road crossings as follows.

(a) Survey and map any potential spawning habitat within 300 feet downstream of a proposed crossing.

(b) Do not place a stream crossing at known or suspected spawning areas, or within 300 feet upstream of such areas if spawning areas may be affected.

(c) Design the crossing to provide for foreseeable risks (*e.g.*, flooding and associated bedload and debris, to prevent the diversion of streamflow out of the channel and down the road if the crossing fails).

(d) Vehicles and machinery will cross riparian areas and streams at right angles to the main channel wherever possible.

v. Obliteration. When the project is complete, obliterate all temporary access roads that will not be in footprint of a new bridge or other permanent structure, stabilize the soil, and revegetate the site. Abandon and restore temporary roads in wet or flooded areas by the end of the inwater work period.

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[9] Distances from a stream or water body are measured horizontally from, and perpendicular to, the bankfull elevation, the edge of the channel migration zone, or the edge of any associated wetland, whichever is greater. 'Channel migration zone' means the area defined by the lateral extent of likely movement along a stream reach as shown by evidence of active stream channel movement over the past 100 years (e.g., alluvial fans or floodplains formed where the channel gradient decreases, the valley abruptly widens, or at the confluence of larger streams).

o. Heavy Equipment. Restrict use of heavy equipment as follows:

i. Choice of equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (*e.g.*, minimally sized, low ground pressure equipment).

ii. Vehicle and material staging. Store construction materials, and fuel, operate, maintain and store vehicles as follows.

(1) To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on-site.

(2) Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage in a vehicle staging area placed 150 feet or more from any stream, water body or wetland, unless otherwise approved in writing by NOAA Fisheries.

(3) Inspect all vehicles operated within 150 feet of any stream, water body or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by Corps or NOAA Fisheries.

(4) Before operations begin and as often as necessary during operation, steam clean all equipment that will be used below bankfull elevation until all visible external oil, grease, mud, and other visible contaminates are removed.

(5) Diaper all stationary power equipment (*e.g.*, generators, cranes, stationary drilling equipment) operated within 150 feet of any stream, waterbody or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or waterbody.

p. Site preparation. Conserve native materials for site restoration.

i. If possible, leave native materials where they are found.
ii. If materials are moved, damaged or destroyed, replace them with a functional equivalent during site restoration.

iii. Stockpile any large wood[10], native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site restoration.

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[10] For purposes of this Opinion only, 'large wood' means a tree, log, or rootwad big enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull channel width of the stream in which the

q. Isolation of in-water work area. If adult or juvenile fish are reasonably certain to be present, or if the work area is 300 feet upstream of spawning habitats, completely isolate the work area from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials, unless otherwise approved in writing by NOAA Fisheries.

r. Capture and release. Before and intermittently during pumping to isolate an inwater work area, attempt to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

i. The entire capture and release operation must be conducted or supervised by a fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish.

ii. Do not use electrofishing if water temperatures exceed 18°C.

iii. If electrofishing equipment is used to capture fish, comply with NOAA Fisheries' electrofishing guidelines.[11]

iv. Handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

v. Transport fish in aerated buckets or tanks.
vi. Release fish into a safe release site as quickly as possible, and as near as possible to capture sites.

vii. Do not transfer ESA-listed fish to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

viii. Obtain all other Federal, state, and local permits necessary to conduct the capture and release activity.

ix. Allow NOAA Fisheries or its designated representative to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.

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wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

[11] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

s. Earthwork. Complete earthwork (including drilling, excavation, dredging, filling and compacting) as quickly as possible.

i. Drilling and sampling. If drilling, boring or jacking is used, the following conditions apply.

(1) Isolate drilling operations in wetted stream channels using a steel pile, sleeve or other appropriate isolation method to prevent drilling fluids from contacting water.

(2) If it is necessary to drill through a bridge deck, use containment measures to prevent drilling debris from entering the channel.

(3) If directional drilling is used, the drill, bore or jack hole will span the channel migration zone and any associated wetland.

(4) Sampling and directional drill recovery/recycling pits, and any associated waste or spoils will be completely isolated from surface waters, off-channel habitats and wetlands. All waste or spoils must be covered if precipitation is falling or imminent. All drilling fluids and waste will be recovered and recycled or disposed to prevent entry into flowing water.

(5) If a drill boring conductor breaks and drilling fluid or waste is visible in water or a wetland, all drilling activity will cease pending written approval from NOAA Fisheries to resume drilling.

ii. Site stabilization. Stabilize all disturbed areas, including obliteration of temporary roads, following any break in work unless construction will resume within four days.

iii. Source of materials. Obtain boulders, rock, woody materials and other natural construction materials used for the project outside the riparian area.

t. Stormwater management. Prepare and carry out a stormwater management plan for any project that will produce a new impervious surface or a land cover conversion that slows the entry of water into the soil. The plan must be available for inspection on request by Corps or NOAA Fisheries.

i. Plan contents. The goal is to avoid and minimize adverse effects due to the quantity and quality of stormwater runoff for the life of the project by maintaining or restoring natural runoff conditions. The plan will meet the following criteria and contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) A system of management practices and, if necessary, structural facilities, designed to complete the following functions.

(a) Minimize, disperse and infiltrate stormwater runoff onsite using sheet flow across permeable vegetated areas to the maximum extent possible without causing flooding, erosion impacts, or long-term adverse effects to groundwater.

(b) Pretreat stormwater from pollution generating surfaces, including bridge decks, before infiltration or discharge into a freshwater system, as necessary to minimize any nonpoint source pollutant (*e.g.*, debris, sediment, nutrients, petroleum hydrocarbons, metals) likely to be present in the

volume of runoff predicted from a 6-month, 24-hour storm.[12]

(c) Ensure that the duration of post project discharge matches the pre-developed discharge rates from 50% of the 2-year peak flow up to the 50-year peak flow.

(2) For projects that require engineered facilities to meet stormwater requirements, use a continuous rainfall/runoff model, if available for the project area, to calculate stormwater facility water quality and flow control rates.

(3) Use permeable pavements for load-bearing surfaces, including multiple-use trails, to the maximum extent feasible based on soil, slope, and traffic conditions.

(4) Install structural facilities outside wetlands or the riparian buffer area[13] whenever feasible, otherwise, provide compensatory mitigation to offset any long-term adverse effects.

(5) Document completion of the following activities according to a regular schedule for the operation, inspection and maintenance of all structural

[12] A 6-month, 24-hour storm may be assumed to be 72% of the 2-year, 24-hour amount. See, Washington State Department of Ecology (2001), Appendix I-B-1.

[13] For purposes of this Opinion only, 'riparian buffer area' means land: (1) Within 150 feet of any natural water occupied by listed salmonids during any part of the year or designated as critical habitat; (2) within 100 feet of any natural water within 1/4 mile upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system such that water, sediment, or woody material delivered to such waters will eventually be delivered to water occupied by listed salmon or designated as critical habitat; and (3) within 50 feet of any natural water upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system such that water, sediment, or woody material delivered to such waters will eventually be delivered to water occupied by listed salmon or designated as critical habitat. 'Natural water' means all perennial or seasonal waters except water conveyance systems that are artificially constructed and actively maintained for irrigation.

facilities and conveyance systems, in a log available for inspection on request by the Corps and NOAA Fisheries.

(a) Inspect and clean each facility as necessary to ensure that the design capacity is not exceeded, heavy sediment discharges are prevented, and whether improvements in operation and maintenance are needed.

(b) Promptly repair any deterioration threatening the effectiveness of any facility.

(c) Post and maintain a warning sign on or next to any storm drain inlet that says, as appropriate for the receiving water, 'Dump No Waste - Drains to Ground Water, Streams, or Lakes.'

(d) Only dispose of sediment and liquid from any catch basin in an approved facility.

ii. Runoffs/discharge into a freshwater system. When stormwater runoff will be discharged directly into fresh surface water or a wetland, or indirectly through a conveyance system, the following requirements apply.

(1) Maintain natural drainage patterns and, whenever possible, ensure that discharges from the project site occur at the natural location.

(2) Use a conveyance system comprised entirely of manufactured elements (*e.g.*, pipes, ditches, outfall protection) that extends to the ordinary high water line of the receiving water.

(3) Stabilize any erodible elements of this system as necessary to prevent erosion.

(4) Do not divert surface water from, or increase discharge to, an existing wetland if that will cause a significant adverse effect to wetland hydrology, soils or vegetation.

(5) The velocity of discharge water released from an outfall or diffuser port may not exceed 4 feet per second, and the maximum size of any aperture may not exceed one inch.

u. Site restoration. Prepare and carry out a site restoration plan as necessary to ensure that all streambanks, soils and vegetation disturbed by the project are cleaned up and restored as follows. Make the written plan available for inspection on request by the Corps or NOAA Fisheries.

i. General considerations.

(1) Restoration goal. The goal of site restoration is renewal of habitat access, water quality, production of habitat elements (*e.g.*, large woody debris), channel conditions, flows, watershed conditions and other ecosystem processes that form and maintain productive fish habitats.

(2) Streambank shaping. Restore damaged streambanks to a natural slope, pattern and profile suitable for establishment of permanent woody vegetation, unless precluded by pre-project conditions (*e.g.*, a natural rock wall).

(3) Revegetation. Replant each area requiring revegetation before the first April 15 following construction. Use a diverse assemblage of species native to the project area or region, including grasses, forbs, shrubs and trees. Noxious or invasive species may not be used.

(4) Pesticides. Take of ESA-listed species caused by any aspect of pesticide use is not included in the exemption to the ESA take prohibitions provided by this incidental take statement. Pesticide use must be evaluated in an individual consultation, although mechanical or other methods may be used to control weeds and unwanted vegetation.

(5) Fertilizer. Do not apply surface fertilizer within 50 feet of any stream channel.

(6) Fencing. Install fencing as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

ii. Plan contents. Include each of the following elements.

(1) Responsible party. The name and address of the party(s) responsible for meeting each component of the site restoration requirements, including providing and managing any financial assurances and monitoring necessary to ensure restoration success.

(2) Baseline information. This information may be obtained from existing sources (*e.g.*, land use plans, watershed analyses, subbasin plans), where available.

(a) A functional assessment of adverse effects, *i.e.*, the location, extent and function of the riparian and aquatic resources that will be adversely affected by construction and operation of the project.

(b) The location and extent of resources surrounding the restoration site, including historic and existing conditions.

(3) Goals and objectives. Restoration goals and objectives that describe the extent of site restoration necessary to offset adverse effects of the project, by aquatic resource type.

(4) Performance standards. Use these standards to help design the plan and to assess whether the restoration goal is met. While no single criterion is sufficient to measure success, the intent is that these features should be present within reasonable limits of natural and management variation.

(a) Bare soil spaces are small and well dispersed.
(b) Soil movement, such as active rills or gullies and soil deposition around plants or in small basins, is absent or slight and local.
(c) If areas with past erosion are present, they are completely stabilized and healed.
(d) Plant litter is well distributed and effective in protecting the soil with few or no litter dams present.
(e) Native woody and herbaceous vegetation, and germination microsites, are present and well distributed across the site.
(f) Vegetation structure is resulting in rooting throughout the available soil profile.
(g) Plants have normal, vigorous growth form, and a high probability of remaining vigorous, healthy and dominant over undesired competing vegetation.
(h) High impact conditions confined to small areas necessary access or other special management situations.
(i) Streambanks have less than 5% exposed soils with margins anchored by deeply rooted vegetation or coarse-grained alluvial debris.

(j) Few upland plants are in valley bottom locations, and a continuous corridor of shrubs and trees provide shade for the entire streambank.

(5) Work plan. Develop a work plan with sufficient detail to include a description of the following elements, as applicable.

(a) Boundaries for the restoration area.
(b) Restoration methods, timing, and sequence.
(c) Water supply source, if necessary.
(d) Woody native vegetation appropriate to the restoration site[14]. This must be a diverse assemblage of species that are native to the

[14] Use references sites to select vegetation for the mitigation site whenever feasible. Historic reconstruction, vegetation models, or other ecologically-based methods may also be used as appropriate.

project area or region, including grasses, forbs, shrubs and trees. This may include allowances for natural regeneration from an existing seed bank or planting.
(e) A plan to control exotic invasive vegetation.
(f) Elevation(s) and slope(s) of the restoration area to ensure they conform with required elevation and hydrologic requirements of target plant species.
(g) Geomorphology and habitat features of stream or other open water.
(h) Site management and maintenance requirements.

(6) Five-year monitoring and maintenance plan.

(a) A schedule to visit the restoration site annually for 5 years or longer as necessary to confirm that the performance standards are achieved. Despite the initial 5-year planning period, site visits and monitoring will continue from year-to- year until the Corps certifies that site restoration performance standards have been met.

(b) During each visit, inspect for and correct any factors that may prevent attainment of performance standards (*e.g.*, low plant survival, invasive species, wildlife damage, drought).

(c) Keep a written record to document the date of each visit, site conditions and any corrective actions taken.

v. Long-term adverse effects. Prepare and carry out a compensatory mitigation plan as necessary to ensure the proposed action meets the goal of 'no net loss' aquatic functions by offsetting unavoidable long-term adverse effects to streams and other aquatic habitats. Make the plan available for inspection on request by Corps or NOAA Fisheries.

i. Actions of concern. The following actions require a Compensatory Mitigation Plan to offset long-term adverse effects.

(1) Riparian and aquatic habitats displaced by construction of structural stormwater facilities, new boat ramp, or scour protection

(*e.g.*, a footing facing, head wall, or other protection necessary to prevent scouring or downcutting of a culvert, water intake, utility line, or bridge support).
(2) Maintenance dredging in water closer than 50 feet from shore, or in waters less than 20 feet deep.[15]

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[15] Depth in tidal waters is measured from mean lower low water (MLLW).

(3) Other activities that prevent development of properly functioning condition of natural habitat processes.

ii. General considerations.

(1) Make mitigation plans compatible with adjacent land uses or, if necessary, use an upland buffer to separate mitigation areas from developed areas or agricultural lands.

(2) Base the level of required mitigation on a functional assessment of adverse effects of the proposed project, and functional replacement (*i.e.*, 'no net loss of function'), whenever feasible, or a minimum one-to-one linear foot or acreage replacement.

(3) Acceptable mitigation includes reestablishment or rehabilitation of natural or historic habitat functions when self-sustaining, natural processes are used to provide the functions. Actions that require construction of permanent structures, active maintenance, creation of habitat functions where they did not historically exist, or that simply preserve existing functions are not authorized, unless otherwise approved in writing by NOAA Fisheries.

(4) Whenever feasible, complete mitigation before, or concurrent with, project construction to reduce temporal loss of aquatic functions and simplify compliance.

(5) When project construction is authorized before mitigation is completed, the applicant will show that a mitigation project site has been secured and appropriate financial assurances in place.

(a) Complete all work necessary to carry out the mitigation plan no later than the first full growing season following the start of project construction, whenever feasible.

(b) If beginning the initial mitigation actions within that time is infeasible, then include other measures that mitigate for the consequences of temporal losses in the mitigation plan.

(6) Actions to complete a mitigation plan that require a Corps permit will also meet all applicable terms and conditions for this Opinion, or complete a separate consultation.

iii. Plan contents. Include all pertinent elements of a site restoration plan, outlined above, and the following elements.

(1) Consideration of the following factors during mitigation site selection and plan development.

(a) Watershed considerations related to specific aquatic resource needs of the affected area.

(b) Existing technology and logistical concerns.

(2) A description of the legal means for protecting mitigation areas, and a copy of any legal instrument relied on to secure that protection.

11. **To implement reasonable and prudent measure #11** (maintenance dredging), the Corps shall ensure that:

a. Exclusions.

i. The economic loading method[1] of placing dredged material on a barge as part of a dredging operation is not allowed.

ii. Dredging in the following places is not allowed.

(1) Salmonid spawning habitat in tributaries or upstream of those habitats.

(2) Any channel for a water intake that does not have a fish screen that is installed, operated and maintained according to NOAA Fisheries' fish screen criteria.[2]

(3) The Columbia River, above Bonneville Dam, in backwater sloughs, silted-in lateral channels, alcoves, side channels, or other shallow-water areas less than 20 feet deep, measured from mean lower low water in the Columbia River in areas downstream of Jim
Crow Sands (river mile 27) and in estuarine areas with mean annual salinity greater than 0.5 parts per thousand and measured from ordinary high water in all other areas.

b. Dredge Material Evaluation Framework. Evaluate sediment quality before dredging begins using the most recent version of NOAA Fisheries' approved criteria for evaluation of contaminated sediments.[3] Only sediments approved for in-water disposal using those criteria are authorized for maintenance dredging.

c. Dredge operation. Operate dredges as follows:

i. Keep hydraulic dredge intakes at or just below the surface of the material being removed, although the intake may be raised for brief periods of purging or flushing.

ii. Use clamshell dredges with a finishing type bucket with flaps, whenever feasible.

d. Spoil disposal. Place dredge spoil in an approved upland area where it cannot reenter the water body and that is large enough to allow settling, or an in-water disposal area approved by the Corps.

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[1] 'Economic loading' means pumping dredged material with a high water content into the containment area of a hopper dredge or barge, and allowing highly turbid water to overflow over the holding area so that more consolidated material may be collected in the dredge containment area. This process results in a large turbidity plume from the dredge and is often preferred by the contractor performing the dredging because it saves time and money by increasing loads.

[2] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

[3] See, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Oregon Department of Environmental Quality, Washington Department of Ecology, and Washington Department of Natural Resources, *Dredged Material Evaluation Framework: Lower Columbia River Management Area* (DMEF) (November 1998) (procedures to determine sediment quality for dredging activity) (http://www.nwp.usace.army.mil/ec/h/hr/Final/).

(4h)

12. **To implement reasonable and prudent measure #12** (return water from upland disposal sites), the Corps shall ensure that:

a. This only applies to dredging actions permitted under this Opinion.

b. Return flows do not exceed 4 feet per second at either the outfall or diffuser port, the maximum size of any aperture does not exceed one inch, and stream flows are not otherwise altered in a way that significantly impairs spawning, rearing, migration, feeding or other essential behaviors.

c. Return flows will not increases ambient stream turbidity by more than 10% above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the discharge.

13. **To implement reasonable and prudent measure #13** (monitoring), the Corps shall:

a. Regulatory program implementation monitoring. Ensure that each applicant submits a monitoring report to the Corps within 120 days of project completion describing the applicant's success meeting his or her permit conditions. Each project level monitoring report will include the following information.

i. Project identification

(1) Applicant name, permit number, and project name.
(2) Type of activity.
(3) Project location, including any compensatory mitigation site(s), by
5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
(4) Corps contact person.
(5) Starting and ending dates for work completed.

ii. Photo documentation. Photos of habitat conditions at the project and any compensation site(s), before, during, and after project completion.[1]

(1) Include general views and close-ups showing details of the project and project area, including pre and post construction.
(2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

iii. Other data. Additional project-specific data, as appropriate for individual projects.

(1) Work cessation. Dates work ceased due to high flows, if any.

(2) Fish screen. Evidence of compliance with NOAA Fisheries' fish screen criteria.

(3) Pollution control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release, and correction effort.

(4) Drilling. A description of the drilling technology used, required access roads, and methods used to isolate all drilling operations and fluids from flowing water.

[1] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

(4c)

(5) Pilings.

(a) Number and type of pilings removed, including the number of pilings (if any) that broke during removal.

(b) Number, type, and diameter of any pilings installed (*e.g.*, untreated wood, treated wood, hollow steel).

(c) Description of how pilings were installed and any sound attenuation measures used..

(6) Site preparation.

(a) Total cleared area – riparian and upland.
(b) Total new impervious area.

(7) Isolation of in-water work area, capture and release.

(a) Supervisory fish biologist – name and address.
(b) Methods of work area isolation and take minimization.
(c) Stream conditions before, during and within one week after completion of work area isolation.
(d) Means of fish capture.
(e) Number of fish captured by species.
(f) Location and condition of all fish released.
(g) Any incidence of observed injury or mortality of listed species.

(8) Streambank protection.

(a) Type and amount of materials used.
(b) Project size – one bank or two, width and linear feet.

(9) Road construction, repairs and improvements. The justification for any new permanent road crossing design (*i.e.*, road realignment, full span bridge, streambed simulation, or no-slope design culvert).

(10) Water dependent structures and related features.

(a) Area of new over-water structure.
(b) Streambank distance to nearest existing water dependent structure -- upstream and down.

(11) Minor discharge and excavation/maintenance dredging.

(a) Volume of dredged material.
(b) Water depth before dredging and within one week of completion.
(c) Verification of upland dredge disposal.

(12) Site restoration. Photo or other documentation that site restoration performance standards were met.

(13) Long-term habitat loss. The same elements apply as for monitoring site restoration.

iv. Site restoration or compensatory mitigation monitoring. In addition to the 120-day implementation report, each applicant will submit an annual report by December 31 that includes the written record documenting the date of each visit to a restoration site or mitigation site, and the site conditions and any corrective action taken during that visit. Reporting will continue from year to year until the Corps certifies that site restoration or compensatory mitigation performance standards have been met.

Oregon
Theodore R. Kulongoski, Governor

Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204-1390
503-229-5696
TTY 503-229-6993

February 5, 2004

REC'D FEB 0 6 2004

Ms. Mary J. Headley
U.S. Army Corps of Engineers
ATTN: CENPP-CO-GP
P.O. Box 2946
Portland, OR 97208-2946

Dear Ms. Headley,

The Department of Environmental Quality (DEQ) has reviewed U.S. Army Corps of Engineers (USACE, Corps) Permit Application numbers 1991-00099, and 1992-00812, [Division of State Lands (DSL) # RF1055, and 30895-RP respectively] for maintenance dredging. The applicant, Schnitzer Steel Industries, proposes to remove sedimentary materials from their International Terminals Slip, Berths 1, 2, and 3 (Project # 1991-00099); and Berths 4 and 5 (1992-00812). The project site is located at River Mile (RM) 3.8 and RM 4.1 respectively of the east shore Willamette River in Portland, Multnomah County, Oregon (Section 35, T2N/R1W).

The project involves maintenance dredging to a depth of -42 feet Columbia River Datum (CRD) to maintain safe navigational access and berthing for existing facilities at the International Terminals Slip. Over the life of the 5-year permit and certification the applicant proposes to dredge a total of 228,000 cubic yards (CY) from the facility (127,000 CY and 101,000 CY respectively). Initial dredge volumes are calculated at 138,000CY (77,000CY and 61,000 CY respectively). The remainder will be removed on alternate years from locations as required to maintain berthing depths. All dredged materials will be removed by clamshell dredge and transported by rail, truck, or barge to an approved upland facility.

The International Terminal is located in an area that the US Environmental Protection Agency (EPA) has designated an area of interest under the Superfund program. A letter dated November 2, 2001 from Sally Marquis, Manager, Aquatic Resources Unit, EPA, to Ms. Judy Linton, USACE, outlines protocol for conducting necessary maintenance dredging of facilities within the Superfund Site. It contains a reference to a "Superfund Condition" which has been provided to the Corps for inclusion in all Section 404 permits that they issue for the Portland Harbor area.

This project was determined by the Corps to be covered for ESA consultation under the *Programmatic Biological Opinion and Magnusson-Stevens Act Essential Fish Habitat Consultation for Standard Local Operating Procedures for Endangered Species (SLOPES II) for Certain Regulatory and Operations Activities Carried Out by the Department of Army Permits in Oregon and the North Shore Columbia River* dated July 8, 2003.

The Willamette River is classified as Water Quality Limited under Section 303(d) of the Federal Clean Water Act for the following parameters: Bacteria [Fecal Coliform (Fall/Winter/Spring)]; Toxics: [Tissue-Mercury (Year Round)]; Temperature (Summer); and Biological Criteria (Fish Skeletal Deformities).

The Willamette River supports salmonid spawning, rearing and migration.

Based on information provided by the applicant, DEQ does not anticipate any violations of State Water Quality Standards, including Oregon Administrative Rule (OAR) 340-041-0004, Antidegradation Policy for Surface Waters, provided the conditions which follow are incorporated into the permit.

1) **Fish protection/ODFW timing:** All in-water work shall occur within the Oregon Department of Fish and Wildlife's (ODFW) preferred time window, as specified in: *Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources, June 2000.* Exceptions to these guidelines must be reviewed and approved by DSL and ODFW.

2) **Aquatic life movements:** No activity may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species that normally migrate through the area.

3) **Turbidity/Erosion/Monitoring:** A *Water Quality Management Plan* (Plan) is contained in the Appendix to this Section 401 Water Quality Certification (WQC). The Plan and its contents are incorporated into and become a binding condition of the Certification. The Plan outlines: an effects-based turbidity standard; implementation of action level and stop-work level turbidity thresholds; monitoring protocols; and reporting requirements.

4) This Section 401 Water Quality Certification will expire concurrent with the USACE Section 404 permit for this project. The applicant will conduct an analysis of sediments, consistent with the Dredged Material Evaluation Framework (DMEF), for sediments they propose to remove during each separate dredging event authorized by this certification.

5) All dredged materials and associated water will be placed in barges equipped such that return water to the Willamette River is filtered before discharge.

6) No dredging of holes or sumps below maximum depth and subsequent redistribution of sediment by dredging, dragging, or other means is allowed.

7) If the dredging operation causes a water quality problem which results in distressed or dying fish, the operator shall immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ and the Oregon Department of Fish and Wildlife (ODFW).

8) Petroleum products, chemicals, or other deleterious waste materials shall not be allowed to enter waters of the State.

9) Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc., shall be checked regularly for drips or leaks, and shall be maintained in order to prevent spills into State waters.

10) In the event of a discharge of oil, fuel, or other chemicals into State waters, or onto land with a potential to enter State waters, containment and cleanup shall begin immediately and be completed as soon as possible.

11) Spills into State waters, or onto land with a potential to enter State waters, shall be reported immediately to the DEQ Spill Response Team [Northwest Region/Portland: (503) 229-5614].

12) DEQ reserves the option to modify, amend or revoke this WQC, as necessary, in the event new information indicates that the dredging/disposal activities are having a significant adverse impact on State water quality or critical fish resources.

13) A copy of this WQC letter shall be kept on the job site and readily available for reference by the Corps of Engineers, DEQ personnel, the contractor, and other appropriate state and local government inspectors.

14) This WQC is invalid if the project is operated in a manner not consistent with the project description contained in the Public Notice for certification.

15) DEQ is to have site access upon request.

16) If you are dissatisfied with the conditions contained in this certification, you may request a hearing before the Environmental Quality Commission. Such request must be made in writing to the Director of DEQ within 20 days of the mailing of this certification. You may also request written information about alternative dispute resolution services under Oregon Revised Statute 183.502, including mediation or any other collaborative problem-solving process.

The DEQ hereby certifies that this project complies with the Clean Water Act and state water quality standards, if the above conditions are made a part of the Federal permit.

The applicant shall notify the DEQ of any change in the ownership, scope, or construction methods of the project subsequent to certification. If you have any questions, please contact Tom Melville, (503) 229-5845.

Sincerely,

Michael T. Llewelyn, Administrator
Water Quality Division

T:TM.Certhead.91-099&92-812

cc: Applicant
Neil Mullane, DEQ
Kirk Jarvie, DSL

Appendix

International Terminals Water Quality Monitoring Plan

Prepared for

SCHNITZER STEEL INDUSTRIES, INC

Prepared by

Floyd Snider McCarthy, Inc.
83 South King Street
Suite 614
Seattle, Washington 98104

January 9, 2004

1.0 Introduction

This document presents the Water Quality Monitoring Plan (WQMP) for maintenance dredging of Berths 1 through 3, and Berths 4 and 5, of the International Terminals. The site is adjacent to Schnitzer Steel's facility, located in Portland, Oregon. This WQMP has been prepared to ensure compliance with Section 401 of the Clean Water Act and Oregon State Water Quality Standards (OAR 340-41).

Schnitzer Steel Industries, Inc. (Schnitzer) operates the International Terminals and associated berths. Berths within the project area currently support metal recycling operations and are also used to import bulk cargo such as manganese, pig iron, steel coils, and steel slabs.

2.0 Purpose

The WQMP was developed to evaluate water quality and ambient (background) conditions during maintenance dredging in order to ensure that turbidity will remain within acceptable limits outside of the project area and, if necessary, implement corrective actions to mitigate impacts to water quality. The project area includes multiple potential discharge points from the dredge and receiving barge (filtered return water).

This document defines the monitoring procedures that will be followed for water quality monitoring during maintenance dredging within the project area and provides a description of the Best Management Practices (BMPs) that will be implemented to ensure that potential water quality impacts will be minimized.

3.0 Best Management Practices

Maintenance dredging activities will be conducted during the Oregon Department of Fish and Wildlife's (ODFW) agreed upon in-water work windows as follows:

- July 1 through October 31 (any year with valid permits);
- January 1 through January 31, 2004; and
- During other times as needed. Activities will be coordinated with the ODFW and approved by the Oregon Division of State Lands.

In addition, the following BMPs will be used to minimize potential water quality impacts. Activities that occur during maintenance dredging with the potential to impact water quality include dredging, barge dewatering of sediments, and sediment offloading at a transload facility. BMPs that will be implemented during each of these activities to minimize potential water quality impacts are described below.

3.1 Dredging BMPs

Mechanical dredging of sediment has the potential to cause sediment resuspension, which can impact water quality and the aquatic environment. The following BMPs will be implemented to minimize potential impacts to the aquatic environment during dredging operations:

- The construction contractor will ensure that no fuel, garbage, or debris enters the waterway from the dredge, receiving barge, other vessels associated with the project.
- Dredging will be conducted using an environmental clamshell bucket that is closed, vented, and sealed in order to minimize the release and redistribution of dredged material to the water column during dredging. In the event that large woody debris or other obstructions must be removed from the dredge prism, the environmental bucket may be replaced by a bucket suitable for the removal.
- Dredging will be conducted using procedures that will minimize potential impacts to water and sediment quality to the extent practicable. These procedures include the following:
    - Slow dredge bucket deployment and retrieval will be required. The maximum rate of retrieval of the dredge bucket will be 2 feet per second for the first 20 feet off the bottom (where the highest potential for bottom sediment disturbance exists). For the remainder of the bucket ascent, the rate may increase up to a maximum of 4 feet per second.
    - The maximum rate of bucket descent will be 10 feet per second and the descent rate will decrease significantly until stopped at the designated depth of digging penetration.
    - "Sweeping" the post-dredge surface to smooth contours will not be allowed.
    - Stockpiling of material on the bottom will not be allowed (i.e., each time the bucket is closed it will be brought to the surface).
    - The bucket will be required to pause for several seconds at the water surface during retrieval to release excess water.
- Barges and other floating equipment shall be operated to avoid grounding on the riverbed or banks at any time.

3.2 Sediment Dewatering BMPs

Dredging efforts are required to be accomplished in a manner that minimizes the amount of water added to recovered sediment. In practice this is accomplished by taking full depth cuts whenever possible so that the dredge bucket is completely full of sediment and by pausing as the dredge bucket breaks the water surface during bucket retrieval to allow excess water to drain before sediment is discharged onto the receiving barge.

Dredged sediment placed onto the receiving barge will be allowed to passively dewater within the project area prior to being transferred upland. During barge dewatering activities, the following BMPs will be implemented to minimize potential water quality impacts:

- Return water draining from the receiving barge will be treated by filtering water through straw bales and/or geotextile fabric before returning to the waterway.
- Straw bales and geotextile fabric will be changed regularly to ensure efficient filtration of the return water.
- Barges will not be overfilled to the point where recovered material, including both sediment and water, overflows directly back to the waterway.

- During sediment dewatering, the receiving barge will remain within the project area.
- Return water from the barge will not be allowed to discharge to the waterway outside the project area (e.g., during transport to, or while stationed at the transload facility).

3.3 Dredged Material Offloading BMPs

The following BMPs will be implemented to prevent potential release of sediment at the transload facility and to prevent potential water quality impacts to the waterway:

- The clamshell bucket used during sediment offloading will not be allowed to swing directly over open water. A protective "capture barge", temporary structure, or spill apron will be placed along the swing pathway of the bucket to prevent material from entering the waterway.
- Railcars or containers used to transport dredged sediment will be lined with impermeable liners prior to being filled.
- The transload facility will be swept regularly to prevent potential spreading or release of sediment.
- Sediment will be removed from the outside of equipment and railcars by brushing or sweeping prior to leaving the transload facility.

4.0 Water Quality Monitoring Locations

Compliance water quality monitoring will be conducted at the compliance boundary located downstream of project area. Ambient water quality monitoring will also be conducted upstream from the project area to establish background conditions for the river.

Water quality compliance monitoring will be conducted at one location 150 feet directly downstream of the project area, as shown in Figure 4.1. The water quality monitoring station will be relocated, based on field conditions, in order to intercept any visible turbidity plumes originating from dredging operations. Monitoring stations will be located in the field using a Differential Global Positioning System (DGPS) on board the sampling vessel.

Ambient water quality monitoring will also be conducted at one station located within the waterway but at least 100 feet outside the influence of dredging operations (upstream from project area), as shown in Figure 4.1. Ambient monitoring stations will also be located in the field based on field conditions.

At each compliance or ambient monitoring location, turbidity will be measured and recorded at three depths:

- Shallow- within one meter of the water surface
- Mid depth
- Deep- one meter from the mudline

Measurements from all three depths will be recorded separately, but will be averaged to determine the turbidity concentration.

Turbidity thresholds were developed in 2001 by Ellis Ecological Services, Inc. (EES) and adopted by the Port of Portland (2001) for maintenance dredging at Terminal 2 and Terminal 5

on the Willamette River. These threshold levels were approved by the Oregon Department of Environmental Quality (ODEQ), the Oregon Division of State Lands, and the U.S. Army Corps of Engineers and were incorporated as a condition of the Terminal 2 and Terminal 5 maintenance dredging permits. The following threshold levels, developed by EES, are proposed for maintenance dredging at the International Terminals (Berths 1-5).

Table 4.1
Turbidity Threshold Levels for Maintenance Dredging at the International Terminals during the Allowed In-Water Work Periods

Turbidity Level (NTU)	July 1 – October 31	January 1 – January 31
Action Level (48 – hour average)	35	44
Stop Work Level (8-hour average)	135	144

Compliance monitoring results will be compared to the turbidity thresholds presented in Table 4.1 to evaluate water quality compliance. In the event that natural background turbidity exceeds the action level or stop work level in Table 4.1, then these levels will be 10 percent above background turbidity in accordance with Oregon State water quality standard (OAR 340-041-0445) for turbidity for the Willamette Basin. An exceedance of the threshold occurs only if the average turbidity exceeds the action level for a consecutive 48-hour period or the stop work level for a contiguous 8-hour period and the monitoring supervisor identifies the dredging operation as the cause of elevated turbidity.

5.0 Water Quality Monitoring Schedule

Turbidity will be monitored visually approximately every 4 hours during dredging operations. If visible turbidity observations indicate a potential problem then the *in situ* compliance-monitoring schedule will be adjusted to sample sooner than the next scheduled monitoring event.

In situ compliance monitoring for turbidity will be conducted twice daily for 3 days (intensive monitoring), at the water quality monitoring station located 150 feet downstream from the project area. Compliance monitoring results will be compared to turbidity thresholds (shown in Table 4.1) and ambient concentrations.

If exceedances are measured, another round of compliance monitoring and ambient monitoring will be initiated to verify the exceedance and ODEQ will be notified. If turbidity is consistently found to be acceptable during subsequent "intensive" monitoring, monitoring will return to visual-only monitoring every 4 hours during dredging operations. Apparent visual exceedances will trigger a return to intensive monitoring (twice daily instrument monitoring) until turbidity exceedances ceases. Visual-only monitoring every 4 hours would then resume.

6.0 Water Quality Monitoring Equipment and Methodology

Turbidity measurements will be collected using a turbidity meter. Prior to each use, the turbidity meter will be calibrated according to the manufacturer's instructions. When the interface screen shows no significant change in the readings, the probe will be considered calibrated and ready for monitoring. Turbidity readings will be measured at each of the three depths specified in

Section 4.0. All water quality monitoring field data, as described in Section 8.0, will be documented in the Water Quality Monitoring Report.

To satisfy QA/QC procedures, all field analyses will be conducted in duplicate at least 10 percent of the time. A significant difference (± 3 percent) in the replicate analyses will result in a recalibration of the field instrument. All field analyses will be recorded in logbooks and will be traceable to the specific person conducting the calibration.

7.0 Field Equipment Calibration and Preventative Maintenance

Field instruments will be properly operated, calibrated, and maintained by qualified personnel according to the manufacturer's guidelines and recommendations. Documentation of routine and special preventive maintenance and calibration information will be maintained in the appropriate field or laboratory logbook, and will be available upon request. Each maintenance and calibration logbook entry will include the date and initials of the individual performing the activity.

8.0 Documentation of Water Quality Monitoring Data

Field personnel will prepare daily field water quality monitoring reports detailing monitoring data collection activities and results. These field reports will include the following information:

- Depth of water at monitoring locations.
- Results of water quality monitoring instrumentation.
- Calibration sheets and notes for all daily instrument calibration.
- List of personnel on board vessel.
- Problems encountered that might affect data results.
- Weather at time of water quality monitoring.
- Date and time of exceedances, if any have occurred, and associated corrective actions.
- Station coordinates, including exact time and date of monitoring data documentation.

A Water Quality Monitoring Report will be prepared and submitted to ODEQ after maintenance dredging activities have been completed. This report will include:

- Depth of water at monitoring locations.
- Record of compliance and ambient monitoring results.
- Description of maintenance dredging activities occurring during water quality monitoring activities.
- Description of any monitoring results that exceeded compliance criteria including time and date of the exceedance.
- Description of corrective actions implemented to mitigate water quality impacts.
- Maps indicating water quality monitoring locations.

- Maps showing construction activity locations during water quality monitoring activities.

9.0 Corrective Action and Notification

If compliance monitoring data indicates a turbidity exceedance of the water quality criteria at the compliance boundary, ODEQ will be notified immediately after the exceedance is confirmed and corrective actions will be evaluated. Corrective actions will include confirming that environmental buckets are properly functioning, modifying dredge procedures (such as changing dredge buckets, slowing or otherwise revising dredge rates, etc.) and/or modifying barge-dewatering procedures (e.g., replacing filter materials or increasing settling time). ODEQ will be informed of potential corrective actions.

10.0 References

Oregon Department of Environmental Quality (ODEQ). Statewide Water Quality Management Plan. Beneficial Uses, Polices, Standards and Treatment Criteria for Oregon. OAR 340-041, Water Pollution.

Port of Portland. 2001. Water Quality Management Plan for Maintenance Dredging. August 31.

Ellis Ecological Services, Inc. 2001. Preliminary Assessment of Potential Effects on Salmonids Associated with Turbidity Caused by Dredging in the Columbia and Willamette Rivers. Memorandum prepared for the Port of Portland. August 30.

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FOREWORD

THIS STUDY of *"fume conditions"* in shipbuilding was made by Drs. Menne, Hunter, Beeman and David of the University of Oregon Medical School. The study was authorized by the Metal Trades Council of Portland and Vicinity. The committee of the Metal Trades Council was composed of Jack Gillard, Secretary of Steamfitters Union No. 235; Tom Ray, Secretary of Boilermakers Union No. 72; J. H. Lake, Secretary of Electrical Workers No. 48; H. J. Detloff, Secretary of Machinists No. 63; Ralph Johns, Business Representative of Machinists Union, Local 63; Roy Hill, Secretary of Painters Union No. 10, and A. H. Hawkins, Secretary of Building Laborers No. 296. This committee was assisted by B. A. Green, Attorney.

It was first contemplated that the Oregon Shipbuilding Corporation would participate in and pay a part of the cost of this study. This the company finally refused to do. This study is not in any sense directed against the Oregon Shipbuilding Corporation. It is recognized that the conditions found in the Oregon yards are prevalent in other shipbuilding yards in the Portland area. The Oregon yard was selected because it employed the larger number of workmen. Conditions in all yards are the same, and complaints are just as frequent from one yard as another.

Oregon does not have an occupational disease law. These workers—men and women—suffering injury from fumes and from occupational diseases are without protection and have no source from which their medical and hospital bills may be paid, and receive no compensation. This study shows the absolute necessity for an occupational disease law in the State of Oregon. Such a law will, of course, cover all occupations.

Five thousand copies of this report are being printed. Copies are being sent to every member of the present Oregon Legislature, to every physician and surgeon in Oregon, to the Maritime Commission, to the proper departments of the Army and Navy, to the U. S. Public Health, to the State Industrial Accident Commission of Oregon and the Department of Labor and Industries of the State of Washington, and several copies will be sent to each shipbuilding yard in the Portland area. Also, copies will be forwarded to all unions on the Pacific Coast whose members are employed in similar occupations, as well as to all international officers of the unions affiliated with the Metal Trades Department of the American Federation of Labor. Naturally, the membership of the various local unions will be furnished this information through meetings, newspaper publicity, and receiving copies of this study. It is anticipated that meetings will be held between the above named committee and the representatives of the various shipbuilding companies in Portland, to the end that these conditions may be speedily corrected.

The unsafe conditions, as shown in this report, can be corrected and will be corrected.

SCHN00317622

INTRODUCTORY STATEMENT

Some time in the early part of August, 1942, we were consulted about a possible investigation of working conditions in the Oregon Shipyards. Certain complaints, accusations, and impending litigations were called to our attention from different sources. The Oregon Shipbuilding Corporation of the Kaiser Company had then been operating since February 8, 1941, during which time this company employed a variable number of workers, averaging approximately thirty-two thousand men and women. The necessity for increased and rapid production of merchant ships made imperative the rapid acquisition of buildings and shipways and the hiring of a large number of individuals to work in the respective fields in the division of labor in shipbuilding. No attempt was made to determine the efficiency, *the state of health*, or the character of the employees. All able-bodied men who met union requirements were evidently hired and assigned to positions in accordance with the need for rapid production of such merchant ships. Eleven shipways were rapidly built; accessory buildings, mechanical devices and arrangements for control were thrown up about these in a manner to effect efficient production of shipbuilding.

In this necessary but sudden development of a great industry, there was included a Safety Division, under the control of the Maritime Commission, of which the State Industrial Accident Commission First Aid Station is a part. After progress had been made in the rapid production of ships, there apparently gradually appeared various complaints on the part of workmen about the hazardous conditions under which certain parts of shipbuilding were carried on. These complaints took form in the filing of certain suits for damages, either relating to the health of certain individuals, or accusations that certain deaths were due to exposure to hazardous conditions, notably welding and other fumes, by the survivors of a number of workmen who died while employed at the Oregon Shipyards.

It must be pointed out in this initial comment that while the State Industrial Accident Commission was represented on the grounds of the Oregon Shipbuilding Company, and had there its First Aid Station, with supervisors and medical service, that under the law as it was explained to us by the attorneys, the Workmen's Compensation Act could only be held responsible for immediate, definitely traumatic injuries. It must also be mentioned that no other provision existed for the care of individuals who might acquire new, or have reactivated within them old disease processes as a result of exposure to certain industrial hazardous fumes. Such disease conditions as develop insidiously, therefore, do not come within the scope of the Workmen's Compensation Act, and workmen who are presumed to become afflicted or injured have no recourse except that of the responsibility of the company operating under regulations of the Maritime Commission. In addition to the State Industrial Accident Commission's supervision and that of the Safety Department of the Maritime Commission, the United States Public Health Service is also concerned with the health and the protection of these workingmen. Such a composite of supervision seems to lead to some confusion as to the responsibilities of each. Many of the workingmen, therefore, complained to the officials of their union, and sought the aid of the State Industrial Accident Commission concerning certain disabilities. After being told that the Workmen's Compensation Act did not cover insidiously acquired illnesses, such afflicted employees sought the aid of physicians for the alleviation of symptoms from

certain disease processes alleged to be due to their occupation of the Oregon Shipyards.

Accordingly, on August 21, 1942, we were authorized by the Boilermakers, Steamfitters, Machinists, Electrical Workers, and Painters Unions, to undertake an unbiased, neutral investigation of working conditions in the Oregon Shipyards. It was understood that this inquiry was not to be specifically concerned with instances of pending litigation, but with an analysis of working conditions in certain alleged hazardous situations, for the purpose of best improving such conditions under which the men and women worked. It was further understood that the results of this investigation would be utilized for the purpose of instructing the various divisions of the labor organization in matters of safety, to make them "*safety-conscious*", and to promote thereby not only cooperation in the better assurance of continued health, but also to increase the efficiency in the production of ships in the prosecution of the war. In promoting this inquiry, the union representatives of labor made it clear that this was to be a constructive investigation by organized labor for the benefit of its members.

PERSONNEL

With the approval of the above-named unions, the following were authorized to make the investigation:

DR. JOSEPH BEEMAN, Toxicologist; Instructor in Toxicology and Pathology, University of Oregon Medical School.

DR. NORMAN A. DAVID, Professor of Pharmacology and Toxicology at the University of Oregon Medical School.

DR. WARREN C. HUNTER, Professor of Pathology, University of Oregon Medical School.

DR. FRANK R. MENNE, *Chairman of Committee*, Professor of Pathology, University of Oregon Medical School.

DIVISION OF INVESTIGATION

In general, it may be stated that experienced investigators in the past have disagreed as to the possible effect of the various fumes and composites of fumes that are inhaled by welders or those who are exposed to them in the process of shipbuilding. There are many possible sources of irritating substances that are developed in welding: (1) metallic particles that are pulverized under conditions of high temperatures necessary in welding; (2) various gases from the metals welded or the welding rod itself. Differences of opinion exist as to the influence of the metallic substances that escape. These are chiefly iron, manganese, and carbon, in addition to zinc from pipes and other materials that are galvanized. In essence, it is stated in medical literature, while the metallic particles may be inhaled and taken into the lungs, that they do not excite any serious disturbance in the lining of the windpipe or the lungs in general. On the other hand, the various gases, particularly those of nitrogen, are sufficiently irritating to produce acute inflammations of the larynx ("voice-box"), the trachea (windpipe), and bronchi (the smaller windpipes in the lungs), and that such irritations under certain conditions may result in pneumonias, described as "chemical pneumonias". There is no unanimity of opinion as to the influence of these various substances, and the consequences that may develop from them in different individuals. Animal experimentations have been done under controlled conditions, not comparable exactly to the working conditions under which certain men operate in the

EUGENE, OREGON

building of ships. Such experimental conditions as described in the literature are selected as more ideal methods of study, in rooms with controlled temperature and controlled concentrations of fumes, the effect being noted on animals that are obviously in a good state of health prior to being exposed.

Bulletin No. 5 of the United States Department of Labor comments on the hazardous effects of welding and the control of fumes and other irritating substances. This bulletin points out that gases, fumes and smoke have injurious effects when they occur in certain concentrations. Among these is the development of so-called Metal Fume Fever, or so-called "brass-shakes", which arises in individuals exposed to fumes emanating from the welding of galvanized pipes. In addition to these, the fumes that emanate from the welding of pipes that have been painted include certain volatilized portions of solvents for lead and of lead itself. In this bulletin it is further mentioned that the Metal Fume Fever resulting from the inhalation of zinc particles is transitory and leaves no apparent permanent effect. This bulletin further points out the danger to eyes being exposed to light, the occurrence of burns, and the possibility of explosions, all of which may arise in so-called arc or oxy-acetylene welding. The bulletin further stipulates the ventilation conditions which are effective in removing the hazards of fumes resulting from welding under different conditions, finally terminating its comments with the statement that if adequate ventilation is instituted, that such welding may be carried on with safety, and that such measures are dependent upon the cooperation of both the employer and the worker.

A considerable number of piecemeal investigations have therefore been carried on by investigators both here and abroad. The general consensus of opinion appears to be that the effects of certain fumes emanating from welding may be hazardous to the extent that they cause a transitory disturbance within the air passages, including the lungs, which may on occasion result in the development of pneumonias of a chemical nature; that the metallic fumes that escape from welding and are inhaled give rise to certain inert reactions within the lungs that do not alter the function of the lungs to any degree incompatible with health. Other studies on the other hand contradict this conclusion.

There is a dearth of evidence that is strictly applicable to varying conditions of the previous state of health of the individuals employed, the irregularities that may develop under varied working conditions in various parts of the ship in shipbuilding, in accessory shops or in the open. There is very little direct evidence in previous investigations of the immediate effect upon the lung tissue of the inhalation of both gases and foreign substances. There is also very scanty evidence in the medical literature of the role of such exposure to fumes in aggravating previously existing diseases of the heart and lungs in individual laborers hired without any question as to their physical fitness or their capacity to work in the presence of contaminated air.

With this in mind, it was decided to carry on as far as possible the investigations of the Oregon Shipyards under two main divisions: (1) The physico-chemical aspects, which was to include a study of the actual conditions under which welding and associated operations were carried on as to space, ventilation, number of workers, the concentration and character of fumes in such different locations in shipbuilding. This part of the investigation was assigned to Doctors David and Beeman.

The second part of the investigation, which we regarded as being one that is quite generally neglected, was to be concerned with the clinical side; that is to

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say, the study of individuals who are, or were, employed in shipbuilding, for evidence of pre-existing diseases which may have had an influence in rendering them unfit for work in certain hazardous positions, or those who complained of serious effects of fumes, dusts, and other contaminations leading to ill health as a direct consequence of such exposure. This phase of the investigation was to include direct interviews with workers or relatives of deceased, examination or observations made by doctors who were consulted for physical ailments by the various workers, also office and hospital records. In addition, the clinical investigation was intended to study the disease processes in postmortems of individuals who died while employed at the Oregon Shipyards.

In a consideration of this second phase of the investigation, one must assume at once that certain difficulties would be encountered; that such an investigation as this entails persistence, effort, and determination. Physical defects in individuals are uncovered with great difficulty. In undertaking such an investigation, one has to deal with the variations in individual character—the honesty and integrity of the workers themselves and the accuracy of reports from members of the family and physicians concerning the health of the individual before, during, and following cessation of labor as an employee of the Oregon Shipbuilding Company. An attempt, however, was made in this investigation to "separate the wheat from the chaff", in an effort to determine in those individuals who alleged illness as the result of exposure to bad working conditions, as to whether or not that illness was due to irregularities in diet, clothing, general working conditions, variations in temperature, inclemency of weather, exposure to cold, excessive labor on the part of those not accustomed to working, previous disease processes that might have been aggravated, the influence of age, and finally, the actual effects of exposure to welding fumes and other hazardous conditions in those individuals who might be regarded as well and strong at the onset of their employment. This phase of the investigation was made by Doctors Menne and Hunter.

RESULTS OF INVESTIGATION

The following evidence is presented on the basis of these two divisions of the investigation. Each of these will include specific comments, and will be followed by a general summary together with recommendations for the improvement of working conditions.

Metal Fume Hazard Investigation

Physical and Chemical Phase

1. **Places Investigated:** Fume samples have been taken in locations where men have complained of smoke and fumes. These places have also been inspected and observed at frequent times to note the visible conditions. Places which have been claimed to be bad with respect to fumes are: Pipe Shop Loft, Downstairs Pipe Shop, Engine Rooms while boats on ways, CO_2 Refrigerator Room, Ice Box Refrigerator Room, Companionways leading to Refrigerator Rooms, After Peak Tanks, Fore Peak Tanks, Aft Magazine Chambers, Void Spaces between walls of Magazine Chambers and Ship Sides, Settling Tanks of Engine Rooms, Main Decks, Upper Decks while being completed at Outfitting Dock. The double bottoms have yet to be inspected and tested.

   Chart No. 1 shows the various places tested for fumes and the other times these places were visited for visual inspection.

2. **Degree of Visible Fume Conditions:** The following degrees of smoke or fume haziness are arbitrarily named in this report and shown in the tables. The degree is shown in order from the worst conditions observed to the mildest.
   a. Very bad—CO_2 Refrigerator Room, Ice Box Refrigerator Room.
   b. Definitely bad—Production Welding in Fore Peak or After Peak Production Welding on Main Decks at Outfitting Docks, Void Spaces, Welding in Mop and Broom Closets, etc.
   c. Bad—Magazines.
   d. Possibly bad—Downstairs Pipe Shop.
   e. Passable—Pipe Shop Loft, Engine Rooms with Production Welding.

3. **Ventilation:** Apparently, so far as can be determined from observation and the uncertain answers given by workers, the *Electricians* have charge of placing ventilating accessories or the welders "grab" these, or have their foremen get them, if and when such accessories are available. What function the safety engineer assistants have in supervising ventilation, the placing of portable metal suction tubes, their proper functioning, and supplying small portable "blowers" is impossible to ascertain from casual observation. Someone is very lax about the supervision of these accessories and their maintenance.

   The amount of cubic feet of fresh air supplied to a "location" by the ventilating accessories used has not been ascertained. Such figures could be supplied, on request, from the Safety Engineer.

   From our observation, the following ventilating accessories are commonly used:
   a. Five-inch flexible aluminum tubes providing either blown air or suction. These tubes are connected to medium large or large motor-driven suction fans. The medium fans have openings for connecting as many as 8 five-inch tubes, the larger fans for about 10. *Our observation is that the suction provided by these fans is inadequate.*
   b. Portable "Blowers"—these are small, portable blowers which weigh about 50 lbs. They are usually used without attachment to flexible tubes but have openings for 2 tubes. Are used to blow on men to blow away fumes.
   c. Large Fan Blowers—these are portable, but weigh about 150 lbs. Have openings for as many as 8 of the five-inch flexible tubes. Are suction type. However, when all 8 tubes are connected, the efficiency of this "fan" is greatly cut down. Not more than 4 tubes should be connected to this fan. *Suction provided by this fan seems inadequate.*
   d. Engine Room Permanent Fan Suction—This is a permanent installation. However, when observed during working on boat while still placed on ways, this fan was usually rotating slowly and not providing much suction.
   e. Cloth Vent Tubes attached to Large Blowers—these are large cloth tubes (10 inch diameter) which are principally used to blow out holes after painting to facilitate paint drying. Occasionally they are used as auxiliary ventilators when production welding is being carried on in the deck houses.

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4. **Method of Testing for Fume Concentrations:** Dust samples have been collected by means of the electric precipitator method. This is run at the rate of 3 cu. ft. per min. for about 33 minutes, so that 100 cu. ft. of air are taken for a sample. The apparatus is equipped with three 18-inch extension tubes; the number of extension tubes used has varied with the place being sampled. However, sampling has been done at about the level where the dust would be breathed by the men under working conditions.

After collecting the sample of dust, the tube and electrode containing the dust are weighed. The total dust collected per 100 cu. ft. of air sampled is thus measured. This allows the estimation of the dust present per cubic meter of air which is the value usually used to show dust concentrations. Nitric fumes have been tested for in various locations but have not been found in toxic concentrations.

5. **Allowable Dust Concentrations:** Results of our measurements of the dust concentrations are given in the tables in Mgm. per cu. meter. In order to compare these results and evaluate them comparatively with previously determined concentrations of dust which are generally agreed to be harmful, the following material is quoted from scientific articles.

   a. **Zinc Concentrations:** (From: *Metal Fume Fever, IV.* Threshold Doses of Zinc Oxide, Preventive Measures, and the Chronic Effects of Repeated Exposures. By Philip Drinker, Thomson and Finn. J. Ind. Hyg., vol. 9, pg. 331, July 1927)—"We use a concentration of *15 mgm. per cubic meter* as the threshold limit, because we have found that men exposed for eight hours to concentrations of that order do not ordinarily acquire fever. . . . We found that metal fumes other than zinc oxide will also produce fume fever and that there is a decided difference between the reaction produced by the various fumes. The suggested limit of 15 mg. of zinc applies to zinc oxide and presupposes that impurities like lead, cadmium and copper do not occur in physiologically significant amounts." "Concentrations of 300 mg. per cu. meter inhaled for 20 or 30 minutes will produce fume fever."

   b. **Iron Oxide Concentrations:** (From: *Electric Welding, III.* Prevention of the Respiratory Hazard. By Philip Drinker, H. Warren, and Richard Page. J. Ind. Hygiene, vol. 17, page 133, July 1935.)—"As indices of air cleanliness in welding, the engineer can best use the concentration of *Iron Oxide Fume particles,* and can determine this concentration with standard equipment, either the double impinger or the electric precipitator. *Concentrations may be expressed in milligrams of iron oxide per cubic meter.* . . . We advise keeping iron oxide concentrations below 10 mgms. per cubic meter, which figure we believe will eliminate entirely the respiratory hazard. . . . We have shown elsewhere (paper quoted above) that this malady of fume fever can be avoided in the average person if concentrations of zinc *oxide* are kept below 56 mgs. per cubic meter for short exposures, while long exposures (i.e., 8 hours average) require concentrations below 19 mgms. per cubic meter."

   In a recent bulletin made available to engineers in defense plants where extensive welding operations are carried on, the following concentrations are mentioned as "allowable". (Control of Welding Hazards in Defense Industries, Special Bulletin No. 5, U. S. Department of

Labor, Washington, 1941.) "Satisfactory ventilation results are then achieved by keeping fume concentrations (such as ferric oxide) below *30 milligrams per cubic meter.*"

The following is a summarized description of the location of ventilation facilities, types of welding and working conditions. The included tables are again summarized at the end of this section. (See Chart I.)

Pipe Shop Loft

Description: This is a large two-story "warehouse-like" structure. The loft is situated on the top floor. Measures about 100 ft. wide by 800 ft. long, with a rounded ceiling about 30 ft. high on sides and 50 ft. in the center. While welding is done at scattered places all over this area, the majority of it is done in a restricted area at the west end, measuring about 100 ft. wide and 80 ft. deep.

Ventilation: Several of the windows along walls remain open. About 4 large 24-inch fans in operation at about 20 ft. from floor on south wall to suck out fumes. Individual 5-inch flexible aluminum tubes lay scattered on tables; suction by these tubes not very strong; all welders do not make use of suction tubes.

Welding: Almost entirely 100% galvanized pipe. Pipes are placed on work benches so that men may sit at work.

Number of Welders: 6 to 7 men were welding in this location. Facilities for 10 welders. At time of testing, men were not very busy.

Statement of men who have worked here—"Place is terrible when 10 welders are working and a 'job' has to be rushed"—"should be some way to draw fumes off through top of ceiling"—"damned suction tubes are only in the way, ain't no good."

Five Samples and Dust Concentrations

Date	Visible Appearance of Fume Haziness	Mgms. Dust Cu. Meter	No. of Welders Working	Height of Intake Tube	Temp.	Humidity	Barom.
9–16–42—Day Shift	Only mildly hazy	10.7	6-7	6 ft.	62	74%	770
Day Shift	Less smoky	6.64	5-6	6 ft.	62	74%	771
Day Shift	Very little haze, Changed location of sampling	4.94	5-6	6 ft.	64	65%	770
Swing Shift	Mildly hazy; worst thus far	13.88	8-9	6 ft.	69	50%	770
Swing Shift	Less smoky	10.7	6-8	6 ft.	66	48%	770

Downstairs Pipe Shop

Description: This is a room, closed off from pipe bending and cutting shop, located at west end of building. It measures about 60x80x30 ft. high. Both galvanized and iron pipe are welded here; about 80% of the work is galvanized.

Ventilation: Two open "barn doors", about 12 ft. wide and 12 ft. high are located one on west end and one on north end. These doors provide a cross draft across about 4 welders; other welders working on tables in S. E. corner are not in this current of air. A bad dead space exists in this S. E. corner, where

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facilities are provided for 8 welders. Five-inch flexible aluminum suction tubes are placed on benches, but since these are not powerful enough to suck up fumes, men do not bother to use them. Two 20-inch fans of exhaust type are on south wall at about 20 ft. from floor.

Welding: About 80% welding of galvanized pipe and valves.

Number of Welders: Machines for 12 welders; men work at benches.

Statement of men: "You should take a test in here when we are really working." "I have seen this place so thick with smoke you couldn't see that light bulb up there." "It's really bad in cold weather when the doors are closed." "Oh yes, the suction tubes work O.K., but they don't seem to do much good."

Four Samples and Dust Concentrations

Date	Visible Appearance of Fume Haziness	Mgms. Dust Cu. Meter	No. of Welders Working	Height Sample Taken	Temp.	Humidity	Barom.
9–16–42—Day	Mildly hazy; I saw this	9.96	7-8	6 ft.	69	62%	770
Day	place worse before on previous visit	10.38	4-6	6 ft.	70	59%	770
Swing	Quite smoky; men starting swing shift	16.07	10	6 ft.	70	55%	770
Swing	Quite smoky	13.35	10	6 ft.	72	49%	770

Engine Rooms—Ships on Ways

Description: The engine room is located midship in center of boat. Until smokestack is installed, it remains open at top but because of several levels of floors on sides, there are recesses which are only open on one side. The visibly worse place for collection of fumes, and as claimed by men to be bad, is in the after-port corner, where the fuel and water valves and the salt water intake pipes are located on the bottom of the ship. Sampling was done over this area where considerable of the welding was on galvanized pipe. This was about 10 ft. above bottom, or under the engine, which is located in the center of the room. The room measures width of boat and about 60 ft. long.

Ventilation: Adequate when top is open and before engine is installed. Fumes collect in recesses and are visibly bad in vicinity of valves and salt water intake. At times, a small 50-lb. portable blower was placed on floor to blow fumes away from welders.

Welding: Welding on the valves and pipes in after-port corner is mostly galvanized and the fumes are moderately hazy when this goes on. Elsewhere here and there are welders and burners on black iron doing miscellaneous jobs.

Number of Welders: Due to crowded conditions and space, not more than 3 or 4 welders at a time work on valves and pipes. This work takes about 2

complete days to finish and men work more or less continuously in the aft-port vicinity. About 4 other welders are working in scattered places on black iron.

Eleven Samples and Dust Concentrations

Date	Visible Appearance of Fume Haziness	Mgms. Dust Cu. Meter	No. of Welders at Work	Height From Bottom	Temp.	Humidity	Barom.
9–17–42—Day	Under engine; only slightly hazy; Way 11	9.22	3-4	12-ft.	62	72%	772
Day	30% gal.; mild haze	9.60	3	12 ft.	58	72%	772
Day	Under engine; Way 6 moderately hazy	15.12	4	12 ft.	63	74%	772
Day	Moderately hazy	16.71	4	12 ft.	63	74%	772
Day	Mildly hazy; Way 10	25.79	4	10 ft.	70	59%	772
Day	Not visibly hazy	12.94	3	10 ft.	70	59%	772
9–19–42—Day	Not very hazy	21.59	3	10 ft.	77	55%	774
Day	Moderately hazy and hot	35.97	3	10 ft.	76	67%	774
Day	Moderately hazy	27.20	4	10 ft.	78	63%	774
Day	Not hazy	14.84	1	10 ft.	77	63%	774
9–24–42—Day	Way No. 9; not bad	5.79	2	12 ft.	76	74%	770

CO_2 Refrigerator Rooms

Description: Located at far end companionway, port side. Very difficult to get to as companionway usually cluttered up with frames and supports. Size about 10x12x12. Small "man-hole" opening only, measuring 30 inches high and 18 inches wide.

Ventilation: Since this room is located at far end of companionway, and has only one opening, ventilation is very poor. It is difficult to bring 5-inch flexible tubes down to this room. Men, when working, usually use a small 50-lb. "blower" which is aimed to blow fumes out "man-hole" and is blown on the worker.

Welding: First tests, 16 to 19 were made when 2 welders working on galvanized pipes; second tests, No. 29 and No. 30, were made when men were welding black iron seams. This is the normal way these jobs are handled.

Six Samples and Dust Concentrations

Date	Visible Appearance of Fume Haziness	Mgms. Dust Cu. Meter	No. of Welders Working	Height Sample Taken	Temp.	Humidity	Barom.
9–18–42—	Extremely thick	290.24	2	4 ft.	70	59%	774
9–18–42—	Extremely thick	171.34	1	4 ft.	74	43%	774
9–18–42—	Moderately bad	76.2	1	4 ft.	73	53%	774
9–18–42—	Moderately bad	73.5	1	4 ft.	76	43%	774
9–28–42—	Moderately bad; both gal. and black iron	35.7	2	3 ft.	74	65%	770
9–28–42—	Moderately bad; both gal. and black iron	33.0	2	3 ft.	80	60%	770

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Refrigerator Cold Storage Room—Port Side

Description: Located alongside port companionway. Size is about 30 ft. long by 10 ft. wide by 12 ft. high. No galvanized work and no pipes. This place is later insulated and heavy white pine wood placed around it to serve as meat storage room. Usually 2 or 3 welders work in here at a time on seams and brace plates. Also, 1 or 2 gas burners may be in here. At times, men say as many as 5 welders may be in there on production welding.

Ventilation: 1 doorway forward to companionway accessible to suction tubes. This place has been inspected about 12 times and about 6 times it was noted that no suction tubes with fans were around. At times, a small blower fan is used. When last tested on 11-10-42, suction tubes (3 leads) were in room, but these were not connected to the fan. The fan had evidently been taken elsewhere. Consequently, fumes were so thick from 2 welders working that electric light could not be seen 15 feet away.

Welding: All black iron. Usually welders number 2, but at times as many as 4 to 5 welders may be in here.

Four Samples and Dust Concentrations

Date	Visible Appearance of Fume Haziness	Mgms. Dust Cu. Meter	No. of Welders at Work	Height Sample Taken	Temp.	% Humidity	Barom.
9-24-42—Day	Mildly hazy	25.9	2 welders 1 burner	6 ft.	75	78%	766
Day	Moderately hazy; worse than first sample	38.4	1 welder 1 burner	6 ft.	76	70%	766
Day	Mildly hazy	29.13	1 welder	6 ft.	80	68%	766
Swing	Very thick and bad	90.00	3 welders	6 ft.	60	68%	774

Fore Peak Tanks

Description: The fore peak tanks are situated in the prow of the ship. They are triangular in shape, similar to the after peak tanks, and measure about 30 ft. wide (width of ship) aft and come to a point at the bow of the ship. They are about 40 ft. deep. A central perforated plate extending from top deck to keel divides these tanks into two tanks. There are three "cat walks" placed all around sides and along the aft base, these are placed at 10, 20, and 30 ft. heights from the bottom. Supporting beams cross at each of these levels from sides to center plate. Entrance is made from a narrow small "man-hole" through central floor of chain locker or from a small hole on starboard side from No. 1 hatch.

Ventilation: Some natural, but not much, ventilation is effected by means of a cross draft up from small man-hole on starboard side from bottom of No. 1 hatch up and across through the small hole in center of chain locker floor. However, both these holes are usually clogged up with 2 or 3 ventilating tubes, air hoses, electric welding wires, etc. The "man-hole" through on starboard side from No. 1 hatch is usually welded closed before men finish working in the fore peak tanks.

I have inspected the fore peak at six different times and have always found it fairly smoky and being poorly ventilated each time. Usually there are 3 or 4 of the 5-inch ventilating tubes passing down through the hole on the floor of the

chain locker. These tubes are supposed to suck air to the outside, but because they are connected up as many as 8 to a medium-sized fan, their efficiency is poor. Each tube doesn't suck up as much air as a vacuum cleaner. I have been told that not more than 4 of the 5-inch aluminum tubes should be connected up to these medium size exhaust fans at a time if they are to exhaust the air efficiently.

Welding: This is by "production" welding. Production welding is where as many as 6 to 8 men, i.e., a crew with a lead man, are assigned to a job in one particular location and continue working there throughout the shift or until the particular assigned work is completed. Such practice of production welding is used in these fore peak tanks. At times, as many as 10 or 12 men weld on "production" work in these tanks. The men say the tanks are the next "worst" place to the double bottoms. When the samples below were taken, from 6 to 8 men were welding on black and galvanized iron.

Three Samples and Dust Concentrations

Date	Visible Appearance of Dust and Fumes	Mgms. Dust Cu. Meter	No. of Welders Working	Height Sample Taken	Temp.	Humidity	Barom.
10-26-42—Swing	Very smoky and hazy	66.9	8	30 ft. above keel	74	53%	.....
Swing	Moderately smoky	32.9	6	30 ft. above keel	73	53%	.....
Swing	Very smoky	92.3	8	30 ft. above keel	74	50%	.....

After Peak Tanks

Description: The "aft" peak tanks are located below the steering mechanism floor and the magazines at the stern of the boat. Similar in shape to the forepeak, it is triangular and measures about 40 feet at the base, which is forward and about 40 ft. deep. Similarly, 3 "cat walks" are placed around sides of boat at 10, 20, and 30 ft. levels above keel. Samples for our tests were taken on the 30 ft. level above where most of the welders were working. Access is through a small 24-inch hole on starboard side of steering mechanism floor and from below through a "manhole" on port side through to No. 5 hatch. This arrangement affords some cross ventilation.

Ventilation: Until the "manhole" at bottom on port side through from No. 5 hatch was "punched out", which has only recently been done (since October 1942) the ventilation of the "aft" peak was said to be terrible. Some cross ventilation is provided now by this arrangement, but, again, not much because both holes are clogged up with ventilating tubes and air hoses, etc.

When samples Nos. 38 and 39 (first two listed below) were run, tubes were in place but not working. When samples Nos. 46 and 47 (last two) were taken, a single 5-inch vent. tube was placed through upper hole, but it was *blowing* a small stream of air in, instead of sucking it out, as it should. This stream of air was naturally *against* the natural draft provided by the two openings. As usual, it was evident that a welder placed this tube down the upper hole and wanted to blow air on himself, and this was the easiest way to do it, even if it upset the natural current of air. Many evidences of complete lack of ventilation mechanics and engineering have been seen here and elsewhere.

Welders: When samples were taken, from 4 to 6 welders were working on

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black iron. At times, for periods of 1 shift, or more, as many as 8 men work in here on "production" welding.

Four Samples and Dust Concentrations

Date	Visible Appearance of Fumes and Dust	Mgms. Dust Cu. Meter	No. of Welders Working	Height Sample Taken	Temp.	Humidity	Barom.
10–24–42—Day	Moderately bad	24.7	6	30 ft. level	64	74%	770
Day	Moderately bad	34.06	3-4	30 ft. level	68	69%	770
11–10–42—Swing	Quite smoky	27.2	3	30 ft. level	60	66%	774
Swing	Quite smoky	20.1	3	30 ft. level	58	50%	774

Magazines

Description: These are located at stern of boat. Entrance is through a medium size door from steering room mechanism. There are two magazines, the larger on starboard side and one on port side. The larger room measures about 20x12x12 ft. high, and the smaller is square-shaped, measuring about 14 ft. and 12 ft. high. Some galvanized pipes run through these rooms.

Ventilation: A "manhole" is placed near center part and forward in these rooms which leads to a very narrow closed-in pipe tunnel. Openings into this pipe tunnel are from starboard side and through from No. 5 hatch, first level. Thus, until these "manholes" are closed, some draft can get through by a circuitous route from the open No. 5 hatch to these rooms and out through the door to the steering mechanism room. At times, on inspection, I have seen 5-inch vent. tubes in these rooms leading from steering room and connected up to blow instead of to suck. Ventilation could be easily improved. No accessory vent. apparatus was being used when tests Nos. 40 and 41 (below) were made, and while there seemed to be a good draft through from forward "manhole" along center side of magazine out through door, the rest of the room remained very smoky and was not ventilated.

Welders: There are usually 2 to 4 welders working in here at a time. No production welding is necessary in here. When a previous attempt was made to do tests in the magazine of the Record Boat when on way No. 5, it was impossible to set up the machine due to the fact that great activity was going on in here and about a dozen men were working while 3 welders were busy. The place was very smoky at this time—an estimated concentration of about 40 mgms. per cu. meter. When tests Nos. 40 and 41 (below) were made, two women welders worked in here constantly from 12:30 P. M. up to when we left at 3:00 P. M. A worker said that on the day previous when 3 women were welding in here the fumes got so bad that 1 woman had to "knock off" at about 2:00 P. M. and go home, saying she was quitting.

Two Samples and Concentrations

Date	Visible Appearance of Fumes	Mgms. Dust Cu. Meter	No. of Welders at Work	Height Sample Taken	Temp.	Humidity	Barom.
10–24–42—	Mildly bad	33.2	2 women	6 ft.	74	65%	770
10–24–42—	Moderately bad	20.9	2 women	6 ft.	78	64%	770

Outfitting Dock—Main Deck Houses

Description: The main deck house is placed midships around and over engine room. There are three floors or levels to the deck house. The "lower" deck consists of living quarters for engineers and stewards, the kitchen, dining room, lavatories, and lounge room. It is partitioned up into smaller rooms with larger rooms across forward part and a large room on the starboard and port sides. The "middle" deck house comprises the living quarters for officers and a quartermaster deck across the forward part. The "top" deck house is the captain's quarters and, across the forward part, the bridge deck. The three rooms, one above the other, across the forward part measure about 30 ft. wide by 15 ft. deep and 12 ft. high. The dining and lounge rooms are about 20x20x12 ft.

Ventilation: Ventilation is generally good in all these places, but at times the fumes become definitely objectionable, particularly when "production" welding is under way. Worst conditions exist when the screen floor mats are being tacked to the steel plates of the floor. These floor mats are for holding down the asphalt cement composition poured on the metal floors. Since these places are easily accessible, usually suction tubes and blowers are freely placed when welding goes on. However, on several occasions the places have been very smoky because whoever was supposed to install and arrange the suction tubes and blowers was "not on the job".

Welding: Black iron. Work is usually done by "production welding". About 6 to 8 welders will work on the seams and iron walls in one room, or when the metal screen mats are being tacked to the floor, this work is pushed by as many welders as available. This makes the place quite smoky. Men say that at times the place gets so bad that you can't see your hand in front of your face, but we have not seen conditions this bad but appreciate how easily they could obtain.

Four Samples and Concentrations

Date	Visible Appearance of Fumes	Location	Mgms. Dust Cu. Meter	No. of Welders	Height Taken	Temp.	Humidity	Barom.
10–5–42—Swing	Mod. bad	Hull No. 578 Starboard XFK	36.7	5	5 ft.	75	65%	765
Swing	Mod. bad	Mop & Broom Closet—XFK	37.0	1	5 ft.	82	69%	765
10–6–42—Graveyard	Not bad	Hull No. 578 XFM – Qmstr.	16.96	6	5 ft.	67	71%	765
Graveyard	Not bad	Hull No. 578 XFM – Qmstr.	16.39	6	4 ft.	68	62%	765

Comments on Analysis of Fume Samples and Dust Concentrations

(1) The fumes from black iron welding consist essentially of magnetic iron oxide with small amounts of manganese. Iron, manganese, calcium, magnesium and aluminum silicates, along with titanium (probably titanium oxide) comprise approximately ten to fifteen per cent of the fumes. Copper, zinc, cadmium, lead, thallium and mercury are not present in any significant amount. Flourides are absent. The metal fumes from galvanized iron welding consist of the above, to which is added variable amounts of zinc. No other toxic metals are identified.

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(2) The total amount of metal fumes expressed as milligrams per cubic meter are shown in column 6. Concentrations of total fumes above 15 mg. cubic meter must be considered as possibly hazardous for long continued exposures. Concentrations of total fumes above 50 mg. cubic meter must be considered hazardous for continuous exposure to such fumes.

The total amount of zinc fumes, expressed as milligrams per cubic meter is shown in column 7. A concentration of zinc fumes over 15 mg. cubic meter must be considered hazardous for continued exposure. The only significant amount of zinc fumes were found in the CO_2 refrigerator rooms (Samples Nos. 16, 17, 18 and 19).

(3) The majority (99%) of the metal fume particles encountered are less than 3 micra in diameter. These particles are of such size as to be easily respirable.

(4) Under the conditions of welding with coated electrodes, no significant amount of nitrogen oxides were identified on several spot samples, close to and away from the arc. Ozone was not identified in any significant amount.

(5) It is our opinion that a close estimate of the amount of metal fumes in the atmosphere may be made by visual inspection; if the atmosphere is moderately hazy, a probable hazardous concentration of fumes may exist.

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CHART I.

Summary of Fume Samples and Dust Concentrations

Sample No.	Date	LOCATION	Type of Welding	Minutes	Mgms. Dust per Cu. Meter	ANALYSIS (Expressed as mg/ cubic meter) Zinc	Lead	Silicates
1	9/16/42	Pipe Shop, Left, N.W. Corner	100% Galvan.	33-1/3	10.7	...	...	...
2	9/16/42	Pipe Shop, Left, N.W. Corner	100% Galvan.	33-1/3	6.64	...	...	...
3	9/16/42	Pipe Shop, Left, S.W. Corner	100% Galvan.	33-1/3	4.49	...	...	...
4	9/16/42	Downstairs Pipe Shop	80% Galvan.	33-1/3	9.96	...	...	...
5	9/16/42	Downstairs Pipe Shop	80% Galvan.	33-1/3	10.38	...	...	...
6	9/16/42	Downstairs Pipe Shop	80% Galvan.	33-1/3	16.07	...	...	...
7	9/16/42	Downstairs Pipe Shop	80% Galvan.	33-1/3	...	...	...	...
8	9/16/42	Pipe Shop, Left	100% Galvan.	33-1/3	13.88	...	...	...
						Samples No. 1-9 Pooled		
9	9/16/42	Pipe Shop, Left	100% Galvan.	33-1/3	10.7	1.94	Neg.	1.21
10	9/17/42	Way No. 11, Engine Room	30% Galvan.	33-1/3	9.22	...	...	...
11	9/17/42	Way No. 11, Engine Room	30% Galvan.	18	9.60	...	...	...
12	9/17/42	Way No. 6, Engine Room	30% Galvan.	33-1/3	15.12	...	...	...
13	9/17/42	Way No. 6, Engine Room	30% Galvan.	33-1/3	16.71	...	...	...
14	9/17/42	Way No. 10, Engine Room	30% Galvan.	33-1/3	25.79	0.71	Neg.	8.38
						(Samples: No. 10, 11, 12, 13, 15)		
15	9/17/42	Way No. 10, Engine Room	30% Galvan.	20	12.94	7.89	Neg.	8.28
16	9/18/42	CO_2 Refrigerator Room, Way No. 10	100% Galvan.	33-1/3	290.24	46.2	Neg.	2.54
17	9/18/42	CO_2 Refrigerator Room, Way No. 10	100% Galvan.	14	171.34	41.5	Neg.	6.26
18	9/18/42	CO_2 Refrigerator Room, Way No. 10	100% Galvan.	10	76.2	28.4	Neg.	1.12
19	9/18/42	CO_2 Refrigerator Room, Way No. 10	100% Galvan.	10	73.5	32.6	Neg.	1.19

20	9/19/42	Engine Room, Way No. 5, Record Boat	40% Galvan.	33-1/3	21.59	...	...	...
21	9/19/42	Engine Room, Way No. 5, Record Boat	40% Galvan.	33-1/3	35.97	...	...	...
22	9/19/42	Engine Room, Way No. 5, Record Boat	40% Galvan.	33-1/3	27.20	...	...	...
23	9/19/42	Engine Room, Way No. 5, Record Boat	40% Galvan.	33-1/3	14.84	...	...	...
24	9/24/42	Port Ice Box, Way No. 9	Black Iron	32-1/2	25.9	...	...	...
25	9/24/42	Port Ice Box, Way No. 9	Black Iron	32-1/2	38.4	...	...	...
26	9/24/42	Port Ice Box, Way No. 9	Black Iron	20	29.13	...	...	...
27	9/24/42	Engine Room, Way No. 9	40% Galvan.	32-1/2	5.79	...	...	...
28	9/28/42	Port Settling Tank	Black Iron	32-1/2	28.05	...	...	...
29	9/28/42	CO_2 Refrigerator Room, Way No. 7	Galvan. and Black	32-1/2	35.7	...	...	...
30	9/28/42	CO_2 Refrigerator Room, Way No. 7	Galvan. and Black	32-1/2	33.0	...	...	...
31	10/ 5/42	Outfitting, Hull No. 578, Starboard XFK	Black	32-1/2	36.7	...	...	...
32	10/ 5/42	Mop and Broom Closet	Black	24	37.03	...	...	...
33	10/ 6/42	No. 578—XFM	Black	32-1/2	16.96	...	...	...
34	10/ 6/42	No. 578—XFM	Black	32-1/2	16.39	...	...	...
35	10/19/42	No. 583—Port, Void Space	30% Galvan.	32-1/2	21.73	...	...	...
36	10/19/42	No. 583—Port, Void Space	30% Galvan.	32-1/2	21.94	...	...	...
						(Samples: No. 29, 30, 35, 36)		
37	...	...	...	...	...	0.45	Neg.	2.3
38	10/24/42	Way No. 9, Aft. Peak, Starboard	Black	32-1/2	24.7	...	...	...
39	10/24/42	Way No. 9, Aft. Peak, Starboard	Black	32-1/2	34.06	...	...	...
40	10/24/42	Starboard Magazine	Black	32-1/2	33.2	...	...	...
41	10/24/42	Starboard Magazine	Black	32-1/2	20.9	...	...	...
42	10/26/42	Fore Peak, Port Tank, Hull No. 590	Black Iron	32-1/2	66.9	...	...	...
43	10/26/42	Fore Peak, Port Tank, Hull No. 590	Black Iron	32-1/2	32.9	...	...	...
44	10/26/42	Fore Peak, Port Tank, Hull No. 590	Black Iron	32-1/2	92.3	...	...	...
45	11/10/42	Refrigerator Room	Black	20	90.0	...	...	...
46	11/10/42	Tank, Aft. Peak	Black	32-1/2	27.2	...	...	...
						Samples: No. 31, 32, 33, 34, 38, 39, 43, 44, 45, 46, 47)		
47	11/10/42	Tank, Aft	Black	32-1/2	20.1	Neg.	Neg.	3.5

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Medical Aspects of Shipyards Investigation in Study of the Disease Processes in Shipyard Workers Employed in So-Called Hazardous Positions

Interviews as well as clinical data were accumulated concerning 40 individuals employed at the Oregon Shipyards. Of these, 8 are incomplete and, therefore, not recorded in the charts. For this investigation a questionnaire, which is hereto attached, was drawn up for the purpose of accumulating uniform data bearing on the problem. The chart hereto attached (Chart II) has been arranged according to age. The names are represented by the initials. Original names are on file and will be made available as a separate list or key, if it is so desired. This has been done for the purpose of not incriminating or betraying the confidence of individual workmen who were willing to participate in this investigation.

Age: Eleven of the 40 have ages ranging between 19-29 inclusively; 12 from 30-39 inclusively; 10 from 41-48 inclusively; 4 from 51-56 inclusively; and 3 from 63-65 inclusively. The accompanying information is therefore concerned largely with those in the younger age groups. Out of the total, only 7 are above 50 years of age. Over half of these men are below 40 years of age. They are, therefore, representatives of that age group in which individuals should be in the full vigor of physical life.

Previous Occupation: Of these 40 examined, 4 were miners, 7 were mechanics, and others had worked in different occupations, such as painting, meat cutting, truck driving, railroading, creamery operation, paper mill workers, construction work, electricians, stone masonry, carpenters, etc. Some of these were undoubtedly hazardous, in the sense that these individuals were breathing impure air, especially those that were garage mechanics, miners, welders, and factory workers. No information was obtained as to the status of the vital capacity of the heart and lungs of these individuals prior to shipyard employment.

Previous Diseases: An attempt was made to determine the existence of previous diseases, in particular those of the nose, throat and lungs, which might have had some bearing upon the susceptibility of these individuals to the inhalation of fumes, regardless of their possible concentration under different working conditions. The existence of such processes must necessarily depend upon the honesty and truthfulness of the individuals interviewed. It is our belief that this information was given to us freely and without any attempt to conceal or befog the issue, although we cannot entirely exclude the latter.

Seven of these men had had pneumonia; 5 were treated for influenza; 3 had had tuberculosis; 4 had had pleurisy; 3 had a history of definite repeated sinus infection over a period of years; 16 complained of frequent colds; 6 had had repeated sore throats; 1 had a definite history of asthma over a period of years.

In many instances there were histories of pneumonia, tuberculosis, frequent colds and sore throats in the same individual. One must, therefore, consider the increased susceptibility of such employees to working conditions in the presence of fumes or dusts. Repeated infections of the respiratory tract, including the nose, throat, air passages, and lungs, tend to render the individual susceptible to recurrence, or more responsive to new insults. Change of occupation, dietary irregularities, inadequate clothing, susceptibility to colds, and variations in temperature and atmospheric pressure must also be considered in the evaluation of the effect of the inhalation of welding fumes and dusts. It is certain that these conditions should be taken into consideration in determining the selection or

hiring of men for occupations which are at their best more or less hazardous. In addition to the above diseases, such conditions as heart irregularities, especially in individuals above 40, must also be considered as having a direct influence on the vital capacity of the lungs functioning in the presence of the impure air.

Exposure: All of these 40 men were exposed to welding fumes, either directly as welders, or indirectly as welders' assistants, or in the capacity of other divisions of labor which resulted in exposure to welding fumes.

Type of Work: Of the 40 individuals under consideration, 24 were welders or welders' assistants; 5 classified themselves as "ship-fitters", 4 as "pipe-fitters", 1 as a "chipper", 3 as machinists, 3 as painters. All of these were exposed to welding fumes, either directly or secondarily. For example, painters who were painting above level where welders were working, were therefore exposed to the fumes that rose up to them. The welding fumes were referred to as being in part due to welding of galvanized materials, or painted or black iron pipes. The fumes, therefore, in many instances were not derived from welding of galvanized pipes alone. The distribution of the welding and the nature of the materials welded have been referred to in the above comment on the physico-chemical phase of this investigation.

Length of Service: Length of service, and therefore the possibility of exposure, usually varied from 3 weeks to 18 months. Thirteen worked from 1 to 6 months, 11 from 6 months to 1 year, and the balance from 1 year to a year and a half. A few were exposed for only a day or two.

Shifts: Twenty-one of those concerned, on whom data is available, worked in the day shift, 5 on the swing shift, and 4 on the graveyard shift. In several instances these men were transferred from one shift to another. The influence of day and night conditions has not as yet been fully analyzed.

Protective Measures: The following comments were made by these various employees as to the availability and effectiveness of the protective measures:

"No blowers available at the time I became sick."

"Blowers and suckers available when you can find them."

"Suckers and blowers were weak, because of length of hose, not always available."

"Ventilating fumes get bad in spots and close to the ceiling. Poor ventilation around vacuum cleaners. Escape of fine dust not controlled."

"Blowers insufficient."

"Ventilation conditions better since change of shift. Protective measures were used until they broke down, then they forgot about them. Better now."

"Suckers and blowers wholly insufficient."

"Not enough blowers to go around. Complained of poor ventilation to foreman. No results. Some improvements lately."

"Blowers present but not used. Suggested cutting hole in opposite end of bulk-head to improve ventilation. Previously painters worked in the presence of welding. This has now been stopped."

"Air hose removed fumes not well enough."

"Air pump inadequate."

"Air hose of little or no value."

"Foreman indifferent to protective measures."

"Foreman told the man to work—'If others can stand it so can you'."

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"Foreman and Safety Director are just about as useless as a 'tit' on a boar."

"Blowers were not available until 3 months ago."

"Very few blowers present, and furnished only on demand."

"Told foreman I would not go down and work in the presence of fumes unless I had blowers and suckers. Condition very bad. Constant metallic taste in mouth. Foreman did not respond. Went directly to Safety Division. Representative was sent over, appeared, and asked about my complaint. He said he would remedy it, but I never saw him or the new devices again."

These comments from various men have been reduplicated again and again. Not one single interviewed employee spoke of adequate ventilation. Without exception they pointed out that there was no insistence upon the use of ventilating devices. It was further pointed out that such ventilation was often completely inadequate, and frequently not available at all. This was true in situations in which the fumes were so annoying that workmen were only able to remain at their work for brief periods of time. They would often be compelled to come up for air without asking or getting permission. There is no doubt in the minds of those who interviewed these workmen as to their honesty and interest in making the above statements for improving these offensive conditions. These workmen were convinced of the indifference of those charged with the production of good ventilation in hazardous positions.

Effect of Exposure: Effect of fumes as it was given to us by the various employees interviewed:

"Had to go home. Chest hurt all the time."

"Drowsy. Mind all fogged. Disappears after leaving work. Nausea after breakfast. Raising of phlegm. Tightness in throat. Sweet taste in mouth. Pain in chest."

"Felt like I had a fever towards evening. Felt chilly at home. Sick to stomach."

"Pain in chest."

"Felt sick. Burning sensation."

"Had to come up for air. Coughed all the time even when away from work."

"Soreness of lungs. Sickening metallic taste."

"Sleepy at first. Metallic taste in mouth."

"Burning in windpipe."

"Sweet taste in mouth present all the time."

"Peculiar feeling in throat. Sweet taste in mouth."

"Burning in nose. Nausea. Vomiting. Severe headache."

"Stomach distress. Loss of appetite."

Again these conditions represent comments made by the majority of welders. It should be pointed out that these comments were made individually to the investigating committee, and represented independent opinions. As one reads the chart (Chart II), it is striking how similar these complaints are. Except for variation in expression, the story of the effect of fumes experienced by the individual workmen is astoundingly uniform.

Symptoms: Considerable variation was present in the symptoms presented by the various individuals examined, both on the part of the individual himself and by the physicians who had occasion to examine them. The most common and constant symptom was that of cough. It was especially pronounced in 20 out of 31 concerning whom our data is most complete. The cough was persistent during work, as well as when the employees were away from work. It was

alleged to be so violent that it often kept the men awake all night, and in one instance it is said to have resulted in rupture of the lung. Difficulty in sleeping and breathing was found to be common. Ten of the 31 complained of this in particular. Hoarseness was often astoundingly pronounced, and was present in over 50% of those whom we have been able to interview.

On one occasion, one of us (FRM) contacted an employee on the street. His voice was practically inaudible. When asked what had happened, he replied: "It's those damn welding fumes; everyone down there exposed to them in the double bottoms talks that way." This is not an isolated instance, especially in the early stages of shipbuilding in these yards.

We have reports from the physicians indicating that unusually violent forms of laryngitis (inflammation of vocal chords) were observed by them in welders. Such inflammation failed to respond promptly to treatment. Pain in the chest was present in the large per cent. Night sweat was complained of by 6 individuals. Appreciable loss of weight was also observed in some cases. Many different factors may have entered into the latter.

Again, as above, the complaints and the symptoms of these individuals are quite uniform, varying in intensity, and in the effect in the different individuals, as one might suspect of any other one disease process occurring in different individuals. Others complained of extreme weakness. Still others had chills and fever. Others complained of nausea and vomiting with loss of appetite. Part of these latter complaints were referred to disturbances in the stomach, others to the nasty taste of phlegm with a persisent metallic tang. Several complained of completely collapsing. Others stated that they would become dizzy, shaky, and often felt on the verge of fainting.

Some who were exposed to paint solvent fumes stated that they felt like they were getting drunk. This latter reaction was thought to be due to "new thinners" being used.

Diagnosis and Treatment: Some of these had treatment at home. Some received no treatment; others were treated both at hospital and physician's office. In a number of instances the relation between the exposure and the immediate symptoms and the subsequent occurrence of certain respiratory infection was apparent. Some of these individuals recovered; a few of them have died. The exact relation of the sequence of events in such cases requires individual consideration of each instance.

Physicians willing to contribute, indicate that there is found in a great many of these individuals upper respiratory infection, including the nose, throat, larynx, or vocal cords, trachea (or windpipe), bronchi (smaller divisions of the windpipe), and lungs. In a number of instances the seriousness of a given patient's condition appeared to be largely due to other pre-existing diseases, rather than to the exposure of the individual to fumes alone. Such considerations must again be on an individual basis.

A number of physicians have found the conditions in the air passages and lungs very refractory to treatment, even after enforced absence from work and after intensive local treatment. Alleged infections such as the pneumonias often failed to yield to specific treatment. In a number of instances patients were advised by their physicians to remain away from such hazardous locations or to seek new employment.

Workmen have expressed great concern about their state of health and the

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consequences as to the permanency or curability. This is not hysteria or desire to recover damages, although a few such individuals may be encountered in every walk of life. By far the great majority of those interviewed impressed us as being fine, honest citizens who found themselves in ill health without recourse. Some were obliged to discontinue work and are without available funds to receive adequate diagnosis and treatment. We suggested to a number that they should see a doctor. The answer was, "Who is going to support my family? Who will pay the doctor's bill?" Obviously a situation such as this requires correction. Hazardous industrial occupations of this kind should be covered by some legally constituted provision.

In addition to the forty employees interviewed and studied, a number of other patients (also employees) examined by certain physicians were studied. These physicians are engaged in the practice of diseases of the chest, and are especially competent in this field. For this reason a large number of employees suffering from conditions alleged to be due to industrial hazards consulted these doctors, or were referred to them by other physicians. In a number of instances the examinations were requested because of a failure on the part of some of these men to pass the physical examination necessary for induction into the Army. The committee had access to these case records through the courtesy of their physicians.

Not all of these fifteen instances here reported have been completely studied; that is, they have not all been interviewed by the examining committee; but among these additional fifteen cases there are two who are nineteen years of age; nine whose ages range in the third decade (between 20 and 30); two who are both 31 years of age; one who was 35 years of age; four whose age range from 42 to 46. Thus it may be seen again that most of these laborers who applied for physical examination and treatment were in the younger age group. A study of previous occupations in this group showed that some were students; some laundry workers; others were salesmen, still others were farmers—all of whom stated that they were relatively free from any major disease prior to working in the shipyards. All of these were exposed to welding fumes and developed various conditions within their windpipes or their lungs, for which they sought the aid of these physicians. Although our records are not yet complete in these cases, they all had complaints similar to those that were studied in detail. Several of these were treated in the First Aid Station for sore throat and obvious infections.

Various analagous complaints were made, such as "dull, aching pain in the chest", "marked difficulty in breathing", "violent coughing", "dizziness", "fever", "hoarseness", "loss of appetite", "collapse" and "chills". In two out of this group, it was found that they had had previous damage to their lungs from other occupational diseases or dusts. Accordingly the doctor advised them to discontinue in positions in which the air was contaminated. An opportunity was afforded to study the X-rays of the lungs of these individuals, and quite uniformly it was noted that in the acute conditions for which these patients (employees) sought relief, there was what was described by the specialists as an "acute tracheobronchial pneumonitis", which means an inflammation of the windpipe and all of its smaller branches, as well as the lung itself, so that the inflammation resulted in sufficient concentration to cast additional shadows which showed up in the X-ray.

It was further pointed out by these specialists to the examining committee that these changes in the lungs were often mistaken for tuberculosis or other occupational diseases for these reasons and some of the men had been turned

down by draft boards for what seemed to be tuberculosis. The specialists pointed out to us that the variation in markings observed in the X-ray were the direct opposite of those of tuberculosis, but that they did show that there was a diffuse low-grade inflammation of the type mentioned above. All of these X-ray pictures were examined by us, and the above conclusions were concurred in.

Additional clinical evidence will be valuable in a future study of these patients as to the disappearance or permanency of this acute condition from exposure to welding fumes. Certain physicians reported having seen 50 or more of such patients. In recent weeks women welders have come to doctors for the same reasons. We have also contacted other physicians who have had similar experience with patients working in certain places in the shipyards. These particular findings are pointed out because it has been stated in the medical literature, based upon the examination of a small number of cases, that the reactions to certain fumes are only transitory. It is therefore our objective to make a more prolonged study of such cases as these in an effort to determine the accuracy of such statements which now seem questionable. We therefore solicit the continued interest of physicians in furthering such a study in order to eventually establish the truth of such contradictory contentions.

All of these particular instances, or cases, of employees seen by physicians have been recognized by them as distinctly occupational disease processes. They have been so treated; and there is evidence that under conditions of treatment which in many instances result in the patient remaining away from work or being advised to change his occupation entirely, the state of health has very definitely improved. However, as soon as the individuals returned to work, they state that their discomfort returns.

We are not in a position completely to evaluate the significance of such clinical evidence as this, because it is as yet incomplete, but it is recorded here because it does have a bearing on the number of individuals who are working at the Oregon Shipyards under the working conditions there; and who are in particular exposed directly or indirectly to welding fumes and other dusty atmospheres and do find it necessary to seek additional medical aid; and further that the number of these employees is at the present time apparently increasing, not receding. We are in no position to comment on such conditions in other shipyards.

It is fair to assume in a study of a group of individuals of this kind that there is sufficient evidence to warrant the conclusions that occupational fumes, gases, and dusts at the Oregon Shipyards is sufficiently hazardous, in certain locations, to per se cause disease processes in the lungs and the air passages. It also seems to us that regardless of a possible difference of opinion as to the seriousness of such clinical diseases, the conditions causing them can and should be corrected.

In such an analysis as is here reported, it must be emphasized that it concerns only a small proportion of the total number of men employed. On the other hand, it cannot be inferred or concluded that this minor number represents the total number of employees who have had difficulty in working under the conditions as they exist in the various phases of shipbuilding. Many have doubtless contacted other physicians in this community, and such reports have not yet reached us for complete study. It may also be assumed that a great number of employees stoically bear such difficulties without complaint, and that the effects that they experience never come to the light of day, except to their immediate family circle. It must still further be admitted that a large number of employees do not have the courage

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to make complaints because of the possibility of being transferred from certain working conditions to others, or being eliminated.

It will be contended, of course, that such intimidation is not at hand, but nevertheless it is so alleged. Then again, it is certain that a number overemphasize alleged improper working conditions and hysterically regard themselves as being seriously ill when only minor disturbances have occurred.

The trend in the clinical investigation thus far, then, does seem to indicate that regardless of all of these variable factors, those employees who are engaged in welding, or who are associated with the welding process, or who are exposed to it in certain locations are on the whole working under conditions which are conducive to the development of certain discomforts, disease reactions and other irregularities, or to the activation or stimulation of pre-existing disease processes by such exposure.

It may be justifiably commented that the number of employees thus far partially investigated constitutes only a very small fraction of the thousands that are engaged in the massive industry of shipbuilding at the Oregon Shipyards at its present high tempo. On the other hand, it may also be assumed that thousands of patriotic citizen workmen are willing to "bear the yoke" stoically without dissent, regardless of consequences that may spell tragedy in many homes. In fairness, both sides must be considered. In short, it must be remembered that in this great experiment in industry, man is the experimental animal and not the guinea pig. All final evaluation of the significance of the clinical manifestations of those exposed to welding fumes must await the results of continuous study of this phase of the investigation from many sources and over periods of years.

Conferences Concerning Working Conditions at the Oregon Shipyards

During this investigation, different members of the committee as well as the committee as a whole engaged in conferences and discussions bearing on the study of working conditions and their improvement. The nature of such conferences have been detailed to those authorizing this investigation.

These conferences were held with the following: many physicians; Mr. Johnson and Mr. Hufford of the Safety Division of the Oregon Shipyards; Dr. Philip Drinker, Dean of Public Health at Harvard University, who together with his associates made a tour of inspection of working conditions at the different shipyards in the United States. Another conference was held at the Oregon Shipyards with Mr. Hufford of the Safety Division; Mr. Boshell, welding superintendent; Mr. Woodell, insurance and safety manager; and Mr. Ross, assistant safety manager, concerning safety devices and methods in connection with certain phases of welding. The following recommendations were considered at this conference:

First Recommendation: The requiring of safety inner soles in the shoes of all welders. These inner soles (of rubber or composition rubber) would prevent the feet from coming in contact with the leather soles and nails.

Second Recommendation: The instruction by the Safety Division of all welders, irrespective of their previous schooling, of the dangers of getting the head too close to the welding arc. It was stated that older welders stay back from the arc, but that the new ones usually hold their heads over it, in their eagerness to see what is going on.

Third Recommendation: The provision of new helmets for welders. Mr. Boshell pointed out that he had inspected and would recommend a new type of

helmet which carried forced air in and around the head and blew it down in such a manner as to expel the fumes, as well as to provide fresh air. It was his belief that if these helmets were used, that it would do away with the necessity of respirators. Mr. Woodell, the insurance and safety manager, expressed a keen interest in the supplying of these remedial measures, even though they should cost considerable money. These special helmets would only be required in certain places.

A meeting was also held with those representatives of the unions that authorized this investigation, as follows:

W. H. Howard, Steamfitters No. 235.
P. Riggs, Sheetmetal Workers No. 16.
S. Eugene Allen, Oregon Labor Press.
Harold J. Wake, Painters No. 10.
Phil Brady, Portland Central Labor Council.
John Gillard, Steamfitters No. 235.
H. J. Detloff, Machinists No. 63.
J. H. Lake, Electrical Workers No. 48.

At this meeting progress of the investigation was reported. Suggestions, from all parties concerned, were made to further the study. In addition, it was pointed out at this meeting that the report when finished should be made available to employers, laborers, physicians, as well as Industrial and Health Commissions, with the expressed view of correcting undesirable working conditions.

Still another conference was held with Dr. Rieke and Mr. Smith and Mr. Nickerson of the State Industrial Accident Commission concerning a certain accidental death of a welder. During this conference the presence of certain hazardous conditions of welders was pointed out. The effect of welding fumes was discussed. Suggestions were made concerning the possibilities of correction of these irregularities.

Conferences with Captain Kastaberg, Mr. E. T. Chanlett of the Industrial Division of the United States Public Health Service, and Dr. Carl Peterson of Council on Industrial Health of the American Medical Association were also held with the same objective under discussion.

In addition to the above, many conferences have been held with doctors by individual members of the investigating committee, as well as the committee as a whole, in making inquiries as to clinical conditions found present in men and women who complain of disturbances due to exposure to welding fumes. Dr. Marr Bisaillon has been very cooperative in presenting all of the material in his office pertaining to this subject of possible effects of welding fumes as they influence conditions within the chest. Dr. Bisaillon and Dr. Ralph Matson, as well as other physicians, have observed a considerable number of these patients who have come to them complaining of illness because of such exposures.

It was suggested to us by Dr. Bisaillon that the mechanics of the hood worn by welders was such as to possibly constitute a trap for the concentration of fumes when the head is held in certain positions. He further pointed out that the frequent lifting and lowering of the hoods results in a variation in the temperature of the air, so that alternately hot and cold air is undoubtedly breathed into the air passage ways and the lungs. Such variations in the temperature of the air must be regarded as an added factor in causing the disturbances of the respiratory tract seen in welders.

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These studies are being continued and will be published in the medical literature at a later date.

Recommendations

(1) Preliminary physical examination of all workers exposed to fumes or dust-laden air, especially in confined place. Such examination should at least consist of an examination of the chest, including an X-ray film, by a competent doctor of medicine especially trained in this particular field of medicine.

(2) The exclusion of all workers on the basis of such examination, and at the discretion of the examining physician, who show a decrease in the vital capacity of their lungs because of pre-existing diseases, such as tuberculosis, asthma, chronic pleurisy, previous industrial disease (siderosis, asbestosis, pneumonoconiosis) or heart disease or extended pneumonia. All of these diseases would predispose to further damage of the lungs when gases or dusts produced from welding are inhaled. It would be, therefore, hazardous for any such individual to engage in such an occupation.

(3) The use of especially air-conditioned hoods for welders or those exposed to welding fumes in places in which adequate ventilation would be difficult, such as double bottoms, etc.

(4) The ventilation of certain places such as fore peaks, after peaks, CO_2 room and refrigeration room, settling tanks, double bottoms, magazines and small void spaces, is inadequate, due to a lack of equipment or improper use of present equipment, improper supervision of that that is available, and faulty ventilating engineering, as well as lack of proper instruction of workers in their use. There is also no evident insistence upon the usage of such equipment by workers who choose to disregard such safety devices.

(5) The creation of specific and sufficient ventilation personnel, with specific duties and authority, wherever such need exists. It is suggested that at least two such ventilating engineers be provided for each shipway. Such a provision as this would eliminate the indifference and "buck-passing" that every employee, who has the courage to speak, recognizes and which is so apparent to a neutral investigator.

(6) Adequate instruction to new welders in the technique of welding and the dangers of fumes and equipment.

(7) The provision of insulating insoles in the shoes of welders to prevent nail contact with the bottoms of the feet of welders.

(8) A careful consideration of so-called production welding under a speed-up program, whereby large numbers of welders are required to work on one job, with the view of avoiding too great a concentration of workers exposed to a fume-laden area.

(9) Further consideration of limiting the length of time that workers are exposed to heavy concentrations of fumes or dusts in such areas where ventilation is inadequate or improper or difficult.

(10) Proper instruction of workers at union meetings by engineers and physicians as to the difficulties and dangers in connection with certain divisions of labor, with a view to making such workers safety-conscious and safeguarding their health and thereby bringing production to a maximum.

(11) The establishment of provision for the adequate care of those who became insidiously ill as the direct result of exposure to industrial hazards by appropriate modification of the present Workmen's Compensation Act.

Your committee feels that a careful consideration of the above recommendations, with the view to having the suggestions properly executed, will eliminate most of the hazards that may occur in the line of duty of workmen in the different positions in shipbuilding, and go a long way towards safeguarding the health of the employees during the time of employment and later when belated effects may manifest themselves and defy causal understanding.

Respectfully submitted,

JOSEPH BEEMAN, M. D.

NORMAN A. DAVID, M. D.

WARREN C. HUNTER, M. D.

FRANK R. MENNE, M. D.,
Chairman of Investigating Committee.

SCHN00317635

A QUESTIONNAIRE FOR THE INVESTIGATION OF WORKING CONDITIONS AT THE OREGON SHIPYARDS

(1) Name .....

(2) Age .....

(3) Previous occupations (duration of each) .....

.....

.....

.....

(4) Nature of exposure .....

.....

.....

(5) Previous diseases .....

.....

(6) Upper respiratory infections:

- (a) Paranasal sinus infections .....
- (b) Sore throat .....
- (c) Colds .....
- (d) Hoarseness .....
- (e) Cough .....
- (f) Pneumonia .....
- (g) Foreign bodies in lungs .....
- (h) Tuberculosis .....
- (i) Pleurisy .....
- (j) Asthma .....
- (k) Irregularities in breathing .....
- (l) Hay fever .....
- (m) Goiter .....
- (n) Adenoids .....
- (o) Use of inhalers .....
- (p) Use of sprays .....
- (q) Use of drugs .....
- (r) Tobacco smoking (extent) .....
- (s) Heart disease .....

(7) Shipyard occupation:

- (a) Date of employment .....
- (b) Type of work .....
- (c) Length of service .....
- (d) Number of hours .....
- (e) Shift .....
- (f) Exposure to fumes .....
- (g) Exposure to light .....
- (h) What protective measures exist for protection against fumes? .....

  .....

  ..... Were these measures used? .....

  Was there insistence upon their usage? .....

(i) What protective measures exist for the protection of the eyes against unusual light? .....

To what extent were these measures used? .....

To what extent was their use insisted upon? .....

(j) Effect of exposure to fumes while at work .....

.....

.....

(k) Effect of exposure to fumes while away from work .....

.....

.....

(l) Symptoms:

- (1) Cough .....
- (2) Burning or irritation .....
- (3) Hoarseness .....
- (4) Difficulty in sleeping .....
- (5) Difficulty in breathing .....
- (6) Pain .....
- (7) Night sweats .....
- (8) Loss of weight .....

(m) Duration of exposure:

Number of days .....

Number of hours .....

(n) Treatment:

At home .....

At hospital .....

Name of physician .....

(o) Date of last examination by physician .....

Extent of examination .....

(p) Condition of health previous to shipyard work .....

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CHART II. Survey of Hazardous Conditions, Oregon Ship Yards — Medical Aspects

Name	Age	Previous Occupation	Previous Disease	Previous Employment Disease	Exposure	Date of Employment	Type of Work	Length of Service	Shift	Exposure or Poison	Duration of Exposure	Protective Measures	Effect of Poison	Symptoms	Duration of Exposure	TREATMENT: Home	TREATMENT: Hospital	TREATMENT: Physician	Last Physical Examination	Previous Health	REMARKS
R.S.A.	29	Machinist, Internal-comb.	Measles. Whooping Cough. G. C.	None. Tuberc, 131 pkgs. day.	Boiler Tubes.	3-2-42.	Ship Fitter.	12 mos.	Day.	Yes.	Yes.	None.*	Pneumonitis, forced to go home by foreman.	Burning of chest. Vomiting. Loss of weight, 12 lbs.	3M mos.	Yes.	No.	Dr. Hamilton. Dr. Brown. Dr. Bailey. Dr. L. Cohen. Dr. V. Adams.	30 days ago.	Good.	Freely under influence of alcohol. * He threatens available as she due to because sick.
W.A.D.	36	Blacksmith. Machinist.	None.	Cable.	Welding fumes.	April, 1942.	Welder.	9 mos.	Swing.	Yes.	Yes.	Sneezes and Blowers.	Not marked	No marked symptoms.	9 mos.	No.	No.	Dr. Hamilton.	Wear previous to employment	Good.	This man was turned down by the army because of T.B. and marked spots. Dr. Hamilton: "Pulmonary of gas and breathing due to welding fumes. He T.B. found."
O.S.	22	Cook. Laborer.	Pneumonia, 3 years ago. Hx, almost every yr.	Pneumonia, 3 years ago. Hx, almost every yr.	Welding fumes.	11-3-41.	Welder.	10 mos.	Swing.	Yes.	No.	Sneezes and Blowers short at time he was sick.	To had 3 mos. ago, temp. 101°. Now all the time.	Cough, "Much stuff" out of lungs in a.m.	Daily, under period.	Lost on time.	No.	Dr. Dewey, Chiropractor.	6 mos. ago for minute over the whole body.	Good.	Sneezes and blowers were much heavier of length of time. Has always worked. Protection against upon handkerchief.
G.C.	22	Painter.	Mumps. Pneumonia. Chicken Pox.	Sore throat once a year. Cable, once a year. Tuberc, 1 pkg. daily.	Paint fumes.	Dec., 1942.	Painter.	3 wks.	Day.	Poison of and lead paint.	3M.	None.	"Dizzy," felt as if "fogged up," sleep. appeared 2 hours after leaving work.	Difficulty in sleeping and breathing.	3 weeks.	No.	1-22-42 to 2-2-42 Hamilton Hospital.	Dr. Dixon. Dr. Lewis.	Work previous in Oregon City.	Good.	"Dr. Dixon says he tests you for poisoning." He has been delivered by drab lead from 1-4 to 4-9.
J.D.	28	Gold miner.	Non-relative.	Occasional colds. Tobacco, 1 to 1½ pkgs daily	Welding gas.	9-23-41.	Welder.	13 mos.	Day.	Yes.	Yes	Head only. He ventilated Poison gas had close to ceiling.	Severe cough. Raising of phlegm. Burns after breakfast.	As above	13 mos.	Yes and Office.	No.	Dr. Hamilton.	Not stated.	Good.	Obtuse pneumonitis. Post-bronchial thickening,—unexplained —Dr. Hamilton. Comments on inspector's certificate, extract chest, scraps of fat that from skin, not controlled.
L.J.H.	39	Truck driver. Garage work.	Mumps disease when 13 years old. —Dr. Chickamauk.	Sore throat frequent. Tonsilitis. No known sore previous to exposure.	Welding fumes.	4-2-42.	Welder.	6 mos.	Day.	Yes.	Yes.	Blowers. Handkerchief.	Tightness in chest. Sweat mon. Cough.	Cough worse. Throughout shop. Burning and sore eyes. Hoarseness. Difficulty in breathing. Slight sweat. Pain, right darting in chest.	6 mos.	?	?	Dr. Hicks, 1941. Dr. Berkley.	June, 1942, by Dr. Berkley.	Good	Dr. Hicks stated into his cough. Bronchitis indicated by walking fumes. Dr. Berkley stated this was infectious. Quotient of relationship of fumes.
L.S.H.	32	Company operator. Mechanical. Welding.	7Yr, last spring.	None, except positive TB reaction when in high-school.	Welding fumes from galvanized pipe.	6-4-42.	Welder.	5 mos.	Swing.	Yes.	Yes.	None.	Felt like he had a fever around evening. At home has chill and was sick as stomach.	Cough. Burning. Hoarseness. Difficulty in sleeping. Pain. Loss of weight.	5 mos.	No.	No.	None.	None.	Good.	None.
O.H.	29	Company, 12 years. Paperhanger, 4 years.	Scarlet Fever and childhood diseases.	Hazel alone infection. Measles. Hazel alone-tuberc. Tobacco.*	Welding fumes.	6-20-42.	Chipper.	5 mos.	Swing. Day Shift. Avg. 8.*	Yes.	Yes.	Blowers.**	Severe dry cough. Dark bronze phlegm.***	Cough, hoarseness. Difficulty in breathing. Pain. Weight loss—5 lbs.	5 mos.	Yes.	No.	Dr. L. Smith. Dr. Weatherly.	6-8-42. Representative of chest.	Good.	*Considered better since change of shift. **Pneumonitis was only cough they broke down. Then they began down chest. ***Sputum gray.
E.W.	29	Farmer. Gold and silver miner.	7Yr, 1922. Scarlet Fever.	None.	Welding fumes.	6-12-42.	Welder and Pipe Fitter.	8 mos.	Day.	Yes.	No.	Sneezes and Blowers handkerchief.	Pain in chest, and coughing.	Cough. Burning. Difficulty in breathing. Pain. Weight loss.	8 mos.	Yes and Office.	No.	Dr. Morrow.	?	Good.	Diagnosis of pneumoconiosis, advised no change occupation.
J.A.	37	Mechanic and machinist.	Exposed appendix.	Occasional sunstroke.	Welding fumes.	10-31-41.	Machinist.	11 mos.	Overtyped and Day.	Yes.	Yes.	Air pump. Handkerchief.	Nausea. Vomiting.	Violent cough. Hoarseness. Loss of weight.	11 mos.	No.	Office and Good Samaritan Hospital. Oct., 1941.	Dr. C. F. Wilson	2 years ago.	Good.	Re report of Dr. Wilson. Industrial employment exhaust from sewer sampling. Sensitive nasoma sense on exhaust fumes. Sensitive nervous system.
J.E.A.	34	Truck driver.	None.	Measles infection 3 years ago. Sore throat.	Welding fumes, galvanized.	6-9-42.	Welder.	2M mos.	Swing.	Yes.	Yes	Air hose of no value.	Felt sick. Cough. Burning sensation.	Cough. Hoarseness. Pain in chest. Difficulty in breathing. Slight sweating. Loss of weight.	2 mos.	No.	Portland General Hospital.	Dr. McFeelum	None.	Good.	Symptoms—blue mood that he had bending in his eyes. Felt sick, cough. Thought it was cold. Felt that bronchitis would develop later.
R.A.D.	31	Gold miner.	Non-relative.	Cable. No other.	Welding fumes.	11-10-42.	Machinist.	1M mos.	Overtyped, then Day.	Yes.	Yes	None.	At first show smoke, half off 1 week. Improved, returned and—fumes returned.	Headache, burning in eyes.	1M mos.	Yes and Office.	No.	Dr. Bostik.	11-10-42.	Good.	Sneezes to sick days and because of welding fumes. Criticism has been made in inspection on pneumonia and diabetes. Diagnosis took set up.
G.L.P.	39	Every place have been work, pipe fitter.	Appendicitis. O.P.D.? M.C.H.	Cable when working in tanks. Hoarseness of bronch 3 mos. before death. Tobacco.*	Welding fumes. Tanks.	Dec., 1941.	Pipe Fitter.	6 mos.	Day.	Yes.	3 on a place, each from 1 to 2 mos. 1 mo. by all	None.*	Had to stay by air fan, and coughed 2d the time while away from work.	Cough. Pain. Hoarseness. Difficulty in breathing and sleeping. Loss of weight.	5 mos.	Yes, H with vomiting and diarrhea.	1M days. 2?	Dr. Magahe.	?	* Pipe *	*Stayed down to lung to be cured, and then came up for job. **Died 2-9-42. for company control.
J.L.H.	37	Truck driver. Construction work.	None.	Bronchitis. Pneumonia. Influenza.	Gas,—double acetylene.	3-12-42.	Ship Fitter.	7 mos. and 5 wks.	Overtyped.	Yes.	Yes.	Blowing, but not available until 3 months ago.	Cough worsened.	Cough. Pain. Difficulty in sleeping. Hoarseness of bronch.	7 mos. and 5 wks.	Yes	No.	Dr. Morrow. Dr. McArthur.	Not stated.	Not stated.	Diseases recognized psychoneurotic and physical disorder,—unrecognized. Recommend work in open. Air hose and make ventilating further suggested at first. Workers were wizard of disbelief when they complained.
J.E.	33	Truck driver.	Gall stone attack. Appendicitis.	Alert infection. Sore throat. Colds and Pneumonia. Pleurisy.	Welding fumes	1-21-42.	Welder.	9M mos.	Day	Yes.	Yes	Non-relative. Improvement in pneumo.	Sensation of lungs. Painful breathing. Sickening nauseific sense.	Cough. Hoarseness. Slight sweating. Difficulty in sleeping and breathing.	9M mos.	Yes and Office.	No.	Dr. Thayer.	None.	Good.	Diagnosis, Bronchitis due to exposure to fumes. Very very diagnosis by Dr. Bailey & Weatherly. Inspector's bronchitis—relative sensitiveness due to nicotine—bronchitis.
A.H.S.	35	Cook, for 17 yrs.	7Yr, 1918. Childhood diseases.	Cold once a year. Pneumonia, April, 1942.	Welding fumes.	Oregon Ship Yards over 1 year. Former job since 5-22-42.	Ship Fitter.	10 mos.	Day.	Yes.	Yes.	Yes.*	Sleep at first. Metallic taste in mouth.	Cough. Burning in chest. Difficulty in sleeping.	Since Mar., 1941, except 6 wks. when sick with pneumonia.	Yes, after leaving hospital.	Good Samaritan Hospital, 11 days.	Dr. I. C. Bell	1 month ago.	Good.	Appears to be fair minded man, and reliable. Seems that condition much improved, fever now in lungs, more serious. Improvement since breathing started.
E.T.	38	Garage mechanic.	None.	Occasional colds.	Welding fumes.	11-19-41.	Welder.	14 mos.	Overtyped.	Yes.	Yes.	Very few furnished only upon demand.	Metallic taste. Burning in wind pipe. Sore throat.*	Cough.** Burning.** Hoarseness. Pain.	14 mos.	Yes and Office.	No.	Dr. Hamilton.	Not stated.	Good.	Had some tracheo-bronchitis,—Dr. Hamilton.
W.O.E.	30	Truck driver. Conservation.	None other than asthma.	None other than asthma.	Welding fumes.	11-18-42.	Ship Fitter.	9 mos.	Day.	Yes.	Yes	Ventilation, shown in photo.	Sick as stomach, vomiting. Headache.	Cough. Pain. Difficulty in breathing. Loss of weight.	9 mos.	Yes and Office	No.	Dr. Morrow. Dr. L. Bellows	Not stated.	Good.	Told he had a typical pneumonia.
J.A.	48	E. S. worker. Construction. Drilling.	None.	Pure cable.	Welding gas.	8-11-42.	Master Fitter.	4 mos.	Day.	Yes.	Yes.	Ventilation.	Cough. Heavy brown phlegm in the morning.	Coughing.	4 mos.	Yes.	Prior Aid	Dr. Metz.	One year before present occupation.	Good.	Man stated that ventilation was poor, complained of fumes,—no results. Improvement noted lately, gaches.
J.H.	43	Logging. Garage, 6 years.	None.	Pure cable.	Welding, galvanized pipe	11-1-42.	Welder.	3 mos.*	Swing.	Yes.	No.	Helmet employed and goggle.	Fever soon in month present all the time. Stupor.	Cough. Hoarseness. Difficulty in sleeping and breathing. Pain. Loss of weight. Lungs soon in month only at week.	3 mos.	Yes.	No.	Dr. G. Miller. Dr. M. Moore. Dr. H. Levin. Dr. Rosenberg.	9-15-42.	Good.	*Tried to return January 15th, but did not stay.
M.J.H.	40	Mechanic, 15 years. Good union, 1 years.	Rupture. Pleurisy, following rupture-nasty. July, 1938.	Cable. Hoarseness, since May, 1941.	Welding, engine room.	3-16-42 (Continued) 6-2-42. (Ore. Ship Yards)	Marine Machinist.	3 mos.	Day.	Yes.	Yes.	Practically none. He blowers working.	"Pudgeed some." "Peculiar feeling in chest." Hoarseness while away from work.	Cough. Hoarseness.	3 mos.	Yes	No	Dr. Boyd.* Dr. Simon.	Week ago.	Good.	*In addition to symptoms Dr. Boyd found suspected nephritis, hydrophilic.
F.J.L.	42	Automobile salesman. Electrician. Mechanic.	TB pulmonary, 1918, 1 yr. Sanatorium. Spanish measles.	Negative, except TB.	Welding, gas in refrigerator passage.	March, 1942. 4-2-42 to 9-12-42. (Ore. Sh. Yds.)	Electrician.	3 mos.	Day.	Yes.	Yes.	Blowers, but not used. Formerly, patients worked in passage of welding. Now stopped.	Burning in nose. Hoarse. Vomiting. Severe headache. Cough.	Cough. Burning in nose. Hoarseness. Pain. Difficulty in breathing. Night sweating. Weight loss, 15 lbs.	3 mos	Yes.	Portland General Hospital.	Dr. Nicholson	July 4, 1942.	Good	Fire hazards in July, painters were in shop, Acetylene and with smoke, vapor, and cable lost. Our eye watch for treatment. Blame that he suggested cut-out hole in opposite and of both lead to improper ventilation.
D.C.M.*	45	Sawmill worker. 1 year. Truck driver. 3 years. Cabinetry, 3 years.	None.	Cable.	Welding fumes.	Feb., 1942. Jan., 1942.	Elect Fitter.	3 mos.?	Day.	Yes.	?	?	Pain opposite. Complained of not feeling well.	Cough. Burning in chest. Difficulty in sleeping. Only symptoms appears in gas chest and not fumes.	3 mos.	Yes. 3 days.	Jones Hospital, Hillsboro. 1 days.	Dr. Hinds.	May 15, 1942. day of death	Good.	*Report by widow Mrs. Minnie Mink. **Off in February with flu for a week, back to work until May 15th.
T.N.S.*	48	Clerk salesman. Very many positions in World War.	None, during 27 years of married life.	Cable. Injury to eye during childhood. Cough occasionally.	Welding fumes in double bottoms.	9-28-42. 3-21-42.	Pipe Fitter.	3 mos.	Day.	Yes.	?	Blower did not remove fumes well. Coughing.	Night sweating. Weakness. Chills.	Hoarseness. Pain. Loss of weight 10 lbs.	6 mos.	Yes.	St. Vincent's Hospital.	Dr. Leland Bellamy.	At the hospital.	Very good.	*Report by widow. Complete clinical record available. Autopsy made.
G.W.L.	31	Machine Engineer. Other odd jobs.	He was large from TB & 1938. Well since 1941.	Many cable while working outside, winter 1941-42. Pneumonia.	Painting fumes. Welding in double bottoms.	June, 1941. Oct., 1941. Dec., 1942.	Ship Fitter.	4 mos.	Day.	Yes.	Yes.	Surface in double bottoms. Not sufficient, would show fumes both in again.	Weakness. "Tired." Pain in chest. Coughing.	Cough. Weakness. Tiredness. Cold feeling. Difficulty. Burning. Loss of weight.	3 mos.	Yes.	No.	Dr. Hemmyer.	9-12-42.	Good	None.
E.C.H.	34	Night watchman in factory. Inspector lead on S.S. Palmer, 2 months.*	None.	None. Smoke quite a bit.	Painting fumes from welder, working below.	3-21-42.	Painter.	3-3½ mos.	Day.	Yes.	Yes.	Blowers, inadequate. Not enough. Blower fumes.	Doubled up with pain. Could not walk in first. Pain in chest.	Pain in chest and shoulders. Loss of weight.	3M mos.	Yes, but 3 weeks.	No.	Dr. G. Bush.	3 years ago.	Good.	Patient has marked acute, acidic.
J.H.	35	Lumberjack. Gold miner. Silver miner. 15 years.	Measles.	Occasional sore throat and colds.	Welding fumes.	Feb., 1942.	Pipe Fitter.	11 mos.	Day.	Yes.	Yes	Not enough to go around. Use one man a blower for 1 hour min.	Dry throat. Difficulty in talking.	Sore. Hoarseness. Pain.	11 mos	Yes and Office.	No.	Dr. Lagoon	June, 1942, by Dr. Gibbins.	Good.	Dr. Lagoon regarded his accidents as definitely due to industrial fumes. Recommended that his employer—not to be replaced by another man. Dr. Gibbins made comment that he would get an expert by ventilation.
D.C.	40	Not stated.	Not stated.	Not stated.	Not stated.	Not stated.	--	—	—	—	—	—	—	Hoarseness and cough.	Hoarseness and cough.	—	—	—	—	—	Not examined by Dr. Sternberg, and pneumonitis noted by Dr. Ferguson. Died as a result of obstructive membranous tracheobronchitis. See report by Dr. Bailey, Report employer.
W.H.H.	65	Carpenter, 30 years	None.	Pneumonia, 1918, 7 wks. Pleurisy in Portland. Lung cancer. Tuberculosis. Hx. Hemoptysis. Hx. Hemoptysis.	Welding fumes.	11-11-41.	Welder's helper. "Lay-out" tool.	6 mos.	Day.	Yes.	Yes.	Blowers, insufficient.	Staunch disease. Pain in epigastrium. Loss of appetite.	Epigastric pain. Hoarseness. Loss of weight 10 lbs.	6 mos.	Yes.	X-ray at Portland Sanatorium.	Dr. F. Hunter	3-20-42.	Good.	None
J.F.W.	43	Building trades.	None.	None.	Welding gas	Oct., 1940, to present time.	Ship Fitter.	14 mos.	Day and Swing.	Yes.	Yes.	Insufficient. Bad working conditions.	Overtired mon.	Cough. Pain in chest. Night sweats.	14 mos.	No.	No.	None.	None.	Good.	Spoke of lack of interest by foreman. Workmen afraid to complain.

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Woodbury & Company.

SCHN00317640

MARINE PIPEFITTING

(A manual of instruction for supplementary training.)

Prepared by

J. C. WINTERS

for the

OREGON SHIPBUILDING CORPORATION
KAISER COMPANY, INC.

Portland, Oregon, and Vancouver, Washington

Drawings by Don Winters — Photographs by Louis Lee

☆

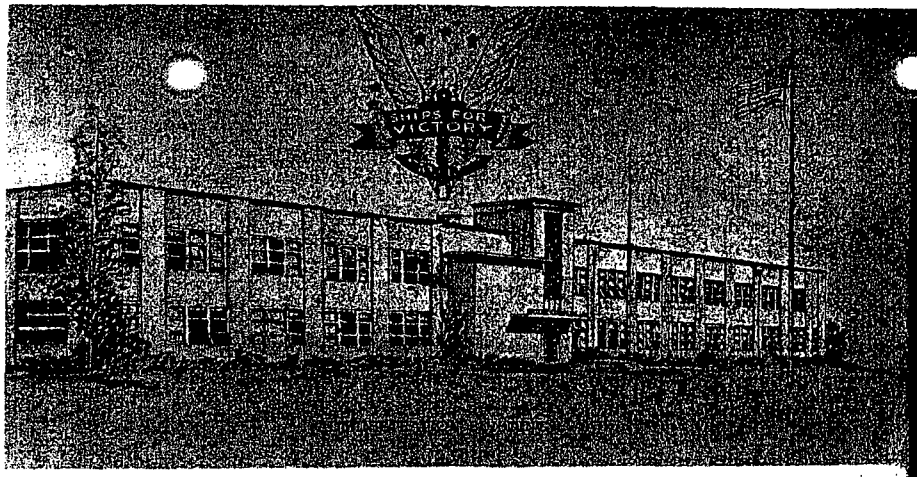
In cooperation with the

United States Maritime Commission

☆

DEPARTMENT OF VOCATIONAL TRAINING

1942



FOREWORD

This manual is published to assist new workmen to learn the procedure of pipe installation.

It is the desire of Oregon Shipbuilding Corporation, Kaiser Company, Inc., and the Maritime Commission to offer in-plant training to new employees that will enable them to readily understand the work they are to perform.

We hope that each and every man will study this manual and will hold in his heart the one thought — that the job he is about to undertake is as important to his country as though he were carrying arms, and that all he can give is none too much.

The management of the Oregon Shipbuilding Corporation and Kaiser Company, Inc., yards wishes to express its sincere appreciation to the supervisory forces in all three yards whose sincere interest and constructive criticisms were helpful in the preparation of this manual; and particularly to Mr. J. C. Winters who compiled the material contained herein.

EDGAR F. KAISER,
Vice-President and General Manager

DEDICATION

This manual is dedicated to the men, who from every walk of life, are giving their services as defense soldiers to the production of merchant ships and navy ships for the furtherance of the war effort.

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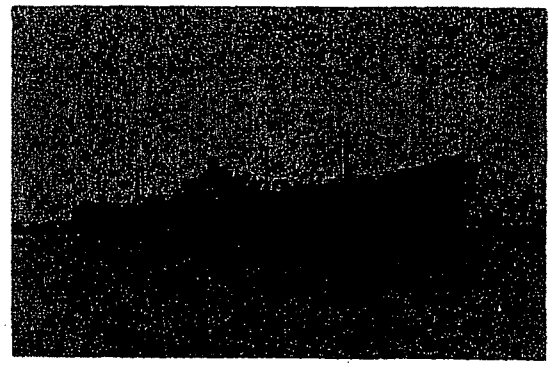

CARGO SHIP OF THE EC2 TYPE

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PART I

SHIP TERMS AND DEFINITIONS

Abeam. — At right angles to the keel.

Accommodation Ladder. — Stairs slung at a gangway.

Aft, After. — Toward the stern from the center of the ship.

After Body. — The section aft of amidships.

After Frames. — Radiant cant frames fastened to transome plates.

After Peak. — A compartment just forward of the stern post.

After Rake. — That part of the stern which overhangs the keel.

Air Casing. — A coaming surrounding any pipe or stack which has no physical connection only by braces or hoods and allows free passage of air. It is used to insulate the ship from heat derived from the stack principally and helps to ventilate the engine and fire room when both are located between the same bulkheads.

Air Port. — An opening in the side of the ship or deckhouse used for light and ventilation. It is usually fitted with a thick glass and has a safety steel cover in case the glass is broken.

Air Tight or Water Tight Door. — A door so constructed that when closed, air or water cannot penetrate through openings.

Aloft. — Above the deck.

Amidships. — In the longitudinal or fore and aft center of a ship. Halfway between stem and stern.

Athwart. — Same as above.

Auxiliary Foundations. — Foundations for condensers, distillers, evaporators, pumps, engines, generators, or any auxiliary equipment on board ship.

Balanced Rudder. — A rudder with its axis halfway between the forward and after edge.

Ballast Tanks. — Tanks carried in various parts of a ship for water ballast, to keep the vessel on an even keel.

Base Line. — A horizontal fore and aft reference line for vertical measurements. This line is perpendicular to the vertical center line. A horizontal transverse reference line for vertical measurements. This line is perpendicular to both the vertical center line and fore and aft base line.

Beams. — The athwartship members of the ship's frame which support the decks.

Beam Knees. — Angular fittings which connect beams and frames together.

Plate Angles. — A beam made from a flat plate, with the flange bent at right angles by an angle bending machine.

Bed Plate. — A structure fitted for support of the feet of the engine columns, as well as to provide sup-

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port for crankshaft bearings. It also helps distribute engine weight and stresses to the ship's structure. The bed plate consists of a series of transverse girders, connecting fore and aft members or girders.

Bevel.—The angle which one surface makes with another. Also to bevel a beam, flange, or plate for vee welding; to tilt a girder to make the sheer bevel.

Bilge.—The rounded side of a ship where it curves up from the flat bottom plates to the vertical shell plating.

Bilgeway.—Same as bilge.

Bilge Keel.—Longitudinal angles welded and riveted back to back on the bilge of a vessel, to check the ship's tendency to roll.

Bilge Plates.—The curved shell plates that fit the bilge.

Bilge Well.—A bilge well is generally located in the lowest part of the compartment. It is used for drainage and is generally shaped like a box, and fitted to the underside of the inner bottom, with a strainer on top.

Bitts.—Cast steel heads serving as posts to which cables are secured on a ship.

Bleeders.—A term applied to plugs screwed into the bottom of a ship to provide for drainage of the compartments when the vessel is in dry dock.

Boiler.—Any vessel, container or receptacle that is capable of generating steam by the internal or external application of heat. There are two general classes of boilers, i.e., fire-tube and water-tube.

Boiler casing.—Awall protecting the different deck spaces from the heat of the boiler room.

Boiler Foundation.—The structure upon which the boiler is secured. It generally consists of girders built up from plates and shapes. In a cylindrical boiler the athwartship girders are often called saddles.

Boiler Room.—A compartment in the middle or after section of a vessel where the boilers are placed.

Boom.—A term applied to a spar used in handling cargo, or as the lower piece of a fore and aft sail.

Bow.—The fore end of a ship. Bullnosed Bow.—Bow with large rounded bow point underneath water line. Flared Bow.—A bow with an extreme flare at the upper and forecastle deck.

Breadth.—The side to side measurement of a vessel at any given place. The ends of the cross beams are considered the outward breadth measurements.

Breakwater.—A term applied to plates fitted on a forward weather deck to form a V-shaped shield against water that is shipped over the bow.

Bridge.—A partial deck extending from side to side of a vessel amidships. It is common in steam vessels, affording a convenient station for the officer in command. It is also known in England as the hurricane deck or bridge deck.

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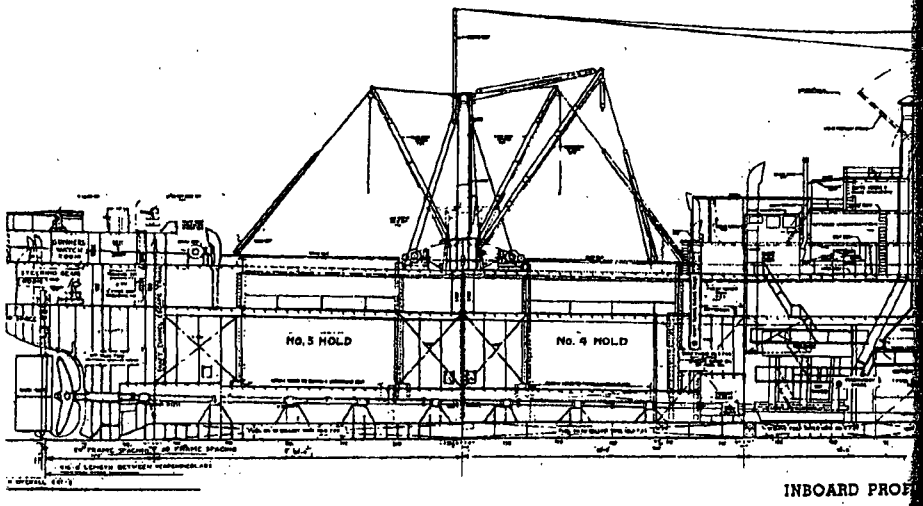


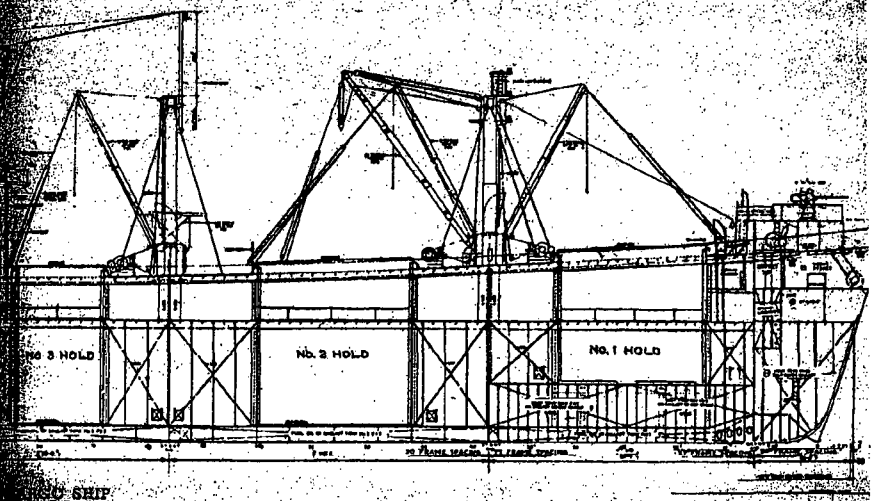
Bridge House. — The erection or superstructure fitted about amidship on the upper deck of a ship. The officer's quarters, staterooms and accommodations are usually in the bridge house.

Bulkhead. — A partition in a ship which divides the interior space into various compartments.

Collision Bulkhead. — A water-tight bulkhead approximately 25′ aft of the bow, extending from the keel to the shelter deck. This bulkhead prevents the entire ship from being flooded in case of a collision.

Swash Bulkhead. — A partial bulkhead used for the same purpose as a swash plate.

Bulkhead Stiffeners. — A term applied to the beams or girders attached to a bulkhead for the purpose of supporting it under pressure and holding it in shape. Vertical stiffeners are most commonly used, but horizontal stiffeners or a combination of both may be used.



Butt Joint. — A joint made by fitting two pieces squarely together on their edges, which is then welded or butt strapped.

Calk. — To tighten a lap or other seam with a chisel tool, either by hand or mechanically.

Camber. — A slope upwards toward the center of a surface, as on a deck amidships for shedding water. This deck camber is usually 1″ on 50″.

Cant. — The inclination of an object from the perpendicular. As a verb, to turn anything so that it does not stand square to a given object.

Cargo Port. — An opening in the side of a vessel of two or more decks, through which the cargo is received and discharged.

Center Line. — A horizontal fore and aft reference line for athwartship measurements, dividing the ship into two symmetrical halves. A vertical reference line

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in the center of the body plan, midship section or other sections.

Center Line Bulkhead.—A fore and aft or longitudinal bulkhead erected on the center line or in the same plane as the keel. Also a reference line scrived on a transverse bulkhead to indicate the center of the ship.

Chain Locker.—The compartment for storing the anchor chains, located near the hawse pipes in the bow of the ship.

Chocks.—Deck fittings used principally for mooring lines to pass through.

Cleat.—A metal fitting having two projecting arms or horns to which a halyard or other rope is belayed. The deck, side plating, a stanchion, or other convenient structure serves as a support for securing the cleat.

Coaming.—Strictly speaking, coamings are the fore and aft framing in hatchways and scuttles, while the athwartship pieces are called head ledges but the name coaming is commonly applied to all raised framework about deck openings. Coamings prevent water from running below, as well as strengthen the deck about the hatches.

Cofferdam.—A small space left open between two bulkheads as an air space, to protect another bulkhead from heat, fire hazard, or collision.

Companionway.—A set of steps or ladder leading up to a deck from below.

Countersunk Hole.—A hole tapered or beveled around its edge to allow a rivet or bolt head to seat flush with or below the surface of the bolted object.

Countersunk Rivet.—A rivet driven flush on one or both sides.

Davits.—A set of cranes or radial arms over the gunwale of a ship, from which are suspended the lifeboats.

Dead Rise.—The upward slope of a ship's bottom from the keel to the bilge. This rise is to give drainage of oil or water toward the center of the ship.

Deck.—A platform or horizontal floor which extends from side to side of a vessel.

Forecastle Deck.—A deck over the main deck at the bow.

Flush Deck.—A deck running from stem to stern without being broken by forecastle or poop.

Half Deck.—A short deck below the main deck.

Hurricane Deck.—Same as bridge.

Main Deck.—The highest complete deck on a ship; in other words, the highest deck which runs the full length of the ship.

Poop Deck.—The raised deck on the after part of a ship.

Shelter Deck.—The main deck.

Deck House.—A small house on the after or midship section of a vessel.

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Deep Tanks.—These usually consist of ordinary hold compartments, but strengthened to carry water ballast. They are placed at either or both ends of the engine and boiler space. They usually run from the tank top up to or above the lower deck. However, the deep tanks on the present cargo ships are used for dry cargo or oil cargo. Also, during this emergency where long trips are anticipated they are used to carry extra fuel oil for the ship's use.

Displacement.—The weight in tons of the water displaced by a ship. This weight is the same as the total weight of the ship when afloat.

Double Bottom.—A tank whose bottom is formed by the bottom plates of a ship, used to hold water for ballast, for the storage of oil, etc.

Doubling Plates.—Extra plates (bars or stiffeners) added to strengthen sections where holes have been cut for hawse pipes, machinery, etc. Also placed where strain or wear is expected.

Drain Well.—The chamber into which seepage water is collected and pumped by drainage pumps into the sea through pump dales.

Draught Markings.—The water line marks showing how deep the keel is in the water at stem or stern.

Even Keel.—When a boat rides on an even keel, its floating line coincides with the water line.

Expansion Joint.—A term applied to a joint which permits linear movement to take up the expansion and contraction due to changes in temperature.

Fathom.—Six feet. A sea-going measure of length.

Fidley.—Framework built around a deck hatch ladder, leading below.

Fidley Deck.—A partially raised deck over the engine and boiler rooms, usually around the smokestack.

Floors.—Vertical flat plates running transverse of the vessel, connecting the vertical keel with the margin plates or the frames to which the tank top and bottom shell is fastened.

Fore, Forward.—Toward the stem. Between the stem and amidships.

Frames.—The ribs of a ship.

Freeboard.—The distance from the water line to the top of the weather deck on the side. Sometimes refers to the whole out-of-water section of a vessel's side.

Gage.—A standard of measure.

Galvanizing.—The process of coating one metal with another, ordinarily applied to the coating of iron or steel with zinc. The chief purpose of galvanizing is to prevent corrosion.

Girth.—The measurement around the body of a ship. The half girth is taken from the center line of the keel to the upper deck beam end.

Grating.—An open iron lattice work used for covering hatchways and platforms.

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Grommett. — A ring of fiber usually soaked in red lead or some other packing material, and used under the heads of bolts and nuts to preserve tightness.

Gussett Plate. — A tie plate, used for fastening posts, frames, beams, etc., to other objects.

Hawse Pipe. — The tube lining a hawse hole in a ship's bow.

Hawser. — A cable used in warping and mooring.

Height. — Vertical distance between any two decks, or vertical distance measured from the base line to any water line.

Inboard. — Looking toward the center from the outside of the ship.

Inboard Profile. — A plan representing a longitudinal section through the center of the vessel, showing heights of decks, location of transverse bulkheads, assignment of various spaces and all machinery, etc., located on the center or between the center and the shell on the port side.

Inner Bottom. — The tank top.

Jacob's Ladder. — A rope ladder with wooden rounds.

Keel. — A longitudinal beam or plate in the extreme bottom of a ship, from which the ribs or floors start. Different types of keel are described and illustrated in the main text.

Keel Blocks. — Blocks on which the keel of a vessel rests when being built, or when she is in a drydock.

Keelson. — A large I-beam placed above the vertical keel on the rider plate for reinforcing the keel. The term may also apply to bottom fore and aft girders on the sides or at the bilge.

Lap. — A term applied to the distance that one piece is laid over the other in making a lap joint.

Laying Out. — Placing the necessary instructions on plates, shapes, etc., for planing, shearing, punching, bending, flanging, bevelling, rolling, etc., from the templates made in the mold loft or taken from the ship.

Lightening Hole. — A hole cut out of a plate to make it lighter and yet not reduce its strength. Also to make a passage through the plate.

Light Load Line. — The water line when the ship rides empty.

Limber Holes. — Holes in the bottom of floors through which bilge water runs through tank sections to a seepage basin, where it is then pumped out. The row of holes constitutes the limber passage.

List. — To lean to one side.

Load Water Line. — The water line when the ship is loaded.

Locker. — A storage compartment in a ship.

Magazine. — Spaces or compartments devoted to the stowing of ammunition.

Main Breadth Line. — The greatest width of a ship

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amidships. If a ship's sides tumble home, the main breadth line will be considerably below the bulwarks.

Manhole. — A hole in a tank, boiler or compartment on a ship, designed to allow the entrance of a man for examination, cleaning and repairs.

Mast. — A spar or hollow steel pipe tapering smaller at the top, placed on the center line of the ship with a slight after rake. Masts support the yards and gaffs. On cargo vessels they support cargo booms.

Midship. — The middle of the vessel.

Molded Depth. — The extreme height of a vessel amidships, from the top of the keel to the top of the upper deck beam.

Outboard Profile. — A plan representing the longitudinal exterior of a vessel, showing the starboard side of the shell, all deck erections, masts, yards, rigging, rails, etc.

Peak Tank. — Tanks in the forward and after ends of a vessel. The principal use of peak tanks is in trimming the ship. Their ballast is varied to meet required changes in trim. Should the after hold be empty, the vessel would ride so high that the propeller would lie half out of the water and lose much of its efficiency. Filling the after peak tank forces the propeller deeper into the water.

Port Hole. — An opening in the ship's shell plating.

Propeller Arch. — The arched section of the hull above the propeller.

Pump Dale. — A pipe to convey water from the pump discharge through the ship's side.

Rake. — The forward pitch of the stem. The backward slope of the stern.

Rolling Chocks. — Same as bilge keel.

Scupper. — Any opening or tube leading from the waterway through the ship's side, to carry away water from the deck.

Scupper Opening. — A hole longer than an ordinary scupper on the decks, with an outlet through the side plating just above the water. The water thus diverted from the deck does not discolor the ship's side plating or damage the paint.

Shaft Alley. — A passageway along the shaft line between the after bulkhead of the engine room and the stern post, affording a means of access to the propeller shaft.

Shaft Tunnel. — Same as shaft alley.

Sheer. — The upward curvature of the lines of a vessel toward the bow and stern.

Shore. — One of the many wooden props by which the ribs or frames of a vessel are externally supported while building, or by which the vessel is held upright on the ways.

Skeg. — The after part of the keel, upon which the stern post rests.

Skin. — The plating of a ship. The inside skin is

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sometimes called the ceiling, the outside skin the case. It consists of steel plates laid in alternate inside and outside strakes.

Sliding Ways. — One of the structures on each side of and parallel to the keel, supporting the cradle under the bilgeways on which the vessel rests in launching. The sliding ways form the inclined plane down which the vessel slides, made of planks laid on blocks of wood.

Stern. — The after part of the vessel.

Sounding Tube. — A straight pipe leading from a tank top or from deck to within a few inches of the bottom of a tank, used for measuring the contents. This is generally done with a steel tape with a weighted end.

Tail Shaft. — The aft section of the shaft, which receives the propeller.

Tank Top. — The plating laid on the bottom floors of a ship, which forms the top side of the tank sections or double bottom.

Test Head. — The head of water corresponding to the pressure prescribed as a test for bulkheads, tanks, compartments, etc. Test heads are prescribed to insure satisfactory water or oil tightness, and also as tests of strength.

Turrets. — Structures designed for the mounting and handling of the guns and accessories (usually main battery guns) of a war vessel. Turrets are constructed so as to revolve about a vertical axis usually by means of electrical or hydraulic machinery.

Umbrella. — A metal shield in the form of a frustrum of a cone, fitted to the outer casing of the smokestack over the air casing to keep out the weather.

Uptake. — A sheet metal conduit connecting the boiler furnace with the base of the smokestack. It conveys the smoke and hot gases from the boiler to the stack, and should be made double thickness with an air space between to prevent radiation. Swinging dampers for controlling the fires are fitted in the uptake.

Vertical Keel. — A plate running in a fore and aft direction connecting to the flat keel and keel rider plates, it is usually connected by two angles at the top and bottom for a riveted job or welded to the keel and keel rider.

Ways. — The timber sills upon which a ship is built.

Welding. — The method of fastening steel objects together by fusing the metal with a gas flame or an electrical arc.

Wing Tanks. — Tanks located outboard and usually just under the weather deck. They are sometimes formed by fitting a longitudinal bulkhead between the two uppermost decks, and sometimes by working a diagonal, longitudinal flat between the ship's side and the weather deck.

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ABBREVIATIONS AS USED ON BOARD SHIP

BLK . . . . . Black
BHD . . . . Bulkhead
BW . . . . Butt Weld
CONN . . Connection
CS . . . . . Cast Steel
ELL . . . . . Elbow
EX . . . . . Extra
F&D . Faced & Drilled
FS . . . Forged Steel
FLGD . . . Flanged
GALV . . Galvanized
HD . . . . . Head
HEX . . . . Hexagon
HVY . . . . . Heavy
IPS . International Pipe Standard
ID . . Inside Diameter
LG . . . . . Long
LR . . . Long Radius
LW . . . . Lap Weld
MI . . Malleable Iron
MT'D . . . Mounted
SH . . . . . Short
SQ . . . . . Square
SCR'D . . . Screwed
SR . . . Short Radius
STD . . . Standard
WI . . . Wrought Iron
V . . . . . Valve
G.S.V. Globe Stop Valve
H.S.C.V. . Horizontal Swing Check Valve
ST.C.H.V. Stop Check Valve
REL.V. . . Relief Valve
DK . . . . . Deck
DR . . . . . Drain
EXH . . . . Exhaust
C-L . . . Center Line
S . . . . Sheer or Seam
S . . . . . Starboard
W.T. . . . Water Tight
F.O. . . . . Fuel Oil
AUX . . . Auxiliary
CTRS . . . . Centers
DIA . . . . Diameter
ELEV . . . Elevations
L. or Lav . . . Lavatory
SK . . . . . Sink
HTR . . . . . Heater
A.A. . . Anti-Aircraft
CAL . . . . Calibre
O.T. . . . . Oil Tight
LBS. or # . . . Pounds
M.L. . . . Molded Line

STL'S ST'L Stainless Steel
ST'L . . . . . Steel
WT . . . . . Weight
F-HD . . . Flat Head
F to F . . Face to Face
MS . . Machine Steel
NS . . . . Nickle Steel
R . . . . . Radius
TH . . . . . Thread
VER . . . . Vertical
X.H. . . . Extra Heavy
C.F.W. Cold Fresh Water
H.F.W. Hot Fresh Water
Dr. Fount Drinking Fountain
RED . . . Reducing
R.F. . . . Raised Face
S.D. . Seamless Drawn
SPEC . . . . Special
S.F. . . . Smooth Face
H.P. . High Pressure or Horse Power
COFF . . Cofferdam
MAX . . . Maximum
MIN . . . Minimum
BL . . . . Base Line
O . . Midship Section
P . . . . . Port
TEMP . . . Template
FWD . . . . Forward
BEV . . . . . Bevel
C to C . Center to Center
LUB. OIL Lubricating Oil
L.W.L. . Load Water Line
N.W.T. . Non-watertight
F . . . . . Finish
R.P.M. Revolutions per Minute
TRANS . . Transverse
PL . . . . . Plate
R or RAD . . Radius
T.T. . . . . Tank Top

PLIMSOLL LINE DEFINITION

F. or F. W. . . . . Fresh Water
IS . . . . . Indian Ocean in Summer
WNA . . . . . North Atlantic in Winter
S . Summer in other waters than Indian Ocean

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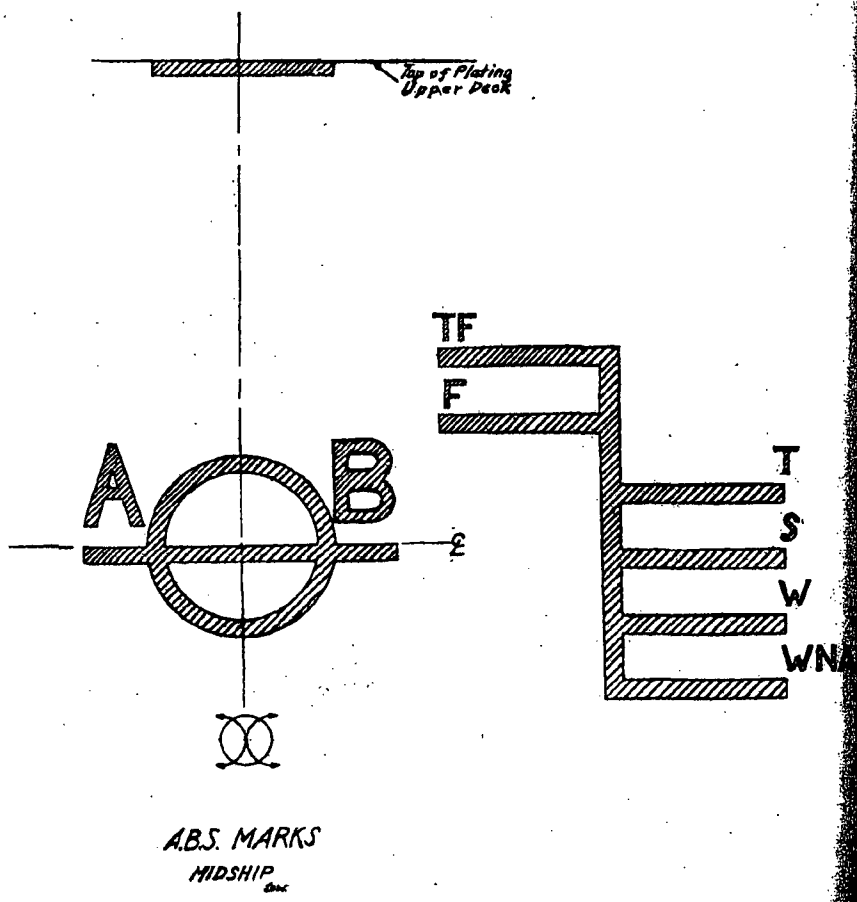
W . Winter in waters other than North Atlantic
T . . . . . Tropical Waters
T.F. . . . . Tropical Fresh Waters



PLIMSOLL LINE OR LOAD LINE MARKINGS

FIGURE 1

SYMBOLS

VALVES

- GLOBE, ANGLE, OR GATE VALVE AS APPROVED
- GLOBE
- ANGLE
- ANGLE STOP CHECK. (a) (b)
- ANGLE CHECK (a)
- CROSS
- GATE
- SWING CHECK (a)
- LIFT CHECK (a)
- STOP CHECK (a) (b)
- HOSE GATE
- HOSE GLOBE
- HOSE ANGLE
- RELIEF
- SAFETY
- REDUCING, REGULATING, BACK PRESSURE, GOVERNOR, OR THERMOSTATIC. INCREASED ACTUATING PRESSURE OR TEMPERATURE CLOSES VALVE.
- SAME AS ABOVE BUT INCREASED ACTUATING PRESSURE OR TEMPERATURE OPENS VALVE.
- SOLENOID
- NEEDLE
- AIR OPERATED GLOBE OR ANGLE. STOP, SPRING CLOSING.

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SAME AS ABOVE BUT SPRING OPENING.

AIR OPERATED GLOBE OR ANGLE STOP CHECK, SPRING CLOSING. (b)

HYDRAULICALLY OPERATED GLOBE OR ANGLE STOP.

HYDRAULICALLY OPERATED GLOBE OR ANGLE STOP CHECK. (b)

VALVE WITH OPERATING ROD ABOVE BULKHEAD DECK. (c)

STOP CHECK VALVE WITH OPERATING ROD ABOVE BULKHEAD DECK. (c)

STOP-CHECK-LIFT VALVE WITH OPERATING ROD ABOVE BULKHEAD DECK. (c)

WEIGHT LOADED PRESSURE REGULATING.

EXPANSION.

GOVERNOR TRIP THROTTLE.

MOTOR OPERATED.

TEST VALVE OR COCK.

MANIFOLD STOP VALVES

MANIFOLD STOP CHECK VALVES. (b)

MANIFOLD STOP VALVES WITH OPERATING ROD ABOVE BULKHEAD DECK. (c) (d)

MANIFOLD STOP CHECK VALVES WITH OPERATING ROD ABOVE BULKHEAD DECK. (b) (c) (d)

QUICK CLOSING GATE

QUICK CLOSING GLOBE

COCKS

TWOWAY.

THREEWAY.

FOURWAY.

FITTINGS ETC.

FLANGED JOINT.

UNION.

BLANK & RING FLANGE.

ORIFICE PLATE.

REVERSIBLE ELL.

BELL MOUTH.

STRAINER BOX.

ELL.

TEE.

REDUCER.

OPEN FUNNEL.

CLOSED FUNNEL.

SEPARATOR.

SIGHT FLOW GLASS.

METER.

DESUPERHEATER. (EXTERNAL)

EXPANSION JOINT.

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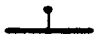
CREASED PIPE BEND.

CORRUGATED PIPE.


PIPE HANGER.

PIPE SUPPORT.

SPRING HANGER.

SPRING SUPPORT.

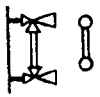
MACOMB STRAINER.

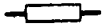
DUPLEX STRAINER.

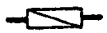
MAGNETIC MACOMB STRAINER.

MAGNETIC DUPLEX STRAINER.

PLATE STRAINER.


GAGE GLASS.


RADIATOR.


VENT HEATER.

AIR CONDITIONING UNIT.

LAVATORY.

WATER CLOSET.

BATH.

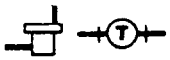
URINAL.

SHOWER.

STEAM STRAINER.

FILTER.

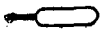
DUPLEX FILTER.


TRAP.

DRAINER.

FLOAT VALVE.

GREASE EXTRACTOR.


AIR CHAMBER.

SUCTION SEA CHEST.

DISCHARGE SEA CHEST.

THERMOMETER.

PRESSURE GAGE.

VACUUM GAGE.

COMPOUND (PRESS. & VAC.) GAGE.

DUPLEX GAGE.

SALINITY CELL.

SCHN00317654

OXYGEN TEST CONNECTION.

DISTANT READING THERMOMETER.

ZINC BOX.

LUB. OIL SPRAYER.

THERMOSTAT.

PIPES JOINING.

PIPES CROSSING.

PIPE TURNING DOWN OR AWAY.

PIPE TURNING UP OR TOWARD.

PUMPS

MOTOR DRIVEN VERTICAL CENTRIFUGAL, ROTARY, GEAR, OR SCREW.

STEAM DRIVEN VERTICAL SIMPLEX.

STEAM DRIVEN VERTICAL DUPLEX.

MOTOR DRIVEN VERTICAL DUPLEX.

MOTOR DRIVEN VERTICAL TRIPLEX.

STEAM DRIVEN HORIZONTAL SIMPLEX.

STEAM DRIVEN HORIZONTAL DUPLEX.

MOTOR DRIVEN HORIZONTAL CENTRIFUGAL, ROTARY, GEAR, OR SCREW.

TURBINE DRIVEN HORIZONTAL CENTRIFUGAL, ROTARY, GEAR, OR SCREW.

RECIPROCATING ENGINE DRIVEN CENTRIFUGAL.

NOTES

(a) INDICATE BY NOTE IF VALVE IS SPRING OR WEIGHT LOADED.

(b) STOP CHECK LIFT-SAME SYMBOL WITH NOTE.

(c) INDICATE BY NOTE IF VALVE IS ALSO TO BE OPERATED LOCALLY OR IF FROM DECK ABOVE OUTSIDE OF MACHINERY CASING.

(d) IF MANIFOLD IS AIR OR HYDRAULICALLY OPERATED USE SAME SYMBOL WITH NOTE.

SCHN00317655

OREGON SHIPBUILDING CORPORATION

INTER-OFFICE MEMORANDUM

DATE May 2, 1945

Albert Bauer

FROM Bert J. Harris

Bert J. Harris

AT 201 Service Bldg.

SUBJECT Story of Oregonship

ES TO

The enclosed book "Oregonship" by Mrs. Julia Osborn, is a story account of the building and growth of the Oregon Shipbuilding Corporation from its beginning in 1941 up to and including January 1945. It deals with development, construction and organization; the setting up of administration departments, the building of the yard, the construction of ships, and human interest highlights.

Mrs. Osborn gathered her material from records compiled and maintained by various departments, and personal interviews with superintendents, department heads, clerks, the workers and "old-timers". We owe a great deal to all of these people for their thoughtfulness, their interest and patience.

The idea of a history of Oregonship was first suggested by Mr. Bob Stice and Mr. Hal Babbitt after learning that Mrs. Osborn was interested in writing, with the thought in mind that a story of the organization would be of value in the future.

We have ditto processed the book and have run six copies which are available for further study and reference. This copy to you will be the only one issued without further instructions.

In the event you think this book merits further development, we will be happy to assist in any way possible.

BJHrfl

No page 33

original with paper copy

SCHN00317709

OREGON SHIPBUILDING CORPORATION

INTER-OFFICE MEMORANDUM

DATE May 2, 1945

Albert Bauer

FROM Bert J. Harris

Bert J. Harris

AT 201 Service Bldg.

TO

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BJH:fl

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SCHN00317710

OREGON SHIP

A story of a shipyard — its beginning and development from the year 1941 through 1945.

by

Julia Osborn

Oregon Shipbuilding Corporation
Portland, Oregon

SCHN00317711

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SCHN00317712

CAPTURING A STAR

CHAPTER I

It's funny about stars. If you hitch your wagon to one you discover that you must follow it in its trek across the heavens. If you stretch enough you may capture a star — or you may do as Henry Kaiser did and build one. But, captured or built, once it is yours it will rule your life.

Henry J. Kaiser hitched onto a star that pulled him back and forth across the continent. It took him from a salesman's job with a sand and gravel company into the building of roads; it connected him with other construction men who, in a group known as the Six Companies, built Boulder Dam, Bonneville Dam, and parts of Grand Coulee and Shasta; it drew him into various enterprises such as the manufacture of cement, magnesium and steel; it lifted him high and plopped him into shipbuilding. That is where he created a Star that is governing his destiny.

It was in the fall of 1939 that the Six Companies received their first contract from the Maritime Commission. As such contracts go it was a small one involving the building of five cargo ships in a two-way yard. It must have been enough to whet the appetites of the Six Companies, however, for their next activity was the erecting of 30 British freighters in a 7-way yard at Richmond, California. By 1941 the United States had entered an era of extensive shipbuilding, and the Maritime Commission had truly big contracts to offer reliable west coast builders. So the Six Companies signed a contract to build a Pacific Coast yard and deliver 87 Liberty ships to the Commission.

The site that had been chosen for the shipyard was a marshland, boggy and rough. Small lakes, rimmed with ash and willow, covered the low spots. On the south, granaries looked out across the barren acres; just to the north a road wandered down from the highway to a long trestle and on to a group of oil tanks. With the oil company's agreement to move farther north and relinquish the land they had been occupying, the intervening strip seemed adequate. Who could foresee that in the next 4½ years this stretch of the Willamette River would receive over 1½ million deadweight tons of steel in the form of Liberty, Victory, and Transport ships?

SCHN00317713

CHAPTER I

With the vision given to builders, Edgar F. Kaiser (Henry's son) and his key men saw in this expanse of mud and brush a pulsing, clanging shipyard. They stood near the soggy bank and planned where the ways would be built, where the outfitting basin would be scooped out, and where the main buildings would be rooted. Then they gathered a handful of engineers and construction men about them and began the creation of the yard.

As soon as construction had progressed far enough the first two keels were laid. The date of their laying marked the centennial of the original Star of Oregon, the first ship ever built in this state. Societies and historic minded individuals had started a campaign to honor that ship by naming the first ship launched in the new shipyard after it. Stories caught the romance of the situation.

Oregon's first Star appeared because of a need of the hardy pioneers who were wresting a living from the wooded valleys of the Willamette nearly a score of years before Oregon became a state. Timber was there in quantity, but livestock was distressingly scarce. What could have been more natural than the idea of trading timber for livestock? And since timber, as such, could not reach the necessary market, what could have been more logical than the decision to build that timber into a ship that could sail to its destination? So, where the next century would find the Swan Island shipyard building tankers, Oregon's first ship was christened on May 19, 1841, and launched into the Willamette. She was made of white oak, red fir and cedar. Her keel measured about 48 feet, and she drew only 4½ feet of water; but she was handsome and seaworthy. Furthermore, she served the territory well, for when she arrived at Yerba Buena, California, she was traded for large herds of cattle, horses and sheep.

So it came about that the Maritime Commission finally agreed to make an exception in its plan to name all Libertys after great men or women, and granted permission for the first Liberty launched to bear the name of that pioneering little craft.

The laying of the first two keels in the Oregon Shipyard was accompanied by quite a dash of ceremony. Admiral Vickery was there to officiate. As the yard had not yet acquired whirleys, three "cherry picker" cranes solemnly walked down the craneway bearing their unwieldy burden. It was a tedious process to place the keel plates, for they had to be blocked up and moved over, blocked again and moved over, while the workmen struggled patiently to get them lined up exactly. Vickery, disappointed at the stage of development the yard had reached, included in his keel-laying speech some blistering remarks that served to put the crowd in a we'll-show-him mood. And eventually they showed him -- much to his satisfaction.

During the spring and summer the first two hulls rose deck and deck, but it soon became evident that the second keel laid would be the first one finished. As completion neared, the shipyard began to throb with an excitement that spread through Portland. A ship was about to be born -- a second Star was to do her proud share of answering her country's need! And though the Oregon Shipyard had given her life, the city was eager to claim relationship.

SCHN00317714

CHAPTER I

The government had designated September 27, 1941, as Liberty Fleet Day, and Libertys were to be launched from all the yards constructing these ships. So it was toward that date that the launching of the Star of Oregon was planned. It was arranged for the ex-mayor, the mayor, the governor and his wife to take part. Elaborate preparations were made. Seats to accommodate visitors were placed from the Ways back to the Plate Shop; an army band was procured to furnish appropriate music.

The eventful day arrived. As time for the launching neared, a great crowd assembled to gain entrance into the yard. Not only Portlanders, but people from outlying districts flocked in. Celebrities, reporters and photographers were much in evidence. Hot dogs, ice cream, coffee, and cold drinks were furnished free. The afternoon was perfect, the music inspiring, and the crowd in a festive mood.

Promptly at 3:00 o'clock the ceremony began. The band played the National Anthem, and Mayor Joseph K. Carson, master of ceremonies, took over. There was a brief transcribed message by President Roosevelt, and address by Chaplain C. H. Marshfield. Then a ripple of excitement ran through the crowd, for the great moment had come. Oregon's first Liberty Ship was about to be freed from her wooden prison to glide into her natural element. Would she hit the water at the right speed? Would the "barn door" and the 14-ton concrete anchors that she would drag into the water slow her down properly?

One person in that crowd had a different worry. Would she break that bottle? What if she struck a glancing blow that wouldn't shatter the glass? Would she seize upon the right moment, or be a moment too early, or -- heaven forbid! -- too late?

Mrs. Charles Sprague, Oregon's first lady, was excited, uneasy and deeply thrilled all in one surge of emotion. Accustomed though she was to officiating at public affairs, the special significance of this particular launching and her happiness at being the one to perform the christening almost overwhelmed her.

The burning of the plates that held the ship was begun. Mrs. Sprague said in a proud voice "I christen thee, 'Star of Oregon'", placed her left hand on the prow and gripped the bottle firmly. There was a cracking report, the ship quivered -- and Mrs. Sprague swung the bottle in a determined arc at precisely the right moment. In a warm glow of triumph and a splash of champagne, she watched the ship of her christening slide majestically down the Way.

For a moment a reverent hush descended upon the crowd, but as the Star of Oregon cut the water and sent a spray curling up from her sides, twenty-five thousand throats swelled with wild cheering. Men slapped each other on the backs and women wiped their eyes as they laughed over their own emotions.

So began an amazing procession of launchings from the Ways of the yard that was to be called by Admiral Land, "The best damn shipyard in the country", and to be affectionately referred to by Henry J. Kaiser as "My Baby Number One".

SCHN00317715

CHAPTER I

The second Star sailed the seas for less than a year. Loaded with lumber, she left in January of '42 for an unknown destination. She plied in and out of several African ports, unloading one item of cargo and loading on another. In the late summer she stopped at Durban, in South Africa, exchanged part of her cargo for tan-bark extracts, hides, and asbestos. Away she went, headed for the safety of a convoy — only to be torpedoed ten hours short of her goal. Her life, like the lives of most cargo ships during that phase of the war, was as short as it was busy; but she became a symbol of achievement to the people of Oregon, and to Henry Kaiser she became the Star that zoomed him to heights of international fame — the Star that henceforth will never let go of him.

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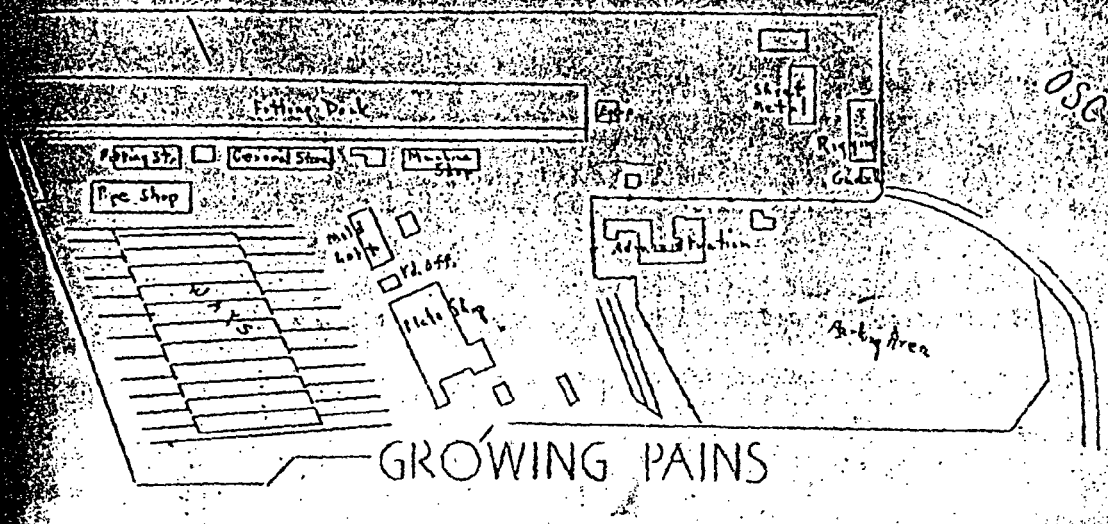

GROWING PAINS

CHAPTER II

On January 11, 1941, the Oregon Shipbuilding Corporation received from the United States Government its first appropriation for the building of an 8-Way shipyard on the bank of the Willamette. On February 4 the corporation leased its first strip of land -- also, on the same day, it started to move the Northwest Oil Company from the ground where the Ways were to be constructed. Already the Port of Portland was filling in the area involved. (The Port of Portland eventually did all Oregonship's dredging except for the land upon which the dormitories were built.) The spot selected for the yard stretched between Burgard Street and the Willamette immediately north of the City of Portland Dock Commission's Terminal 4, two miles north of St. Johns.

The first tract of land marked what was expected to be the southern edge of the shipyard, and it extended from the shoreline back over 83 acres of ground. An adjacent strip of nearly 66 acres was added on February 7th, and on the same day land was bought for the location of the Northwest Oil Company. This deal included three small tracts that lie on the shoreline north of where the Outfitting Dock was to be built. Four days later the 10½ acre tract that the oil company had occupied was purchased. This gave Oregonship an unbroken area large enough to contain 8 Ways and an Outfitting Dock with its basin, and the buildings and shops deemed necessary for the shipyard.

The press of war was steadily increasing the demand for merchant vessels, and the government, with a contract for 12 additional ships to be delivered by the expiration date of the original contract for 31, appropriated money for the building of three more Ways. On April 17th, Albert Bauer received from O. A. Meehlin, Resident Plant Engineer, a communication stating that the appropriation had been made and the contract signed in Washington, D. C.

In order to have room for the new Ways an 11-acre tract adjacent to the southern boundary was purchased from the Terminal Flour Company. These acquisitions answered the water-line needs for some time to come, but occasionally land was obtained back toward the highway. One quarter-acre lease obtained in May and a 23-acre lease in December rounded out the first year's expansion.

SCHN00317717

CHAPTER II

Though in 1942 only two small tracts were acquired, in 1943 the yard had again grown too big for its bounds, and over 120 acres were added in what was approximately a 50-acre and a 70-acre purchase (the former for housing, and the latter for general yard storage).

January 13, 1941, two days after the first government appropriation had been made, the Oregon Shipbuilding Corporation rented its first office in the Pittock Building. Into two offices and an ante room moved Edgar Kaiser, Charles A. Shea, Mike Miller, Bill Harlowe, Albert Bauer, Todd Woodell, and the first woman to work for the Oregon Shipbuilding Corporation, Mrs. Edna Knuth.

The place buzzed with the problems of selecting and acquiring a site for the shipyard, and of hiring the right men for responsible positions. But the era of the Pittock Building location was brief. About the 20th of January they moved into the Lewis Building, where there was more room for expansion.

The Personnel department drew its first breath on January 20, 1941, when Todd Woodell moved into a Pittock Building office where Charles Shea was working over deals that involved the acquisition of land for the shipyard. Woodell, who had been in charge of personnel problems at Bonneville and Coulee, promptly set about hiring clerks for the offices that were coming to life along the railway. Labor management and hiring procedure were at this time a part of his work. In February, after the Oregonship offices had moved into the Lewis Building, he was joined by O. L. "Chick" Johnson who had also been connected with personnel work at Bonneville and Coulee. Together they put in long hours interviewing and hiring droves of job applicants. Together they continued their work in an office in the Administration Building as soon as it was ready to house them.

Before the Oregon Shipbuilding Corporation had actually acquired land, a group of its engineers were already planning the layout of the shipyard. Albert Bauer, then Chief Engineer, John Hallett, Yard Superintendent until he left to act in a similar capacity for the Vancouver yard, and several others took over one of the three offices and promptly littered the room with blueprints. That is the way Vincent Palmer and Robert Eiring found it on January 25th, 1941, when they arrived from Coulee to begin their work as draftsmen. At first the engineers were one small busy family, but with the arrival of Roy Cook, during the first week of February, the group divided. Cook, as Design Engineer, headed the engineers who drew up or altered plans for buildings and structures; while Palmer and Eiring, under the direction of Bauer, took over the business problems. They budgeted expenditures, sent out bids and made contracts for jobs that were to be sublet.

At first the Gilpin Construction Company, which was building the Ways and driving the piling under sub-contract, kept time for the shipyard's few employes, but when Oregonship prepared to hire new crews it had to take over this duty. So O. R. Stanley, who had been Head Timekeeper for the Consolidated Builders Incorporated at Coulee, came to take charge of Timekeeping. After spending a couple days in the Lewis Building he moved, on February 9, out to the shipyard and into

SCHN00317718

a corner of the only building up -- a three-room shack that Russ Hoffman, then Construction Superintendent, shared with the field engineers and several other men who were in charge of operations.

At the outset, timechecking meant checking men in and out from a listed page as they streamed by. As one pioneer loftsman expressed it, the Time Department used to be "a fellow sitting on a stool beside the road".

When Stanley first took over the Gilpin Construction Company's list of Oregonship's employes, it had only engineers and exempt men on it. The first week, however, the names and numbers of ten laborers were added, and very soon after that ironworkers, carpenters and loftsmen appeared. In the beginning, the various craftsmen were all listed together on construction work, but before long they began to be separated into departments. At first the Cost Department handled the only breakdown between facilities and production work, but on June 1 the Timekeeper started keeping the production payroll independent from facilities.

On February 9, Paymaster Roy Kendler began covering the same duties for the Oregon Shipyard that he had for the C.B.I. at Coulee. Kendler set up headquarters in a tiny room in the Lewis Building. Into it moved an adding machine, a calculating machine and a typewriter. Soon after he was settled, C. W. Spencer joined him as Assistant Paymaster, and the two of them became the nucleus of the Payroll Department. For a time they prepared the checks in this office and sent them down to the yard with the Timekeeper, but as soon as the erection of the Administration Building was far enough advanced to allow it, they moved their meager equipment into one of its nearly finished rooms. This predated the completion of the building by 16 days, and the place was in a turmoil. There were no lights as yet, and no furniture; but that did not stop the Paymaster and his assistant. First they persuaded the electricians to run "hot" wires in to operate their machines, then they laid plywood across sawhorses, deposited the equipment upon it, set themselves down on nail kegs, and went to work. The machines bounced merrily to the tapping of their keys; the electricians, cabinet makers and painters came and went; but the payroll progressed according to schedule.

Until that August, all the work connected with getting out checks was done by hand, and done by a staff of nine regular employes, with borrowed help when the checks had to be typed; but by then there were nearly 5,000 on the payroll, and IBM machines were introduced to facilitate the work. Although the machines soon proved to be unbelievably accurate and indispensable, the staff's first encounter with them did not turn out too happily. Someone made a mistake in wiring them, and the department that prided itself on its accuracy turned out checks that overpaid a large number of men. The error was not caught till after the checks had been distributed, and the Paymaster practically had to become a collection agency to recover the money.

The yard personnel grew astoundingly and the duties of the department grew with it. There were many tasks besides the one of getting the regular checks out on time. All terminations, deceased cases, transfers, cash advances, adjustments

SCHN00317719

garnishments were handled also. Sometimes a week's turnover involved 400 inations and 500 recruits. These jobs were always taken care of early in eek, before the regular time reports came in. (Until December 27, 1943, the rotating day-off was discontinued in favor of Sunday for everyone, sday was payday. At that time a switch to Friday was made.)

ontinue doing all the work manually would have taken a regiment of workers, achines were acquired. There was a signing machine that signed as many as 000 checks an hour, and a detacher to separate the checks. These checks ran one continuous roll, with as high as 20,000 in one bunch, and it would have a big undertaking to separate them all by hand. Once, when the detacher ill had several thousand checks to disjoin, it broke down, and Kendler had to rrow every available office girl in the Administration Building to get the ecks ready for distribution. Never was the department late about presenting checks, but it had some photo finishes. Payroll employes felt about their ork much as postmen do about their mail -- regardless of circumstances, livery must be on time. And with the exception of the week of the fire in vember '44, it always was.

e first notice that the telephone company took of the Oregon Shipbuilding orporation was when they installed two phones and connected two lines for it the Pittock Building, January 20, 1941. Their next connection was when they stalled a 30-line switchboard with three outside lines for the group in the wis Building offices. Mrs. Ray Kendler, wife of the Paymaster, who had come wn from Coulee where she had been in charge of the C.B.I. switchboard, was e telephone operator. Although a line was run to connect the shipyard with e outside world in February, the telephone company installed the first itchboard for Oregonship in the original Administration Building on April 14, 41. It was a 3-position board, and Mrs. Kendler was joined by two other erators. When Mrs. Kendler left the company, Mrs. Cora Newell, who had worked th Mrs. Kendler at Coulee, became the chief switchboard operator. Mrs. Newell ained to direct the handling of the 6-position dial board that was installed the new Administration Building September 27, 1942. Although the operators this board put through around 60,000 calls a week, the work on the automatic ard was lighter than the girls had experienced with fewer calls on the manual ard.

ong the incidents that livened the routine of the operators was the quake in fall of '41. Because it disconnected all outside calls, the board was mped with queries as to the cause of the break. The majority of inquiries ought that there had been an explosion. Then there was the heavy snow early 142, with the countless calls concerning crews that would or would not be pected to work. The highlight of all was when, with the excitement of secrecy, outside lines were disconnected before President Roosevelt arrived at the ipyard to take part in the launching of the 10-day ship.

r those lines went big business discussions, desperate long distance arguments arrangements, and messages that changed the course of the shipyard. The rchasing, Expediting and Traffic Departments all kept the wires hot in their ort to keep the shipyard supplied on schedule.

SCHN00317720

CHAPTER VI

[illegible] of the first departments to become active was the Purchasing Department. [illegible] required desks, chairs and typewriters. The shipyard needed piling, [illegible] and machinery. Later on, ships frequently depended upon the purchasing [illegible] for supplies that did not come through the regular channels. Office [illegible]ipment was easy to obtain, for nine out of ten of the salesmen who constantly [illegible]eamed through the doorway of the Purchasing office were eager to sell office [illegible]nishings. The tenth one had shipyard equipment to offer, but often it was [illegible] what was required, or there would be a delay in obtaining some of the parts. [illegible] it frequently happened that the purchasing agent would consider some second-[illegible]d articles. In such cases, Claude Bacon, then acting as machinery inspector, [illegible]uld make the necessary trip to examine the machine in question. If he gave [illegible] OK the purchasing agent would write out an order.

[illegible] first purchasing agent to appear at the Lewis Building was Ken Weaver, who [illegible]eft a Kaiser project at the Gray's Harbor jetties to join one in Portland. [illegible]though he hired in as assistant purchasing agent, as yet there was no one for [illegible] to assist. He began his new work by setting up records and getting the office [illegible] shape for business. Soon after he arrived a regular Purchasing Department was [illegible]t up, with the addition of a chief purchasing agent, two buyers and several [illegible]ypists.

[illegible] Valentine's day Todd Woodell hired into the department a girl who remained [illegible] become the pioneer woman employe of the Oregon Shipyard. She was Hazel Clark, [illegible]nd she entered the office in time to write out every shipyard purchase order up [illegible] the launching date of the Star of Oregon. These orders ranged from carpenter's [illegible]ools to hydraulic joggling presses for the bending of heavy plates, and to "headache balls" for cranes.

[illegible]odell recalls with amusement the incident of Miss Clark's hiring in. In those [illegible]ys the Kaiser crowd thought nothing of working far into the night. When she [illegible]ked for an appointment he told her to come down about eight o'clock that evening. [illegible] did not realize how unconventional the hour would seem to the uninitiated till [illegible] appeared that night -- with her father.

[illegible] March, 1941, Mr. Reis set up the Accounting office. His disbursement clerk [illegible] Eunice Sadler, who had acted in a similar capacity at Coulee and Bonneville. [illegible] May, A. MacGregor became Chief Accountant.

[illegible]ouchering invoices for payment and posting cost ledgers were an old story to [illegible]s. Sadler, but the job in the Lewis Building office was anything but routine. [illegible]ople stormed the office to find jobs, to sell ideas, to request concessions. [illegible]en there were flocks of salesmen trying to sell everything from hat racks to [illegible]chinery. It took an adroit clerk to stand off the unwanted and welcome the [illegible]ited. It took a smart clerk to keep her accounts straight in the midst of [illegible]ch confusion. She survived, however, and stayed on through the years that [illegible]llowed.

[illegible] closely allied to the Purchasing Department that for a while it operated in [illegible] same office, Invoice Audit checked every purchase order against the vendor's

SCHN00317721

invoice and the Warehouse Receiving report. George Chapin, after keeping the files of the Oregonship men on the Gilpin payroll and acting as a sort of expediter for a couple months, took charge of this phase of the work about the first of April '41.

During the first three years of its existence this office invoiced approximately 70,000 purchase orders. It also handled sales, transfers of materials, billings and pricings. Starting with invoices of orders for machinery parts, it found itself later on invoicing safety pins by the gross — for when the infant yard grew up it took over the part-time care of its employes' children.

Before an office was created, its procedure had been determined by Mr. Reis. An office manager was set up to coordinate these procedures, keep an eye on expenditures and steer the course of administrative offices.

From the spring of '41 till January '42, Rex Hamby filled this position. When he left to do the same work at the Vancouver yard, Oregonship's Chief Accountant, A. MacGregor, left the Accounting office to take over as the Office Manager. Through the years that followed he served in this capacity, making decisions concerning problems of procedure, saying "yes" and "no" to matters of expenditures, and in general acting as watchdog of the treasury.

Now an entire floor in the Lewis Building was taken up by offices of the Oregon Shipbuilding Corporation, and the Administrative branch of the shipyard was off to a good start. However, these offices were too far from the yard for convenience, and it was a great relief to all concerned when the Administration Building was finished and they could transfer their files and equipment to the scene of action. In April, 1941, the part that the Lewis Building played in Oregonship's history came to an end, and the clerks who vacated those offices became separated from welders and warehousemen, painters and pipefitters by only a fence.

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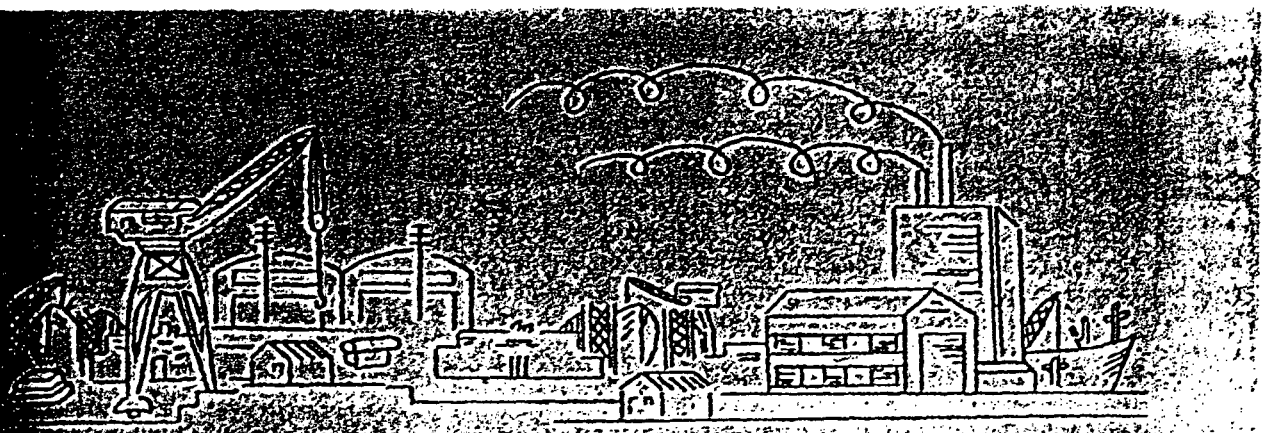

FROM SWAMP TO SHIPYARD

CHAPTER III

33 acres of mud, some rented equipment and a few crews of men — that was the ginning of the Oregon Shipyard. In its prime, with its 330 acres, its numerous ops and powerful machines, and a personnel that topped 30,000, it was the tion's leading shipyard. It was neither the oldest nor the largest, but it ilt ships fastest and with lowest man-hour cost.

th the breaking of soil on February 4, 1941, a project that involved the moving approximately 3,500,000 cubic yards of earth and the driving of around 30,000 iles (ranging from 35 to 60 feet in length) was begun.

e story of the yard's formation is one that belongs to the Facilities Depart- nt — to the design and field engineers, the laborers, carpenters, ironworker ggers, pipefitters, electricians, warehousemen and painters. It belongs to 3 Hoffman, under whose direction the whole thing was accomplished — under a ntract that granted the shipyard a $2 profit. Under his direction, dredging, lling and grading was done, piling was driven, and tracks, roads, buildings d shops were completed. Whether the labor was done under sub-contract or by ilities men, he was responsible for the workmanship.

the vicinity of what eventually became Way I squatted the Northwest Oil mpany. According to agreement, it was to vacate that territory and settle on e north side of what was to be the Outfitting Basin. The first spadeful of rth turned concerned this move. Sam Fullman, pioneer in the Materials Depart- nt, had cause to remember the day that the tanks were emptied and moved. A nd of oil had formed from the drainage of the tanks, and as a cat had spread nd over it, the surface appeared normal to the swing shifters who began work dusk. Fullman, bent upon a hurried mission, started to run across the spot. a moment, he was plunging, knee deep, through a thick, dark mess, and by the me he emerged he looked ready for a feather finish.

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The moving was done by employes of the oil company. As they were not members of a union, yet were working on the same territory as the Oregonship employes, there was talk of picketing the place. For a while it looked as if the baby shipyard would be launched into the world to the music of labor trouble. When the situation reached Edgar Kaiser's ears, he acted promptly. In a sincere and persuasive manner, and with diplomacy worthy of his father, he prevailed upon the men not to give the project such a bad start, and the matter was patched up.

So an incident that would have smudged the clear slate of Oregonship was averted, and her record for peaceful operation stood through the years that followed.

The first local resident to investigate the job situation of the new shipyard was Al Burroughs. On the 18th of February he went to the union hall, hired out as a labor foreman and rode out to the area that was to be a shipyard. Looking down from the highway toward the river, he could see only a lumpy swamp. His inquiry at terminal No. 4, "Where's the Oregon Shipbuilding Corporation?" brought forth the vague information that several cars had been driven 'down that way' toward the oil tanks. Maybe they were connected with the concern. So Burroughs tramped across the long trestle that sloped toward the river and picked his way along a plank road. Once, as he skirted a clump of brush, half a dozen Mallard ducks lifted frightened wings from a pond and flapped protestingly away.

As he neared the river bank Burroughs came upon a small group of men engaged in earnest discussion. When he told them why he was there one of them put him to work with an axe, for trees and brush had to be cleared away before anything else could be done. Burroughs later came to know this man as Russ Hoffman. Along in the afternoon, eight newly hired laborers showed up and formed the first crew signed by the union to work at the Oregon Shipyard. This was the nucleus of the Labor Department.

This same gang ran into plenty of exasperating jobs during the weeks that followed. One cold, raw morning a caterpillar tractor that was grading the site for the Plate Shop bogged down. Efforts to free it only made it sink lower. Finally the labor gang, toiling in mud and water that soaked them to the waistline, dug it out — only to repeat the operation for another tractor a few hundred yards away. Their report for the day was, "Lost two cats in the mud. Dug them out."

Other men had their troubles. Materials clerks frequently suffered dunkings while taking inventory on the rafts of piling that they had to receive. Slick floes and wet piling make a bad combination. Cat drivers had their trials. Occasionally a cat, grading too close to the waterline, lost its toehold and plunged into the river, submerging its driver. Joe Ennis (later a whirley operator, but then driving a cat) pulled several drenched cats and swearing drivers from the water.

As soon as the ground was ready, truckload after truckload of gravel arrived; and when roads had been constructed, heavy trucks, weighted down with building materials began lumbering across the trestle and crushing their way along the fresh gravel to deposit their burdens at specified spots. As the fill was completed, the trestle, which had stood 15 feet above the water, was slowly buried until at last the top planking and stringers were removed and all trace of the remainder disappeared beneath sand and gravel.

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Entering materials were received and dispatched by W. R. Thomas, the materials supervisor, and his clerk. The first receivals were for the building of a big culvert to carry off the water where the dredges were at work. The next were for the Mold Loft and the Administration buildings, with materials for the Plate Shop and the Machine Shop close behind. Machinery and equipment parts began entering the yard in quantity, and the clerk was joined by several others in his work of receiving, dispatching and issuing.

The first cherry picker to belong to the shipyard arrived at the terminal No. 4, was assembled there and run into the yard under its own power. Soon after this a railroad spur was extended in from the terminal, and material was brought in by rail also.

For a while everything was dumped on the sand near where it was to be used, or left on the loading platform. The first material meant for the construction of a building went into the original Yard Office. On the left of its small hall was a room where Bill Harlowe, Chief of Party, directed the activity of his surveyors. At the end of the hall was a long room which Russ Hoffman shared with the field engineers and their tables of blueprints. On the right was the room that housed Thomas and Fullman with their materials records, and Stanley with his timekeeping figures. There was a spirit of camaraderie among the men in that little office. For instance, at shift changes the materials men would vacate their desk for Stanley's use, because beside that desk was the window where the men checked in and out.

When the ground had been leveled and graveled, Billy Hartsook and his carpenter crew built a long loading platform which served as a foundation for many early activities. Countless things were stored there, and it supported the carpenter shack which served as their tool house and office.

Closely allied with the carpenters were the labor crews, for facility labor was involved in all yard construction. After the first big task of the clearing and burning of brush had been finished, and the ground had been made ready for building, their duties took in many new jobs. Early in April, Jim Miller (another pioneer who remained to see Oregonship hang up record after record) hired in as a labor walker. His crew poured the footings for the Mold Loft, the Plate Shop and the Compressor Stations. They helped construct manholes and they laid railroad and whirley tracks. They were scattered over the Ways, the Dock, and the entire yard.

As soon as material began to arrive men were needed to handle it. Parts of cranes that the yard was acquiring had to be assembled, and overhead cranes had to be installed. So, the last of March, Swan Johnson and his ironworker riggers entered the yard. For a while there were only three of them, then several crews were added. They had a rigging shack on the loading platform, where much of their work was centered. They were very busy indeed, building with the carpenters (for they handled the steel used in the erection of shops), assembling and installing cranes, and transferring materials. Ironworkers do their own riveting and welding. Their trade is one that demands a long apprenticeship and a lot of skill.

Under sub-contract the Administration Building was started late in February, and about a week later the yard's laborers, carpenters and ironworkers began work

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upon the Mold Loft. Because the upper floor of the Loft had to be finished before loftsmen could make templates for the ships, and because several construction departments were homeless, two shifts were put upon the job, and it was completed by April 20 — 6 days ahead of the Administration Building. Following upon the heels of those two buildings came the Blacksmith Shop and the Field Office (completed May 2), the Machine Shop (May 22), and the Fitting Stores (June 7). The Plate Shop, which had been started late in March and put on a three-shift construction schedule, was in use for a month before the roof was on it; June 18 marked the date of its completion.

Meanwhile, into a corner of the Mold Loft, with the electricians as their very close neighbors, moved the machinists. They squeezed into their corner one lathe, one drill press, and one emery wheel; then they set up shopkeeping with a personnel of 10 or 12 men for the three shifts. Their first job was boring a set of bearings for a punch and shear machine that was sitting off by itself on a concrete foundation in a great sea of sand. Fred Spear and Walt Wilson, who were Machine Shop foremen, wondered why it had been left in such a deserted place — till they saw the Plate Shop rising solidly around it.

Another early job was the drilling of the whirley rails which, to their surprise, were carried out and deposited on what they called "the desert". That spot later became the Steel Yard.

They began to make dies, reamers, taps and drills for various departments that suffered a shortage of implements. At first tools were obtainable from vendors without too much delay, but as time went on it took longer and longer for firms to deliver their orders, and finally no amount of pleading or demanding could get some filled at all. So the machinists took on more work of filling orders for shipyard tools.

As increasing demands were made upon them, the department's numbers swelled proportionately. More room and more equipment became a necessity. So a Machine Shop was built right next to the Blacksmith Shop. For weeks before the building was finished machinists had been installing equipment in it, and when, on the 22nd of May, '41, it was completed, they were already half settled in their new home. This time they had a band saw, a couple of new lathes, and half a dozen drill presses, shapers, and grinders. Within a month the shop had a personnel of 81, and besides the regular facilities work they were doing an increasing number of jobs for the Star of Oregon.

Their most memorable job, which came several weeks after they had moved into their Machine Shop, was the machining of the stern frame of the Star of Oregon. Stern frames are huge, and it was quite a job to machine them under any circumstances, but the preparation of the one for the first ship to be launched from an Oregonship yard held a special importance.

The entrance of cranes into the yard added to the work of the machinists the task of installing the machinery and the responsibility of keeping them in good running order.

The earliest work of handling materials was done by two rented "crawler" cranes. Before the yard was a month old, however, it had acquired two of its own. One had 3/8 cubic yard capacity, and the other had a hoe attachment. Early in the summer

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...ple of kranekars — small truck cranes that are useful within a shop — ...ed, and autumn saw four large truck cranes added.

...irst whirley assembled in the yard was the "Blue Goose", a relic of ...ville days. It was an amazing collection of parts taken from several makes ...nes, but it was ideal for the Steel Yard, for it was fast with light loads; ...ould handle only 12 tons, but it had a radius of 85 feet! Old timers speak ...the Blue Goose with a trace of fondness.

...summer several whirleys on the Ways, two in the Plate Yard and another in ...Steel Yard were installed. By the end of September, there were 9 on the Ways ...on the Outfitting Dock.

...of the whirley parts were slow to arrive. The cabs for the American whirleys ...the Ways did not show up for four months after the machine was all assembled ...in running order. But it took more than missing cabs to hinder enterprising ...builders. To what better purpose could lawn umbrellas be put than shielding ...operators from blistering sun or driving rain? So the cabless cranes ran ...along their tracks sporting gaudy umbrellas beneath which men hunched over ...controls for all the world like frogs under black and orange toadstools.

...for tractors, two caterpillars with bulldozers were brought into the yard ...ebruary 20, 1941. During April another cat appeared; a Clarkson followed in June ...two cats with trailer hitches in July. In the fall the yard acquired one Beal ...-trailer and 6 Willamettes.

...side locomotives were constantly bringing steel into the yard, but Oregonship ...ed engines of its own to transfer it. The first yard locomotive was an elect-...one that arrived on the 12th of March, '41. Two months later it was joined ...diesel electric dinkey. Those two handled the locomotive problems throughout ...year. 1941 also saw the arrival of 8 or 9 pickups and as many flatbeds, ...eral sedans and dump trucks, a fire truck, a Handy Andy, a hyster, a road sweep ...motorcycle and 6 bicycles.

...y in April, 1941, pipe began to arrive in truckloads, and pipe maintenance ...started the project of furnishing water to the entire shipyard. Down from ...minal 4 to the pump house they brought the main line in 10-inch and 12-inch ...; from there they ran an 8-inch domestic and a 10-inch fire pipe over to ...the Paint Storage later stood. Early men like pipe welder Bill Dillon, ...pipefitters Lloyd Beck, Emil Reich and Ken Siler toiled through the loose ...as they branched the pipe lines — running one of them west to Way 10 and ...the head of the Ways, and the other along the east side of the Plate Shop, ...near the Mold Loft, then south to the head of Way 1, where it joined the ...line and ran over to the Dock. The Dock system, when finished, completed ...second circuit. From the head of each even Way a domestic line was extended ...the far end, and from the head of each odd Way a fire line was run back. ...was almost over before the men finished these systems.

...while, other crews were extending acetylene and oxygen lines from their ...ective shops to the Plate Shop, the Ways, and various shops on the Dock.

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[illegible] lines were ready for use, portable oxygen and acetylene cylinders [illegible] the workmen's needs.

[illegible] time there were around 80 pipefitters and pipe welders on all three [illegible] At first they had their headquarters in a tool shack that stood near [illegible] 2, then later, in a corner of the Mold Loft.

[illegible] ights began hiring in about the first of May, and as soon as the bank [illegible] had been dredged and graded and piling had been driven, they began setting [illegible] and keel blocks on Ways 7 and 8. When they had accomplished this job, [illegible] two Ways were ready for keel laying, the crews fell to erecting the [illegible] olds that the carpenters were sending down to the Ways in 55-foot towers. [illegible] were 80 such sections for each ship, and both the Star of Oregon and the [illegible] ther Lewis had risen considerably before their scaffolding was all in place.

[illegible] department had its headquarters in a shack near the Mold Loft, and during [illegible] ummer they picked up about 500 members. Ray Hausmann, another Coulee man, [illegible] began driving piling on the Dock till work on the Ways had progressed far [illegible] for shipwrights to start their work. Then he joined them, and in July he [illegible] a foreman of the department.

[illegible] through the summer and fall buildings and structures were springing up like [illegible] ooms in a sunny meadow -- compressor stations, a garage, sub-station, pump [illegible] water tank, and oil house. The Ways, a parking area and some paved surface [illegible] all taking shape. Carpenters were building scaffolding, laborers preparing [illegible] itions, and ironworkers were assembling cranes. The middle of October found [illegible] ard enclosed in a steel and iron fence with a carefully guarded gate.

[illegible] amp was a thing of the past, and in its place stood an ambitious young [illegible] rd.

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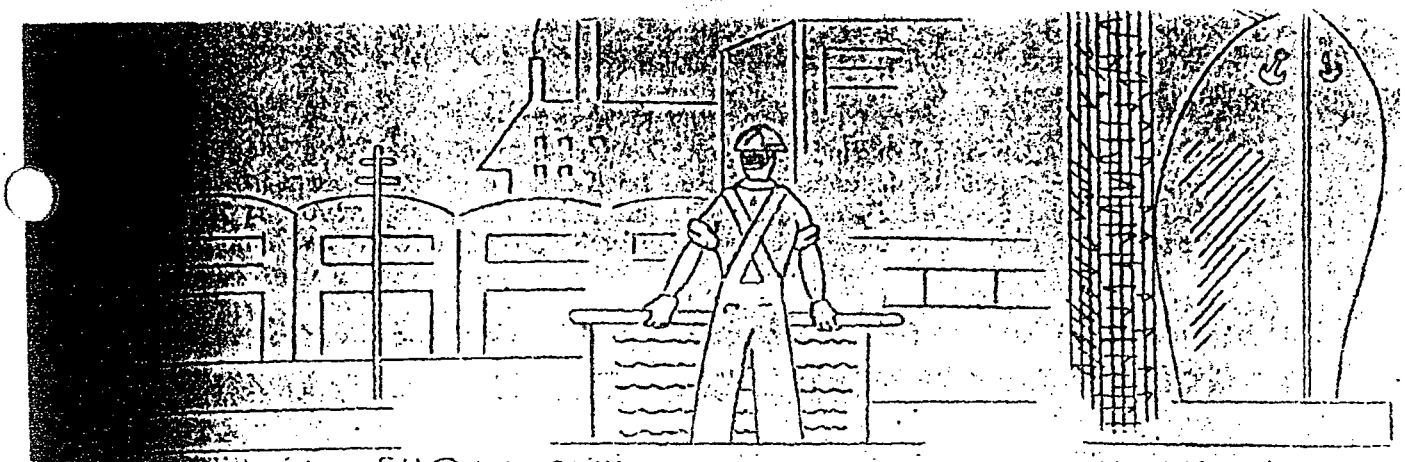

FROM SHIPYARD TO SHIPS

CHAPTER IV

dredging, filling, pile driving, and the erection of buildings and shops ging ahead at a mad pace, attention was directed to filling the Maritime mission's contracts. The yard was merely a means to an end. The government interested in ships.

ctricity

lack of form and void, and the darkness spoken of at the beginning of Genesis, ld easily have referred to the shipyard during those first weeks of her exist- e. By February, '41, something was being done about the form and void, but kness still prevailed.

rom Coulee came the first electrician who had hired in there with the C.B.I. as Mel Hord, and on February 15 he moved into an office next to the design ineers and with the aid of a draftsman began to draw up plans to furnish the pyard with light and power. By the end of the week he had two more draftsmen, plans were progressing rapidly.

Gilpin Company, which was already filling in land for the shipyard, did the inal temporary lighting for the Ways construction, but as work was started on rea or a shop the electricians furnished light and power. On February 20th, first electricians were hired in, and a line was run from P.E.P. company lines the Field Office, at the head of Way 3. This was soon followed by lines to the ding sites of the Mold Loft and Main Office Building. As swing and graveyard ts were added to the various departments' schedules, much lighting was needed. the exception of the original Administration Building (which was wired under contract) the shipyard's electricians directed power to each building as the arose. They had established a small shop on Way 1, and they soon followed another on Way 4. The first transformer was borrowed from the P.G.E. Company used from March 27 through June. The first working power was carried to the Shop and to Ways 7 and 8 long before permanent feeders could be installed.

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of the greatest struggles the department had was the constant rebuilding maintenance of the second-hand bridge cranes that the yard had acquired. of the overheads that were installed in the Plate Shop had been built in , and two more in 1898. Having fought through two wars, they were being ded into a third one.

ther problem grew out of sudden requests for power shifts — to be made in urry. It was nothing for them to have to supply power for 100 welding machines spot that had not heretofore needed power.

Mold Loft, which temporarily housed many homeless departments, sheltered the tricians, also. Into it they moved, bag and baggage, within a week after the lding was complete. Besides the stocks which they piled in the north end of lower floor, they crowded in several desks that represented their office equip- It was a very inadequate setup for a department that was growing so rapidly. soon as the General Stores could be occupied the electricians found temporary ge there. It was a happy group that moved, around Thanksgiving time, '41, their own new Electric Shop.

the Star of Oregon arrived at the Dock no cable had been installed. As yet system had been worked out, and reels were simply plunked down upon a deck so their cables could be pulled till they stretched over their course before y were cut off. At that time cable could not be cut in the shops because orseen conflicts (such as steam pipe that had to be given the right-of-way) en required extra footage.

crews did their own layout, cable pulling and hookup work. There were times after electricians had carefully marked with chalk the spots where cable to pass through bulkheads, exuberant painters would spread their handiwork ss the whole surface and go merrily on their way, leaving only a headache for electricians. There was the desk that every craft moved — after the electri- ns had installed its wall lamp in exactly the right spot. When the final ation had been determined and the lamp had found a permanent resting place its cks left record of its wanderings — 34 holes in the wall!

the departments had timed their jobs and worked out a cooperative plan they interfered with each other. Confusion occuring from incomplete blueprints, timing, or changes in the original plans explain why, when each department worked out sequence and schedule, the time between keel-laying and delivery pped from the Meriwether Lewis' record of 253 days to the Joseph N. Teal's days. Yet only 8 months elapsed between the delivery dates of the two ships!

Mold Loft

oduction started with the Mold Loft. Not one piece of steel could be shaped loftsmen had traced upon the floor life-sized patterns and made templates those outlines. During the construction of the Mold Loft loftsmen appeared. was in April, '41, and as yet there was no work shop. Loftsmen Joe and Elmer and sawyer Dick Schulzke worked on the sand, laying out wedges and tools for

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shipwrights. When, April 20, they moved into the Loft they were joined by Teed, who became their supervisor, and in July Walter Torres (later the partment Superintendent) hired in as their foreman. All these men stayed rough the years that followed, working upon the templates for the Liberty, atory cargoes, and Troop Transports.

th several departments on the ground floor below them, these men took over the stairs. Upon the freshly finished floor they marked off the body plans of the berty ship in water lines and buttock lines. Several new loftsmen appeared, d one group worked upon the aft, while the rest worked upon the fore patterns. e sawyer set up a band saw and began cutting the plywood that the loftsmen had rked out. As soon as the body plans were half done the men began building mplates.

ddenly the Mold Loft's personnel jumped to about 50, and work began to press on them so that from the fourth of July till Labor Day they worked straight rough on a 10-hour schedule with no days off. The Loft was the starting point the progress of the Star of Oregon's construction.

aterials Department

en the earliest loads of material began lumbering across the trestle and down to the fresh fills the materials clerk merely said, "Dump it on the sand where ey are leveling for the Mold Loft.", or, "Take it over and unload it beside e Plate Shop footings." Then he jotted down the receival of it, and there it y till the Facilities men got around to using it. Much of the small stuff was ft on the loading platform. As yet there was no Materials Department, but W. R. omas was in charge of handling materials -- which were all for facilities.

soon as the Mold Loft was near completion the Materials men took over a corner the ground floor, moved in a desk, some chairs and a store of bolts, nails and ols, and set up department-keeping. The end of May saw the General Stores nished, and a week later the Fitting Stores was ready for use; so the Materials partment established offices in the General Stores and promptly began to fill e buildings with materials. Into the General Stores went material for vessel nstruction, and into the Fitting Stores went ship supplies.

Walker, who had been in charge of materials at Coulee, was brought in to rect the handling of ships' steel and materials, while Thomas remained in charge Facilities supplies. The two departments were consolidated later, and Walker s made Superintendent over the whole operation.

e clerical side of the Materials Department was complicated and exacting. The nagement placed E. C. Bechtold in charge of this work. Under him a Materials counting section that grew to include 150 forms was developed. The depart-nt's kardex system was the heart of Material Accounting. It was the basis for dering material, and the basic record for inventory. It posted all requisitions purchase orders, receipts and issues, carried the entry of prices paid, and t a running balance. It was set up alphabetically by commodity, and it gave the

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partment a complete record of all material transactions. So practical was the
stem that Bechtold became another of Oregonship's men to be promoted to the
sition of a 3-yard executive. He transferred to Swan Island as Administrative
sistant in charge of Materials Procurement, Materials Accounting, Purchasing,
editing, Traffic and Contract Terminations.

two stores soon proved inadequate to house the flood of materials that was
iving, so the company used a warehouse at 26th and Nicolai Street for the
erflow. In October, '42, the Columbia Steel warehouse, a few blocks away,
obtained as additional storage space.

his settled the storage problems of the Warehouse for the time being, but the
pansion of the department had really just begun.

ull Control

hen it came to remove steel from storage and start it circulating through the
Plate Shop a need arose for an office that would be responsible for releasing
the steel. Records would have to show every item taken from the Steel Yard,
nd just when and where it was used. So the department of Hull Control was
reated.

supervisor and three junior engineers got the department off to a good start,
or during the shipyard's infancy the release of steel was often no more than
40 or 50 tons a day -- a far cry from the 2200 tons released daily during the
all of '43!

upervisor Ted Dunkin, who was with the department throughits years of service,
aw the record books grow from a 50-sheet to a heavy volume size, and from
impy files to those containing countless items, for every piece of steel re-
eased from Star of Oregon days on can be found among them.

ull Materials

utton, button, who's got the button? That is a good parlor game, but it
ouldn't do for shipbuilding. Someone must know exactly where everything is
t all times. By the first of June, '41, materials were appearing in rapidly
ncreasing quantity.

was one thing to unload them and forget about them, it was another to record
nd keep track of them all. So into the shipyard came a one-man Expediting
epartment in the form of Jerry Coombes. As a Kaiser employe, he was an old-
imer, for he had worked in their construction ventures not only at Bonneville
nd Coulee, but on former jobs. At the time of his arrival the Assembly plat-
orms that were being built in front of the Ways were not yet completed, and
teel had not begun to move from storage. His first jobs concerned keeping
aterials on hand for the riggers and furnishing materials for the making up of
ate Shop burning tables, which were constructed on the platform of Way 6.

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As he began to handle ship's steel Coombes had to make a switch from thinking in terms of dam materials to ship materials. When Jack Anderson told him that they were ready to start making inner bottoms, the expediter had to find out what inner bottoms were. He had to learn hundreds of materials and their piece marks, and prepare himself for what was coming by getting an engineer, from the Analysis Department to make up a schedule for him.

Till mid-summer Coombes worked alone. Then materials began drifting through so fast that he acquired a helper. In August he added a swing shift, and a couple of weeks later a graveyard shift appeared.

The department increased its territory of responsibilities, too. From the Plate Shop and the Assembly it spread, at the management's request, to the Ways themselves. Then, as the Star of Oregon arrived at the Outfitting Dock, the expediters became involved in doors, ladders, hatch shifting beams, and hundreds of other articles that shipfitters on the Dock clamor for. Many such materials were ordered by the Hull Materials office.

At first these expediters belonged to the Technical Engineers Union, and were not supposed to actually handle materials. Because of this limitation they transferred to the Boilermakers' Union where they could lend a hand in speeding materials on their way.

For a while the expediters stacked assembled sections beside the Assembly platform but this caused too much confusion. Sometimes a crew from another Way would acquire its neighbor's material, and it was difficult to uncover the parts in the desired sequence.

Before he had been there long an aggravating condition prodded him into an inspiration that resulted in a vastly improved method of storing materials. The common practice was to stack plates high upon each other. During the first summer materials were piled to the eaves all around the Mold Loft. Often the plate desired was near the bottom of the stack. When Coombes began campaigning to have racks built to hold the materials in an upright position he met with opposition. It would cost too much; the racks would tip over with their contents; it would take too many. However, some were made, and they served so well that they were adopted for yard storage. Soon other yards followed suit, and before long, racking stored materials became the practice.

Besides hastening and simplifying the orderly arrival of materials in the Plate Shop, the Assembly, the Ways and the Dock, the department's actual checking of materials received in the yard eliminated the chance that always existed for mistakes that crept into the most careful paper checking. So it was only natural that it would eventually grow to employ over 400 men and women.

During its development it moved into several spots -- the Plate Shop, the Assembly Shop, Way 5 and the Outfitting Building. But the department needed a roomy central office. When the old Administration Building was cut up and three parts of it were moved away, the fourth stood, a small, two-floored square. Taking opportunity by the horns, Coombes obtained permission to take it over as a home for his Hull Materials Department.

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CHAPTER IV

Welding

Late in April, 1941, a group of welders hired in to form the first welding crew. With Les Blackford as their Superintendent, they did both welding and burning, and first used their stingers and torches on the construction of the big water tank at the south end of the yard. When that was completed they made tools and wedges for the shipfitters. Then they were confronted with the building of tables for the Plate Shop. One of the welders, Les Voshell, who had been with the Kaisers at Coulee and Bonneville, taught the rest of the gang how to operate an automatic burner, and the tables were promptly turned out.

The welders' first headquarters, which old-timers declare was "just a box", became inadequate as other crews were added, and the welders moved into larger quarters. By July several ships were under construction, and welders were scattered through the Plate Shop, the Assembly platforms and the Ways. The foreman was responsible for four ships, and each leadman had charge of one hull. As Erection hit its stride a welder foreman was put on each ship, and a leadman was set over each crew of twelve welders or burners. As the department was acquiring members at the rate of 30 or 40 a day, it again sought roomier quarters. To further increase the supply of workmen welding and burning were taught in the yard. As other shipyards began to drain the neighborhood of workmen, it became more and more difficult to obtain welders.

So far the yard had not employed women craftsmen, but a downtown school was teaching them to weld. As soon as she had mastered the art, one of these women began an insistent campaign to force an entry into the Oregon Shipyard. She pestered Voshell, then head of Welding, till he weakened and promised to let her hire in. When she showed up, however, he got cold feet, and tried to back out of the agreement. Obtaining Mel Hord's consent to place her in the Electric Department, he endeavored to persuade her to become an electrician's helper. The ensuing argument ended in a compromise. If she could bring in enough women welders to make up a crew, she would be admitted as a welder. She did, and she was. But while she was rounding up a group two other women who had qualified, applied for work and were hired in. That let down the bars for all women who wished to work in the yard. In a few days there was a crew of ten who were determined to prove that they could weld as well as men. Soon the weaker sex was swarming in, not only as welders, but as craftsmen in other departments. The incident gave Oregonship what is probably the record of being the first shipyard in the United States to hire women as craftsmen.

Unionmelt

While the group of men who formed the plans for the Oregon Shipyard were still in the Lewis Building shaping the procedure they would follow, they discussed giving the Unionmelt welding a try in their Assembly. Unionmelt was still in its infancy, but it was a very promising infancy. Seattle and Tacoma war industries were pleased with the results they were getting, for their Unionmelt machines were accomplishing automatic welding with a speed and efficiency never before approached by other methods.

Since local welders did not know how to operate the machine, the company that handled the product arranged to send an instructor to the shipyard for the benefit

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those who wished to become Unionmelt operators. So as soon as construction reached the point where Unionmelt could be introduced a number of machines were installed. In May, 1941, on Way 7, Unionmelt welding was done on the flat bill plate of the Star of Oregon.

Steiner, arriving from Coulee, acquainted himself with the process and soon became Superintendent of the Unionmelt Department. For a while, before becoming independent, Unionmelt was a branch of the Welding Department, and was under the direction of Welding Superintendent Les Blackford. As the Assembly platforms came into full operation, the automatic welding machines became an important part of assemblage work. Already established on the Ways, the machines soon found welcome room on the Assembly platforms and before long most of their work was being done there.

Steiner was on the alert for young, promising recruits who would make good Unionmelt operators. Workmen were plentiful in these days, and nothing was thought of it if he persuaded a member of some other craft to transfer into his department. The time was to come when other superintendents would have wrathfully called him a pirate had he used such tactics -- the time would even come when a clearance office would flatly refuse to give a workman a transfer under such circumstances.)

At first, when he wished to issue directions to his men, Steiner would tell his crews to meet him on a certain Way at a specified time; then he would show up a few minutes early and wait for them. As he put it, he carried his "office" -- a small record book -- in his pocket. As the yard grew up his department grew up, too. It moved into a tiny office down on Way 6, where the Shipwright, the Erection and the Assembly departments all had offices, and later, when the New Assembly Shop was built, it came into its own as a separate department with an office on the north side of the shop.

Plate Shop

Records show that the Plate Shop was not finished till June 16, '41, yet before that date four keels and a lot of shell plate had passed through its Bays and been dispatched to the Ways. A dozen layerouts, shipfitters and burners (having constructed their own tables, horses, etc.) had been toiling over the burning and knuckling of the keel plates while into the roofless Bay the sun or rain poured unhindered. It was Bay 9 through which that first material passed, but Bays 1 and 2 were the first ones finished.

At the outset the shop was sadly lacking in equipment, and the knuckling of the keel plates presented special problems. The plates were about 30 feet long and 8 feet wide, and they were laid upon a couple of roll tables and pulled along by a cherry picker that poked its long neck into the Bay and substituted for the bridge cranes that had not yet arrived. Cherry pickers were greatly in demand at that time, and pioneers like H. W. (Hank) Hockett, (Plate Shop Superintendent before the end of '42), John H. Blockey and Bob Porter (later Assistant Superintendents) used to act upon the conviction that the one who 'hollered loudest and longest' was the one who would manage to obtain and retain the cranes' services.

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Grimes, then Plate Shop Superintendent, had many handicaps to surmount. As was no machinery for flanging, and no channel iron, the men had to flange inal brackets by cutting off a piece of steel and welding it on at the correct . The arrival of rolls and presses caused excitement, and when the first ge crane was installed the gang was jubilant. Most of the early equipment purchased by Claude Bacon, the first Plate Shop Superintendent.

of the toughest problems was the working out of a sequence for the material dled and the establishment of a schedule. John Hallett, Yard Superintendent, ally drew up a schedule that called for the handling of 450 tons daily. At time it was all the men could do to meet that requirement. (The fact that time came when the shop turned out 2400 tons in a day illustrates the tremend- development of the department.)

ter the keel and flat shell had gone through the Bay the men started assembling pen floors and small sections. For a short time some of the flat plate was rned on the Ways. More men were added, and about two weeks after the first els had been handled a swing shift was put on. A graveyard shift followed a k later. By July there were about 30 men on each shift. Much equipment was dded, and the whole schedule was stepped up.

ring 1942 several additions to the Plate Shop were made. In February Bay O completed, by the middle of July the Sub-Assembly extension was ready for , and about a month later Plate Shop men moved into the Gadget Bay.

embly

soon as the Plate Shop was through with burning and shaping a piece of steel, m it went to the Assembly platforms in front of the Ways, where following the epted shipyard custom, separate pieces were fitted and welded into sections. ry J. Kaiser was strong for having as much assembling as possible done before tions were passed on to the ship, and such assembling was playing a much larger t than it had in the past. At the outset of Oregonship's Assembly history, n a crew finished with a section of double bottoms it would start on deckplates bulkheads, or whatever was brought in for them to work on. Each ship was tirely assembled in front of its own Way. This caused general confusion, and vented crews from becoming expert at any one job.

idea of erecting an Assembly Shop was conceived at a meeting that was held the office of John Hallett. The discussion, which had swung to Assembly blems, suddenly took a surprising slant when Jack Anderson, Assembly Superin- dent, offered the opinion that if material were handled according to sections ead of ships the work would be accomplished more rapidly and efficiently. ar Kaiser, Russ Hoffman, Ralph Winchell and Howard Denhart all joined in the ussion and kicked the suggestion around till they developed plans for a rtling innovation. They would build an Assembly Shop with Bays that would dle only certain sections. Double bottoms would all pass through the same in a continuous stream, and there would be crews to work upon double bottoms Bays. There would be a Bay for bulkheads, one for deckplates, etc.

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Assembly Shop was erected. By its completion on June 18, '42, work was going on within the Bays, for the moving from the ways to the new. This had to be done gradually, and took about 35 days to accomplish. Because shop was an afterthought it had to be placed where there was room for it rather where preference would put it. But the new arrangement stepped up production. Surprisingly that other yards promptly adopted it.

More Oregonship had led the way of advancement and added another "first" to record.

ing

ing the spring of '41 there were only ironworker riggers in the yard, but before there was a crying need for production riggers. It was evident that there would to be a large, well organized Rigging Department to answer the yard's need for transportation of materials. All steel would have to be handled several times fore it reached its final destination, and much of it would have to be taken back storage after being assembled, to await delivery to the hulls.

set up a Rigging Department that could take care of all such problems someone experience and a gift for organizing was needed. The latter part of June, 1941, Kaiser sent for Jim Butler. Butler had been with the Kaisers before, but at the he was doing construction rigging in Panama. Rather reluctantly, he flew north look over the situation. John Hallett showed him the layout with the remark,

here it is; take it by the face."

what a face! The whole thing was a jumble of crawler cranes, trucks, steel and Butler almost took the next plane back. However, the job held a challenge he couldn't ignore. So he stayed.

found several rigging crews already working in the yard -- riggers on the Ways ding for H. A. Erikson, then Superintendent of the Erection Department; riggers the Assembly, under Jack Anderson; and riggers in the Steel Yard, handling erial going into the Plate Shop, under Ray Walker, of the Materials Department.

as the case of other early departments, this one was set up on a scale that was too small. The first office and Rigging Loft consisted of a 30' by 50' space the back of what was then the General Stores. Their outlook faced the Basin, they watched the Dock being built at their front doorstep. It might have been resting, but it was so crowded that as the department expanded, Butler lifted voice in vehement protest. He asked for space to build a loft between the eral Stores and the Outfitting Stores, but the Engineering Department already plans to build the Outfitting Dock office there. More insistence brought him thirds of the Dock Stores, but as months went by the department outgrew these tors. Again he clamored for space, and this time he achieved his goal, for the middle of March, 1942, the Rigging Department moved into their new Rigging It was 50' by 200', and it occupied a northeast corner of the yard, near the Yard platforms that had been erected a month previous. Their Sail Loft, which first found room in part of the Rigging Loft, crowded them, so late in the fall moved into the ground floor space of the Utility Building nearby.

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SON

rection Department dates back to the laying of the keels of the Meriwether and the Star of Oregon. Its beginnings were uncertain, for the exact method ting in the department had not yet been determined, and so few of the ship- and helpers knew anything about shipfitting. They had to learn by doing — they did a lot of learning on the first two ships.

Russ Hoffman, Construction Superintendent, had the building of the yard cessing satisfactorily he centered his attention upon the Erection Department. supervisors were set up — one for each hull.

ally, Al, George (Scotty) Wright, a master shipfitter, was brought in to be a of trouble shooter for the department. Before long he had made himself pensable. So when, about the time that Hoffman became General Superintendent, Eriksson vacated the position of head of Erection, Wright stepped into it.

while pipefitters on the Ways were busily installing pipe in the double bottoms he Star of Oregon and the Meriwether Lewis. They needed shelter for their blue- and tools. So they scooped out the sand from a spot under Way 8, put up shift walls and moved into it a desk and an iron box to hold equipment. The blew rain or sand through the cracks of their den, and wet blueprints flopped diamally, but the pipefitters carried on, undaunted. At first there were only of them, then about twenty. Finally a second crew was added, and toward autumn numbers were augmented by a vents and overflow crew and one to install manifolds engine room. Under the direction of Herb Kurner, the Pipe Department was shape.

side the Machine Shop a Pipe Shop was rising, and during the early summer of the pipefitters took possession of a central portion of it. Installing a small bender and a slab, they went to work on the circulatory systems of the Star of . A welding table in the corner failed to provide enough room for all the welders, so a group of them located north of the Mold Loft, and, with sand in shoes and sun or rain in their hair, they toiled uncomplainingly till cold her prompted them to demand shelter. This brought them walls and a roof.

se the shop lacked a bender that could handle over 6-inch pipe the first two arrived at the Dock with very little pipe except that in the double bottoms; bout that time a large bender was installed. Old-timers like Dick Foley (who during May, and remained to supervise pipefitting on the Ways) and Ivan S. ng (who arrived in June, and stayed through the years that followed as super- of the Pipe Shop) helped the department to conquer one tough situation after er. They took the pipe that hung from pegs along the wall or spilled out the shop's front yard and made it fit here or there. They bent it on the bender, or on the slab. When it was too large to be handled by the shop's equipment they heated it with a Flamo gas torch till it was pliable. Henry who became the department's office force in July and graduated to the ion of chief clerk, had his troubles, too. Frequently someone in quest of ould fail to find the correct material in the pipe storage yard and would upon something that could be made to answer his purpose, cut it to the

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ired length, and trudge triumphantly away with it. Later, when Miller looking ough his records, would assign that pipe to its rightful owner, the latter ld return protesting that there was no such pipe in storage. And a checkup ld prove his claim.

first August saw the Pipe Shop doubled in size to make room for refrigeration plumbing crews, and soon afterward the welding shop was annexed. When the last the pipe welders who had been working north of the Mold Loft had abandoned that ation, the Mechanical Department took it over and converted it into a garage.

Pipe Shop was completed that winter, but though the pipe fitters were all housed, ey were cold. No provision had been made against falling temperatures. So the devised methods of obtaining warmth. In shops they set up acetylene torches in cans, and under decks in their sheds they placed dishpan reflectors containing veral high powered bulbs that radiated heat. During the winter they acquired a y shop under each Way, and as they took possession they made use of their impro- ed heaters.

veting

il recently ships depended upon rivets to hold them together. Many of the first ld war's ships had 560,000 rivets in them. So when Oregonship needed men who ew riveting she turned to those who had acquired experience on such ships. She d not have far to look. John McGregor had served his apprenticeship on the Battle- ip Oregon before the turn of the century, and while the Columbia Shipbuilding pany was building ships during the last war he was their Assistant General Superin- dent. So he was chosen to join the group in the Lewis Building and help them to anize plans for the new shipyard.

McGregor took over the job of setting up and running the Riveting Department he, turn, selected assistants from the ranks of men who had worked with him in the t war. Among these were Fred Yount, later Assistant Riveting Superintendent, in Martin, Superintendent of test tank gangs, and "Salty" Saltonstall, Assistant erintendent of chipping.

first men hired into the department were chippers, for chipping is the ship- ilder's way of removing temporary fixtures or erasing mistakes. As soon as work on steel was begun chippers began to ply their guns and chisels. As the Star of gon's frames reared themselves aloft, holter-ups bolted the shell plate in place left the rest to the riveters.

of the men who hired in to become riveters had never done such work, so a tion was set up at the end of the Ways, and, under an instructor, they learned drive rivets. Then they went aboard ship as riveter helpers.

re were about 10 gangs of riveters on the Star. The records of the Material ervisor Joe Rivers (who entered in his books every name belonging to the depart- t), show that during that first fall men came in the department at the rate of to 40 a day.

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As soon as the Star's tanks were completed the department's tank test crew began their tests to make sure that the tanks were watertight. Tank testing was the main job on the Ways performed by the Riveting Department, and it was a highly important one.

Boiler Erection

Into the yard, late in June, came an experienced boilermaker who hired in as a shipfitter, and, as a leadman, directed the building of the shaft tunnel on the Ville. He was Frank Cour, and he had picked up his knowledge of boilers while working for a railroad and various yards (including a navy yard). When the need arose for some competent man, somebody who could set up and take charge of the Boiler Erection Department, Cour was chosen. So, on August 13, he took several employes from a railroad company, and formed a small crew. First they had to locate somewhere. Lacking any sort of home, they set up a platform and rigs southeast of the Plate Shop, near Terminal No. 4, borrowed and appropriated sledge hammers and similar tools wherever they could lay hands on them, and, on the 25th day of August, started in on the Star of Oregon's boilers.

They had been working only about 10 days when they added a swing shift, and soon after that, a graveyard shift. But there was no office, no clerk, and no records other than those the Superintendent himself kept.

Even when they became possessors of a Boiler Erection Shop, they were none too happy, for they were still crowded, and material had to be lowered in and lifted out by way of a hole in the roof. A cherry picker handled the boiler sections for them — when they could inveigle one away from some other department long enough. As many of the sections weighed a ton, the method was dangerous, and the crew felt lucky that there were not more accidents than the few that occured.

The department soon acquired its own welders and burners, its brick-layers and apprentices to supplement the work of the boilermakers. They had to have 4 or 5 certified welders also.

Those were hectic days, for their equipment was pitifully inadequate. Cour claims that although they lived through everything, there were times when they thought they wouldn't.

Quantity & Production

By the middle of June, '41, there had arisen the need for a department that would make up schedules coordinating the activities of the various Hull departments. By the time the Assembly platforms were ready to handle various pieces of steel the Plate Shop should be through with them, and by the time Erection needed certain sections the Assembly should have them ready and waiting. Sequence and timing were important factors.

John Hallett, Yard Superintendent, set up an Analysis Department. The first half dozen men in the department included three who contributed their talents to the Kaiser yards for years to come. They were Roy Rickey, Bill Wright, and Blake

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Hamilton. In late August, the department split into two branches — a Quantities Department that kept track of the work done by the Hull departments, and a Planning and Production Department that continued with scheduling. Several months later, Wright (who had been in charge of the latter office) transferred to the Dock, and in February '42, Rickey (who had directed the work of the former office) transferred to the Vancouver yard. This left Hamilton in charge of both offices. His right-hand man was Max Shillock, who entered in the late summer of '41 and stayed on to become report supervisor.

By this time the schedules for the Hull Materials, Plate Shop, Assembly and Erection Departments had been worked out in accurate detail, making little need for the continuation of the Planning and Production Office, so Hamilton combined the two groups under the title of Quantity & Production, cut its personnel to about three dozen men and eliminated the swing shift. Under this Quantity & Production heading the department continued to gather information concerning welding, riveting, and steel. How many feet of welding is done on the average Liberty? the AP3? the AP5? Quantity & Production could answer. It could tell you exactly the welding footage on any ship built at Oregonship. How many rivets were driven on the second Monday of last month. How much steel came into the yard in 1943. That department knew the amount of steel fabricated each day in the Plate Shop, and the erection tonnage on each Way. Their reports and charts, showing the daily and accumulative figures, were furnished to all superintendents concerned. They not only knew the amount of welding upon each ship, but the number of welders who accomplished it. Especially were their reports used by the General Superintendent and the Progress Department.

One of Hamilton's early jobs was to visit the departments, get their estimates on how many men would be needed by a certain date to carry out their plans, and report their estimates to John Hallett. In the fall of '41, Hallett told Hamilton to cut down heavily on such estimates. "The yard simply can't handle that many men." The yard's payroll promptly jumped to 2,000 more than the departments had asked for. This was no reflection upon the Superintendent. It was as if the shipyard had taken the bit in its teeth and run away with itself. No one was prepared for the way it developed.

Paint Department

As the early buildings were painted under sub-contract, there was very little such work to be done by shipyard painters till ship construction began. Five painter helpers started scaling the steel, and painters stenciled the shore posts on the shipways and painted the whirley equipment. One of the men, George Tilling, remained as Supervisor of Facilities Painters during the years that followed.

Although the General Stores was built to serve as a warehouse, when it was finished, on May 30, 1941, it housed several homeless departments. The painters moved themselves and their supplies into the southeast corner of this building. During the summer they acquired eight painters (day shift only), and on August 25 they began painting the Star of Oregon as she rose, piece by piece, on the Ways. Early in September a swing shift appeared, and late in the same month a graveyard shift was added to the department's schedule.

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One of the earliest trials of the painters sprang from the fact that the staging had been constructed with only the welders in mind. Painters complained that they would be permanently humpbacked if they had to work at the levels and in all the positions offered by the staging. Finally, the Shipwright Superintendent made all scaffolding conform to standards that had proved satisfactory to all craftsmen employed upon scaffolds.

It was not till Oregonship had begun to receive materials several ships ahead of their scheduled use that painters began to red lead and paint steel and equipment while it was still in storage.

The Paint Department was often treated like a stepchild — not because of personal feeling, but because painters were more easily dislodged and relocated than machinists, electricians, loftsmen, etc. They were finally crowded out of the General Stores Building and into two small offices — a paint storage room on the Ways and a little office in the old Trial Run building on the river end of the Dock.

For the sake of painters working on the Ways small shops that served as dispatch centers and places where material could be mixed were set up on all the even Ways. The fly in the ointment was that these shops, located under the river end of the craneways, were occasionally flooded by high water. Later on, pioneer painters laughed at the recollection of how the rising Willamette used to send them scurrying forth with their possessions, like ants from a molested hill. Homeless painters, sitting disconsolately on paint cans, must have touched the hearts of the Powers. That So (more likely the insistent voice of their superintendent, "Cap" Cail turned the trick), for those shops were replaced by a modern paint shop at the head of Way 2, and another at the back of Way 8.

Marine Department

On May 25, 1942, F. A. Abraham moved into a room in the Yard Office. His primary purpose was to set up and superintend the Marine Department, but before this was achieved he was involved in many activities. His first job was the checking of piping and machinery blueprints, and the planning of a time chart for the arrival of all materials outside of shell plate. This done, he turned his attention to the setting up of the Machine Shop, the Blacksmith Shop and the first Pipe Shop.

Then he concentrated on establishing his own department. First, he gathered in some Marine machinists to assemble the machinery for the Star of Oregon. It was early autumn, but a very rainy autumn. Out on the sand under an exceedingly wet sky, the machinists uncrated engines and assembled turbines. J. H. Garrison (who came in time to handle the Star's machinery, and remained to direct such work for all the ships that followed) found it hard to understand why newcomers during 1942 had to have shelter, when local men had toiled uncomplainingly through the drenching fall and winter of that first year. But they demanded — and got it. Several small shops, with provision for heat, were provided as the second winter approached. The Marine machinists had been cutting chocks and doing similar jobs right in the ship's engine room, where they had set up a lathe. There were three such lathes in use within the ships till the department acquired shops to house equipment.

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ore long, Abraham found it necessary to divide the work into separate channels. Anderson, Assistant Superintendent, took over responsibility for the operation trials and machinery; Garrison became Installation Superintendent, and Abraham concentrated upon keeping Marine operations coordinated.

this time a Marine Engineering Inspection Office was set up to cover pipe, tank and hull testing; but as there were 80 groups of tests on pipe and machinery, and on hull (with perhaps 15 tests in a group), tank testing, ventilation and blast were soon passed on to Bill Wright. The Marine Engineering Inspection office set the time for all tests and arranged for the presence of officials of the Maritime Commission, the Coast Guard, the American Bureau of Shipping, and a test supervisor from the Marine Department. Numerous copies of the report of such tests were then made and distributed to the proper authorities.

hen the office's original supervisors left to establish a similar office at Swan Island, Russ Peyton and Cecil Naslund stepped into the positions vacated. Under their guidance, name plate data was kept for each of the thousands of fittings and pieces of machinery that went into every ship. Not only did the office keep a record of the identity of each piece, it frequently kept the record of the special bill to which machinery or equipment was assigned, and explanations regarding any substitution that had to be made. The same clerks also compiled blueprint indexes and thousands of handy notebooks filled with drawings and information.

ort Captain & Staff

would never do for a lot of landlubbers to be responsible for the maneuvers of a ship on her trial trip. Seasoned seamen are needed for such an occasion. Even a launching requires their presence.

hortly before the Star was launched, Captain Gillard hired in to take charge of this phase of the shipyard's problems. He gathered for his staff, Captain Peters, four or five deck officers and a yard bo'un'n who were already working in the yard. Several of them were riggers who were glad to transfer to a job where they could feel a moving ship under their feet. At every launching these men saw to it that the ship was properly picked up by tugboats and maneuvered into her berth at the dock. Then, while she was being outfitted, they guarded against fire hazards to which the workmen unwittingly subjected her, and saw that she was properly secured at all times — especially while on dock trial.

hen it came time for her trial trip the captain carefully studied the itinerary, took into consideration the river and weather conditions and planned the details accordingly. He notified the Coast Guard so that their patrol boats would have the river clear at the specified time, and, when the hour for leaving came, he and his crew took charge.

ides the men who were to make and record the numerous tests, there were crafts who were finishing incomplete jobs, and a throng of guests to whom the trip was a gala occasion. These people had to be fed. So the steward and his crew took care that food ordered from the cafeteria arrived on time, and that the table was

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readiness. Then, at mealtime, they seated and served everybody. On an average there were about 150 people. The guests, the captain and his crew sat at three tables, and the craftsmen at the remaining three. The trip had many interesting angles, but mealtime endowed it with a "party" touch.

Sheet Metal

A crew of five sheet metal workers formed the nucleus of the Sheet Metal Department in the summer of '41. Establishing themselves in a 30 by 40 foot space in the east end of the General Stores, they set to work with hand stock shears and a manually operated forming brake making their own sheet metal patterns for the Star of Oregon vents. Besides constructing vents, they turned out cabinets, galley equipment and insulation jobs. The same crew that made up parts, installed them on the Star; but as the tempo of the yard quickened it became impossible for the men to do both jobs. The Meriwether Lewis received material made up by one crew and installed by another. It was several months before a swing shift was added, and longer before a graveyard crew appeared.

Pioneers in this department had to develop patience. They were always among the last to get to work upon a ship, and often, when they were trying to install a vent that had been constructed according to blueprints, it would be discovered that another craft had taken over the space alloted to the vent. Sometimes the sheet metal men won the ensuing argument, and sometimes they returned the vent to the shop for a jog here or a curve there to carry it around the disputed space. Steamfitters usually had the right of way because they could not raise or lower their pipes without impairing the efficiency of the system they were installing.

With Lee Elbon at its head the department grew till their need of roomier quarters led them into the Outfitting Building, where they had a space about 50 by 75 feet in size. Here they stayed till April 6, '42, when they moved into a shop of their own.

Salvage

Where there is cutting and trimming there has to be waste. Cleanup crews began collecting large quantities of scrap steel as soon as the Plate Shop began operating. The same condition developed on the Assembly platforms and even the Ways, so a center where such material could be sent for salvaging was established in the southeast corner of the yard. At first it was just a location where stuff was sorted, some burning was done, and scrap steel was sold out through the arrangement of the Purchasing Department. However, this arrangement did not answer the yard's need for a Salvage Department, and in June, '41, an unpretentious little Salvage Shop was completed.

Kalin, who came in as a machinist, was soon placed in charge, and under his guidance the department grew into a fully equipped organization for the salvaging of the shipyard's scrap and waste material.

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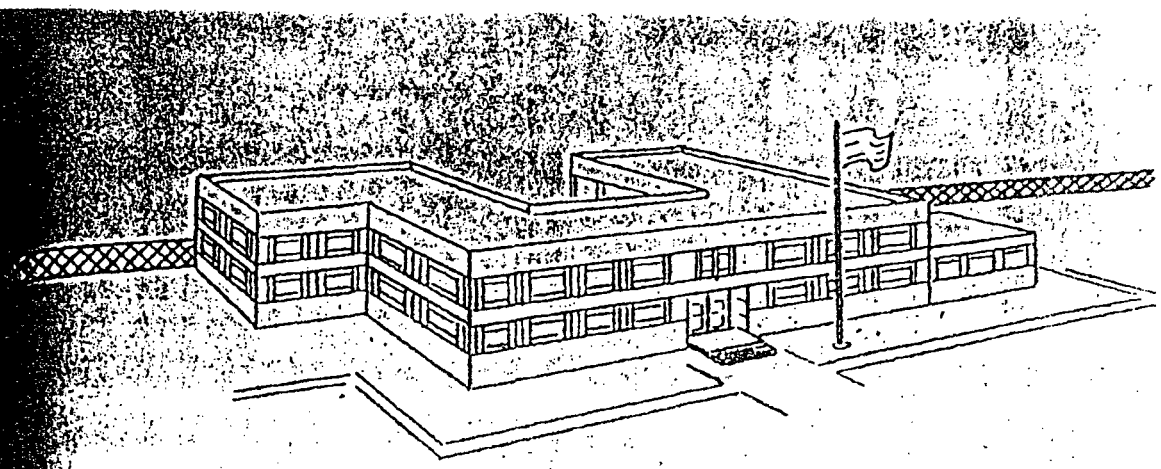

ADMINISTRATION ARRIVES

CHAPTER V

Before the Administration had time to hang out an "At Home" sign, departments were already trooping into the almost finished rooms of the fine new building that was expected to house all the offices that the administration end of shipbuilding would need.

The men who handled tools were unimpressed. True, they picked up their checks each week; they asked for transfers and early check outs; they received rate changes and title promotions; and later they enjoyed the radio broadcasts and Bo's'n's Whistles. But offices? What did offices have to do with shipbuilding?

Meanwhile the Administration went serenely ahead adding to its family of offices departments. When the Accounting Department became over-worked a Cost Department was created; when timekeepers waxed frantic with the difficulty of keeping track of the milling thousands a Badge Department resulted; when the Payroll people grew tense with the effort of getting out checks for the swelling multitude, IBM machines were introduced; when material began to arrive late or get lost along the way the Expediting and Traffic Departments appeared. Telephone operators, janitors, messengers, and many other workers formed organized groups to take care of necessary angles of Administration.

Starting with a few small offices the Administration expanded until eventually it numbered over 1100 men and women, with the women outnumbering the men [illegible]. They had one central chief clerk to whom they went for transfers, later requisitions, terminations, rate changes, etc. Harry Steele transferred from the Cost Department, where he had been since Star of Oregon days, to fill this position.

Reproduction and Photography

On April 14, '41, Frank Alexander hired in as a chief blueprinting operator and joined Vincent Palmer's Office Engineers the day that they moved into the Administration Building. He soon found himself in charge of blueprinting and reproduction work and the shipyard's photography.

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the blueprint work the office acquired a blueprint machine, a photostat, a [illegible] and a blackline. These machines took care of the shipyard's need for [illegible] produced prints. The blueprint machine could run off 1850 square feet of [illegible] print an hour. Though at first there was little demand for blackline, such increased steadily in volume till it represented a good share of the work by the department.

and a dozen engineers and office clerks were kept busy on each shift operating machines and labeling for distribution the blueprints reproduced by the office.

For the photography, at the outset Wally Eiring, one of the engineers, would [illegible] up a camera and hie forth to take whatever pictures the management requested. Developing was done by the Photo Art Studios. This company also took air [illegible]tures and special shots for Oregonship. But the demand for pictures increased [illegible]dily. The Progress Department and the management desired them as records, [illegible]er on, the Bo's'n's Whistle required them, and the Traffic Department used them [illegible] proof in case of shipments that arrived in a damaged condition. So two photo[illegible]phers were hired to supply the demand for pictures.

[illegible] Department

The yard prepared to build ships there developed a crying need for a Cost [illegible]rtment. Until the Accounting Department had established itself in the Admin[illegible]ration Building, it had kept record of the cost of materials secured by the [illegible]hasing Department but the rapid increase of purchases demanded the full [illegible]ntion of a special department. On May 19, '41, Chief Cost Engineer, [illegible] Miller, acquired the help of Paul Eyolfson, an engineer, and Norman Brown, [illegible]ccountant. They moved into a small office in the Administration Building and [illegible]ged into their work.

[illegible]ome time Eyolfson had been keeping track of equipment, and he had partly [illegible]tructed an inventory of the numbering system for all machinery and equipment. [illegible] its completion the Maritime Commission liked it so well that they requested [illegible] adoption in all Maritime yards. Eyolfson and Brown went from Cost Reports [illegible] Records to Labor Distribution. These were hectic days, and they kept sur[illegible]ing hours. Once, when expenditures were crowding the appropriations, they [illegible]d 52 hours straight.

[illegible]eeping their records the office staff traced man-hour costs by the hull and by department, handling material cost distribution in with reports and records. [illegible] also reviewed and cost-coded every purchase requisition, and all material [illegible]ed from warehouse stock.

[illegible] the first of November, '41, Miller left to become Assistant General Manager [illegible] the Vancouver yard, Eyolfson was made Cost Engineer at Oregonship. He took [illegible] miscellaneous jobs that affected the Cost Department, and developed procedures [illegible] number of other departments. When he left, in the summer of '43, to be the [illegible]e-yard executive over Cost, Timekeeping and Payroll Departments, Jack Lacey [illegible]ed into the position of Cost Engineer at Oregonship.

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he department had divided into four offices -- the Main, the Labor Distribution aterial Cost and Field Cost Offices. Their personnel totaled 120 men and women nd their duties had expanded.

he Labor Distribution Office, which was set up as a separate branch of the epartment in the fall of '41, handled cost problems that pertained to labor. hey audited all IBM daily and weekly reports, furnished the Progress Department ccounts -- spoilage, contractor's expense, etc., compiled the monthly insurance eport, set up new cost codes involving labor, and did many other similar jobs

he Field Cost Office was set up in March, '42, to take care of cost increases n manhours due to additional work required by the Maritime Commission. At that ime only five ships had been delivered, and the Maritime Commission was con- tantly adding materials to the ships. As these were above the specifications f the contract, the shipyard was reimbursed for the added manhours that esulted. The office also kept tract of deletions that made fewer manhours ecessary. Many department superintendents based their schedules upon estimates ade by this office, and in the fall of '42, when preparations were being made o change to a fixed price contract, this office furnished a cost basis for rawing up a bid.

n the Material Cost Office, which was located in the Warehouse, requisitions nd warehouse issues for material were coded so that they would be charged to he proper account. The office was under the jurisdiction of the Warehouse till ate in '42, when the Cost Department took it over

uilding Maintenance

irt and disease are partners; so as soon as there were buildings there had to be rovision for keeping them clean. The Building Maintenance Department started ut with several janitors who, under Gene Smith, took care of the Hold Loft, the dministration Building, and scattered rest rooms. When William Haskell joined em in the middle of May, '41, he was one of six janitors to whom pleasant ather meant sand and dust, drifting in across docks and floors from trucks ildozers outside, and bad weather meant mud in corners and chunks. Soap and ater helped to remove the dirt, but remained in fine particles till a second coat liminated it.

first there was only a day shift, and all the janitors [illegible] ildings multiplied, so did the folks who kept them in order. Soon there were of them on each shift, and women began to join their ranks. The department o acquired two carpenters of its own, but continued to call upon Facilities plumbers and painters. When Smith left, Fred Daily was [illegible] and when left, Haskell took over.

the time the shipyard had become [illegible] janitors and window washers, and women [illegible] old for strenuous work helped to train ships to [illegible] standards [illegible]

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condition for other workmen. The 320,000 pounds of paper towels and 14,000 pounds of soap that shipyard workers used monthly were carefully distributed, the lunch rooms and rest rooms all over the yard were regularly cleaned, and necessary repairs were promptly reported. One very efficient janitor was 82 years old, but he was still young enough to contribute in the war effort. Another was worth $75,000, but he was working to buy more bonds.

Progress

The need for progress reports arose when work began on the construction of the shipyard, in February, '41. In response to this need Bob Eiring compiled the first progress report in his Lewis Building office. It began with the moving of the Northwest Oil Company from land the shipyard intended to use, and it covered the dredging and filling being done by the Gilpin Company, and the percentage of completion of the Mold Loft, Administration Building, Plate Shop, and the Ways.

About the time that the departments in the Lewis Building moved into the Administration Building, Eiring added vessel construction reports to those of Facilities. By November so many reports were needed that the management selected Lamond Henshaw to organize and head a Progress Department. His little group, besides publishing a monthly vessel's report began putting out daily and weekly information of such progress. They published the Quantity Department's data on the amount of steel, riveting and welding footage involved in the work upon each ship; and they began conducting special studies on situations in which the management was interested -- construction schedules, manpower estimates, etc.

When, in March, '42, Henshaw became Office Engineer at Swan Island, Bob Stice stepped into the position vacated. Stice had been with Oregonship since the spring of '41, when, as an engineer, he had worked upon sub-contracts with Vince Palmer.

During the summer of '42, a field crew was added to do actual checking aboard the ship and turn over their reports to the main office. Soon after this the department branched into four separate groups; the first group, under Vince Lindquist, kept books on the progress, force and cost of all Kaiser shipyards, published facilities, monthly and weekly reports, daily and weekly vessel's construction reports and maintained files of progress photographs; the second group, under Bob Waddell, published data on production, and completed most of the government's questionaires; the third office was the graphics group who, under Stan Parshall, drew up graphs and charts for the management; and the fourth group was the field office, carried on under Bert Delaney.

The office that devoted its energies to special studies covered many subjects. Its records told exactly how a woman's value to the shipyard compared with that of a man on the same job. They delved into the vulnerability and deferment status of male employees. They recommended Thursday as the best day to get jobs done (as more workmen would be present on that day) and Monday and Saturday as bad days for the accomplishing of a large

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amount of work (because of absentees). They disclosed that accident frequency and severity are lowered instead of lifted during special production drives. And when the management wished to know just how much a week of bad weather would effect the output, the progress records revealed the answer.

As time went on the department took on more and more duties. The results of its studies were far reaching, for they were passed to other shipyards. All yards in which the Kaisers had an interest had a Progress Department whose findings were passed around for mutual benefit.

Progress department records were to the Administration what a patient's day-to-day chart is to the doctor. Just as a doctor shapes his prescriptions by the record of a patient's reactions to certain conditions, so did the management govern its decisions by the yard's recorded past performances.

Naval Architecture

By April, '41, the management was establishing offices that were concerned with actual ship construction. Plans for the Liberty ship had been drawn up by the design agents Gibbs and Cox, but no preparation had been made to adapt them to Oregonship's individual needs and capabilities.

Fred Huntington and R. N. Nyborg were hired to form the nucleus of the Naval Architect Office. Huntington became Naval Architect, and Nyborg his assistant. They settled into the Administration Building and, with the help of a dozen engineers, draftsmen and tracers, plunged into breaking down and adapting the details of the plans to local needs and methods.

It takes much longer to draw up plans for a ship than to build it, and the little group, given several months head start, sometimes found itself straining to keep a jump ahead of demands for the prints. The hull detail had to be turned out in a sequence that matched the yard and anticipated the departments' needs. Besides their work upon the structural hull's blueprints the group was concerned with outfitting items, such as ventilation, pipe protection, wireways and DeGaussing troughs.

Launching calculations, based on the ship's outline and deadweight tonnage were minutely worked out in this office. They determined the speed that the ship should have on the Ways, the rate of deceleration, and the amount of weight she would have to drag to achieve the desired results. To help them perfect the launching preparations they kept a detailed record of every launching from an Oregonship way.

The department also ran preliminary calculations on a ship's stability, then, when the trial run had been successfully made, conducted on one ship of each type an inclining test to prove those calculations.

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In the late summer of '42 the department established a field office so that contact with the yard departments would be closer. Here field problems concerned in the hull structural phase of the work were co-ordinated, and plans that incorporated revisions were worked out in detail.

An important part of the work done in this office was the making of production drawings in perspective. These 3-dimension drawings, which represented about 25 percent of the office's output, gave the layman an understandable illustration of his problem. This type of drawing was developed in the first world war, when the RAF used it for mechanics who were overhauling engines, and during the second world war its use became widespread. Especially was it in demand in the Assembly, Sub-Assembly, Erection, and Outfitting Departments. Blueprint shacks on the ships, both on the Ways and the Dock, contain a goodly proportion of such drawings.

The time spent on perspective drawings was cut in half by the use of a special board that establishes perspection for the draftsman. The board was the result of inspiration and a couple of months' homework on the part of two draftsmen in the department, and it is such an improvement that other yards are using it. The Oregonship office kept a dozen such boards busy.

Staffing a field office in addition to the main office meant enlarging the personnel of the department, and the total of its members climbed to around 50 or 60 men and women. When, some time later, Huntington left Oregonship, the two offices continued with Nyborg as their Chief Architect.

Marine Engineering

Shops and buildings were rising fast, the Ways were under construction, and the Administration Building was almost complete. Ship's plans were arriving from the New York office of George Sharp, design agent. Those plans required breaking down and adaptation to the needs of the pipefitters and Marine machinists who would be handling them. So a Marine Engineering Department was created with Jim McClay at its head. They moved into the Administration Building with the general influx of office staffs, set up drawing boards and began toiling over "see bees" and prints. For the marine machinists they drew countless detailed plans of ship's machinery. For the pipefitters the draftsmen broke down prints that covered five and a half miles of pipe, and the department was satisfied when it made an average of one manhour for each foot of pipe detailed.

The first ship of a kind always means more work and trouble for all concerned than the ships that follow, and this is especially true in the case of blueprint offices. Months of steady activity in the Marine Engineering Department preceded the Star of Oregon's launching date.

When it came time for the Star to make her trial run these marine engineers studied the agenda of the Maritime Commission, made out forms that covered all the questions to be answered, and (during dock trial and river run) furnished the engineers who recorded the results of the tests. These tests

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were intricate affairs, and involved the reading (at half-hour intervals) of countless thermometers and gauges. During early dock trials the ship's mooring lines were lashed securely to the Dock, then her engine was set running under normal load and ran for 6 hours ahead and one-half hour astern.

The marine engineers used a wide assortment of instruments in their testing. A mercury column measured the vacuum in a condenser; a tachometer, held against a shaft, counted the revolutions per minute; thermometers that ran up to 950° measured the temperature of superheated steam; 3 steam indicators charted upon a card the pressures of the cylinders and measured the horse power; an orsat analyzed the gases of smoke to determine combustion efficiency.

Additional tests were made on the trial run. At 9:15 in the morning the trip was usually started, and half an hour later it entered the Columbia River. At this point it started on its endurance run, with its engines running at normal power. Various tests were made — an anchor test, a steering gear test, and a crash test.

To make sure that the anchors would lower and lift without hindrance one anchor was dropped to 60 fathoms and lifted to 30, then the other was dropped to 30 fathoms, and both were drawn up. This was done in a specified time that tested the strength of both the windlass and the anchor.

The steering gear test was made while the ship was making full headway. The rudder was first moved from amidships to hard left or right, then from hard left to hard right, and vice versa; next, from hard left to amidships, and from hard right to amidships. Meanwhile the marine engineers were recording the time movement from each position, also the revolutions of the propellor shaft, and the maximum oil pressure developed in the ram cylinders. Later, an astern steering gear test was made and recorded.

For the crash test the ship was put under full headway, then full astern power was released. Meanwhile the engineers recorded the time it took the shaft to stop, the time it took to reach normal revolutions astern, and the time that elapsed before the ship came to a dead stop in the water.

When the trip was over the records were taken directly to the Marine Engineers' Office, where they were carefully checked and necessary computations were made before they were turned over to the Marine Department.

When the Outfitting Building was completed (January, 1942) the marine engineers moved the part of their group that recorded tests into one of the offices so that they could be near the departments with whom they worked. There, as their department's test crew, they acquired the necessary equipment and confined their activities to recording trial performances of the ships.

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Vessels Delivery

It was early fall in '41 that the Vessels Delivery Office was established. The Star of Oregon had reached the Outfitting Dock. Before she could become an accredited, licensed ship she had to possess, in the shape of carefully filled out and signed papers, proof that she complied with navigation rules. To satisfy the Maritime Commission, the Coast Guard, and the American Bureau of Shipping she had to bear the designation of her home port, and to show that she had applied for and received her official number; she had to carry information that would let her through the Panama and Suez Canals, and certificates that showed her to be seaworthy and in compliance with health and safety regulations. There were about 200 blueprints and 60 or 70 instruction books to be placed on board, also. Furthermore, every ship delivered would have to carry the same supplies. Material would have to be gathered, placed in stock, and, when the time came, put aboard. An office and several people were needed to take care of all the details.

Vincent Palmer, of the Office Engineers, set up a Vessels Delivery Department to fill the need. Into an office in the Administration Building moved Carl Savage (who later transferred to Swan Island) and Drew Haines. They promptly accumulated stores of Vessels Delivery material and arranged them in numbered packages in readiness for the ships that were moving down the Dock.

From the Star of Oregon down through the long lists of Libertys, Victorys, and Attack Transports, every ship, as it prepared to bid the yard farewell, received its credentials from this department and had its record of delivery and acceptance placed on file in that office.

Expediting

Expediting as it came to be known during the second World War was in an experimental stage when the Oregon yard was built. It was the outgrowth of a less extensive effort in which a production scheduling engineer endeavored to keep supplies arriving in time to meet the demand.

Don C. Jaxtheimer had been a production schedule engineer during the first World War, and when Oregonship's departments were being established he was chosen as chief expediter to create an Expediting Department. Starting out with one expediter to help him, he moved into the Administration Building as soon as the room was ready for an occupant. His first task was to set up the procedure and records that concerned the expediting of steel, and those of machinery and equipment. Gradually he enlarged the department and divided it into three branches: one that took care of all steel; one that concerned itself with machinery, equipment, and small items not ordered by the Maritime Commission; and, still later, a field expediting and order office that confined its attention to shipyard purchase.

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An expediter's business was to know the main items required for a ship and the sequence in which they would be needed. From the stage of construction a ship was in he could estimate when certain items would have to be ready for installment. If necessary, he prodded design agents into preparing and submitting to the Maritime Procurement Section the requisitions for materials. Then, after the order had been placed by the Maritime Procurement Section, he saw to it that the Maritime group properly allocated the material to the Oregon Shipyard. His next responsibility was to make certain that the vendor from whom the materials would come would really deliver them on time.

There could be no alibis. Supplies had to be present when needed. Sometimes it took around-the-clock attention, cross country phone calls, the cooperation of the Army or Navy, and concern that ranged from swearing to praying — but those supplies arrived! Many of the experiences left the expediters limp from strain and loss of sleep.

One such problem concerned cargo booms for a Liberty ship during a critical period when Libertys were desperately needed for convoys. Due to war conditions in general and a shortage of steel in particular cargo booms were so slow in leaving the eastern factories that one Liberty left the Dock without her booms, went to a nearby port to be loaded for her trip, and was scheduled back at Oregonship just long enough to have those booms installed. Meanwhile, from his Ohio factory, the manufacturer shipped booms for several ships.

Reports made along the trip indicated that the booms would not arrive in time. So the Union Pacific was persuaded (after plenty of pressure) to allow booms for one ship to be unloaded at Pocatello, Idaho. Then a St. Johns transfer company was prevailed upon to send a heavy truck and two drivers to Pocatello to load on the booms and return with them. Experience had taught Jaxtheimer to expect the worst, so he sent an expediter by plane to Boise, and on to Pocatello by bus to speed the arrival of those booms. The carload of booms, the truck, and the expediter all arrived at about the same time, but the railroad's yarding crane was not available for transferring the booms to the truck. It was late at night, but the expediter aroused someone connected with the Morrison Knudson firm, which was doing contract work for the Navy, and he agreed to furnish a crane to load the booms if the Navy would grant permission for it to be used for this purpose.

So the Navy was contacted at Bremerton, and permission was obtained; the booms were loaded, and away started the drivers and the expediter with their treasure. The booms were long, and when the truck stopped at a filling station for gas, the expediter acted as signal man to warn motorists of faulty clearance. Nevertheless, a careless driver smacked his car into the load, damaging the truck, spilling the booms and taking the side off his auto. When police responded to the tourist's wrathful summons the expediter went into action. He pointed out that the truckman had complied with traffic rules, and that the motorist was at fault. Furthermore, he insisted, if anything prevented those booms from arriving

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at the Oregon Shipyard in time, the White House would be out for somebody's blood. So the policeman arrested the careless motorist; the expediter once more got Morrison Knudson to supply their crane, persuaded the operator to roll out of bed, come down and reload the booms, and away through the night sped the truck with its burden. By one scant hour the booms beat the ship to the Oregonship Dock, and the story had a happy ending when the Liberty proudly steamed away for the convoy with her booms in place.

Another typical incident occured about the time that the yard swung over from Libertys to Victorys. The shortage on high pressure tubing had become acute, and the pipe for the first Victory should have been arriving by the time word came that it had left Titusville, Pennsylvania, by truck and was on its way to Pittsburgh, where it was to be picked up by plane and brought on. But at Pittsburgh thick weather had reared its ugly head and grounded all planes. Arrangements were then made to express the pipe to Canton, Ohio, where an army plane was to pick it up; but the train on which the material had to go had no express car. It took a lot of fast talking to persuade the railroad to load that 16 foot pipe into a passenger car, but the tubing made the second leg of its journey stretched along an aisle, under the feet of sputtering passengers.

Its arrival in Canton was heralded by more headache. Planes were grounded for 36 hours, and nothing could be done about it. Distressingly behind schedule, the pipe finally reached Ogden, Utah -- where it was stymied because no plane was charted for Portland. So the material was routed through Billings, Montana, and on to Seattle, picked up there by an Oregonship truck and rushed to its destination. Received at 5:00 PM, it was installed in time for the Victory to leave on her trial run the next morning at 9:00!

Threatened disaster averted into close calls practically forms the routine of the Expediting Department, but very few of the throngs that watch ships majestically leaving the Dock have an inkling of the hectic days and sleepless nights involved in getting them equipped on time.

Traffic

Every article that entered the shipyard had to be borne in on some sort of vehicle. Often it took a succession of vehicles to complete the itinerary of material. Until April, '41, Fred Lord, Purchasing Agent, took care of the traffic angle of the materials he ordered. At that time the job of handling such problems broke loose from the Purchasing Department and landed in the lap of a traffic man who tended it till July. On July 1st, Lee F. Damon, a man with 23 years of such experience, stepped in as Traffic Manager and set up the beginnings of the Traffic Department.

As the Purchasing Department hit its stride, and materials for the fast growing shipyard came rolling in, Damon and his stenographer had their hands full keeping wheels under the shipments. Often the material had to be rerouted and furnished with a fresh avenue of transportation several times

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before it arrived at its destination, and every possible type of vehicle would be pressed into service. Besides the usual railroad and trucks, that brought in shipments ranging from bulky freight to parcel post packages, steamships, air express, and even barges were used. Pipe was flown in a passenger plane, phone lines were kept hot during emergencies, and Oregonship traffic men in Washington, D. C. often went as sleepless as those at the yard.

Sometimes the movement of army troops would wreck carefully laid plans, and sometimes a blizzard would accomplish the same result, but regardless of the obstacles the staff came through.

The Traffic Department has furnished transportation for almost 2200 carloads of shipments in one month, which brought in all on one train, would load a string of cars about two miles long. The anchor chains they brought in during the first three and a half years of the shipyard would stretch over about 100 miles -- or the distance from Portland to Astoria. And all this was accomplished with a staff that never rose above 15 in number.

Badges

The first Oregonship employes turned their hiring-in slips over to the timekeeper and received metal buttons with identification numbers printed across them. The timekeeper filed these slips as his record of each man and his number. This worked while the payroll was very small, but soon a more complete system was necessary. During July the guards began the task of photographing each shipyard employe -- not only the new-hires, but the thousands who were already at work. The pictures were assembled downtown and sent out to the Time Department for distribution. New-hires were given their picture badges; those who had buttons exchanged them for picture badges. This partly solved the identification problem, but it left many questions unanswered. The yard was running on a rotating day-off plan. Each employe was assigned a day-off letter which designated the day on which he would not be allowed to work, but as the picture badge did not show this letter, the guards at the gate lacked the information necessary to control the situation. Other questions were answered only by the office records of the timekeeper. What was a man's occupation? To what department did he belong? What was his shift? His location?

The Timekeeping Department finally handed out white cards that bore the day-off letter of the bearer, but as the payroll multiplied the problems did, too. Even the Cost Department had difficulty in locating a man and charging the cost of his work to the correct department. Mr. J. F. Reis decided to create a department to take care of such things, and he appointed Paul Eyolfson, Cost Engineer, to do the job. Eyolfson gathered about him several men to help him work out a feasible plan whereby a man's badge as well as his record in the office file would carry all the needed information. The first effort resulted in each man's receiving a card colored to designate his shift, with the day-off lettered on it and his identification number typed across it in big black letters. The nucleus of a Badge Department settled in an office in the original Administration Building, and several

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girls were hired to do typing and filing. Meanwhile, they continued to work on a method whereby the rest of the information desired could be put upon the card.

During the spring of '42, the little group moved into the vacated Guard House, and, under the supervision of John Jenkins and later Bert Harris, began a series of innovations in the badging of the yard. To the day-off, shift, and identification number, they added work number, occupation, location, and department information. They also began the assembling of the cards in metal cases that made up into wearable badges.

Summer came, and part of the group moved back into the original Administration Building. For several months they remained there, all one busy, happy little family, till the record half of the department developed an urge to reside in the spacious new Administration Building that had just been finished. This left the production girls to make badges while their domain was practically being torn down about their ears. Then one wing of their building was removed, and, as the Service Building, established near the new Administration Building, they followed it and settled into an office where the pounding of their hammers upon the used material that they straightened for re-use was drowned out by the roar and clang and hiss of the Assembly Shop, just across the fence.

The recording and issuing of exempt and general badges was another branch of the department's activity. The shipyard, full grown, had over 500 exempt men and women. General badges merely allowed the bearers to come and go through the gate as their work demanded. Electricians, truck drivers, and vocational instructors were among these.

The time was to come when the entire Badge and Record Control would employ 60 clerks, when their files would include a permanent record of all terminations, and they would answer as high as 2,000 questions a week requesting employe status information.

Tabulating

International Business Machines entered the yard during a critical phase in the lives of the Timekeeping and Payroll Departments. The number of employes was mounting so rapidly that it was beyond human limitations to keep up with it. So in August of '41, the struggle was largely taken over by machinery.

The United States Government — no less — issued the cry that resulted in the invention of IBM machines. It had taken government employes 7 years to compile the census figures that they had collected in 1880. The nation was growing so rapidly it was evident that future census compilations would overlap. So in 1894 a helpful inventor produced the IBM machine as the solution to the problem. The government was delighted, and soon big business began to use the machines.

Nevertheless, 50 years later, when Mr. Reis introduced them to the shipyard, there was a good deal of head shaking. Few people could imagine

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the growth in store for Oregonship. As if to prove their worth, the machines began to breeze through formerly tedious jobs at a breath-taking speed. The machine that printed payrolls and checks had 75 miles of wiring, and operated at the rate of 150 transactions a minute!

The department was a small one at the outset, with only a few operators and not enough machines. To G. A. Rogers, who became supervisor in the fall, life was mostly work and headache. The original estimate of the yard, full grown, was 5,000. As it expanded, the management would warn him that an increase to about 8,000 was due; he would prepare to take care of 10,000 — and the number would rocket to 12,000. Next, being told to expect 14,000, he would plan for 16,000 — and 18,000 would come through. While the yard was young the department was short not only operators, but machines. Frequently it would send a frantic SOS and a truck to another local user of IBM machines, and back would come the truck with an antiquated specimen that had been resurrected and pressed into wartime emergency service.

Always the work went out on time — but there were some close calls. In those days when the yard was steadily acquiring shop machinery that taxed the supply of electricity there was frequently an overload that resulted in the sudden cessation of power. IBM machines were unionized on that point — no power, no work. Too many such interruptions sometimes had the department sprinting to meet a deadline. Old timers later told of strange procedures that were followed during the months after Pearl Harbor. Blackouts were frequent, and though arrangements had been made to supply the machines with power during such intervals, the operators had to carry on by the light of lanterns. Panels covered the windows, and the air was stifling. Then there was the shivery time they had in December '41, when carpenters tore away the outside wall to enlarge the original Administration Building. Warmly clothed, the operators hovered around the borrowed electric heaters and joked about the light globes that gleamed from their dishpan reflectors. Those were the times when, because it took from 6 months to a year to train a new operator to be reasonably expert with the machines, the older operators worked 12 or 14 hours daily to get jobs finished on time.

From the beginning a man's personnel card cleared through this department. A set of 5 cards were made up: a master card carrying all information (for filing in badge sequence), a duplicate card (for filing in alphabetical sequence), a card carrying shift information (for the shift control file), a withholding exemption certificate card (enabling the department to set up the proper tax status), and a war manpower card used for manpower schedules. Besides all this a daily time card was prepared to send out to the checks stations for the marking of each employe's time. These cards were returned to the office for daily and weekly processing. After the installation of time clocks, in the winter of '43-'44, weekly cards were prepared in addition to the others. Quarterly and annual earning reports were made out for every man and woman who had worked at the shipyard during the time in question, and for the management

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the department reconciled weekly bank statements on the tabulating machine. They also produced daily and weekly reports on labor costs by accounts, hulls, departments, etc.

Then, in their spare time, they turned out war bonds and handled all deductions for bonds, war chest, Red Cross, M & H and Group Insurance and government withholding tax. The approximate number of cards handled in a week's time totalled over 1,000,000 -- and some of them went through the machine as high as ten times!

Stationery

While half a dozen offices in the Lewis Building handled the affairs of the Oregon Shipbuilding Corporation the Purchasing Department saw to it that the needs for papers, ink, pencils, erasers, folders, etc., were met. But when the original Administration Building had been completed, and its rooms filled up with office workers, a Stationery Department was to be responsible for having on hand and issuing supplies that those offices would be needing. While it was in its early stages the department had several supervisors, but in December, '42, Lloyd Owre transferred from Duplicating to take care of Stationery, and he remained in charge through the active years that followed.

While administrative offices were multiplying, departments were springing up all over the yard, and each had its own office needs. Finally, there were over 150 offices clamoring for supplies. 150 offices, each with accumulating records and files, with daily bookkeeping and expanding activities, will use more supplies than an ordinary city with 30,000 people. The Stationery Department was soon ordering pressboard covers 2500 at a time, desk blotters by the gross, erasers 10 gross at a time and pencils 50 to 100 gross (they were handled like kindling). All material was requisitioned out by the department applying for it, and the requisitions were filed.

Two clerks in the stockroom did the cutting, trimming and drilling of the paper to meet the special requirements, and a counter and stock girl prepared the packages for delivery. Postage stamps were originally kept for the stamping of mail that couldn't be scheduled through the mailing machines. However, the fact that shipyard employes often found it difficult to obtain stamps meant that they would keep appealing to the department for them. So the department began to accommodate, when called upon, to the extent of three per applicant.

In the Duplicating Office were two electric and two hand machines -- the only ones in the entire shipyard. Consequently, all duplicating needs had to be met by the office crew of 4 operators on the day crew, one night operator, and a supervisor. They made their own stencil forms, of which they kept on file about 2,000. They averaged 35,000 copies of ditto work weekly, and a check made in '42 showed that during the year they ran around 3,000,000 duplicating copies. As this number increased about 5 percent in '43, and 10 percent in '44, the amount of work turned out by those operators was truly enormous.

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Not only did the Stationery Department keep supplies on hand, it saw to it that those supplies were delivered by their own messengers. Each messenger had his own zone of delivery, and a crew of 7 with their supervisor handles around 12,000 messages weekly. As equipment the department had eight bicycles (each with canvas bags attached to carry the deliveries), one motorcycle, and one pickup for downtown trips.

The department was at the mercy of the tempo of the yard. Sometimes the youngsters were idle; sometimes they were frantic with rush work. They delivered all kinds of stationery and duplication orders, plus fluid and carbon for the yard's 18 ditto machines. There were special deliveries that had to be signed by both the receiver and the messenger, for often large checks that must reach their destination by a certain time were involved, and the messenger needed proof that his job had been performed.

Girl messengers wore slacks, for they were not allowed to ride a bicycle in skirts. It was something of a problem to keep the motorcycle manned. Youngsters thrill over a motorcycle -- but war had taken most of the available boys who had reached the age of responsibility, and the jar of the machine was so hard on girls that they rarely stayed with it long. The pickup that made downtown deliveries, however, was easily provided with a driver. The turnover in the department was large. Every opening of school, every siege of bad weather depleted the crew, and new messengers had to be obtained and trained.

Some of the messages contained a laugh, some a headache. Such messages as those addressed "From Jones to Jones" contained an element of both. There were always plenty of problems, but the work was seldom dull.

Master File

Shipyard correspondence contains the history of all transactions, procedures and events upon which the yard's achievements depend. Such record is necessary, and must be kept on file. Oregonship's correspondence grew so overwhelmingly that by the spring of '42 it was a problem to arrange things so that material could be located. A special filing system was badly needed.

At Mr. Reis's request Dorothy Parcher, who had been filing and typing in Edgar Kaiser's Office in the original Administration Building since July, '41, set up a Master File system to govern the filing of all shipyard correspondence. Using principles similar to those employed by librarians, she worked out a complete code system that provided a certain space for every possible subject. It was a big undertaking, and a tedious one, but when it was finished the departments had a code manual that established the filing procedure for the entire yard. So successful was the system that it was adopted by Vancouver and Swan Island yards, and occasionally the three Master File chief clerks met to make uniform additions and alterations.

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After the Master File was once set up, the chief duty of the department became the handling of all mail that entered or left the yard. All incoming mail was sorted, opened and coded, then taken to the Messenger Service room for distribution. Out going mail was stamped, sorted and taken to the St. Johns postoffice.

The office staff also typed, proof read and filed all Maritime correspondence and did ditto work for such correspondence.

War Bonds

The spring of '41 found the government badly in need of money to finance war. So in April it set up a national War Finance program. Through its plans corporations began to sell their employes non-negotiable bonds that insured no loss of principle. The idea of a company's deducting a designated percent of a workman's paycheck for purchase of bonds was being tried out all over the country. With the approval of the Maritime Commission a Bond Office was established in the Oregon Shipyard in March, 1942.

Into the A. F. of L. Building, which was still on territory that was later enclosed within the yard, moved the Bond Office staff. Four bond clerks and their chief clerk walked into the outer office, pulled up chairs to a table and sat down. They had no other equipment other than pen, ink and paper; but they were there to take care of the shipyard's sale of bonds.

The response was at first slow. On April 25th they issued their first bonds — 34 of them, and the total deductions were only about $34,700 — slightly over 2 percent. They managed to borrow a graphotype and an addressograph so that they could inscribe metal plates for those who had agreed to make weekly deductions and print the necessary details on the bonds.

The cool response called for headwork. A meeting was held to dope out a campaign that would get results. Out from that meeting came martyr Ray Conway, State War Bond Administrator. He was pictured as scoffing at the effort of the shipyard to sign up 90 percent of its personnel for the deduction plan. Newspapers ran his laughing promise to publicly eat crow if the shipyard succeeded. A crow was obtained, caged, and exhibited about the yard. Everybody was urged to make Mr. Conway eat his words — or rather, his bird.

The stunt clicked, and subscriptions soared to 95 percent. The deadline arrived, and Conway, thoroughly game (and secretly pleased), paraded about the yard for a couple of hours with a sandwich board that announced, "I am Ray Conway, and I'll eat crow."

Lunch time arrived, and with it the crow, all nicely roasted, stuffed and garnished by the cafeteria chef. And there, beside the Mold Loft, to the cheers and laughter of 10,000 workmen, Mr Conway ate crow. The legs, he commented were a bit strong and coarse, the wings slightly better, the

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least fair. He not only survived the ordeal, he took on a bigger one. He later ate six crows at the Vancouver yard when he lost a bond bet there. Winning objectives meant more to Conway than losing bets.

The event had a lasting effect, for it firmly established the custom of payroll deductions for the purchase of war bonds.

The little group in the A. F. of L. Office was sorely in need of machines. Every time one of their subscribers changed his address, his beneficiary, or the amount of his deduction a new plate had to be made for him. So the office acquired its own equipment — graphotypes to print the plates, addressographs to print the bonds, and a mailing machine.

Under the direction of Paul Bliss, who entered the department in the fall of '42, the department, which became known as Bond Accounting, grew till it turned out an average of 1500 plates and issued well over 400,000 dollars worth of bonds through deductions weekly. This made it the largest War Bond issuing agent on the Pacific coast.

Five or six months after the first bond office had been set up a field bond office (Bond Sales) was established in the Safety Building. From then on the first office handled the records and distribution of bonds, while the second sold them. The opening move of the field office was to obtain a booth for the girls to use while selling bonds, place it near the gate and keep it open around shift changes. In rigorous weather the girls needed plenty of fortitude, for the whole outdoors drifted in through the open front of their booth, and there was only a valiant little electric heater to combat the cold. They received their early coaching under Charley Mack, and, from '43 on, under Ken Moyer.

The best chance to contact newcomers was as they hired in, so girls were placed in the downtown hiring hall and in the guard house where pictures were taken. They were trained to give pep talks, and contests were held among them to increase their efforts.

During the department's first month yard deductions rose from 6½ to 10%, and with the exception of several weeks when overtime boosted the payroll, of one short week when deductions were not made, and of a 6 weeks' period of readjustment after the Administration Building burned in November, '44 the percentage never dropped below that figure.

It took a persistent effort to maintain such a level. The Bo's'n's Whistle, the public address system and countless posters were constantly used. The shipyard management offered ship christenings and luncheon invitations as prizes for the departments showing the best response to war loan drives.

Results obtained from each drive were gratifying, but for the fifth one they were astonishing. With a $3,500,000 quota they launched a drive that sold $3,766,548 worth of bonds. Practically all of this was bought by shipyard employes, most of whom were already having a goodly sum deducted weekly for the purchase of bonds!

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Because of wartime conditions many laws were temporarily ignored. Motorists formerly cautioned not to pick up chance riders, suddenly were expected to do so; drivers, once forbidden to charge for hauling riders, set their rates with the government's blessing. Then why should lotteries and punchboards, used for a worthy cause, remain in disfavor? They didn't. All about the yard, in the offices, through the boats, each department promoted schemes of chance to boost its standing in the War Loan Drive. A downtown dealer offered with each bond a chance on a Dodge car. The shipyard management put up bonds as prizes to holders of lucky bond tickets. With the guards in the lead, the departments ran a neck-and-neck race that set a new pace.

The Field Bond Office took on numerous other duties. Through the public address system they broadcast appeals for blood donors and made appointments for those who responded. Red Cross trucks met the donors near the gate at the close of the day shift on Tuesday and Thursday, and at the close of the graveyard shift on Wednesday and Friday mornings. Through their steady efforts 3,000 pints of blood were donated by Oregonship employes during the first 8 months of '44. Many of the donors belonged to the "gallon club", and responded as often as they were allowed to. There was even one regular donor who, starting 20 years ago, had parted with blood 26 times by the fall of '44! This was R. D. Adams, Oregonship electrician, and by November, '44, his record was 11 pints donated.

The showing of war films, the responsibility of putting up and taking down posters, the publicizing of the War Chest, Red Cross and Infantile Paralysis drives were all handled by this department. For the years of '43 and '44 Red Cross response totaled nearly $163,300; the War Chest over $111,400; and the Infanile Paralysis drive about $8,825.

All told, the Bond Department led a busy and varied life.

Suggestions

"Here's my invention of a skip that will unload itself." "This drawing shows how to improve rivet heaters." "Here's how a painter on the deck can see the side of a ship by using a periscope."

Suggestions ranging from the sublime to the ridiculous landed not only in the office of the Bo's'n's Whistle, but on the desk of every shipyard executive. Those that didn't find the nearest waste basket required the time and attention of the Bo's'n's Whistle editor. The undertaking became far too big to be handled as a side issue, and Hal Babbitt sounded an SOS that resulted in the birth of a Suggestions Department.

On August 17, 1942, A. H. Schmidt, an engineer at Swan Island was transferred to Oregonship, given a small office in the Administration Building, and invited to do something about the crude sketches and scrawled scraps of paper that littered the desk. He sorted out the accumulation, saving those worthy of consideration, and discarding the others. He placed forty

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...ed suggestion boxes about the yard and invited everyone to drop into ...n ideas that would promote safety or increase production and plant ...ficiency in the yard. War bonds were offered as prizes for the best ...ggestions. The department was so successful that similar departments ...re set up in the Swan Island and Vancouver yards, and late in December, ...a Labor Management was formed to select the final 3-yard winners from ...e winning suggestions sent in by the local yard committees.

...each of the yards $225 in war bonds (donated by the Maritime Commission) ...s distributed monthly among 5 to 7 winners. The winning suggestions ...ere sent to the War Production Drive headquarters at Washington, D. C., ...here they were judged again by the W.P.B. committee and given recognition ...according to merit. To promote their usefulness they were distributed by ...the War Production Board to shipyards throughout the nation.

...s for the Oregonship Suggestions Department with a field clerk to gather ...the suggestions, a draftsman to set them up properly, a secretary, a stenographer, and a supervisor they processed and submitted suggestions that in two years' time have saved the company almost 200,000 manhours and $181,000 worth of material.

Priorities

...hen the Oregon Shipyard went into operation in 1941 it was not too difficult to obtain materials for construction of facilities and for production of ships; so the Purchasing Department extended the necessary priorities. ...hen the War Production Board brought forth the Production Requirement Plan ...Priorities division was set up within the Purchasing Department, and ...cessary procedures were followed in compliance with the plan. In March, ...43, however, the War Production Board instigated a new plan, commonly ...known as CMP (Controlled Materials Plan), which department employes suggested stood for "Confusion Made Perfect". The plan evolved after two years during which the priority system had progressed through a series of complicated stages of effort to effectively distribute the nation's raw materials.

...t this time a separate Priorities Department was created, with Henry ...Nelson at its head. Nelson, who had been employed in the Engineering Department since November '41, allied the new department closely with the Purchasing, Engineering, and Expediting Departments, and with Production and Administration.

...he Priorities Department processed all requisitions and assigned the applicable preference rating, allotment number, and certifications. ...t policed activities of the Oregon Shipbuilding Corporation insofar ...s compliance with War Production Board regulations and the control of and use of materials was concerned. They also requested a higher priority for the purchase of materials when the production schedule demanded it.

...uch appeals were usually made direct to Washington by telephone, telegram ...or letter, in accordance with the urgency of the situation. During tense

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times (such as the period when Liberty Ships were desperately needed as convoys, and when the AP-5 Transport Attack Vessels were under construction) material was to be had for the asking if it was available. In appealing for priority the department had to set forth facts and figures that justified the request. Other war industries were also seeking the same privileges.

In addition to its other duties the department completed many War Production forms for submittal to the U.S. Maritime Commission and the War Production Board. They also helped employes of the yard to procure materials needed while on the job, but when asked for priority ratings on new stoves, telephones, or electric equipment for home use they could merely offer helpful advice.

Resident Attorney

From the outset it has been the policy of the Kaisers to leave the handling of big problems to their general counsel in San Francisco, but in September, '41, Oregonship acquired a resident attorney whose work it was to take care of legal matters (except for corporate taxation, and labor), that confronted the shipyard. Orders of government agencies, contracts, leases, taxation insurance, garnishments, etc., all came under his assignments. One of the problems that demanded a good deal of attention was the wages and hours law. Matters pertaining to this kept constantly popping up.

The first resident attorney, J. R. Devers, remained at Oregonship from September, '41, till May, '42. At this time he left for Swan Island, and George E. Birnie, (who acted at both Vancouver and Swan Islands while they were being set up), replaced him.

Birnie found several surprises awaiting him when he first abandoned private practice to join the Kaiser interests. One was the lightning speed with which the Kaisers act. Accustomed as he was to giving a contract several days' consideration, to hold consultations and pore over law books, it rather took his breath to be required to draw up a contract on a couple hours notice. The Kaisers expect their counselors to know the answers and render immediate decisions. They also want their attorneys to practice preventive rather than remedial law.

Another unusual feature was the way, when an agreement had been reached between the company and a sub-contractor, work would start at once. As soon as possible — maybe two or three weeks later — a contract would be duly drawn up and signed, but in the meantime the job was well under way. The procedure demonstrated the complete faith and confidence that big and little business had developed for Kaiser-operated industry, and it speaks well for the eager cooperation of war workers in general.

Legal matters seem generally dry to the layman, but the resident attorney often plays a part in human interest stories. For instance, although

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plenty of shipyard employes endorsed their checks with an X. Birnie was once asked to help a well-educated man persuade the bank to accept his signature. Into his office came two Arabs, and one, speaking for the other, explained that his brother had accumulated checks for six months because the bank refused to honor the signature — written in Arabic. Since the signature matched that on the Personnel card, he convinced the bank that everything was all in order, and the checks were duly honored.

The New Administration Building

Although the original Administration Building was big enough to house all the early departments that moved into it, new departments kept springing up, and the old ones constantly expanded. As the building of the yard became fast and furious, Roy Cook's design engineers were swamped with plans of buildings and structures, and more engineers were required. The same was true in the naval architects' and marine engineers' offices as the building of ships picked up momentum. When the yard's payroll increased, the Time and Payroll Departments did also. And so it went. The result was that 18 months after the first Administration Building had been erected a new one was built. This was a beautiful three-storied structure with concrete footings, timber construction and a finish that gave the appearance of gray stucco.

During the first summer of the yard's existence several cafeterias sprang up within its limits, and just outside the fence was a building that served as a mealtime mecca for the Administrative office staff and, on the second floor, as a banquet room. The yard cafeterias were closed by the management, but the outside establishment did a flourishing business till it vacated that building in favor of the second Administration Building. The building it left became the General Stores Annex.

As soon as the original Administration Building was vacated it was cut into four parts. One became the Service Building, settled just across the fence from the Assembly Shop; another, the Safety Building, located near the east side of the Mold Loft; another, the Utility Building, set down at the upper end of the Basin. One part remained on the original site, and became the home of the Hull Materials Department.

Even the new Administration Building did not settle the problem of housing the ever-increasing Administration groups. The spring of '43 saw a beautiful Personnel Building erected and filled with office staffs that devoted their attention to taking care of matters concerning transportation, housing, rationing, counseling, etc.

Personnel

The Personnel work, originally concerned mostly with the hiring of employes, had developed into a department with many interests and a series of managers. When Todd Woodall withdrew to center his attention upon Safety and Insurance

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Jack Murray stepped in. When Vancouver and Swan Island set up Personnel Departments, Murray became a 3-yard manager, but when he relinquished that responsibility for Labor Relations work, Les Randall moved up from Oregonship's Personnel Department to the position vacated by Murray. Then J. P. Cooke and R. A. Hadley divided the fast multiplying responsibilities.

Cooke, who had arrived at the Oregon Shipyard in May, '41, had worked under the Kaisers at Boulder Dam, Bonneville, and Coulee. Before leaving the last place he had become connected with Personnel work, and when he joined Oregonship he continued in the same capacity. Finally, in '44, he became Head of Rate Control Department and made that his special interest.

In March, '42, government regulations and the tremendous volume of rate changes handled, caused the management to set up a Rate Control group within the Personnel Department. It was the systematic way to provide information required by the Maritime Commission and the management, and at the same time exert some control in all rate changes originated by the individual department heads.

As the duties of the Rate Control Office increased it became advisable to set up a separate office to handle them. So, in October, '42, the Rate Control Department was established, headed by Ken Smith. Using a schedule that had been approved by the Treasury Department and the Wage and Hour Division of the Department of Labor, they verified and passed upon all rate changes initiated.

To keep them in close touch with conditions in the yard and help them make decisions they established, in January, '44, a field section to investigate occupational classifications. Men who act in that capacity covered the yard regularly and turned in to the main office reports based upon their observations.

Upon Hadley's arrival, in March, '42, he became a Public Relations Manager. As part of this work he set up, first, the Vacations Department, then the Clearance Office. When he stepped into Personnel work he handled, especially, hiring and clearance problems, and later, an office that made payroll advancements to recruits who, landing broke at the shipyard, were given necessary financial aid with deductions made later out of their weekly checks. Hadley's right hand man in this work was F. A. Pade.

When, early in '42, Vancouver and Swan Island started operations there was plenty of unskilled labor. But even then war industries were suffering heavy losses in labor turnover. Men whom they had trained for specialized crafts were quitting and drifting away to other plants or to other occupations within the same plant.

In the fall of '42, labor shortage was becoming acute, and companies had begun to lure away each other's employees. So Clearance Offices were set up to stop labor pirating and discourage drifters. The plan was merely a

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gentlemen's agreement, based upon a voluntary stabilization plan and entered into by Vancouver and most of the war industries around Multnomah County west of the Sandy River.

Oregonship's Clearance Office, which was set up October 16, checked an enormous number of transfers and held many a workman who had a roving foot. Transfers were given when a medical statement advised such action, and when an employe could be employed at a higher skill; clearance was given if housing, transportation or other problems were unsurmountable. A move had been made in the right direction, but as labor needs grew desperate it became clear that it would be necessary to put teeth into the agreement. So in the fall of '43, the War Manpower Board lent its weight to the project by taking control.

For about 6 months during '43 and '44, the Woman's Counselor's Department had a member in the Clearance Office. This woman forestalled 60% of the women who applied for clearances.

By the spring of '44, a brand new problem was confronting the Clearance Office. Veterans from World War II were drifting into the yard with increasing tempo and creating many situations that needed special attention. The G. I. Bill of Rights provides that veterans be rehired at the jobs they held before they left. Yet often when they returned conditions made this impossible. Other desirable jobs, however, could be found for them. There was need of an authority to straighten things out for them and place each man where he would fit in best.

So, in June, a branch office was set up as part of the Clearance Office. First, veterans already working in the yard were listed. The next move was to mark all veterans' applications for work at the downtown office of Personnel and arrange with Induction Training officials to send each veteran, with his application, over to the Clearance Office. There a veteran was urged to go down to the First Aid Building for a thorough physical examination. From the doctor's report the Personnel assistant determined the particular niche in which the applicant belonged. Then the Clearance man took the veteran down to the department in which he was going to work, and informed the new boss of any handicap from which the employe might be suffering.

Department Heads cooperated fully with the plan, and five personnel men covered all three shifts in making weekly rounds of the departments to find out how those boys of ours were getting along with their jobs. If, at the end of 60 days, they seemed happy and well placed, the Clearance man put their records in the "completed" file. If things were not going well he tried to make adjustments. In the case of veterans, transfers were freely given.

The job was one that took both understanding and keen insight. Many of the boys were returned heroes to whom the country at large owed constructive

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gratitude, and for these the department made every possible effort, but there were also fourflushers who were trying to collect from the credulous what belonged to the battle-marked veterans. One ex-service man claimed to be suffering from a serious nervous ailment that had been brought on by 60 overseas missions. The whole department in which he was placed responded with generous sympathy. They even laid plans to take up a collection to send the poor fellow back to the mid-west. At this point Fred Gleeson, Assistant Clearance Officer, held up the plan to do a bit of checking. He discovered that the self-styled hero had never been nearer a battle field than Camp Adair — from which he had been released because of a physical defect!

An example of the growing need for the Clearance Department was shown by the records of the first four months. Starting in June, '44, with about 500 veterans, they handled over 1,000 cases by October.

With the Administration and Personnel Buildings comfortably filled, and the Service Building accepting the overflow, it looked as if all Administrative departments would be properly housed for the duration.

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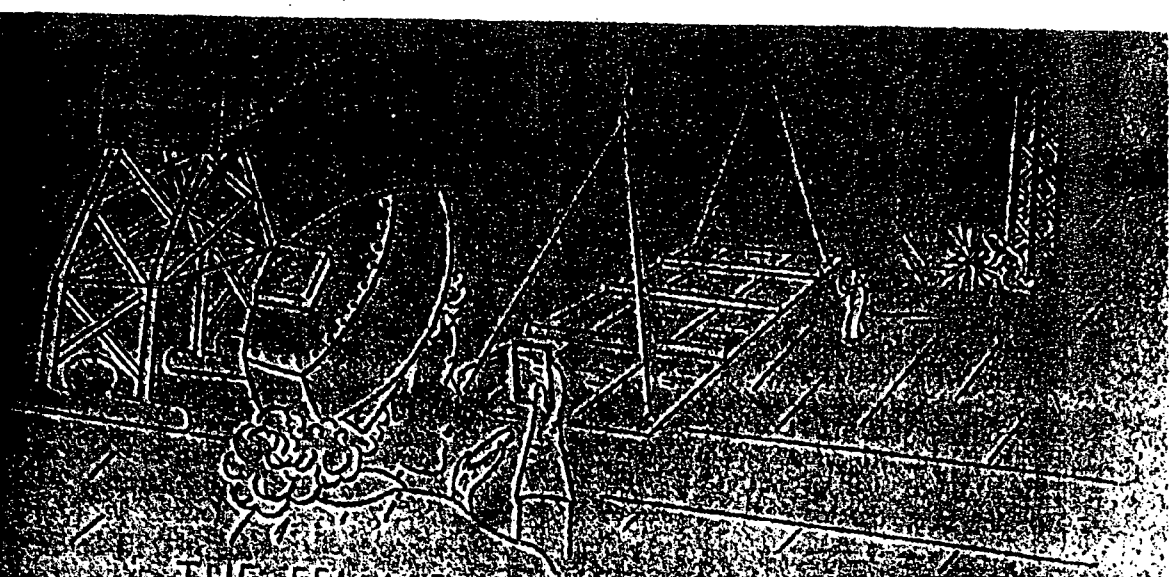

THE FEMALE OF THE SPECIES

CHAPTER VI

en women entered the yard in the spring of '42, they had obstacles to hurdle. e was the strangeness of their jobs. Another was prejudice. The first women re aware of many a man who had slipped away from his job to watch them at work. t won't work out," he would mutter, with a dubious shake of his head. "It nt won't work."

t it did. Women invaded the yard as rats invaded Hamlin — and the men had no ed Piper. There were two welders — two courageous woman welders whose presence considered a huge joke. Then there were more of them; other crafts received ir sisters. At first men resented, then tolerated, finally they gave worthy n ungrudging tribute. Long before the liberty contract was completed women e rated as men were rated — according to individual ability and performance. majority of them took pride in their work, and the men became willing to give m all credit due. One foreman, asked for an opinion, replied,

e a woman with a son overseas, and you can't beat her as a bridge crane opera- . A man may have more knowledge of the handling of machinery, but he isn't as cientious about it."

the beginning they turned the old regime topsy-turvey. Up to then the area in the gates had been strictly a man's world. Lunch rooms, rest rooms and re were scattered about the yard, but they were for men only. Now these niences had to be furnished for women. Another upset was the way men ed to accept as a casual fact that women were in the yard to stay. Six h after the feminine intrusion, Russ Hoffman remarked to department superin- ent:

time the novelty of having women co-workers in the yard wore off. A little n talk might help."

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[illegible]

[illegible] of the girls on the job could [illegible] before she accomplished her [illegible] to protect her sex from their predi[illegible] The first thing that disturbed her was the way women were bending over [illegible] with their [illegible] and pants flap[illegible] loose. It displeased her to [illegible] differing in their flimsy clothing and splashing about in thin-soled [illegible]. She hated to watch welders risking burned ankles by wearing low shoes [illegible] short pants long. The thought of what high heels can do where good looking [illegible] essential provoked her. So she started a campaign to get women into proper [illegible]ing.

[illegible] Martin acquired an assistant soon after Christmas, and two more joined the [illegible]ff in a short time. Without easing up their drive to make women dress properly, [illegible] counselors took on many other duties. They handled problems from sending an [illegible]ling woman to the First Aid station to taking a girl out of an illicit love [illegible]air that could bring only grief to all concerned.

[illegible]fore long, Jack Anderson, the Assembly Shop Superintendent, asked that counselors [illegible] stationed in his shop. Although Mr. Anderson's purpose was not to supply his [illegible]en workers with people who could advise and protect them, but rather to furnish [illegible] leadmen with means of getting the feminine members of their crew out of the [illegible]t room, the counselors were pleased. The request gave them a chance to prove [illegible]selves of real value to the department. They conscientiously shooed their [illegible]sters out into the cold and back to the grind; but they kept their ears and eyes [illegible]n for chances to make things easier for women in the yard. They ran down stolen [illegible]icles and saw that the rightful owners regained possession. They patched up [illegible]rrels, procured lunches for people who found themselves cooped up in the yard [illegible]th nothing to eat, they made telephone calls, carried messages, and supplied [illegible]dle and thread to any unfortunate who had split the seams of a poorly made pair [illegible] trousers.

[illegible] time went by, counselors became the go-between for yard workers and the Rationing, [illegible]nsportation and Rationing Offices. They made appointments for blood donations; [illegible] carried shoe ration stamps to those who couldn't visit the office to procure [illegible]ir own; they sold articles of apparel for those who had no further use for such [illegible]ipment; they hunted up answers to legal tangles, made out income tax reports, [illegible] even upon desperate occasions made private loans to someone in distress. So [illegible]essary did they make themselves that in '43 the staff numbers rose to eighteen, [illegible] the following year found twenty-four counselors on the job.

[illegible]ppy people make poor workers; and leadmen, who often were aware of conditions [illegible] were worrying their crew members, learned to depend upon the counselors for [illegible] in restoring contentment to harassed employes. Although women counselors [illegible]centrated upon women's problems, they never turned down any appeal for help, [illegible] a man had cause to think gratefully of them.

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[illegible] began to play a very important part in the building of Ship-
[illegible] Wives came and departed. [illegible] war on, of course,
[illegible] Johnny had a bad cold, or baby Judy had a stomach
[illegible] mighty mean well, but they were not too dependable.
[illegible] If only there were a really good home where Johnny
and Judy could be left during work hours!

Oregon Shipbuilding Corporation became involved in the situation because there was need to check the chronic absenteeism of these mothers. Every absence slowed production and built up costs. Still worse was the tendency of women to stick to the job till they had become skilled workers, and then decide that the home needed them more than the shipyard did. Mothers definitely required aid in arranging for the care of their families during work hours.

As a result of this need a children's counselor was added to the staff. She set up an office in the yard and promptly compiled files that contained full information concerning every Oregonship mother of children up to sixteen years of age. From the Multnomah Welfare Commission she obtained a list of carefully investigated foster homes in which children could be placed for full or part time care; she kept on hand lists of schools that had extended their hours of supervision to cover the interval between school schedules and those of the shipyard; she passed around information concerning Portland's day nurseries, and the offer of summer schools to supervise children during the day.

But the problem was not solved yet. Day nurseries affected only day shift workers. Besides, often the mother seeking a place for her children could not transport them to and from the nursery or the foster home. She needed a place where she could drop off the children on her way to work and pick them up on her return. It became apparent that the shipyard should have a child center.

The Kaisers, father and son, never achieved success for the present at the expense of the future. All through the war's crises they thought of tomorrow's consequences. Neglected children had no part in their plans. Ships must be built, and parents must build them — but children must live. Tomorrow's children should not bear the scars of today's unrest. Since a child center was needed as a part of the shipyard, the Kaisers decided to make it such that it would be a privilege for a child to stay there rather than a "must".

They obtained an appropriation for the building of a Child Service Center on the grounds of Oregonship and of Swan Island; they secured top notch architects and builders; and they engaged Dr. Lois Stols, eminent authority on child care, to act as consultant director for both centers. Under her supervision the centers were equipped to insure utmost convenience, pleasure and training for children. Tables, chairs, benches, toilets and bowls were all at a child's level. Windows were low enough for him to gaze out of. Individual lockers were small and within his reach. Built to accommodate three hundred children on each shift, both centers furnished surroundings for little folks from eighteen months to six years.

Dr. Stols had gathered an expert staff to take care of the feeding, teaching and medical care of the little patrons; many a mother enjoyed freedom from what had been a constant headache. She knew that at the center her Jimmy would ride bicycles, play on slides and bars, paint pictures, listen to stories, or handle

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with children of his own age. She knew that Baby Judy would join other tots dragging wooden toys around or in playing with dollies. Mother could think, "Now they are being good — now they are having a nap." She was happy in the knowledge that the slightest ailment of either child would receive prompt medical attention, and that if she were needed she would be called immediately.

Only the mother of a child in the Child Center, but every Oregonship mother knew that if she were needed at home she would be notified promptly. If the loud speaker announcement did not reach a mother's ear, a counselor assistant would hunt up, for the office of the children's counselor was the point of contact for both the Child Center or the foster homes and the mothers.

Housed properly, and with their children well cared for, women were able to give their jobs undivided attention. There were many shipyard crafts that a woman could do as well as a man. Women, used to measuring and cutting patterns with exactness, made excellent layerouts and burners. Frequently women workers worked on scaffolds without concern. Others became electricians who threaded the ship's running lights, forced tiny wires into the compensation boxes of binnacles; still others became warehousemen who unpacked and stored articles in the bins reserved for them. Women were the backbone of the Labor Department, where they outnumbered the men two to one. A small, wiry woman could clean and scale a tank much more easily than her boyfriend could, for tanks afford cramped quarters. A big hefty woman could load refuse into a skip, or help to pull a dolly along a craneway to a salvage truck. There were even women truck drivers, but they seldom handled their loads themselves.

There were a few jobs that were not open to women at all. Chipping and riveting were among these. There are light rivet guns that a strong woman can handle, but shipbuilding Oregonship used only a heavy gun that tried even the endurance of a muscular man. The Riveting Department at Oregonship never had a woman rivetor or dipper. Rosie the riveter didn't work there.

A woman could hold a job that would require her to remain on board during a launching or a trial trip. The code of the sea demands that no woman shall ride a ship on the Ways. A woman must christen the craft, but if one should ride it into the water sailors would refuse to man it.

The woman, assigned to write up the preparations that precede each launching, became keenly aware of the importance of respecting this custom. A rigging foreman had brought her aboard to show her how his crew pass the dragline through loops of rope that hang from the deck's edge and finally secure it by a huge rope that is anchored to a capstan. The deck swarmed with busy men and women performing last minute tasks. From far below came a rhythmic thudding as Shipwright crews drove rams against launching wedges. Suddenly her guide deserted her to lend a hand to his crew, and she became uncomfortably aware that the women workers were picking up their belongings and heading for the scaffold stairway. Soon there were only men around her, and they were eyeing her suspiciously.

A mate approached with a streamer of smoke-grimed flags of various shapes and colors. He made fast one end of the line and headed for a hook that was to receive the other end of it. Flashing a grin at the woman he asked,

"How do you like my laundry?"

SCHN00317772

)ook her finger at him and reproved:

don't use Sudso!"

"Is it," he roared. "I couldn't think of the name — but next time that's
I'll get."

the line properly strung he gave the reporter a long, puzzled look, shrugged,
departed. About the time that she had begun to feel as welcome as measles at
eekend party, the foreman who had brought her aboard returned and led her down
stairway to the craneway below.

ose early '41 administrative offices had hired women, but the spring of '42 saw
fices within the yard add women to their staffs. Vicki May, Maxine Kirkland,
Niles, Dorothy Jacobson and Elma Burtch entered the Rigging Loft, Plate Shop,
Materials and Materials Departments and made good in a big way. Many of the
rtments finally acquired feminine chief clerks who represented their sex with
brains and beauty. One of them looked like a top ranking debutante; another,
h a rose between her teeth and a shawl across her shoulders, could have posed
spanish dancer. The office personnel included gray-haired mothers who were
ling a void left by empty homes to youngsters fresh from school and flushed
their sudden independence. There were accomplished musicians and dancers,
even a Rose Festival princess. But girls like this -- and there were many of
m — were so intent upon a stern present that past glories were unimportant.
y had become shipbuilders.

of these girls met with adventure in the course of duty. Three youngsters
the Progress Department made regular trips through the boats to check progress
ing accomplished. On a particular excursion one of them ventured alone into the
peak. While she was making up her record some workmen from the deck above
an to throw pipe down about her. In a panic she plunged toward the access open-
through which she had entered — only to have her exit barred by the flash of
elder's arc. Huddled against the shell of the ship, she yelled herself hoarse;
an energetic chipper was drowning her cries. She was envisioning herself crush-
beneath a mountain of pipes when she had an inspiration. Picking up a short
gth of pipe she drummed on the bulkhead with all her might. Promptly the welder
pped his work and poked an astonished face into the opening. The girl was still
king and a little tearful when she rejoined her comrades.

strange part of it is that these young women, clad in slacks, bandanas and
mets, sallied forth into the smoke, oil and asbestos of an engine room to skid
greasy steel, trip over hose, stumble into half covered manholes, and dent their
mets by suddenly choosing the wrong spot for standing erect, then returned to
office smeared, whitewashed and disheveled -- only to emerge from the washroom
rtly after, immaculately dressed, happy, and sure they had the best job the
pyard could offer!

matter how demanding was the routine of office work, slack moments were enliven-
with gaiety. Take the Rigging Loft, for instance, and the girl who later joined
WAVES.

oreman discovers Mary eating candy.

SCHN00317773

CHAPTER VI

Foreman: Better lay off that stuff, Mary. You're getting plump.

Vicki: Don't mind him, Mary. He's boorish.

Mary: Believe it or not, I met a chivalrous man last night.

Chorous: No! Tell us more.

Mary: He offered me his seat on the bus.

Foreman: (shocked) You didn't take it!

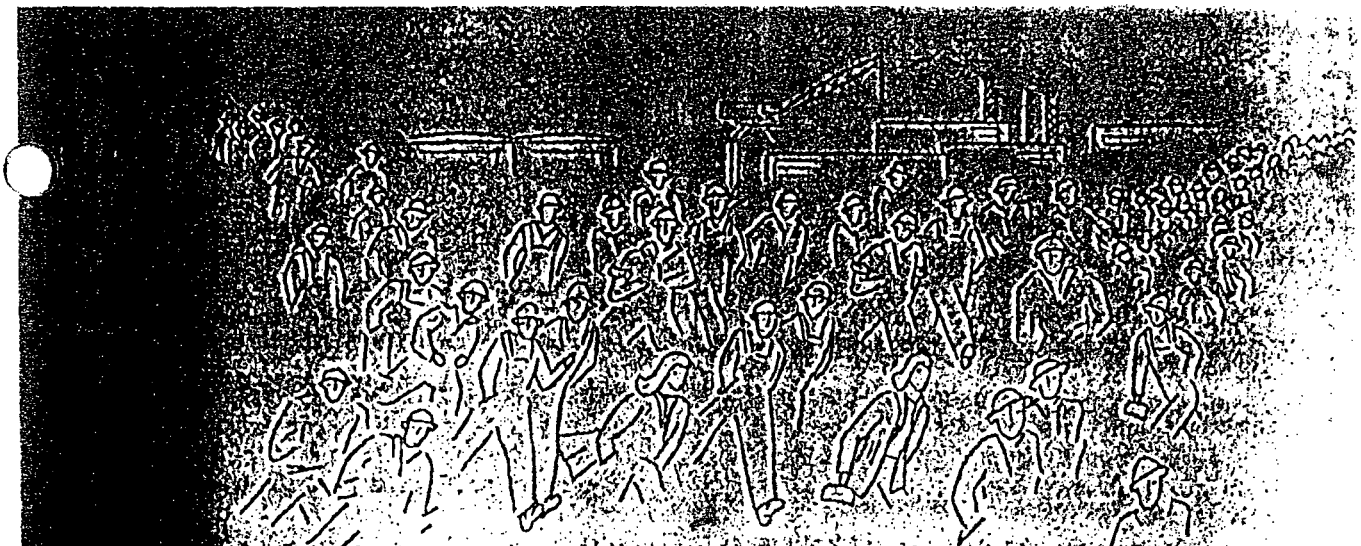
Mary: Oh, I was quite decent about it. There was a preliminary bout — here, Miss, take my seat — oh, I couldn't think of it — go ahead, do — really, I couldn't — I insist — we-e-ll, if you put it that way —

Foreman: And you took it. Aren't you ashamed of yourself? All day that poor fellow had been murdering his bunions while you sat around on your — chair, and you invoigle his seat from him.

Mary: What could I do? He INSISTED. Besides, if I had argued any longer he might have changed his mind.

A new girl took Mary's place in the office the following week, for Mary donned her country's uniform.

SCHN00317774



TO HAVE AND TO HOLD

CHAPTER VII

ince the first year of its life, Oregonship had on its hands the problem of tting competent workmen. It encountered more troubles keeping them. The rmer, the housewife, the deacon and the petty thief all worked side by side on strange job. Upon their arrival most of them lacked the knowledge and under-anding of their jobs; they wanted friendliness and counseling — and they need-protection from those who had too little conscience, or supervision to prevent eir making life miserable for others. Special departments had to be set up to fer protection, guidance and instruction.

surance

ne of the most important forms of protection was that offered by insurance. To ld Woodell, head of Insurance and Safety, fell the work of arranging insurance r both the workman and his employer. The biggest phase of such problems was nnected with the workman's compensation. One consideration dealt with cases ere the employer was responsible, and another was concerned with situations ver which the employer had no control. Injury on the job was covered by the duction from the workman's check of about one cent a day, and a collection fro employer of what amounted to about 15 cents a day for each employe. Changes d additions were constantly affecting the policies, and continued attention ne cessary. One of these additions was the covering of industrial disease in the ddle of '43.

osely tied in with financial protection from accidents was the company's wide-road effort in the interest of safety. Accidents and sickness prevented were re to be desired than financial compensation. So Woodell set up a variety of partments in the interest of safety. There was the Safety Department, with its spectors, school equipment and First Aid facilities; there was the Guard Depart the Plant Protection and Radio.

SCHN00317775

[illegible] the first of such departments was the Guard force. At the beginning [illegible] answered Oregonship's need for such protection, but by the middle of [illegible] had progressed to such an extent that a dozen guards were put on duty, with [illegible] Smith as their chief. Chief Smith had desk room in the Administration Build[illegible] but his desk seemed to be cursed with wanderlust; in the morning he might [illegible] it in the Safety Office — and in the afternoon, after a diligent search, he [illegible] locate it in another office down the hall.

[illegible] summertime the Guard force had expanded to eighty members, and they had their little office near the Administration Building. A fence had been built around [illegible] yard, and a regular regime set up. The force was headed by a chief, a captain, [illegible] lieutenants, and twelve sergeants.

[illegible] the early stages of yard development their toughest problems concerned the hand[illegible] of traffic and parking, for not only were the roads rutted and deep in either [illegible] or dust, but parking space was scarce. On failing to find a place to put his [illegible] many a man would leave it blocking the road and run for the gate. Constant [illegible]ging was being done on what was eventually to form adequate parking space, but [illegible] the meantime, the guards had their hands more than full trying to settle quarrels, [illegible] the roads clear for traffic and prevent thievery. The stealing of gas, or of [illegible] and their equipment, was common.

[illegible] help them in their efforts to forestall such activities, a guard on each shift [illegible] mounted on a horse. From the saddle he could keep an eye on a much larger [illegible] and could cover ground faster and more thoroughly. A barn was built on the [illegible]hwest corner of the parking lot, and several horses were stabled there.

[illegible] the time of the attack on Pearl Harbor the size of the Guard force suddenly [illegible]ped to 300. Shipyards were a perfect target for the enemy, and it would have [illegible] very foolish indeed not to put forth every possible precaution against suffer[illegible] harm from either within or without. From that time till danger was no longer [illegible]nent, all guards were sworn in as Coast Guard police.

[illegible]e were many interesting personalities in this department. Most of them had [illegible]ice training. Chief Smith was once Chief of Police in Helena, Montana. Many [illegible] them saw service overseas in both our world wars. One of them, a veteran with [illegible] stripes from World War I, got into the fracas the second time and had a [illegible] troyer sunk under him. Not only did he keep himself afloat, but held a comrade [illegible] above water for eighteen hours! Discharged from active duty, he returned to [illegible]onship's guard force and let his son carry on in the service. Another guard — [illegible]scharged veteran back from New Guinea — had several hair raising experiences [illegible] the Japs. Others of the group had previously been cartoonists, musicians, or [illegible]aroos.

[illegible]rally there were a lot of excellent marksmen among the guards, and to raise [illegible] record of the entire force a daily rifle and pistol practice was required. [illegible] had a first class field where they improved their shooting ability. Even the [illegible] guardettes — girl guards who took care of problems that called for the [illegible] presence of a woman — entered these contests. One of them placed second [illegible] competition with the guards and a team of yard superintendents.

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[illegible] during July, 1941, the guards at shops [illegible] fingerprinting all [illegible]loyes. Sergeant R. [illegible] Taylor [illegible] over the work of directing the fingerprinting. [illegible]is was a real task, for besides fingerprinting every new employee, he and his [illegible]ro helpers had to get sets of prints from everyone who was already working in the [illegible]rds. Out they went, carrying a cabinet that contained a roller, ink and cards, [illegible]n on the Ways, into the washrooms, the Plate Shop and the Hold Loft they went. [illegible] the shops the superintendent contacted the foremen and had them send their crews [illegible] to where the guards were at work. Finally every person in the yard had been [illegible]ngerprinted.

[illegible]re were a few who quit rather than comply with the ruling, but the majority [illegible]leased it. They gave serious thought to the guards' statements concerning the [illegible]line of having such prints on record. Not many of them wished to chance being [illegible]ng the 3,000 people who are yearly buried in paupers' graves because they cannot [illegible] identified.

[illegible]re Department

[illegible]til in May, 1941, the danger of fire was so small that a watchman with a portable [illegible]re extinguisher was deemed sufficient protection for each shift. The day after [illegible]e laying of the Star of Oregon and the Meriwether Lewis keels, however, Captain [illegible]ed Day was established as the head of what was to become a very efficient fire [illegible]partment, with a force that grew to include six men who were stationed at headquarters to respond to all fire alarms, and ten men who were assigned to the Ways [illegible]d the Dock to act as fire inspectors and keep the portable fire extinguishers in [illegible]lace and ready for use.

[illegible]e various types of fire extinguishers distributed about the yard were calculated [illegible] control any type of fire that started. Of course there were many water pump[illegible]ns for ordinary conflagrations, and soda-and-acid extinguishers for use in offices. [illegible]en there was the CO_2 type for controlling gas and oil fires which was needed in [illegible]e garage, in vaults, shops, whirley and bridge cranes. For the servicing of this [illegible]tinguisher, dry ice was purchased in blocks and placed in a converter in the fire [illegible]ation. For electric hazards the tetrachloride extinguisher, which is void of [illegible]isture and will not damage electrical equipment, was used unless the enclosure [illegible] too confined. Since it gives off dangerous fumes, tetrachloride was handled [illegible]ly by experts. The foam extinguisher was placed where painters' supplies were [illegible]ot. Because it was not generally known that thinner used in paint is volatile, [illegible]ere was much call for the foam extinguisher. Sometimes a perfectly conscienceless [illegible]ee welder would stand astride an open barrel of thinner and let the sparks from [illegible]s rod shower into the liquid. The resulting flame would send him scurrying for [illegible]fety while someone put the extinguisher to work.

[illegible] December, 1941, the department received a 500-gallon pumper with 2,000 feet of [illegible]-inch fire hose. In 1944 a second fire truck was added to the equipment, and the [illegible]re Station enlarged.

[illegible]e office had two phones — one for general use, and one exclusively for fire calls. [illegible]ones were placed handily about the yard, and pull boxes that sent in an automatic [illegible]rm were to be found near any vital spot. Another device for letting the office [illegible] of trouble was the supervised sprinkling system in which the operation of the

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ihler head automatically set off a signal. For true emergency Captain Day uld use a direct connection that was set up between the yard and the Portland re Department in an appeal for all-out help.

dio

laying of the Star of Oregon and Meriwether Lewis keels was the first big nt of the Oregon Shipyard. The launching of the Star of Oregon was to be a ill bigger event. It was to be Open House day, and the crowd must not be isappointed. Without a public address system the program would not be heard by e multitude, so plans were made to install such a system. A control room was up in a corner of the Mold Loft, and loud speakers were placed at spots where ey would best distribute the speeches and music. The result was so gratifying at the system was retained. The radio crew broadcast every Oregonship launching t three or four. They even set up a public address system aboard the ship so at the captain could talk to the crews on the tugs that picked up the ship and owed it into the Dock. Although the radio system expanded, and new features were dded, the Oregonship radio claimed the date of the first launching as its birth-ay.

ollowing the attack upon Pearl Harbor, radio reception became a matter of vital mportance, and from that time on (with the exception of several Sundays in the ring of '44) an operator was constantly at the control desk. Earl E. Carter, o hired in under Chief Smith three weeks after Pearl Harbor, sat at that desk hrough jittery days and through the placid years that followed, when as a guard eutenant, he broadcast the news, launchings, music and announcements that made the radio operator's routine.

ough the radio operators were guards, Paige Kuchenthal, their supervisor, was electrician, and as a service department they were responsible to the depart-nt they were servicing. In paging people or broadcasting bus announcements they re responsible to the Guard Department; in matters pertaining to safety they swered to the Safety Department; in cases of fire announcements they acted under e jurisdiction of Captain Day; and in emergency due to enemy action they were der the direction of the Plant Protection Engineer.

ring the summer of '42 a little house containing a Plant Protection room and a dio room was erected on top of the old General Stores Building. Kuchenthal and crew were happy about the set up, for the new equipment was complete as any dio operator could ask for. There was a radio desk with a panel for telephone telegraph communication with a dozen vital spots, a panel that controlled the blic address system, and a radio unit for standard broadcasts and listening-in r a short wave band. The public address system was extended and amplified to ch all parts of the yard, and was arranged so a message could be shut off from t of the yard and sent out to the section for which it was intended. News was ayed from KGW, KEX, and KOIN over a leased line.

ut six months after they moved into their new quarters, the radiomen stopped nding upon other concerns for the recording of important events. They built ecording machine of their own. From that time on visits by such notables as sident Roosevelt, Admiral Land and Admiral Vickery were preserved for posterity records made on this machine. The same is true of launchings and special occas-s.

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the most part the work moved along smoothly, but once, during a launching adcast, the sound issued from the loudspeakers in a tumble of stuttering, and ke rolled from the amplifier till the juice was shut off. Occasionally a den emergency shut off the electricity and the operators were forced to switch their own auxilliary plant for power to continue their broadcast.

ough uneasy days when alerts were sent out several times a week and the event- hour that the announcement of D-day was flung out over the yard, the radiomen rd all, knew all, and distributed vital information to their public.

ant Protection

though the yard already possessed guards, firemen and radiomen, during the months llowing Pearl Harbor further safety precaution had to be taken. Detailed protect- on against the results of possible attack was necessary. In case of fires, blocked ads, injured people, etc., trained men would be needed to take care of every phase the disaster.

dd Woodell, as manager of Insurance and Safety, selected Walt Long to be Plant gineer. Long's first move was to set up headquarters right in the Plate Shop, ere he had been working. Then he made arrangements with the Chemical Warfare hool at the University of Washington in Seattle to send down instructors who could hool men on the various types of bombs that might be dropped, the radius of danger, d how to extinguish each type.

trained leaders headed bomb squads that were assigned to protect various sections the yard. A list of their names read like Oregonship's Who's Who. Nor was there hortage of volunteers to man the squads. Crowds showed up for weekly meetings. addition to about 400 units there were five mobile bomb squads with at least ten n to a unit. These squads were assigned to pick-up trucks that would get them mptly to any danger spot in the yard.

ery incendiary bomb unit had sand, water, shovels, and a backpack pump can. There a field inspector whose business it was to see that the barrels were full of nd and that each unit had all its equipment.

the radio room a fire alarm telegraph wire received all air raid warnings emanat- g from the Interceptor Command, and there were wires that relayed those warnings the Swan Island and Vancouver shipyards. Then there were wires to various depart- nts. Of special importance was the line to the Outfitting Dock because in case impending bombings, ships filled with oil were to be cut adrift so that their nflagration would not spread to other ships and over the Dock.

well was the plan for plant protection set up that the department won a special rd — the first given to any shipyard west of the Mississippi.

ety Department

several reasons safety arrangements had to be made before the shipyard had any roll. The state law, insurance provisions, and the general welfare of the mpany (as well as that of the workmen) all demand that such measures be taken.

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ebruary, '41, F. J. Hughes moved into a Lewis Building office and began the rations necessary to establish a Safety Department. Early in May he transred to a similar job for another Kaiser project, and Frank Johnson moved into office in the Administration Building and took over. He found a Safety man ping an eye on yard activities, and safeguards fencing off dangerous spots t the yard. He placed First Aid men on all shifts, and increased the safety pectors to the ratio of one for each 1,000 workers.

the winter of '41-'42, Johnson started an educational safety program, first for inees who were receiving vocational instruction in the Portland public schools, later for the foremen and leadmen. This was so successful that it was adopted other yards. By 1943 there were about 25 local war industries using this program.

soon as the public address system and the Bo's'n's Whistle were set up the fety Department began making use of them for the spreading of safety ideas. cial broadcasts and articles made the workmen safety minded.

rough the safety work carried on under Johnson's guidance the yard's accident ting dropped so surprisingly that the Maritime Commission borrowed him for a year d made him Regional Safety Consultant for all Navy and Maritime yards during 1943 en he returned he took care of all three Kaiser shipyards. H. E. Ahlen, who had ken charge of safety work during Johnson's absence, remained in the capacity of fety Engineer of the Oregon yard.

of the four pieces into which the original Administration Building was cut be- me the Safety Building, housing the Safety Department and the First Aid Unit. It s placed in front of the Mold Loft, in a centrally located position.

the basis of having one Safety Inspector for every thousand workmen, there were on several Safety Inspectors on each shift. They watched for unguarded manholes d openings, insecure ladders, and tools or scrap iron left where they might fall on some workmen.

e problem of properly ventilating ships in which many welders were at work was a ighty one. The new system of building ships meant many more welders concentrated thin a given space, and air circulation that would have been sufficient under her methods would no longer suffice. On the other hand, blowers were not yet well veloped and were hard to get. It took a deal of persistence to obtain permission install the proper number of blowers, but the results proved the necessity and ficiency of such ventilation.

e Safety Department handled claims of injured men and women. A Safety man saw it that their claim sheets were filled out while they were being examined or ated in the First Aid offices. The patient's version of the accident appeared one part of the sheet, the doctor's findings on another, and the Safety man's formation on the third. The completed sheet was sent to the State Industrial cident Commission in Salem. Except for keeping track of time lost by the patient, t ended the Claims Office's connection with the case. However, a welfare worker o belonged to Personnel, but had an office in the Safety Building, notified latives, took care of the injured man's belongings (such as lunch box, tools, and oe clothing) and kept informed concerning his condition.

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The department also issued safety equipment to those who needed it. Thousands of goggles were supplied monthly. Gloves were issued to those who made proper application for them. Life belts, jackets and respirators were distributed as situations demanded.

Another branch of their activity was the janitor service. Offices, lunch rooms and rest rooms were kept clean and sanitary; towels and soap were placed in the washrooms; and plumbing and lighting failures were promptly reported.

The biggest project of all — that of training workers to be thoughtful of their own safety and that of others — was a continuous job because of the yard's rapid change of personnel. Just when Junior had accepted their teachings, away he went to war; so the Safety man had to start all over again, working this time upon papa and mamma, who came to replete the shipyard ranks; then, when the labor shortage became acute the department found itself drumming safety rules into grandpa and grandma.

But it paid. It paid in lives, and in dollars and cents. Though Junior's family were not aware of it, probably they owed their unimpaired condition to the ceaseless effort of the Safety Department.

First Aid

The yard's first effort toward the physical welfare of its people was to have, on each shift, a First Aid man and his kit in a tiny room in the Mold Loft. Only the most superficial aid was given, and if more were needed an ambulance was called, and the patient was sent to a hospital.

By July the yard had grown to a place where more provision was required for injured employes, so on the sixth of the month, Dr. Reike and nurse Gene Carr entered the yard with bandages, tweezers, scissors, aspirin, and a jar of petrolatum. As soon as they arrived they met with Frank Johnson, Safety Engineer, and a claim agent of the State Industrial Accident Commission to lay plans for their work in the yard. Then they went shopping for surgical instruments and equipment.

The following day they set up their headquarters in the Yard Office. Although treatment tables had been ordered, their arrival could not be expected for several days; so across tall horses were placed boards covered with towels. There were no beds, and men who were brought in overcome by heat were laid out on the floor to recover.

Up to that time the shipyard had been strictly a man's world, and as Miss Carr was the first woman to invade it, she was looked upon as a curiosity; but she was accepted, as nurses always are. To her the place was simply a wilderness of sand or mud — and men. She was glad when, soon after, another nurse joined her.

As for Dr. Reike, he was absorbed with plans for a real First Aid Unit — examination and treatment rooms, a surgery, a ward, a laboratory, and an x-ray room. He got all this, and more, when the lower floor of the Safety Building was turned over to him and his fast growing staff.

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[illegible] of the [illegible] which [illegible] injury in [illegible] needs subjected. Some thousands [illegible] inflamed eyes were treated. By [illegible] time the staff included a dozen nurses an average of 500 cases was being handled daily.

[illegible]ions

In the spring of 1941 the west coast was being called upon to aid the country in its sudden need for ships. Both labor and capital were eager to join hands in their effort to meet the demand, and the surest way to merge their aims and keep them co-operating smoothly was to have a comprehensive agreement which both endorsed wholeheartedly. With this in mind a conference was held in San Francisco, and on April [illegible], 1941 a Master Agreement was drawn up and entered into by the Pacific Coast Shipbuilders and the Metal Trades Department of the A. F. of L. and affiliated unions. The agreement covered all new vessels to be constructed for the U. S. Navy, the U. S. Maritime Commission, and for foreign governments with the approval of the United States Government.

In accordance with this agreement employers hired their workmen through the unions as long as those unions could supply the demand, but they were allowed to recruit their own help whenever that became necessary because of local labor shortage. When an employer hired men or women outside the union such recruits were required to become union members within a given time. The company retained the right to discharge, for a reason, any employe sent in by the union. Disagreements were to be settled by arbitration, and there were to be no strikes and no lockouts.

The Master Agreement also set down rules governing the workmen's pay rates, vacations, safety and sanitation, and vocational training. It made provision for the settling of grievances and complaints, and its efficiency was proved by the lack of strikes and lockouts. It was never to be tampered with, but for the purpose of clarification of its provisions a Shipbuilding Stabilization Committee was created. It was composed of representatives of management, labor, and the public, and it acted as the deciding body wherever there was any question of the interpretation of the Master Agreement.

Sometimes it took a lot of finagling to cope with sudden conditions. A good example of this was the emergency that arose at Oregonship when the switch was made from the building of Libertys to that of Victorys. The Victorys required about twice the [illegible]ing that the Libertys needed, and many extra electricians were called for. Electricians were at a premium, but the Boilermaker Union was able to spare a lot of its members as substitutes, and it loaned about 420 men and women to the Electric Department. This averted a shipyard crisis.

To further promote harmony between the employer, employe and union the Oregon Shipbuilders followed a plan that had proved successful in several places. A labor coordinator, selected by the union and paid by the company, was hired to consider the complaints that an employe might feel against either his employer or his union. This was the final touch that made it easy for the labor and industry to join hands in the war effort.

Mr. Nelson, who became Oregonship's coordinator in November, 1942, was successful enough at settling disputes to really enjoy his job. There were some tough problems

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humiliation and some amazing excuses. The office girl received the man and then was ordered into the office. In the office Nelson had his hand full, for he had to listen to a wrathful tirade before he had a chance to sort things out for himself and then to talk to the man. Now and then a man had failed to pay his union dues, the wrong man would get the notice that he had been pulled off the job until he paid up. In the worst storm, and it was easier to let him talk himself out than to stop him, finally the girl would call the union to verify his standing, write him a clearance slip and send him to the Recruiting Office with it, informing him that he could then return to the job with no time lost. If it was a case of dad's being suspended for Junior's carelessness, the lecture Junior received was a good thing for all concerned.

Sometimes Nelson had a real problem to solve, or real trouble to dissolve, but his understanding and sense of humor saw him through to a successful finish. He would say, with a trace of a smile, "I have the only job I know where a man is paid to straddle a fence!"

Recruiting

Because Oregonship was the pioneer shipyard in that locality it acquired all the labor it needed to get under way without reaching out into remote territory. Till the Vancouver and Swan Island shipyards were built there was no manpower shortage. When these two yards swung into production, however, the demand for labor outgrew the supply. With the Manpower Commission's consent, Les Randall, three-yard personnel manager, sent a team of recruiters back to New York in the fall of '42. The 2500 recruited men settled in the barracks at Vancouver and Swan Island, and Oregonship was not affected by the event.

Exactly a year after the Star of Oregon sailed away from the scene of her birth, Oregonship launched a real campaign to build up her supply of workmen. Chick Hanson, as field supervisor of employment for all 7 yards, directed the drive. He sent out, as one of the first recruiters from Oregonship, Vinton Kinkade, who had transferred from the Time Department (where he had entered in July of '41, as timechecker). He left, after a three hour warning, for Chicago, where he and his brother, Fred Pado, tackled the project of finding a place to sleep. They finally wheedled upon a hotel clerk to house them in a linen closet, where the space was such that they had to lay their suitcases on the bed to get in and out of the room. There were 4 employment agencies to be covered that day. Not only did prospects have to be contacted, persuaded, and put on a westbound train, but the railroad had to be notified of needed accommodations, and shipyard officials given full information concerning the time of the arrival and the number of the recruits.

From Chicago Kinkade and Pado went to Tennessee, where they worked one week in Knoxville, another in Chatanooga, returned to Chicago, took in Peoria, Minneapolis, Fargo (wheeling into South Dakota on the wings of a blizzard) Sioux Falls, Watertown and Aberdeen. They followed that jaunt with one-day stops in Des Moines, Council City, Centerville, Creston, Shenandoah and Omaha before heading back to Minneapolis.

This was merely a sample of a recruiter's life. Fifty hours a day was a good average from a week's stop-over in cities and overnight pauses while beating the brush.

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[illegible] week ending December 15th, '42, brought the Oregonship 75 men, and the [illegible] ending January 21st, '43, saw 130 recruits start work. About that time an [illegible]ort was made to recruit men from Oregon and Texas. It failed to get results [illegible] largely because transportation was not arranged for. Then recruiters were [illegible]ld to offer transportation upon the man's signed promise to pay back the amount [illegible]volved, at the rate of five dollars a week. Prospects were advised about the [illegible]k, pay, and the rent in the housing district; and they were required to pass [illegible]gical examinations before they were signed up. The need of workmen increased, [illegible]d by the fall of '43 there were 74 recruiters combing any localities that the [illegible]power Commission permitted them to cover. (This recruiting was for all Kaiser [illegible]dyards on the west coast, and Oregonship received only her share.) There were [illegible]n six women recruiters who, having been welders themselves, were signing up [illegible]en who agreed to become welder trainees.

[illegible]ruiting did not stop with the arrival of the workers in Portland. Each ship-[illegible]rd had a representative who met every train, gathered up his yard's recruits, [illegible]ranged to have their baggage delivered, then took them to the U. S. Employment [illegible]vice for tickets of availability, got them fixed up with their unions, and [illegible]ally deposited them upon their own doorsteps. Families were also met and [illegible]red for. During a recruiting siege the Oregonship guides had to meet and look [illegible]er from fifteen to twenty five families daily.

[illegible]eeting a group of bewildered mothers with a lot of travel-worn children and [illegible]lping them to establish themselves in new homes was a job that required tact [illegible]d experience. Stories concerning these strangers in a foreign land were often [illegible]nny, sometimes pathetic. Worried workmen make half-hearted employes, so the [illegible]pany did all it could to help the newcomers to become adjusted to conditions. [illegible]pecially it concerned itself with getting them properly housed.

[illegible]duction Classes

[illegible] the spring of '43 the labor shortage was serious enough to make it imperative [illegible]t every worthwhile man and woman who hired in should stay on the job; yet many [illegible]comers, bewildered and discouraged, wanted to quit before they had given the [illegible]pyard a fair trial. Someone was needed to establish a feeling of loyalty betwe[illegible]en and their employer, and to sell them on the whole enterprise.

[illegible] this reason induction classes were established. Every morning the new hires [illegible]e ushered in to learn from the Induction Training Supervisor the ins and outs, [illegible]dos and don'ts of the shipyard. Maps and pictures were discussed; the Safety [illegible]lding, with its First Aid services, was pointed out; the significance of badges [illegible]time cards was explained; the relationship of crew members to their leadman [illegible] foreman was made clear. The class was warned against absenteeism, or against [illegible]ing to work under the influence of liquor; and they were told bluntly that they [illegible]ld be fired if they drank on the job. They were informed fully about the [illegible]onnel Department, with its housing, transportation, gas rationing and shoe [illegible] service. They were told about vacation, transfer and clearance rules, and [illegible]heir right to appeal to their unions if they felt that clearance had been [illegible]stly denied them. They learned of the shop stewards who were there to take [illegible] of labor problems, and of the Labor Coordinator, Ed Nelson, who was paid by [illegible]onship to mediate between the workmen and their union. The talk was mostly

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in a light vein, and was calculated to establish a feeling of fellowship and confidence.

Near the close of the class the Induction Training Supervisor took the men into his own office while women remained to listen to the woman counselor discuss matters of interest to them. She stressed the importance of safety in dress — clothing that would not catch fire or get tangled in machinery, shoes that would protect ankles and afford good footing, hair tied up closely, and helmets worn if occasion warranted. She advised hot baths to induce relaxation and sleep, and a nourishing breakfast to prevent "macaroni legs" as the morning wore on. She emphasized that the counselors were there to befriend them.

Vocational Training

Before the first keel was laid at Oregonship, plans were being formed to supply the yard with skilled labor. With the aid of the Oregon State Employment Service the shipyard officials had reached an estimate of requirements for such workmen. For years the public schools had been growing increasingly interested in vocational training, and it was decided to place in their hands the job of training men for the shipyard. So, under state supervision, and using federal funds, the public school system set up a preparatory training for skilled arts.

This only partly answered the needs of Oregonship. Because they were employing a lot of welders who needed further training, in June, '41, a committee from the State Vocational Office met with Todd Woodell and agreed to promote special training for employes of the shipyard. Other craftsmen needed training also, so the War Production Training Agency hired foremen as evening school instructors in shipfitting and blueprint reading. This move proved so satisfactory that a Portland school gymnasium was converted into a mold loft floor to further train loftsmen. Classes for pipefitters were also held.

There was still a shortage of welders — especially good ones. The men who were hiring in needed instruction — lots of it. J. W. O'Brien (a leadman-instructor who served through later years as a welding school supervisor) found a set of fuel oil pipes that blossomed forth with 24 leaks out of 27 welds! As the job had been done by several workmen, it emphasized the prevailing need for a welding school within the yard. Pipe welding, always tricky, often presented special problems because of inconvenient surroundings. Al Spiska, a pipe welder who became an instructor, often thought back to days when he had to climb up on a hold's batten boards to get at various pipe welding jobs.

So the shipyard set up a school of its own. In a shed east of the Plate Shop it installed 40 welding machines and a number of qualified foremen and leadmen who were paid to stay after hours and teach welders who wished to improve their knowledge of the craft. Pipe welding was taught as well as plate welding. The classes were two-hour periods held just before and after each shift. During the first 8 months almost 3,000 welders participated in this enterprise, and the quality of the welding done upon the ships was vastly improved. As instructors frequently had members of their own crews in their classes, they could raise the standards of their own men. The cost of teaching, supplies and the wages of the instructors were paid by the War Production Training Agency, from federal funds.

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February 1942, classes for training leaders and foremen as instructors were inaugurated, and they were taught how best to present the material they offered their pupils. This made the classes for the journeyman or helper still more effective, and in the next 8 months 18,000 people participated in various training courses.

Despite of this the supply of welders did not nearly equal the demand. Two innovations resulted. First, it was arranged to pay welder trainees .95 cents an hour; second, as there were simply not enough men available, the school sought women trainees. Women responded rapidly to the call, till they reached a point where 75 percent of the trainees were women. While the school for trainees was building up, instruction for voluntary training declined. Only those working toward promotion kept on with such study. When the shipyard had obtained the employment level it wished, all classes except those for welding instruction were discontinued. The shipyard, grown up, felt that school days were over. They had what they wanted, and they felt prepared to hold onto it.

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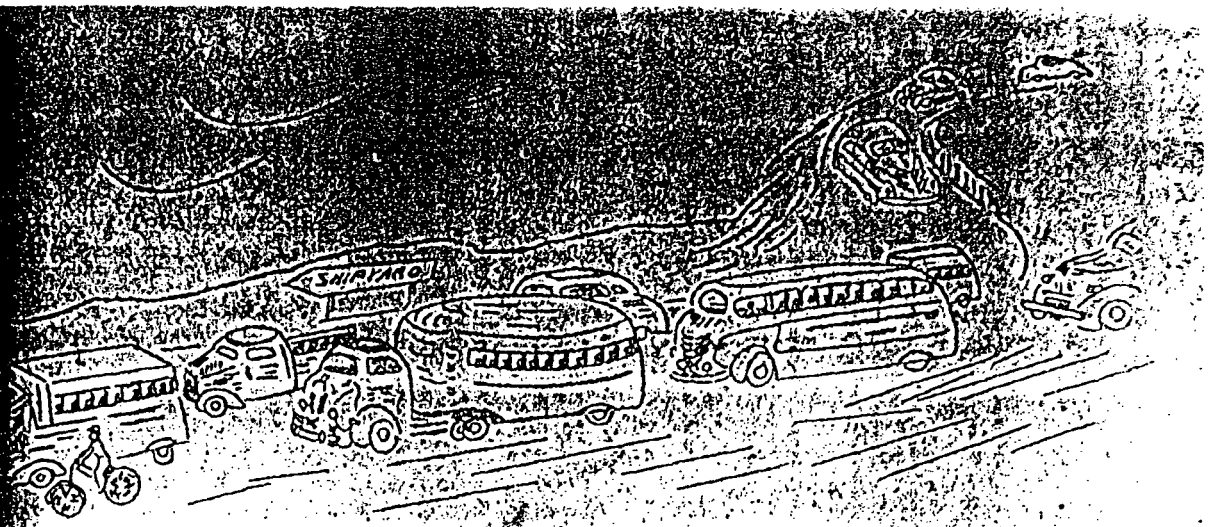

MERRILY WE ROLL ALONG

CHAPTER VIII

Multitudes here, and more coming! Every train brought in throngs of them, homeless, and with no means of getting to and from their jobs. Personnel offices covering transportation, housing, and rationing problems were adrift in a tide of effort to take care of the newcomers. The situations ranged from humorous to pathetic, and sometimes it took the concerted effort of several departments to solve them.

Ralph Collett, who had been with Kaiser enterprises on previous occasions, took hold of the problem at this point, and formed Transportation and Housing Departments.

On February 18, 1941, the Oregon Shipbuilding Corporation hired a crew of 8 laborers. They got themselves to work, and their transportation was no affair of the company. The trickle of men who followed came in their own cars and parked them on the gravelled shoulder of the road that led down across the swampland. This still left the workers stranded at a halfway point, and every day the street was dotted with men trying to thumb their way.

While the shipyard's need of men was increasing by leaps and bounds the gas and tire situation was becoming critical. It was soon apparent that something must be done about bus transportation. So the Portland Traction Company was approached. Could it offer transportation to groups of workmen scattered about Portland? The traction company thought it over. They had only 118 busses to answer city needs. They finally bought 25 new busses and resurrected 4 discarded ones. These arrived at the yard with men going to work and left with those coming off shift. This gave solved the problem for a short time only. Soon the shipyard and the men who wished to sign on for work were clamoring for more transportation facilities.

In October, 1942, the Maritime Commission stepped in, bought 120 busses, and turned the operating of them over to the Portland Traction Company. Soon a network of bus routes spread across the city to converge at the shipyard. Still later semi-trailer busses of 75 passenger capacity were added.

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At this time Swan Island was making heavy demands upon the bus service, also. In order that the same busses might serve both yards, their shifts were staggered. Swan and Oregon shipyard shifts went to work two hours later. In this way 164 busses were able to do the work of 267.

This greatly increased number of busses created a new problem for the shipyards. Where in the world would they all park while unloading one shift and loading up another?

At that time there was little supervision of cars as they arrived and left. Drivers fought for parking space, private cars tangled with each other and with busses. Fenders were crumpled and radiators were battle scarred. No car could expect to remain respectable long in shipyard traffic.

The dredging, filling and gravelling of additional parking space had been going on for some time. Now it was rushed. The area was flooded with lights, and bumper logs were placed to mark off the boundaries. When it was finished the entire parking area covered 29 acres and contained room for parking approximately 4,000 cars.

Meanwhile shipyard guards were assigned to direct the stream of private cars, and the traction company's division superintendent placed inspectors to dispatch the busses.

One more effort was made to simplify traffic. A ferry run was established between west Portland's Front street and the shipyard. Busses on the west side were scheduled to run their passengers down to the ferry, which would transport them to the yard. The ride was pleasant, but slow, and not truly successful. After several months of trial the plan was abandoned, and busses once more brought their loads directly to the yards.

The distance daily covered by the traction company's busses in transporting Portland people to and from the Oregon and Swan Island Shipyards equalled 6,000 miles, and the gas used amounted to approximately 1900 gallons!

As the traction company officials stopped worrying about the shortage of busses they developed a brand new headache. It was the shortage of drivers. Some had left to go into the service, others had hired into the shipyards because of the pay rates. Finally, the draft that took every able man under 26 thinned the driver ranks till the company would have had protesting throngs demanding transportation while their busses stood idle had it not been for women. Women who possessed a knack for handling cars answered the company's SOS for drivers. They flocked in, learned to pilot those big busses, and took regular runs. By the summer of 1944 a good proportion of the shipyard busses were driven by women.

At first these women drivers had a prejudice to overcome. Not only men, but women would peer into a bus, mutter, "A woman driver!" and pass on. When the men-driven busses were filled the rest of the passengers had to ride with women drivers. Nothing unpleasant happened to them. They arrived at their destinations right side up and unimpaired. Gradually they learned to judge women

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drivers as they judged men — by their individual merits instead of their sex. Old facts show that women bus operators actually had fewer accidents than men, but they were not as regular. When women coming off of a shift had to crowd into three busses instead of their routes usual four it was more apt to be that a woman driver failed to show up than that a man was absent. Although the transition company might have resorted to aspirin because of this fact they paid ready tribute to the women who stepped in and successfully manned driverless busses.

"They saved the day for us," the officials admitted. "We could not have carried on without them."

Another indication of wartime stress was that the Office of Defense Transportation had ruled that the shipyard busses must be well filled. As many passengers began leaving the bus before it had traveled far, and no new riders were picked up, this meant that when it left the yard the bus should really have some standing passengers. It was discouraging to a man or a woman who had put in a heavy shift to have to stand during part of his ride home, but he rarely had to stand long, and he generally accepted it as just another wartime inconvenience.

There were usually several busses covering each route that lay within the city limits, and riders picked their busses according to the driver at the wheel. They learned to prefer a particular man or woman driver. As a result the same crowd commonly rode a bus, and a spirit of companionship sprang up. They exchanged department gossip and news, and there was a good deal of bantering:

"Hey, Goldie, I hear that you love your work so much that you tried to spend last night in a deep tank."

"Oh, yeah? If I could only locate the so-and-so who blocked the exit with that blower, I'd weld him to the dock!"

Or:

"Say, driver, Viola wants to know, what color are your eyes?"

"They have been black, at times."

Some passengers were given to beefing, some to dozing, some to running the war and government, but on the whole the bus ride was a rather pleasant feature of the job.

Meanwhile, the Transportation Department, under the guiding hand of Wayne Taylor, was making every effort to furnish private cars with riders, and prospective riders with rides. There were 2500 private cars making daily trips to and from the shipyard, and many times that number of people needing rides. Riders and drivers were scattered over a wide area, and it was often difficult to group them properly. It took careful listings and watchful waiting on the part of the office staff. They struggled valiantly, for gas coupons were not obtainable unless the driver's car carried several passengers; and if neither

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the driver nor the people who might be riding with him could get to the shipyard, a number of potential workmen would be lost to the cause.

Due to war conditions the Oregon law that forbids the driver of a private car to charge for hauling passengers was blithely overlooked. Frequently cars were checked as they left the yard, and if they did not carry several passengers an inquiry was made. Gas permits were sometimes revoked.

What of the men and women who wanted to work in the shipyard, but who couldn't drive, and who lived too far from the bus terminal or its route to take advantage of bus transportation? Sometimes one man with a truck carried riders, and sometimes several men formed a cooperative group that invested jointly in a bus or a truck. Some of these vehicles traveled an amazing distance. Workmen from Salem made a round trip of 120 miles a day — more than 37,000 miles yearly!

One Gaston farmer who made the venture on his own had an idle pick-up truck. He also had neighbors who needed transportation to the Oregon Shipyard. So he erected walls and a roof over the truck's pick-up body, built a seat along each side, bolted down a small brooder stove in the center of the floor, and began hauling a dozen men to and from work with him. His charge of fifty cents for the sixty mile round trip would have let his venture pay him a neat profit if only the turnover among his riders had not been so rapid, and if they had been more regular with their trips. Too frequently, however, the hauling of only six or eight men pared the financial margin so thin that the enterprise turned out to be worthwhile mostly from a patriotic standpoint.

There were many other tribulations. Although the stove was too firmly anchored to joggle around when the going was rough, its lid had an annoying way of teetering around till it slipped through the stove top and plopped itself into the firebox. Immediately great clouds of smoke would billow forth, much to the discomfort of the passengers.

Then there was the responsibility the driver shoulders for getting a group of men to work every day, and getting them there on time. Before time clocks were installed a man who entered the gate one minute late was docked thirty minutes — which really amounted to forty-five minutes because of the time-and-a-half loss. Forty-five minutes lost by thirteen men meant a sizeable sum — enough to worry a driver considerably. Then came the matter of upkeep. No car would travel 45,000 miles in two and a half years without needing a good deal of attention, and the tire situation meant patching, recapping — and flats. Flats have always had a way of selecting inopportune moments for their visitations, and they seemed to take special delight in appearing when this group had got off to a late start. One such time nine desperate men, all working feverishly, jacked up a truck, fixed a flat in slightly over four minutes, and galloped triumphantly in through the gate a jump ahead of the whistle.

As Mark Twain remarked, nobody does anything about the weather. Like many other rural groups, this one traveled over a road that wriggled down many steep grades that became dangerous at the slightest provocation. Early in '43, an inch of dry snow conquered three large busses on the Germantown Road and left them

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Boldly straddling the roadway at angles that blocked it, about forty cars were held up for some time. The farmer from Canton, starting his riders walking, finally squeezed his car past the busses. Down the hill he coasted, skidding around a curve where the treacherous bank had already dumped one car upon its nose in the snow, and finally coming to a doubtful stop at the foot of the grade. Picking up his crew he finished his journey and deposited them only ten minutes late. The men were too happy about arriving in good shape to mind being docked that morning. Another snowy day they started their trip at 6:30 and arrived at 10:30, after trying three different roads.

Both the privately owned and the co-op busses boasted a wide variety of sizes, shapes, and colors. They ranged all the way from school busses to a sort of chicken coop set down upon a truck bed, and they illustrated the urgency of the times. Often the only entrance was a back door with a short ladder to encourage the passenger who desired to enter. Sometimes this door represented the chief arrangement for air and light. In such cases it was left open as the car traveled unless the weather was severe. Benches were set up for the occupants, but the car was often so crowded that half of the men were sprawled on the floor, dozing in uncomfortable tolerance. It was all a part of the strange shipbuilding venture they were experiencing. Often a patriotic note was evidenced by the name the bus bore. One proudly flaunted the name, "MacArthur Victory Club", another, "The Shipbuilder", still another, "The Defense Workers' Association". One vehicle expressed its sentiment in a red, white, and blue finish.

There were even several dignified hearses which had been pressed into service. Their riders claimed they never traveled better, for the cars were comfortable, light, and well ventilated. The passengers in one of these hearses laughed heartily at the goggle-eyed curiosity of people they passed on the road, and related with merriment how one office girl who frequently brought an armful of posies to brighten the room where she worked would draw forth such exclamations from the occupants of other cars as "Look! Flowers, 'N everything!". One of the drivers told of how a neighbor, calling about his habit of parking the hearse in front of his home between shifts explained,

"Neighbors who know that I have been ailing think that thing is out in front because of me, and they call our house to offer sympathy!"

Housing

Although transportation problems predated those of housing, they were no harder to solve. The providing of living quarters for recruits led to building projects such as Portland had never dreamed of. The placing of those newcomers in suitable dwellings was handled by the same department that was handling transportation.

At the outset of '41, "For Rent" signs were as common in Portland as street lamps. Slowly but surely these signs disappeared. Shipyard jobs were attracting outsiders as a magnet draws steel. By the beginning of '42, people were actually house hunting, and by summer, full-page ads were appearing begging home owners to fit up any spare room to accommodate some shelterless stranger.

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When the Federal Public Housing Authority sprang into action, North Portland had vacant lots that could easily be utilized, as sewers, water mains and lights were already in. So on these lots, known as the Dartrell Units, the first defense homes were erected. This was followed by a string of projects: Columbia Villa with 400 units, Parkside Homes with 260, Fir Court with 72, St. Johns Woods with 967, Hudson Street with 118, and several others. These were all single or duplex Houses.

Meanwhile the shipyards were trying to house single people by hiring girls to canvas sections of the city urging residents to make room for a renter, and preparing to meet the clamor for apartments by building University Homes with the 2,000 apartments for small families.

All this seemed like a drop in the bucket as an answer to housing needs. So Henry J. Kaiser took the contract to build Vanport for two dollars, and Vanport, the second largest city in Oregon (with nearly 10,000 apartments — 4 to a building, its own shopping centers, hospital, police station, schools, playgrounds, and library), was started late in August, '42. It took 14 months to complete the project, but the first family moved in the 12th of December of that year. Many of the first families were desperate for living quarters. In one case, a man, his wife, and half-grown daughter had been living in one room and sharing one bed for three months!

Except for large families (for whom there never was enough provision made, even though East Vanport was built to accommodate them) this more than took care of family housing.

The first provision made for single men occurred when the barracks were built at Swan Island during the first recruiting campaign that brought single men from New York in the fall of '42. Later, the Riverside Dormitories, built nearby, housed 2,000 more people. Oregonship held its first recruiting campaign that brought single men from New York in February, '43, and the following month it housed the arrivals in Vanport.

Oregonship needed special provision for single employes. So, in February of '43, plans were made to build barracks northeast of the yard. Before work on them was started, the National Housing Agency asked that instead of barracks (which housed many men in one room) dormitories would be built. The contract was let in March, but because no dredges were obtainable it was July before the filling was started. The project was Maritime owned and reimbursed, contracted to Oregonship, and sub-contracted and operated by J. H. Luihn and William Arndt. The first completed units received occupants January 9, 1944, when 300 men and women moved in. C. C. Codding, who left housing problems in Vanport to take charge of the dormitories, organized the various enterprises into one smooth running unit.

The dormitories were long, one-story buildings, with eighteen rooms on each side of a hall that ran between them. At the end of the hall was a reception room for guests. Each room contained two beds and enough furniture to make two people comfortable. Each building had a bathroom with tub and showers, and the two units that housed women had laundry trays.

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The residents here had many advantages over the average city dweller. For one thing, they could get ready for work, drop in at the mess hall for breakfast, and walk over to their jobs in a fraction of the time needed by a downtown resident. Then, when the mood hit them, they could be inside a gymnasium, a recreation hall, a postoffice, a store or a barber shop within a minute or so after leaving their rooms.

The mess hall, where an average of 4,000 meals were served every 23 hours, offered meals to the owners of meal tickets for 50 cents, but the charge to outsiders was 65 cents for week days and 85 cents for Sundays. As they entered, diners were directed to tables set for ten or twelve people apiece. Food was there in variety and quantity, and people ate as much as they wished.

Opening off the dining room was the kitchen, with its huge ovens where 4 or 5 bakers daily turned out 400 pies, 42 cakes (18 by 24 inches) and 2400 rolls. One and a half tons of flour were used weekly in that kitchen. Nearby were huge electric kettles -- an 80 gallon soup kettle, a 50 gallon vegetable kettle and a 40 gallon gravy kettle. Each kind of food had its refrigeration room -- even frozen foods, where the temperature was 12° below. From the dairy products room 300 gallons of milk and over 8600 eggs were used weekly.

Chef Henry Fromm, who planned the meals, had a staff of from 150 to 200 helpers. There was also a purchasing agent who bought the food, and a chef to supervise each shift.

The gymnasium, nearby, offered an opportunity for basketball, indoor baseball, table tennis, boxing, etc. An instructor or two were always on hand to supervise games, to lend balls, gloves, bats, etc. to the players, and to rent tennis shoes and towels. There were showers for men, but the women, even on ladies' night, returned to their rooms to freshen up. Dances for both swing and day shifters were held frequently, and Bob Bateman's orchestra (made up of shipyard talent) played to crowds of 900 to 1,000.

The main room of the recreation hall contained 15 pool tables, a bar where soft drinks, reading materials and toiletries were sold, and a postoffice that offered every service that city postoffices offer. Other rooms included a lounging room for reading and writing, a dry goods store, a three-chair barber shop, shoe-shine service, and a laundry service room.

Across the way was the fire station with its fire truck and the two firemen who constantly attended it. Beside the fire chief's telephone was a record of resident men who were available for call on certain shifts. So the project was amply protected against fire hazard. The fire station was also the headquarters for the two deputy sheriffs who were on duty for each shift.

In his effort to make dormitory residents consider the place their home Codding had many problems, for all kinds of people were thrown into close contact. In pairing off roommates his office staff tried to select those with similar habits, and when they failed to get along the management quickly transferred them to other rooms and other partners.

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took firmness and diplomacy (and occasionally [illegible]) to enforce the ...ings, but most of the tenants were content with their surroundings, and their ranks were constantly augmented by men and women who moved out of dormitory quarters to seek the economy and convenience of the Oregonship dormitories.

...k in the summer of '42 Oregonship set up a Housing Department to help its employes get properly located. They had an office in the Service Building where housing applications bearing all necessary information concerning the housing needs of the applicant were filled out and sent to the Portland Housing Authority. When a place that answered the requirements on an application relocated the Oregonship Housing Office was informed, and they, in turn, relayed the glad tidings to the prospective tenant. Thousands of hours that would have otherwise been spent by employes in house hunting were devoted to the job at the shipyard through this office's services.

...ward Young, who had been busy housing single recruits from New York, joined Oregonship's Housing Department soon after it was established, and remained to direct its activities through the successful years that followed. He handled a wide variety of problems, some headaches and some inspirations. He reasoned with people who demanded more room than housing authorities would allow them, and he said a firm "No" to parents who wanted to stack children three or four to a bed. Sometimes he had to talk folks into temporary quarters, then talk them out of those quarters when proper housing was ready for them. It was, he observed, a job with few dull moments.

Between October, '42, and October, '44, this office handled over 15,000 applications for housing in Federal Public Housing units, besides helping out in numberless cases that involved private listings.

When gas and tire rationing started, in the fall of '42, the OPA demanded that any plant employing 100 or more people establish a plant transportation committee to certify supplemental mileage applications for the OPA's approval. So Oregonship's infant Housing Department took on the added duty of screening applications for extra gas or tires before sending on such applications to the OPA.

Not content with all these activities, the department took on another. It accepted and relayed to the OPA applications for work shoes, and, in the case of safety shoes, it issued them immediately upon request.

When ships were turned out in record time this department could feel that through all hours saved, it could claim a good share of the credit.

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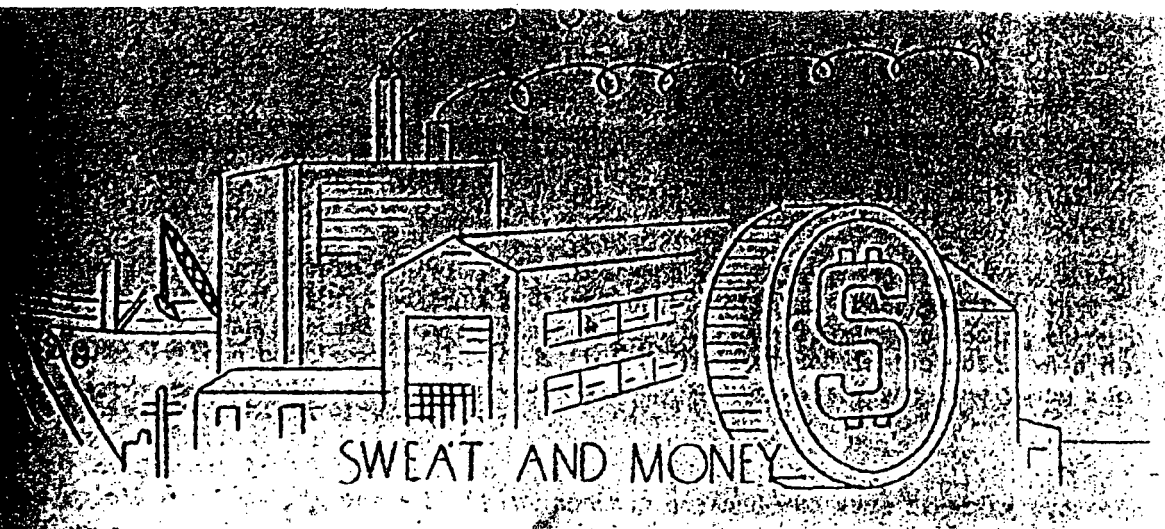

CHAPTER IX

at manner of people was it that casually accepted the tumult and grime of the hipyard as a natural part of their lives? Were they different from other mortals, r did they start life as normal human beings only to develop into freaks? Were hey patriotic heroes, or adventurous renegades? Were the rumors of riotous iving and broken homes true?

taid citizens on the outside looking in were puzzled by the men and women who aily entered the shipyard, sweat through a shift of uproar and toil, and emerged, ishaveled and streaked, to crowd the busses and stores as if they owned the earth. hy didn't the shipyard gang at least wash their necks before they swaggered forth nto a gentle world?

uch reaction was natural, but amusing. Certainly as they came from work shipyard olks were amazingly dirty, and many of them swaggered. Helpers and journeymen ade from around $.95 to $1.40 an hour — and they didn't get paid for keeping lean. They would have been accepting money under false pretenses if they had anaged to be presentable at the close of a shift. Not a minute did they have to ash up between the blowing of the whistle and the pulling out of the busses, and hen a worker — especially a feminine worker — was forced to appear in utter inginess among well groomed people, what defense did she have but an indifferent agger? It was her way of saying, "Sisters, I may look like a menace to society, ut give me a chance to clean up and leisure to strut my stuff, and I could hold own with any of you!"

he personnel of the yard ranged from brains without brawn to brawn without brains, ut there was no dearth of people with both. They hailed from all over the nited States, and their goals in life were as widely separated as their birthlaces. The urge that brought many of them was patriotism, but to others it epresented the paying off of a mortgage or the amount of liquor that a paycheck ould cover.

ong them was the lithe, quiet woman, who, having a brother seriously wounded Guadalcanal and a 17 year old son in the Merchant Marines, had to get into the

SCHN00317795

nt herself. She released a man directly by hiring out as a rigger, ric
ually handled steel, and her special pride was that the men with whom she
rked called her the "Rugged Rigger", and insisted that she did a man's full
re of the work.

ere was the spry little man with the excellent vocabulary and the broken accen
o maintained that he hailed from Indiana — but admitted under pressure that
s birthplace was Holland. He complained that the winter winds sweeping throug
e Assembly Shop chilled his old bones, but he had a catch in his voice when he
lked about launchings, and he lifted his chin as he told of the fine young son
o had entered the service.

ere was the girl welder whose language was shocking, but whose spirit matched
e spirit of '76. The three brothers and the husband who were fighting overseas
st have been proud of her, for during the special rush in the fall of '43 she
elded straight through seven weeks without a day off, and the only time she
issed was an early checkout taken in order to donate blood.

ere was the old salt who talked of ships he sailed in his twenty years at sea,
en boasted of the hand he had in building ships in the Kaiser yards. He would
x profane with enthusiasm over the beautiful, speedy Victorys, and over the
se with which the Transports could be converted into cargo ships after the war.

ere was the warehouseman who was putting away every spare dollar into a little
rm where his youngsters could grow up properly — with maybe a pony to ride,
d pets to care for; the mother who was sending a crippled son through college;
e girl who was saving toward the home she hoped to share with a soldier husband.

en, of course, there was the father whose shivering children locked the door
on him when he came home roaring drunk, and the grandmother who was discharged
r being tipsy on the job. Unfortunately, shipyard wages attract Boozy Bens
d Blowsy Berthas.

vast majority of workers, from transients to professors, were warm hearted,
showed a ready concern for the misfortunes of their comrades. Very few workm
led to respond generously to collections taken up for some unfortunate who had
n stricken by disaster.

ing the day shift lunch period, while music was broadcast from loudspeakers, men
women enjoyed the company of gulls that congregated to snatch up scraps
om from lunch pails. Even rats were fed in spite of warning protests issued
the Bo's'n's whistle. Friendship, relaxation, music and food combined to make
workmen act upon mood rather than logic.

did they overlook the opportunity to profit by being thrown together. Many
ty dweller, as he left the yard at the end of a shift, had a pint of cream
his pocket, a dozen eggs or even a chicken under his arm — while the jeans
he farmer who trudged beside him contained money collected for that produce.

es are human. For the most part there was a feeling of friendship and loyalty
een a leadman and his crew. Most foremen and leadmen honestly tried to place

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ir men where they could do their best work. If one of the gang offered a
dical reason for wanting a change of location, his superior usually transferred
. When a crew member needed a sympathetic ear or a shoulder to cry on, the
dman often supplied it. Frequently he cooperated with a counselor to solve
oblems.

leadman uncovered what was probably the prize story to come from the shipyards.
of the best members of a crew, after six months of steady employment, sadly
uested a quit slip. He would have to stop building ships, he stated, and find
job that paid money. Then the leadman discovered that the fellow had been livin
his wife's earnings, and that, believing shipbuilding to be a patriotic enter-
ise, he had considered his work a contribution to the war effort. The checks
at had been presented to him weekly he had thought to be certificates acknow-
dging his participation, and he was practically overcome by the amount of money
ose accumulated "certificates" represented.

for quit slips, they bore a wide variety of sentiments. One gem announced as
ason for a man's quitting, "Don't like the leadman or the foreman; don't like
e crew; don't like the weather — in fact, don't like the damn shipyard!"

ost of Oregonship's employes had a loved one in the service. Let someone grumble
out the hole Uncle Sam made in the paycheck and a dozen would protest, "What
e hell! You are left with more than $50.00 a month, aren't you? You have a
ttress under you at night, don't you? You're not getting shot at, are you? If
e kids can fight this war we can at least partly pay for it!"

e same line of reasoning was prevalent when the subject of bonds came up. A
gular percent of their paychecks was already devoted to the purchase of bonds
cause bonds meant a safe investment and a sure way to save money, but when a
ive swept through the shipyard they bought an extra bond or two, or raised their
ekly deductions, out of patriotism. It meant putting off buying a new suit or
tting down on spending money, but the thought of the boys overseas made such
rifices seem trivial.

e average weekly paycheck was around $60.00, but after bond deduction, withhold-
g tax and social security sums were subtracted the workman had about $43.00 left
cash in. Of this $16.00 went for food for himself and family. Due to the fact
at so many families shared their homes with others the average rent was only $7.
othing took $5.00, fuel $3.00, and medical care $1.42. This left only $4.40 for
scellaneous expenses and recreation. Had not the Bond Department gained his
rmission to deduct a certain amount for the purchase of bonds it is probable that
ey he had intended to invest that way would have gone to augment the miscell-
ous expenditures. Certainly the average workman saved very little besides what
put into bonds.

employes showed a keen interest in events and achievements within the yard.
ey never grew immune to the thrill of a launching; they eagerly scanned the
'n's Whistle for news and pictures of companions; they enjoyed shows staged
fellow workers; they had lively arguments over news broadcasts, and they whistl
they strode along to the music of the loudspeakers. They laughed, swore, fought
loved much as people do all over the world.

SCHN00317797

broken homes there were. Some of them would never have held together anyway. Others dissolved because a small community couple had suddenly looked upon horizons of which they had never dreamed, and were dazzled by a new and intriguing sort of person. Those were the cases of which the community heard. The divorce announcements and advice columns were full of them. Rarely was the public's attention drawn to the brave couples who worked side by side to produce the ships that would carry supplies to the gallant youngsters they had given their country. Or did they hear of the couples who were triumphantly supporting themselves in spite of age or physical handicaps while their children or grandchildren were unable to contribute financial aid because of the size of a service man's check. Sometimes Junior, not quite old enough to go to war, worked beside them. Thousands of homes were more closely knit by the family's war effort. As one of the counselor's put it,

"People are what they were before they came here."

On the other hand, many legitimate romances sprang to life in the shipyard. The Bo's'n's Whistle was never without a wedding or two to give its columns a rosy touch. Cupid wasted no time ensnaring veterans who found work at Oregonship. Hardly had they begun drifting in before romance entered the picture. It seems that even girls with highly paid jobs still prefer the kitchen sink.

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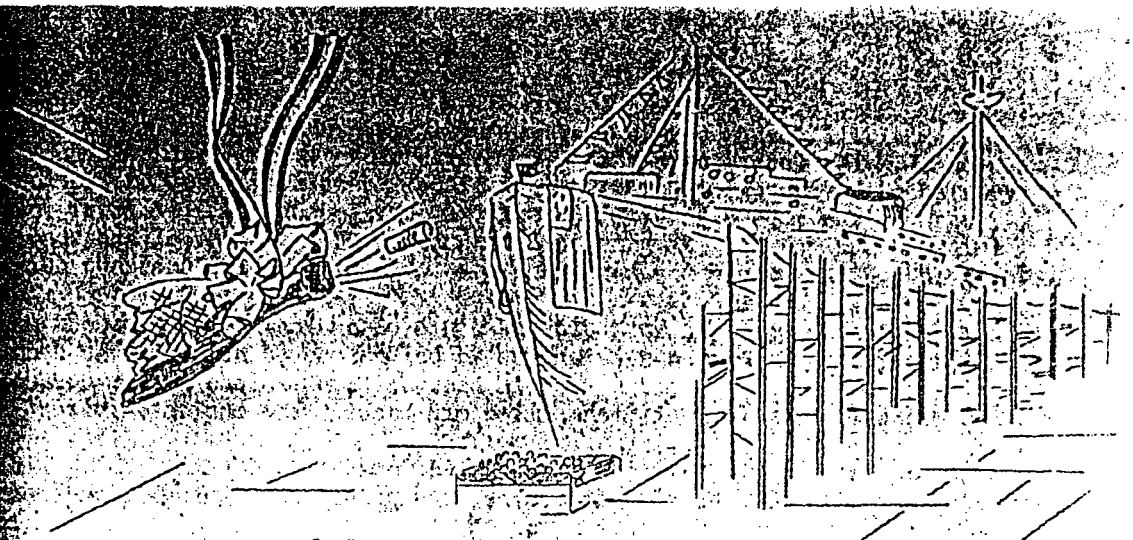

SOCIALLY SPEAKING

CHAPTER X

uring the summer of '41, while shops and buildings were solidly rising where a ew months previous ash and willow had dipped their toes into the edges of duck ponds, Bertrand Blueblood and John Jones toiled side by side. It was heavy, irty work, but it was a great adventure for both of them. They climbed upon a ils of steel during the lunch hour and exchanged accounts of their experiences. hey began to talk of how Mrs. Blueblood and Mrs. Jones were helping the Red Cross round up and mail bundles to people in war-torn nations. Meanwhile, the two omen were enlivening their tasks with anecdotes of their husbands' accomplishments. With widely separated interests suddenly thrown into the mixing bowl of r effort, something was needed to answer the urge of the Bluebloods and the oneses (and the O'Tooles, the Steinbocks, the Venettis and the Olsens) to know ol about each other.

he first attempt to meet this need resulted in a small shipyard magazine. Edgar aiser must have had some such development in mind when he brought C. B. "Chick" ohnson down from Coulee, for not only was Johnson an old hand at personnel work, was experienced at newspaper work. At Bonneville he had edited The Spillaway, paper for all the major contractors. Although his first work here was as a pervisor of employment he was soon handed an additional assignment.

out three months after his arrival, as Edgar Kaiser, Todd Woodell and he were ying lunch together, Kaiser suddenly asked him when he was going to start up a dpyard paper. Johnson swallowed a gasp and replied, without batting an eye,

t's as good as on the street." Then he asked, "What about a name for it? Shall have a contest?"

o", was the answer, "I've selected a name. It's to be the Bo's'n's Whistle."

SCHN00317799

the Bo's'n's Whistle it was. About a week later a modest little magazine, mmed with shipyard news and sketches, made its appearance. With Johnson as editor and Joe Elvers as the staff artist, the Whistle proved to be very pular from its first issue. By the time the Star of Oregon was launched ousands had learned to look forward to receiving it, and for that special casion thousands of extra copies were published and handed out to the guests.

ring the ensuing months the Bo's'n's Whistle took on proportions that made it od much of a project to be handled by anyone with a load of employment problems; Johnson made a choice which severed his connections with the publication and th Public Relations that placed him permanently in employment work.

this point Hal Babbitt became the Bo's'n's Whistle editor. An expert architect, had done planning, rebuilding and landscaping for the Consolidated Builders ncorporated at Coulee. Besides his artist ability he possessed newspaper train-ng. When he took over in January, '42, the Bo's'n's Whistle had a circulation about 25,000 copies. The following year 80,000 copies were being distributed, d at the end of '43 found this number increased to 90,000.

ntil March, '44, the same edition of the Whistle was issued to Oregonship, Swan nd Vancouver; but at that time a change of policy was adopted. Instead of one agazine for all, there was a newspaper with one section of interest to all three ards, and another devoted to the individual news of its own shipyard. Each yard ad its own staff, but the whole operation remained under the original management.

he new Whistle abounded in pictures that covered subjects from the lifting of a uperstructure to an employe's invention, from the week's pin-up girl to the laborer ho offered an interesting opinion. The man in the yard was featured in a way hich made him feel that the paper was for him and of him. He saw his friends, imself, and his boss on its pages. If he was interested in sports, there was a ection which told of softball or bowling teams that competed with other yards. If e wished to keep track of launchings, bond drives, or construction progress, he id so by reading the Whistle. He learned of furloughs, marriages or illness that ouched fellow workmen. The paper even welcomed his own news notes. Many who eceived copies kept a complete file, for between its pages unfolded the history of he yard. Others made scrapbooks of the pictures and items that interested them ost. But all of them howled in protest if for some reason they did not receive a opy at the expected time.

n the spring of '42, Babbitt fell heir to a new job. He was placed in charge of he social details of launchings when Walter DeMartini, who had been taking care of hat work, transferred to Vancouver. As the Bo's'n's Whistle editor had to keep nformed on launching activities for the sake of his news columns, it was natural hat he should assume the duties that were connected with preparing for the occas-ons. The new routine included not only correspondence and arrangements involved ith the selection and entertainment of guests, but a buffet luncheon that followed ach launching. At first these luncheons were held in any administrative office hat allowed itself to be cleared and used for such purpose; later, a room just off he cafeteria was used.

SCHN00317800

CHAPTER X

[illegible] the summer of '42 that Margery Moore entered the office to replace the [illegible]tary who was leaving. The first day her new job left her feeling bewildered. [illegible]tarial duties were old stuff — but this hostess business! When she was [illegible]t told to prepare for a launching she almost regretted the choice she had [illegible] in selecting such work. What did such a job involve? As time went on, how-[illegible] she and Betty Jean Eivers, who joined the staff in September, learned to [illegible]dle their various duties with casual finesse.

[illegible] ever widening circle of tasks which the office accepted finally resulted in [illegible] forming of a Public Relations Department that took care of tasks which [illegible]ged from editing and distributing the Bo's'n's Whistle to acting as the ship-[illegible]d's information bureau or tactfully checkmating gate crashers at their social [illegible]irs. Publicity was given forth or suppressed, correspondence and photographs [illegible] filed, scrapbooks made from press clippings and pictures were compiled in [illegible]fully indexed order, and information was gathered for the radiomen to [illegible]adcast.

[illegible] make great emcees and after-dinner speakers, but no one ever accused one of [illegible]ing a gracious hostess. And, after all, what is a social affair without a [illegible]tess? So, after preliminary details had been taken care of and a launching [illegible] been successfully engineered, Miss Moore and Miss Eivers finished their [illegible]hedules by ushering the guests into the luncheon room and seating them among [illegible]genial people. The office was often strewn with flowers as the hostesses [illegible]anged bouquets for the tables. Upon occasion they even invaded the woods in [illegible]rch of spring greenery or autumn leaves. Their experiences included the frantic [illegible]s of early '43 when a heavy snow practically paralyzed the shipyard. It was the [illegible]blic Relations Department that kept the Portland radio stations informed of the [illegible]nstantly changing work schedules of the various departments. That office staff [illegible]on the job night and day through the whole mad session. Snow bound cars were [illegible] out so that their owners could reach their desks on time to tend the ever-[illegible]ngling telephones.

[illegible]re was a time when books for the ship's library arrived so late that they were [illegible]ken straight to the ship. Being a gift from some organization, they had to be [illegible]beled as such before they could be placed in their bookcase. So down to the [illegible] dashed Miss Moore and Miss Eivers and aboardship they clambered, hot on the [illegible]ll of the ship's literature. Craftsmen were still surging about the cabins [illegible] halls in a last-minute rush, and the only spot the hostesses could find to [illegible] in was the radio room. There were a few discouraging features to using it [illegible] a workshop. For one thing, the paint was still odorous and sticky; for another, [illegible] ever-present guard was always underfoot as they worked. But, being accustomed [illegible] carrying on under unusual circumstances, the girls, weary but triumphant, [illegible]patched the job with minutes to spare.

[illegible] one occasion they had to entertain a dozen guests for hours, because of a launch-[illegible] postponement, and a panicky interval when, with the launching ceremony approach-[illegible] the moment for the invocation, they were still inwardly praying that the missing [illegible]inister would put in an appearance. The period preceding the reverend's breathless [illegible]ival was packed with special torment for Babbitt, for his office staff kept [illegible]kedly insisting that he must pinch hit with an impromptu prayer. Probably, they [illegible]oyed his suffering because it eased burning memories of their own.

SCHN00317801

g, through no fault of theirs, two sponsors showed up to christen the same
p. Another time there were too many attendants, and still another when, after
luncheon crowd had assembled, they had to set several extra tables for
xpected guests. Although they had been in no way responsible for these con-
ions they had to smooth out the friction or mishaps and present to the public
untroubled front. The time always came when the staff could laugh at past
eriences which during their occurrance were nightmares.

m the standpoint of the Public Relations Office the outstanding launching
that of the Horace B. White. Arrangements had been made for Miss Marjorie
rence, the opera singer, to christen the ship. Knowing that she was still
ndicapped from the effects of infantile paralysis, the Public Relations Depart-
t hit upon the plan of having as their special guests crippled children from
Shrine Hospital. It was November 4, '43, and the luncheon was to mark the
ning of a beautiful new skyroom that perched upon the roof of the new Adminis-
tion Building.

ll luncheons represented the culmination of careful planning, but this was to be
re than a luncheon. It was to be more than the opening of the skyroom. It was
be a party — a children's party! The routine work — the procurement of
mpagne and of flowers for the sponsor and her party, the hotel reservations for
ss Lawrence, corsages, and the arrangements for the minister were all taken care
. Then the two hostesses lotthemselves go on party preparations. Favors and
orations were procured, special entertainment was planned.

ound noon on the day of the launching Miss Lawrence arrived in a shipyard auto-
bile, and the children in a special bus. They were introduced to each other
d given a chance to get acquainted before being taken down to the Way where
e ship was waiting to be named and sent on her way. For this occasion the guests
d to be carried up the stairs to the platform, and, after the ceremony, carried
n. The children were wide-eyed over the shipyard, the huge ship that loomed
ve them, and the way the ship scooted for water when Miss Lawrence smacked it
th the gayly trimmed bottle.

e fun of their adventure, however, came when, having been transported to the
y top of the Administration Building, they stood on the threshold of the sky-
m and peered in. They were facing a semi-circular room rimmed with softly
rtained windows that looked out over the shipyard. The beautifully arranged
bles that filled the room were gay with autumn leaves and party favors.

the guests had been seated and served, the Singing Sentinels made folks
ry with original serenades and amusing songs. Then came a marionette show that
lighted children and grown-ups alike. When it came time to go, the children's
s expressed their thanks better than words ever could.

was the memory of occasions like this that kept Miss Moore and Miss Eivers
the Public Relations Department through the years of Oregonship's war effort.

first John and Jane Doe were given to sniffing at the mention of the skyroom.

h-hat Heaven," they called it.

SCHN00317802

To combat this idea, guests from the yard were told that if they wished to attend affairs in their work clothes, they could. Oregonship had led the way in the custom of selecting most of their sponsors from the folks who actually built the ships. More and more welders and warehousemen, shipfitters and stenographers were entertained at launching luncheons, and their attitude toward the skyroom changed. They found that they were greeted, seated and served with the same courtesy shown to notables, and friendliness between the management and the man in the yard was increased.

Trial runs were primarily business affairs, as the scores of men who made and recorded pages of exacting tests would insist. The Maritime Commission inspectors, Coast Guard and American Bureau of Shipping officials, the boat supervisors, crew, and various craftsmen were fully aware of the purpose of such voyages. But there was also a social side to these trips. Lucky were those who were guests on such occasions, and on special runs there were sizeable lists of such passengers. At first a ship's trial trip included her initiation to salt water, and several meals were served aboard her. The steward and his crew were very busy indeed, for though the food, brought from the cafeteria, was partly cooked, there were usually from 150 to 200 people aboard, and they all had to be fed.

Captain Gillard, Captain Peters, and the rest of the crew who made these trips acquired many memories of amusing or entertaining experiences, but their choicest ones are of the trip that introduced the Star of Oregon to the ocean. (The Star made several trial runs, but the initial one was the real occasion.)

Being Oregonship's first baby, the Star was, throughout her shipyard life, subjected to the blundering experiments that the eldest child usually must learn to survive. This extended even through the trial trips. During one of the tests someone opened the wrong valve, and the shipyard's Exhibit A plunged headlong for a sand bank. Immediately the engines were thrown in reverse, and both anchors were dropped. While the officials held their breaths, the ship ground onto a bar — and rebounded into the current! The Kaisers, father and son, who were following in a launch, did not even know at the time that the Star had actually hit bottom. A bit of touching up later by painters at the Dock, and she was as good as new. Of the hundreds of ships that succeeded the Star not one has had such an experience.

As for the guests aboard on that trip, to them the whole thing was a gay adventure — till they hit the ocean. There were many notables aboard, but few good sailors. When the waves grew rough and choppy, the Star behaved admirably — but the guests didn't.

Although a long succession of trial runs followed, none of them reached, for adventure, the one made by the Star of Oregon.

The shipyard management promoted various activities to harmonize the many strata of society that were mingled in the shipyard. Acting upon the theory that (since the Colonel's Lady and Judy O'Grady were powdering their noses

SCHN00317803

Before the same mirror, and the old Colonel and young O'Grady were settling questions of state over their lunch buckets, a spirit of companionship should be developed. Officials encouraged home talent shows, moving pictures, interesting broadcasts, contests, and other entertaining features.

On both day and swing shift, dances were regularly held in the dormitories' gymnasium. Educational movies and newsreels were shown frequently. Sometimes, at a get-together meeting, shipyard executives witnessed previews.

Bond drives were spurred by shows staged on a platform behind the Mold Loft. Movie celebrities gave talks or performed for huge crowds. Alec Templeton received thunderous applause for his act. Andy Devine went serious and told a war hospital story that made scores of people dig deeper for war bond money. Dr. Wassell made a lasting impression; so did Jack Dempsey. Local talent offerings were enthusiastically received.

During the 5th War Loan Drive the shipyard quartet performed frequently, augumenting their offerings with acts given by other shipyard employes. Songs, dances, musical numbers, whistling, and even occasional skits were used. Such shows were staged on the Mold Loft platform and in the Cafeteria. Many an administration clerk, as he enjoyed entertainment with his lunch responded to Harry Steele's clerks' appeal for another bond subscription.

As for the quartet, the story of their formation and rise to popularity is an interesting one.

A good guard force does more than preserve order — it builds morale. Oregonship's first year was a struggling and often discouraging one. Chief Roger Smith, aware that something of the shipyard and for the shipyard was needed to entertain the workmen and awaken a possessive pride, hit upon an inspiration. One of his guards had a fine tenor voice and an intimate knowledge of music. He was Chuck Faris, a former voice teacher and choral instructor. To him Chief Smith handed the responsibility of organizing a guard quartet. Faris promptly acquired a rich, easy bass by persuading Ken Rogers to join his group, and a strong, true baritone by adding Hal Von Zeuthen. With Tony Motrovitch's lead tenor, the quartet was all set to go. They started their career in March, '42, when they sang at a launching after only three rehearsals. Prior to this outside music had been obtained for all such occasions, but the guard quartet was received with such enthusiasm that afterwards they sang at all shipyard affairs.

They were much too good to be referred to as 'those guards that sing'. They needed a name. So a contest, with a $50.00 bond for the person suggesting the best name, was held. Some 500 entries were submitted, but the one the group favored was "The Singing Sentinels", and Mrs. Willard Anders, who suggested it, received the bond.

From the beginning the group did all its own arrangements. At the first launching they sang "The Star Spangled Banner" and "Anchors Away", and these two songs immediately became a routine part of each launching. Not long after this Ken Rogers wrote a song that was added to the program. It was "Down the Ways", and it was sung immediately after the invocation. Because of the necessary brevity of the launching proceedings this was discontinued in favor of the humming of the tune right through the minister's invocation.

SCHN00317804

Original group remained intact except for the lead tenor, which changed [illegible] Tony Metrovitch sang with them only a short time before he joined the Navy. Mel Gordon, who followed him, left in May, 1943, in favor of the Merchant Marines. Herman Klick, who was drawn from his expediter-leadman job in the Plate Shop to fill in the vacancy, remained with them.

[illegible] activities of the Singing Sentinels rapidly widened. They began to make up their own words to familiar tunes when they serenaded guests during luncheons. They learned a great number and wide variety of songs, and grew so close with their harmony and infectious with mood and rhythm that the crowd invariably caught the spirit of their songs.

Their popularity increased till they were in demand not only for local events but for coastwide shipyard programs, for bond drives throughout the state, and for various occasions where notables were entertained. There were frequent attempts to lure them from Oregonship. There was even an occasion when Mr. Kaiser intruded a surreptitious but vigorous headshake into the persuasions of a national celebrity. Their experiences ranged from inspirational to humorous, and they enjoyed them all. One of their prize recollections was of a radio announcer's introduction of them as "The Sinking Sentinels".

Until their musical enterprises took them hither and yon at unpredictable hours these men performed regular guard duty, but finally they had to drop such work. Even when they became members of the Public Relations Department they continued to wear their guard uniforms and rank as one of the shipyard's most colorful groups.

Oregonship always expected and received from her employes an extra measure of effort and loyalty. But her men and women were well repaid. Their social and recreational needs were well provided for. Even their children were offered similar advantages. Welder, expediter, laborer and office clerk all were welcomed on bowling and softball teams. They were entertained at the skyroom, aided by counselors, congratulated or condoled by the Bo's'n's Whistle, and encouraged by the management to submit their suggestions and inventions. Long after the war is only a dim memory the Colonel and his Lady, O'Grady and his Judy will vividly recall the days when they learned to understand and enjoy each other in the shipyard.

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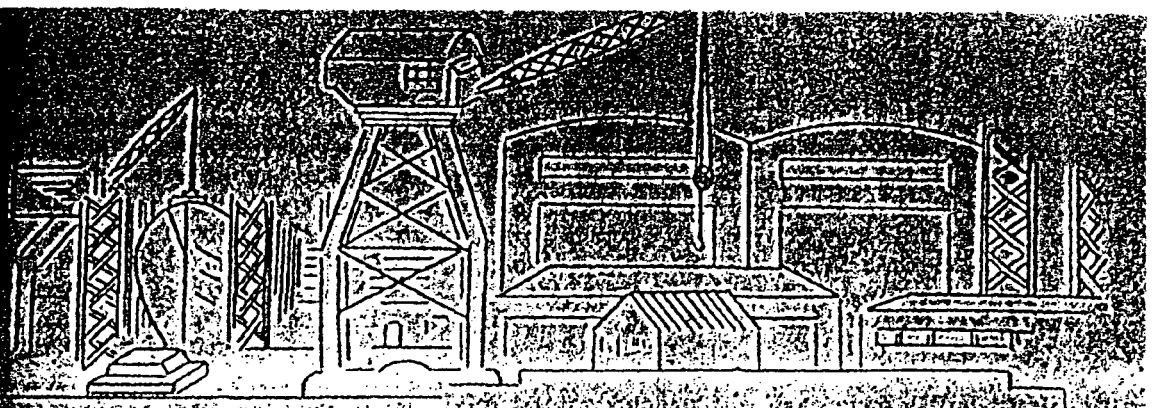

PRODUCTION IN RETROSPECT

CHAPTER XI

Oregon Shipyard reached a peak of production in the summer and fall of '43 — eak during which it broke numerous records, and from which it emerged with the alue of the nation. To get a picture of the yard as it was in those days, ppose you step back into September, '43, and follow a Badge Control messenger ut the yard. All along your itinerary she will drop in at check stations to ve heavy canvas bags full of badges which the timecheckers distribute, and in offices she must leave and pick up material that concerns the Badge Office; strictly for your sake she will lead you through shops and ships so that you see the yard.

go with her to the Service Building, where six girls, with a numbering mach- a bates machine, green and purple printers' ink, and a couple of hundred er stamps are putting cards through 5 stages of processing. The sixth girl hecking each card against the status record from which it is made. The nger girl shows you great bins of metal frames and pinbacks that the girls in assembling badges, and she informs you that those six girls have made and abled over 2,000 badges in one day!

ed down with bags, away the two of you go, heading for the gate. For your ial benefit your guide will not ride her bicycle today — and there are miles of hiking ahead of you.

egin with, when you reach the gate, a guard will expect to see your credent- If you have no badge you must carry a visitor's pass, or you will be ied admittance to the yard. Once through the gate you are held up by a train- of rudders and propellers. These, explains the messenger, are headed for North Storage Yard, on the far side of the Basin. It is really quite a place, it isn't through expanding yet. The Facilities Department will be spending inter grading, putting in roads and whirley tracks, and in general enlarging area. You will probably see Chet Kinman, Facilities Superintendent, discuss- phases of the work with a group of his supervisors. Although Kinman did not e Facilities Superintendent till '44, he is an Oregonship pioneer, for he down from Coulee to set up the bending slab in the Plate Shop and take charge lab Superintendent.

SCHN00317806

Way you go across a strip of pavement and onto graveled surface that is divided by railroad and whirley tracks. The whole area, and the New Warehouse that looms at its south edge, is under the jurisdiction of the Materials Department. You find that the tracks are lined with articles spread out or stacked high in countless numbers. Ladders, lifeboats, winches, pumps, cables and ventilators are all present. Pipe is there in unlimited quantity, for as many as 72 cars of it are sometimes in transit at one time. You watch several riggers and a crane operator (with a whirley as a silent partner) unload the propellers and rudders and store them in their proper places.

Would you, inquires the messenger, like to go through the Warehouse? You would. In all the yard it is the largest building — unless you count the Assembly and the Plate Shop as buildings. It is 200 by 1,000 feet, and has a floor space of 217,360 square feet. Its ground floor is divided into three sections: for receivals, general warehouse, and fitting stores.

Besides the two bridge cranes that handle heavy material, warehousemen use 6 baby hoists (Handy Andys) which pick up loads, run them to the desired spot and hoist them to a height of 9 feet so they can easily be stacked high. There is also a loudspeaker to simplify contacting the workmen engaged in various parts of the building.

Across the center of the Warehouse, directly behind the loading platform, there is a space about 80 feet wide where materials unloaded at the platform are stored prior to being checked, sorted and zoned. About 100 tons of freight come in daily, and in an average month some 7200 individual shipments are received. A list of receivals contains surprises, for it ranges from brooms to condensers — from silverware to tricycles. There is even record of the receival of three live crows! (This for the payoff of a bond deduction drive.)

As the messenger leads you through the General Warehouse section you are intrigued by toggle pins, light bulbs, welding rods, telemeters and refrigerator compressors. There are more than 7,000 carefully labeled bins that rise in tiers toward the ceiling. And rags! Every month sees a carload of rags brought in, for the yard uses about a ton a day. They come in all sizes, shapes, materials and colors. You pause before a mountain of them and reflect upon the extent of grandma's delight were she to be handed her knitting needles and given the "Go" signal.

The men aboard ship have to eat, sleep, bathe, and do their laundry. A sizable portion of supplies that go aboard the ship to outfit her are in answer to these needs. Each Liberty ship uses over 2,000 sheets and as many bath towels, nearly 3,000 face towels, and bedspreads, tablecloths galore. Kitchen supplies include stoves, sinks, toasters, percolators, and even garbage grinders that chop up garbage so that it won't leave a trail a submarine can follow.

On the upper level are offices for expediters and warehouse clerks. In the Chief Clerk's office you learn that the Materials Department contains nearly 1500 men and women. The bulk of the craftsmen are warehousemen, but there are checkers, clerks, and even an engineer, an electrician and a machinist. Among the offices is the Reclamation Office, where claims concerning damaged or rejected materials are filed. 95% of the articles damaged within the yard are handled through this office.

SCHN00317807

If you head for the main entrance of the warehouse you pass the Dispatch Office, where clerks are busy sending materials here and there upon request of departments. There are 92 pieces of automotive equipment belonging to the truck family at their command. Dump trucks, Fordsons and Clarksons are much in evidence. A 4-inch truck rolls merrily past the front platform with a bundle of lumber swinging from a stubby boom. Quacking methodically as it zooms toward you is a yellow truck on stilts. It is a hyster, and you had better heed its warning, for from its lofty perch the driver cannot see the road for twenty feet in front of him. The hyster straddles a rack of steel, picks it up, totes it to its destination and deposits it, with only the driver controlling the whole performance. A moment later, you become aware that something is creeping up behind you, and you wheel about to discover a strange little contraption tracking you down. It resembles the family refrigerator coming at you sideways, but don't be alarmed. It is merely a "Handy Andy" traveling backwards.

Lumbering across from the Shell Jig area comes a huge 16-wheel Beal. Across its broad bed a bulky section of shell reposes. Beals are semi-trailers that carry up to 80 tons. They are drawn by powerful tractors.

The messenger leads you into the neighborhood of the Boiler Erection Building where the Brick Storage Shed stands. There you learn that the two fire boxes on a Liberty ship use 45 tons of bricks — well over 10,000 of them. Into the yard they come by the carload. About 15 women and a half a dozen men promptly unload them and store them in the shed. The same group loads up the skips that go down to the Ways by truck where they are lowered into the ship's hull and the bricks are built into the fire boxes.

The office records for the Brick Shed are kept on the North Storage Yard books.

Come on, says the messenger, let's look in on the lumber yard. She leads you across the head of the Ways, clear down to the southwest corner. There, squatting in the midst of stacked lumber, is the lumber office. This is headquarters for about 18 warehousemen and a score of shipwright helpers. They handle all sorts of lumber — 1" by 3" boards, 2" by 12" planks for scaffolding, 14" by 20" timbers for launching equipment, and plywood for Mold Loft templates and cabinet work. All told, the lumber yard furnished 600,000 to 700,000 feet a month.

Put out your cigarette, cautions the messenger. We are approaching the Oil Dock, and any sort of fire will get you shooed out of there in a hurry. Those "No Smoking" signs mean business, for the materials stored here are highly inflammable. Look at those fire extinguishers. These folks are prepared for the worst even if they don't intend to let it happen. There is a lot of anti-freeze, acetone and ditto fluid to say nothing of all the grease and oil needed for facilities. There are barrels of Basecote and Slipcote, used on the Sliding Way for launchings. There is grease for all equipment, and allowance stock for the Navy symbol oils for the Maritime Commission. It takes half a dozen warehousemen to care for all this.

You should drop in on Paint Storage, for warehousemen handle the supplies there; but the messenger decides to visit that building when she is telling you about paint.

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[illegible] into the welding rod [illegible]. Due to the load [illegible] [illegible] the ground floor [illegible] due to the storage of rods. There are [illegible] different sizes of welding rods and the special kind used for automatic welding. They are stacked high on every hand, and arranged so that the warehouse man and their supervisor can tell at a glance how much there is.

[illegible] welders use nearly 1/4 million pounds of mild rod a week. It arrives in freight cars and is unloaded by a crew of warehousemen. A Handy Andy carries boxes of rods into the storeroom in 3,000 pound loads.

[illegible] shipyard without tools would be like a tailor without needle, thread and scissors. Every craft needs its particular supplies. Tools are expensive, and these days they are often hard to obtain. Someone must be responsible for keeping them on hand and issuing them as they are needed. The messenger loads you down on the [illegible] and into one of the five tool rooms, where tool checkers hand out implements and supplies to the men and women applying at the windows. Stop inside and watch a checker disperse the articles that fill the bins, hang on the walls or lie on the floor.

[illegible] reamer leans into the window and asks for a reaming motor, a couple of bits, a squirt oil can, a bucket of "milk" and an "old man". The milk is a white solution of oil and water that will keep his tools in condition, and the old man is a jig that will steady the motor. Next come a chipper and a riveter for their guns. Riggers pick up "come-along" jacks; shipfitters and shipwrights pick up hammers and mauls; a carpenter gets piano wire, chalk and a carpenter's pencil; a machinist asks for rags; and a couple of laborers pick up brooms, dustpans and buckets.

The tool checker tells you that all told there are probably a thousand chipping guns, 500 electric drills, 800 jacks and 300 impact wrenches in storage. Your eye is caught by a wide assortment of articles — steel wool, fishline, hose and chisels, and you wonder how he can keep track of them all.

The messenger promises a surprise, so you follow her to Tool Room 12, in the old General Stores. Instead of seeing more tools your astonished eyes gaze upon goggles, respirators, safety belts and life jackets, and hats by the hundred. You really should have one of these hats, for before you are through touring the yard you are going aboard a ship. Just because it's you, they land you one — but rules say you must acquire a requisition from the Safety Office before the tool room checker will issue you one. It is light in weight and doesn't seem too durable. You grumble a little because it feels odd sitting up so high, but you reflect, "When in the shipyard, do as the shipbuilders do". You are wise to conform; that "tin derby" may save you from a cracked skull.

Would you be interested in examining the various kinds of insulation used aboard the Liberty? inquires your guide. Surely. She leads you along the south side of the buildings that line the Dock. Halfway down the length of the old General Stores you climb onto the platform, enter the building, and go upstairs. Here you wander along alleys formed by continuous stacks of insulation material. There asbestos, cork, felt and rosin-sized paper. Great rolls of amosite, a full staple asbestos, are waiting to be used in insulating flanges; split, hollow cored cylinders in 3-foot sections of asbestos are ready to encase pipes. Copper wire

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here in quantity, for it takes 200 pounds of it to bind insulation around pipes of each Liberty. Cool cylinders for cold water systems, packages of glass for air duct and refrigeration, and fiberglas tape (a 4-inch silky mesh in block, to use over heat) don't rub against them, for they are chalky.

hough the Materials Department is responsible for storing this insulation, is the Bill Bartells Asbestos Company that insulates the ship, under sub-ntract. From the Star of Oregon down every ship launched from the Oregon yard has been insulated by these men. Let us go into the office and talk H. Churchill, Superintendent of the company's activities for Oregon ship. entrance into the yard dates back to the time when the U. S. Army Engineers to release the dredge Clackamas for the building of the Oregon Shipyard, he joined the Bartells company when it began storing insulation for the Star Oregon. Insulation work was started on that first ship just before Thanksing, '41.

work is done mostly on the Outfitting Dock, for nothing can be finished till ts have been completed. Bartells men usually complete their work just ahead the painters, and barely before the ship goes on her trial run. The employes this department have a dressing room at the end of the Dock, for they must nge clothes at the beginning and at the end of every shift. They dress in ite for the job — and no wonder, for they would quickly acquire a white-hed appearance regardless of the original color of their clothing. Snowbirds, ey are called or seagulls, and they are not too popular with neighboring crafts-, for wet squashy samples of their handiwork splash the vicinity. It takes re than a cutting glance to disturb them however, for they are the highest ld journeymen in the yard. One reason for this is that they frequently have work over intense heat; another is the amount of skill it requires to master eir trade.

ile we are doing the storage spots, suggests your companion, how about a visit the Steel Yard? Away you go across the yard toward the Plate Shop. You drop to the Steel Yard office where they keep record of every piece of steel that ers the shipyard, and you learn that it is all checked out upon the order of e Hull Control office.

u leave the office and wander into a world of steel — 62,000 tons of it, piled er an area of 273,000 square feet. There is a plate yard for keel, bottom, lge, shell, bulkhead, and deck plates; a frame yard for the ship's ribs; a tbar yard for small materials — strap iron, I-beams, H-beams, deck joists, . Two whirleys and several cherry pickers service this area, each with its operator and crew of riggers.

ce you keep running into riggers everywhere you go, your guide decides to take over to the Rigging Loft and let you see the rigger in his lair. Back you go rd the head of the Basin, a long stone's-throw past the Guard House. As you k you are told about the department. There are 1100 riggers on the payroll. g those in the Rigging and Sail Lofts and the crane operators in the Assembly many of them are women, but among the riggers who handle steel, a woman is rity.

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You step into the Loft and you find yourself in the midst of rope and cable. It lies coiled like great yellow snakes; it stretches itself across the floor; it festoons the walls. Girls are coiling it, measuring it or threading it through blocks. All about are tiers of bins that bulge with a wide variety of blocks and rigger's equipment.

On an upper level that extends across part of the room women are making eyes in fire rope. This is really a man's job, but these women have mastered it.

At the north end of the Loft is a platform where men are securing sockets into the ends of shrouds by means of moulten zinc, and at the south end is the office where an account is kept of every piece of equipment used by the department and every foot of rope or cable that enters or leaves the Loft, and whether it was used for facilities or ships.

Riggers are the shipyard's movers, and they are involved in all construction. Soon after locating in their Loft they had a hand in the erection of the Plate Shop's additional bays, in the moving of the Assembly from the head of the Ways to the new shop, in the moving of the Marine Machinists, in the setting up of the Shell jigs, and in every activity that calls for the handling of heavy materials. From flagpoles to IBM machines, from pianos to buildings, it is just a job to the riggers.

They have other responsibilities. One is the operation of the Mast Yard, where masts are painted and rigged in preparation for their erection on the ships. Another is the Sail Loft, where women at special sewing machines make up approximately 22,000 yards of canvas yearly as huge tents and coverings for workmen. A third activity is the inspection of cable. Faulty cable can mean disaster and death, so all the cable used in the yard is under the constant surveillance of a crew of riggers. The same department has a launching crew of half a dozen men who harness and check-rein the ship so that she will behave correctly when her leash is cut. Rigging has always been dangerous work, but the Oregonship riggers have a creditable record. Not only do they take good care of themselves, they watch out for the constant stream of workmen who carelessly place themselves in danger. The rigger leadman's whistle can be heard sounding its warning wherever rigging is going on.

We'll have to visit the Mechanical Department, says the guide, to find out about the cranes and their operators. And while we're there, we might as well go on through the whole department. It has over 1600 men and women — machinists, engineers, pipefitters, blacksmiths, welders, burners, boilermakers, crane and locomotive operators and oilers.

Down you go along the buildings that face the Dock, but you are on the south side of them. When you reach the Machine Shop, up the outside stairs you go through the Maintenance Office and down the hall till you come to the office of the Master Mechanic. There you meet G. C. Filion and his assistant, J. P. O'Leary, who knew the shipyard while it was still a hopeless looking infant. They talk of days when the entire department was under the direction of one superintendent for each shift. The department's activities covered the Machine Shop, the Garage, the Blacksmith Shop, locomotives, cranes, mechanical and pipe maintenance, acetylene, oxygen, compressed air, water, and even salvage, but this was not a satisfactory arrangement.

SCHN00317811

CHAPTER XI

In the summer of '42, Fillon created a group of sub-departments with an assistant superintendent over each. In this way each group became specialized in its own line.

Comes Jack Collins, head of the Equipment Operators' Department. From him you discover that there are 26 whirleys — one on each Way, four on the Dock, two in the Plate Yard, the Steel Yard, the Storage Yard, the front yard of the Assembly, and in the Mast Yard. He takes you down on to the Dock to watch one at work. Like a weird dinosaur, it advances, its bow legs straddling trucks, shacks and work-shops as it lumbers along a track with a 30 foot gauge. Fifty or sixty feet aloft its body supports a 100 foot neck that laboriously swings from side to side as from its mouth dangles a suspended burden. Lest it should tramp you down an automatic bell rings constantly while the crane is in motion.

All about the yard the whirley's pigmy relatives, the truck and crawler cranes (commonly dubbed the "cherry pickers") lumber about on similar missions. There are a dozen truck cranes, 5 crawlers and a couple of little Krane Kars that service the Plate Shop.

As for locomotives, the yard has two steam engines and four diesel electrics that easily drag their 28 cars around from here to there, transferring bulky objects like engine shafts and huge bull gears.

The care and operation of these cranes is a very responsible job, and the operators are well trained and well paid. They know their huge machines as a mother knows her child. A crane operator can tell by the crane's vibrations how much of a strain is being put upon it, and he can place material with amazing exactness.

Just then George Eggiman, head of the Stationary Engineers, appears and the guide prevailes him to take you both on a tour of the pumps, compressors and oxygen and acetylene buildings.

Yardonship has five wells that supply all the water needed. Five pumps, each of which can pump 1,000 gallons of water a minute, service the 200,000 gallon storage tank. In case of power failure two gas stand-by pumps can be cut in and used instead of the regular ones. The same set-up of pumps drains off the water and distributes it.

There is an emergency 300,000 gallon water tank with two gas engines that will pump 500 gallons of water a minute apiece, and two electric pumps — one an 800 and the other a 1500 gallon a minute pump — all hooked up with Bull Run water. Operating all the pumps at once, 8,300 gallons of water a minute can be pumped.

Next you visit the chlorinating plant where chlorine is added to the water as a purifier. This is in the southeast corner of the yard, and as you walk back Eggiman tells you of the work his crews do in maintaining all this machinery. In addition they maintain the yard locomotives and flat cars, all shipyard boilers, all whirley and sludge pumps, and the four sump pumps that flush out the sewage system. These sump pumps are also supplemented with emergency gasoline pumps.

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Automatic oil burners with dry heat furnaces supply the office buildings with heat, while there are boiler jobs in the Child Service Center, the Mold Loft, and the old General Stores.

Your next objective is the acetylene plants, so away you go, past the Machine Shop Annex and into the larger acetylene plant. (The smaller one, which is over toward Way 3 has four generators, but this one has six.) Into each generator, with its 500 gallons of water, is poured 500 pounds of carbide. Each pound of carbide and gallon of water creates 4½ cubic feet of highly explosive gas. Generator pressure should be kept around 13 pounds at all times, so the men watch it very closely. For both plants one carload of carbide (100,000 pounds) is used every 4½ days. The monthly amount is around 509,000 pounds, and the gas manufactured from it totals nearly 2,290,000 cubic feet!

Right across the road there is the Oxygen Control Building. Want to see that? Of course. As you arrive, a trailer is unloading its 26 drums of oxygen. These drums will be connected with pipes that carry oxygen into the building, where it is run through a flometer and released as needed at a pressure of 100 pounds or less. 300 trailers are run in monthly, for in that length of time the yard uses nearly 11,000,000 cubic feet of oxygen. That ought to take care of the burners, you reflect as you allow the guide to lead you to a compressor plant across the yard toward the head of Way 10.

Chipping, riveting, grinding and a dozen other jobs that call for the use of pneumatic tools cannot be operated without compressed air. In two main plants there are 8 compressors, and additional ones are set up on Ways 3, 5, 7, 10 and 11. They have a horsepower ranging from 200 to 600. To meet a sudden need for compressed air in some out-of-the-way place in the yard there are 12 portable compressors, built onto small trailers and dragged to any location. Altogether, these compressors can produce 3,400 cubic feet of air a minute.

Let's go back to the Machine Shop, the guide suggests, and watch the machinists shape, drill and bore parts for machines to be used in the yard or parts of the ships. Into the shop you go, all eyes and ears. It is a big place with a score of lathes, a dozen drill presses and grinders; threading, punch and shear, and milling machines; shapers, saws and planers scattered all around. Over your head a bridge crane moves swiftly; two electric hoists and trolleys and an air tugger hoist are lifting and swinging heavy objects. Near the far end of the shop a ship's stern frame is receiving the attention of two boring bars. Over there a huge boring mill is refacing slabs. Across the shop a milling machine is cutting teeth in a saw. You mustn't overlook that shaper. Right now it is turning out a wrench with an accuracy that cuts steel within a thousandth of an inch. On the other side of the shop is a regular tool room where not only tools, but dies and small jigs are made. It is also a "Fix-it" shop. These machinists sharpen all the drills that are used in the yard — and they sharpen scissors for the First Aid nurses. The room has an electric furnace that temperes tools at degrees that range from 1450° to 2500°. There is also a do-all saw that saws and files steel into any desired shape, and a radiac saw for cutting hardened steel.

Before you leave, Fred Spear, head of the Machine Shop, sends you to the Gold Room upstairs where tools and items that machinists need are stored. Nearby machinists are repairing pneumatic tools — riveters' and chippers' guns, torches, regulators, etc.

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[illegible] to be thoroughly smudged. Have the guide, for you are going into the [illegible]smith Shop, where glowing furnaces with black smoke do you. Whether you are [illegible]ining the kind for the furnace or the heat treating furnaces that are used to [illegible] steel, you had better keep your distance, for they give out an amazing [illegible]unt of heat and dirt. And keep away from that oil vat; oil is fine for cooling [illegible], but no good for clothing.

[illegible] most powerful machine in the Shop is a huge hammer that has a driving power [illegible] 30 tons. Not far away is an ironworker that cuts bars of steel, angle, round [illegible] square. Over there is an air press that turns out 3,000 hook bolts every month. [illegible] bolts and pipe hangers are made in countless numbers.

[illegible] you leave the garage the guide informs you that you are going to look in on the [illegible]ntenance end of the Mechanical Department. There is Grant Green, head of Mobile [illegible]uipment Maintenance, standing in the doorway of the garage. He is inspecting [illegible] will be a first class truck when its rebored motor, its freshly ground crank[illegible]ft and its newly made fenders are replaced. Over yonder is a hyster that is [illegible]nding by while its chains are being boiled in oil. Green takes you into a room [illegible] men are cutting glass. They cut and install not only glass for regular [illegible]ndow panes, but safety glass for windshields and panes on vehicles, and a special [illegible] glass that shields the whirley operators' eyes. There is also glass tubing [illegible] gauges, cut with a cutter that is inserted in the tube to operate from the inside.

[illegible] you go to the Plate Shop to talk to Walt Wilson, head of Machinery Maintenance. [illegible] room at the side of the shop machinists are repairing air guns, chain blocks, [illegible]ks and hoists. Shear blades are ground, and burner tips are reconditioned at the [illegible]e of 200 daily. An inspector and an oiler from this group check and oil all [illegible]idge cranes here, in the Machine Shop, the Warehouse and Boiler Erection. Wilson [illegible]ils you proudly of how his group have built curvagraphs, straightographs, and [illegible]-off machines, and have designed and built small, portable grinders.

[illegible]ntenance is similar at the Assembly Shop and the Salvage Building. At the [illegible]mbly Shop the wheels of the whole yard's bridge cranes are reground whenever [illegible] need shaping and smoothing.

[illegible] On the Dock is another headquarters for machinists who doctor ailing parts. [illegible] maintain machinery in the Pipe, Electric, Blacksmith, Sheet Metal and Boiler [illegible]ction shops. They also service all of the yard's air tuggers, and make up many [illegible] the inventions turned in by employes.

[illegible]d back and forth through the shipyard are around 65 miles of pipe. There is [illegible] water, oxygen, acetylene, drainage, and sewer pipe, in assorted kinds and sizes; [illegible] pipe facilities and maintenance crews have installed and maintained every foot [illegible]. Every expansion means more piping, for expansion means new shops, new rest [illegible] and drinking fountains. For instance, it took about 11 miles of pipe for the [illegible] Storage area.

[illegible] Pipe Maintenance crews take care of all pipe and maintain all hose. Acetylene [illegible] oxygen pipes are tested regularly with liquid soap to make sure there are no [illegible] for both those gases are dangerous if mishandled. As for the hose, repair [illegible] is constant and the turnover is great. On the boats it is constantly trod[illegible] yanked over sharp steel edges and damaged by heat from a welder's rod or a

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...yard. On the dock and on ships 5 and 6 are repair boat shop where ... of hose are handled each month. In spite of this, purchase to leave Ken... Pipe Line Finance Head, figures a bit and tells you that for that month (December, 1943) he has ordered 30,000 feet of hose for air tools, and nearly ... each twinweld or burners' torches.

...conscientious dressmaker, through with her cutting, gathers up the scraps and ... them in patchwork quilts or rag rugs. The guide offers to show you how the ...conscientious shipbuilder conserves steel scraps, and either uses them for small ... or sells them to the smelter. So off you go, way up to the southeast corner ... the yard, where a Salvage Yard with a whirley that gathers up material with a ...net, and a large, well-equipped building are devoted to getting the last possible ...use out of the yard's scraps.

...together over 300 people work here. In the yard many of them are sorting steel, ...pe, gunnysacks, electric cable and scrap copper. Even the brass tubing and tung-...en wires of broken electric light bulbs are salvaged. That smoke and smell is ...ing from those bonfires in the yard where electric cable ends are being burned ...th wires may be pulled from their casings and the lead sent to a lead melter ...rby to be melted into 45 pound pigs and sold.

...r there is a paper press, popularly known as a "hay baler", and invented by a ...lvage workman, where the entire yard's scrap paper (including great quantities of ...vy, corrugated wrapping paper) is baled and sold. The total weight of salvaged ...per equals about 50 to 60 tons monthly.

...terials leaving this yard go out in truckloads, or in carloads weighing from 50 ...75 tons apiece. The total weight of miscellaneous material sold out in a month's ...time is more than 6800 tons!

...thin the building are tables where wedges, dogs, strongbacks and saddles are ...ned out by the thousands. A planograph that burns several cuttings at once, a ...en automatic burning machines, a circle burner, and dozens of hand torches are ... being operated by busy burners. Boilermakers, duplicators, machinists, layer-...ts, welders, expeditors and laborers are at work here, too.

...ll presses, punch and shear machines, threading machines and grinders are all ...use. Many other jobs are done. Bolts are re-threaded, turnbuckles and shackles ...rebuilt, and pipe fittings are buffed.

...rhead a bridge crane rolls back and forth, laying steel upon tables, or picking ...the finished parts and stacking them in racks. These racks stand all about the ...op, and are being constantly filled with materials and shipfitter's tools which ...be carted away to the workmen who need them.

...Salvage Yard is a sort of lost and found department for the shipyard. Often ...itious laborers, eager to do a thorough job of clean-up work, load into a ...lvage skip articles that have been left lying around idle. While you are there ...Boiler Erection makes a frantic call to locate a straying manhole cover. An ...editor answers that it has just turned up in Salvage scraps, and he promises to ...it back home promptly.

SCHN00317815

Until June 1943 the Union Pacific did all Oregonship's weighing for the shipyard, but at that time Oregonship installed its own scales. Two were placed out of the Salvage Building, near where the railroad tracks enter into the yard. The men who unload them weigh in whatever is requisite and weigh out all material leaving the yard, whether it is on cars or trucks. A loaded car weighs from 50 to 75 tons, and the scales handle up to 150 tons.

As you leave the Salvage Yard you reflect that if a penny saved is a penny earned that department earns a lot of pennies.

Those saddles and dogs are going to the Plate Shop, and the guide suggests that you follow them over. The Plate Shop, you are told, is where the ship's skeleton and armor are cut and curved. It is 350 by 400 feet long, and is made up of Bays. Each Bay has two overhead cranes that carry material to and fro as the workers need it. About 2800 men and women of various crafts contribute their abilities to forming the separate pieces of the body to the ship.

Stepping into Bays 0 and 1 you see large deck plates and bulkheads being cut in parallel edges and bevels by straightographs, and in curved outlines by radiograph. Although the track of the radiograph is set with a gauge, an operator must guide the torch along the duplicator's line.

In Bay 2, where all the floor plates are cut, your guide points out a travograph. It has a long bar that holds several torches and a tracing attachment with a magnetized tip that follows the edge of the steel template. Star plates and marginal brackets are turned out in quantity on each of the Bay's two travographs. Over there are two machines punching holes in the brackets and plates. Down at the end of the Bay you find flange turners bending deckhouse corners and brownplates in a press.

Bays 3 and 4 have giant rollers, and rollermen, setting gauges with expert care, insert flat shell plate — and out it comes dipped and swelled in curves that belong to that one piece only. Nearby punch and shear men are operating a countersinking machine.

In Bays 5 and 6 oddly contoured pieces — such as the fantail — are being turned out by one press, while another press with a special die is spreading bulb iron. Across the way a small pony roller rolls out vent combings. Nearby, bulwark rail is being formed in a bulldozer, and a brake machine is flanging metal. Toward the rear of the Bay hand burning is being done on small stuff.

Nowhere in the shipyard is there a more thrilling sight than in Bays 8 and 9, for here the frames, or ribs, of the ship are given their long, smooth curves. At the back of the slabs are two large oil furnaces and one small one that reach a heat of from 1900° to 2000°.

Into these furnaces go the cold frames. After several minutes they emerge, white hot, but turning a glowing red as they are drawn out upon the slab by air tuggers. Then the slabmen spring into action. They pound dogs into the slab to hold the frame firm while they apply a bevel bar to the upright edge. As one slapman moves the bar along, prying the angle open, another measures the slant of the bevel to

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[illegible] its correctness. When the frame has been pounded lightly with a sledge, [illegible] pried with the bar till the angle is accurate, it goes into the furnace, goes the [illegible] for reheating. This time, when it is withdrawn and secured in place, the [illegible] swing heavy sledge hammers upon a flatter to smooth the bar. They swing [illegible] ternately, using the rebound of their sledges to start the upswing, and the [illegible] ing of steel on steel has all the sound and rhythm of the Anvil Chorus. When [illegible] frame is smooth it is curved around a stiff back by pressure from an air jack, [illegible] again dogs hold it in place while it cools. Frames, gunwale bars and stack [illegible] ings are all formed here. Some of the pieces are 30 feet long and weigh almost [illegible] 000 pounds.

[illegible] luctantly you leave to explore the Sub-Assembly, where bulwark rails, rudders, [illegible] d miscellaneous parts of the superstructure are assembled. The Bay has slabs, [illegible] gs, welding positioners, cranes and hoists for the handling of material. Here [illegible] workmen are mostly shipfitters and welders, fitting and joining to turn out [illegible] semblages. Toward the end of the Shop heavy pieces such as engine room and [illegible] ler foundations are built. An engine room foundation weighs approximately [illegible] tons, and several days with 5 or 6 fitters and 8 or 9 welders working on it [illegible] needed to complete it. When it is finished the overhead cranes load it onto [illegible] Willamette trailer, and away it goes to the Ways.

[illegible] me on, says the guide, we must visit the Gadget Shop before we leave the depart- [illegible] nt, for although it has a separate entrance it is part of the Plate Shop. It [illegible] equipped to handle the small parts that must be fabricated and assembled. There [illegible] several punch machines, drills and presses that shape light pieces, and there [illegible] re two small furnaces. Manhole rings and covers are drilled, batten clips are [illegible] rned out by the hundreds, and hatch locking bars are fabricated. A good deal of [illegible] rning is done, and there are several track machines and planographs and many [illegible] nd torches.

[illegible] takes about 90 boilermaker helpers, burners and chippers for clean-up work in [illegible] e Plate Shop Department. They gather scraps and trimmings and send usable [illegible] ces to the Gadget Shop, and scraps to the Salvage Yard. Often hot metal has [illegible] hered to the table or floor, and a chipper must chisel it loose. Burners trim [illegible] ces that are partly for the Gadget Shop and partly for Salvage. Racks receive [illegible] remnants, and skips are loaded with refuse. Sweepers are always busy with [illegible] oms and dustpans. The Plate Shop has a dump truck at its disposal to haul [illegible] ppings to the city incinerator.

[illegible] ll those workmen that their jobs are inconsequential and they will smile and [illegible] ply, "Just let them try to get along without us!"

[illegible] If you linger to watch them at their work you will agree that they have some- [illegible] ing in that remark.

[illegible] ere go some floors and intercostals that have been loaded on a Beal at the rear [illegible] the Plate Shop. They are headed for the Assembly Shop, and the guide is hurry- [illegible] after them. If you follow her you will see those pieces made up into double [illegible] tems — sections that form the bottom level of the ship and the oil tanks all [illegible] one time.

SCHN00317817

Assembly Shop is truly Superintendent Jack Andrews's baby and he is proud of it. A tailor (trimmer), marker, pins, basts and sews. Shipbuilders follow the process. General cutting and shaping has been done in the Plate Shop. The Assembly Shop carries on from there. Layouts measure and mark the exact lines to be followed; burners trim edges and Altar lines according to markings; shipfitters fit the pieces accurately, pinning them firmly in place with dogs or clamps; welders baste and sew; chippers rip out misfits and excess material. Every ship thousands of pieces enter the Assembly Shop, but when they leave they are assembled into about 123 sections and groupings. Nowhere in the yard is there a noisier shop, for on the day shift close to 1,000 workmen are all using their tools in close proximity, with deafening effect.

Shop has 11 Bays, all under one roof, each Bay possessing two bridge cranes. The whole building is 860 feet by 300 feet, with girders from the cranes' tracks extending 200 feet from the back and 60 feet from the front of the building so that the cranes can run over the roadway to bring in or take out material.

Here go the pieces you are following, into Bay 1. There is a section of tank top already made up of plates joined by Unionmelt and marked by layouts for the placing of the floors and intercostals. Floors run one way, and intercostals across them at right angles forming big squares. There are welders tack welding them into place. When the sections are finished they will be loaded onto Beals and taken down to the Ways. The largest section will weigh over 70 tons. There Shirley will pick them up, turn them over, and set them down on the keel of a ship, where they will be welded down to form the tanks for the ship's fuel.

Now follow your guide across Bay 2 (which is also devoted to double bottoms) and into Bays 3 and 4, where you find crews of men and women assembling bulkheads. Here are also chain lockers and fresh water tanks.

Bays 5 and 6 have a flat, vacant appearance because only decks are assembled here, and they lie across the shop's steel girders like floors. Unionmelt machines are very busy here, for flat work like this can be done rapidly and easily by this method. Other welders are much in evidence, too, for there are many pieces that must be welded onto the decks — stiffeners, hatch beams, girders, headers, intercostals, brackets and loading clips. Most of this work is welded in by hand as the machines are impractical for brief jobs.

Look over here where drillers are drilling holes in the main deck to match those in the gun'l bar. You will see the reason for it when you go aboard a ship on the Ways to watch riveters at work.

Decks in Bays 7 and 8 — transverse and platform decks that receive much the same treatment that was given the others. These are sent over to the finishing forms east of the Assembly to be finished with Unionmelt welding, trimming and drilling.

Bay 8 is blocked with deckhouses, masthouses and gun shields that rear their outlines among the workers. This Bay boasts not only shears for cutting flat bars but a mangle that flattens out all unwanted dents in plates from any bay.

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[illegible] the other [illegible] the bow deck, [illegible] bulkheads, the transverse [illegible] are all turned out, and you'll [illegible] a good deal of hand [illegible] and bevelling being done. In Bay 11 the bridge deck plating is assembled, its doubler, stiffeners and the lifts. The [illegible], which is of heavy material, is welded by uniformal on both sides, and leaves the bay reighted down [illegible] girders, hatch beams, stiffeners and brackets.

[illegible] the roadway that runs beneath the bridge crane, [illegible] the extra heavy [illegible] are being turned over and finished on the assembly platforms. Roofs with [illegible] walls are rolled along tracks to cover whatever parts of the platform need [illegible] most, or lifted by a whirley and plunked down over the workmen and their wor[illegible]

[illegible] all plates, you are informed, are welded into sections on wooden jigs in the [illegible] northeast corner of the yard. There they are stored till a cherry picker transfe[illegible] to semi-trailers that carry them down to the Ways.

Visit To The Ways

[illegible] follow a loaded Beal across the yard, past the Plate Shop and toward the Ways [illegible] you pause to survey the sight spread out before you. The 11 identical Ways [illegible] you are facing are constructed of wood piles and timbers, and have a declivi[illegible] from 5/8 to 3/4 of an inch. Each Way is about 475 feet long and 87 feet wide, [illegible] each supports a scaffold that rears itself to a height of 60 feet and contain[illegible] about 48,000 feet of lumber in its braces, stairways and catwalks. Within those [illegible] affolds are hulls of ships in various stages of completion. Twelve craneways, [illegible] feet wide and nearly 800 feet long, separate the Ways. The 28½-foot gauge of [illegible] whirley track which runs the length of each way allows room for workmen with [illegible] wheelbarrows and dollies to pass trucks between the rails.

[illegible]nking each shipway are stockrooms, tool sheds, lunch rooms, "dens" for various [illegible]artments, washrooms, and sheds with high voltage warnings painted across their [illegible]rs. There are also rooms where burners turn out shipfitters' tools by the [illegible]dreds, and where hose is repaired.

[illegible] you are willing to stoop you can walk way back under the shipway, but you will [illegible] your shoes full of sand, you will probably bump your head on the low timbers, [illegible] you won't see much (even with a flashlight) except countless cables that [illegible]tch their lengths along the under part of the shipway floor above you.

[illegible] will really enjoy yourself more if you will accompany your guide over to that [illegible] from which a ship has just been launched. Right down the center of the Way [illegible]pwrights are already rebuilding the foundation for the next ship. Engineers [illegible]longing to the Shipwright Department are calculating grade and establishing the [illegible]terline; shipwrights are laying blocks for the keel and setting up cribs and [illegible]ces.

[illegible] the steel arrives, another shipwright crew lays it out and marks upon it the [illegible]terline and exact location for the double bottoms; then, when those sections [illegible] been installed, the crew marks the line for the placing of the ship's [illegible] or bulkhead. Because of its size and the fact that it is the first upright

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ce erected it is quite a sight to see the shipwrights guy and shore it up until the whirley holds it in position. It must be placed with absolute accuracy, or the slightest miscalculation would throw the whole plan askew, and cause the ship to list. Working both ways from the centerline, the shipwrights busy themselves, some laying out the plan, others guying and shoring up bulkheads and shell plate. Each ship has its own shipwright foreman and two leadmen, but the crews move from hull to hull fulfilling special missions. When the double bottoms crew finishes its task on one ship it goes on to the next one to do the same thing there, and so on. Each crew has around a dozen workmen, and there are about 26 shipwrights on each hull. There are also launching crews with their own foreman. The entire department carries a personnel of about 1200 shipwrights and helpers, and slightly over 30 transit men and rodmen.

The next ship over is farther advanced. Bulkheads and decks are mounting rapidly, with shipfitters fairing them in exactly, using jacks, turnbuckles and wedges. In the wake of every shipfitter or two is a tack welder who tacks down the steel at intervals frequent enough to hold it securely in place till a regular welder can make the job permanent. A burner usually trails in the wake of every group of shipfitters to do the necessary trimming that makes the job ready for the welders. Shipfitters customarily work in crews of from 7 to 10, and certain crews follow certain tasks. There are specialty crews for hand-railing, ladder and hawse pipe jobs. Over on the next ship a specialty crew is fitting machinery foundations to the dock.

It is the Erection Department that orders the sections in regular sequence as the workmen become ready to handle them. All told, the department has about 1700 men and women on its payroll.

In the Assembly, about the yard, in the Bays, on the Ways, and all over the ships you have been passing sweat streaked men and women in leather trousers, jackets and gloves, and with a headgear that rivals a gas mask as a disguise. These folks are smoked and grimy as an old-fashioned teakettle, and they have a casual way of startling the innocent bystander with a blinding flash from their welding rods. Every seam in the ship is melted together by them, and every Liberty carries a total of nearly 44½ miles of steel that has been welded into those seams. All told, the Welding Department has approximately 4800 people on its payroll with about 3 welders to each burner, and a little better than two men to every woman.

A welder's job requires skill and patience. It is dirty work, performed in cumbersome clothing, and often in confined spots filled with smoke and fumes, but a good welder likes his work in spite of these drawbacks. The leathers must be worn for protection against flying sparks, and the weird looking hood has a special pane of glass to protect his eyes from the blinding glare of his arc. As the temperature of the arc reaches 6500° Farenheit, the light is so intense that unshielded eyes would be damaged by exposure to it.

If you want to study the welder in his underground haunts, ask the guide to take you over to that hull where the double bottoms have just been set down upon the shell plate. As you step onto the tank top you see little spurts of flame shooting up through the unfinished seams between the tank sections, and you realize that beneath you a man or a woman is plying his rod in overhead welding. All over the

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top manholes are scattered, and over every manhole is a blower or a box that ily forcing fresh air through the tanks beneath you, or sucking out the and smoke. Without those ventilation measures welders could not work in ere in such close quarters. Now and then a box lid is suddenly lifted, and through the manhole pops a welder, for all the world like a doodle bug emergin his dugout. There are 35 or 40 welders at work beneath the steel you are ding on. They are knitting floors and intercostals to the keel plate, and jo sections of tank top. Welding in those low-squared-off tanks is about as han fixing a tire under an office desk would be.

pecial branch of the Welding Department takes care of supplying fresh air not y to welders, but to other craftsmen who need it. (Painters and pipe welders often dependent upon blowers.) The ventilation men have an office over on We here record is kept of the location of every one of their 300 blowers. Their argest blowers (Austins) have 7½ horsepower motors, will put out 15,000 cubic t of air a minute, and weigh about two tons. Every craneway has a designated ot reserved for blowers. This is where the trucks leave them till the whirleys ok them up and plunk them down on the ships' decks.

r the office, back under the shipway, is a storeroom where supplies are kept. to see a "pair of long pants", and they will show you a heavy canvas tube t has only one channel for about 8 feet from where it connects with the blower n splits into two channels that may be anchored in two sections or left to fla e like trousers from a clothesline on a windy day. Single tubes are called ocks". The office is accustomed to receiving such requests as, "I need a pair g pants and a short sock for the number 67 blower on Way 5". In the deep tank re 4 or 5 welders are working, 5,000 cubic feet of air per minute is brought i ough a 50-foot pair of pants.

hough this tubing is tough and heavy it is frequently cut or snagged by weight jects and sharp steel corners that drag across and often tear it. To keep it i air the ventilation men make their own special needles from welding rods and up the gaps with stout linen twine. On the shelves of the shop are piles of and pants in sorted lengths, mended and waiting to be ordered out. There i a great deal of 5-inch flexible metal tubing that is used as the socks are d. The men do a great deal of repair work on this, too.

Welding Department has a total of almost 4800 workers, with two offices on th and one on the Outfitting Dock. Under the Superintendent are 18 supervisors Ways, and an assistant superintendent and 3 supervisors on the Dock. About of the workmen are burners.

the time you hit the Plate Shop you have noticed a great deal of burning on. All through the Assembly Shop, and wherever there are jigs about the their torches have displayed colorful fireworks. Perhaps you have noticed al burners busy upon the fantail. Their job is difficult, and requiresence and skill because of cramped positions and almost inaccessible spots. the tank top, industriously trimming sections that were left a little too long to avert the catastrophe of their being a little too short, are several ers with machines. Most of the burning on the Ways, however, is done by hand.

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A woman motions you away from a bulkhead, and a shower of sparks shoots through a fissure in the steel. A burner is cutting a passageway for a pipe. You pass directly under a partly finished deck edge, and a man shoos you away. Suddenly sparks cascade down, and in their wake a narrow ribbon of red hot steel drops to the level below. It seems that the safest place to be around a burner's torch is directly behind it, but care is taken to protect the innocent bystander from placing himself in danger.

Suddenly you are curious about pipe welders. The guide decides to take you through the Pipe Department next, as pipe welders work with pipefitter crews and belong to that department.

Across to the Outfitting Dock you go, and down along the whirley track till you come to an area that is piled high as Iowa corn with pipes of all sizes, kinds and contours. Pipes straight as ramrods, pipes in loops, spirals and switchbacks, pipes that are contorted into patterns that would make a pretzel dizzy. They are piled upon the ground or hung over racks till anyone questing for the Pipe Shop must travel through deep lanes between the stacks.

In the Pipe Personnel Office you learn that the department is the third largest in the yard, and has about 2500 men and women in its employ. Since its first year it has operated with A. (Tony) Robinson as its Superintendent. You are told of a Marine Pipe Office that serves as a clearing house for pipes, fittings, valves and hangers, and of a Pipe Fabrication Office that cares for pipe blueprints and keeps a perpetual inventory of all the valves and fittings that are in the storeroom of the Fabrication Shop.

Your guide takes you into the Pipe Fabrication Shop, where you watch a 6-inch pipe being bent as though it were rubber. There are 6 pipe bending machines in this shop, and they are all busily putting curves and kinks in pipes with amazing accuracy. You move over to where a large pipe on a slab is being heated red hot with torches so that it may be pounded and pried to a certain angle. Pipefitters are using dogs, chains and come-along jacks to help them shape the pipe. When bending large steam pipe they put 1500 pounds of water pressure into it to keep it from flattening as they work upon it.

Overhead, running from the front of the shop to the welding room at the back, are two traveling chain hoists with chain blocks and suspended slings for the carrying of heavy pipe.

On the floor above is the Pipe Assembly Shop. Here pipe for the ship's engine room is assembled on jigs that are set up to represent the manifolds and pumps with which they are to connect. The measurements are exact, so if pipes fit this "mock-up" they will fit in the engine room. After they have been tack welded they are taken down to the welding room to have as much as possible done on them before they are transported to the Ways.

The mock-up saves uncounted time by eradicating mistakes that otherwise might not be discovered till the pipe was being installed on the ship, and the Pipe Department is proud of being the originators of the procedure. Other shipyards soon adopted it, and its benefits became widespread.

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In a corner of the room half a dozen pipefitters are making from waste material pipe tees, laterals, bellmouths, and scores of other fittings. Using a small furnace, a collection of dies, a tub of water and odd scraps of metal, these workmen produce whatever fittings are needed to take the place of supplies that are hard to procure. Requests for the making up of such fittings come from the Maritime Commission.

Another time and money saver is the little Gasket Shop, where the inspiration of an enterprising printer turned a small printing press into a gasket cutter that furnishes the Pipe Department with all the gaskets needed. They are cut from rubber, lead, asbestos or canvas, and are made in 250 different shapes and sizes.

Down the stairs and to the back of the shop you go to investigate the Pipe Welding Shop. The department trains its own welders, for the art is one that takes special instruction. It takes about 300 hours to learn the trade, and the student must choose whether he will learn gas or electric welding. Gas welding is used for pipe that is less than 2 inches in diameter, and electric welding for pipe that is over that size.

The Pipe Welding Shop is planned to make the tasks there as easy as possible. Slabs and jigs are set up for the welder's convenience. Outside the shop is an automatic pipe turner which runs at a variable speed and keeps the pipe in a position so that the welder can work from the top at all times and can use a rod larger than the customary 1/8 inch. This device speeds up a job that would ordinarily take from 30 to 40 minutes to 9 or 10 minutes. This pipe turner is another time saver designed by someone within the department.

Pipe welders do a good deal of repairing and salvage work. That one who is so intent upon a boiler is mending a spot that was damaged in transit. Beyond him another man is busily repairing a lifeboat that came to grief while it was being loaded on a ship. But most of the slabs and jigs are holding pipe that is receiving as much welding as can be done upon it before it is sent down to the Ways, for such work is more easily accomplished in the shop where space, position and the absence of other craftsmen simplify the job.

You decide to investigate pipefitting and pipe welding on the Ways, but enroute you look into the Dock Pipe Shop, where about 75 pipefitters and several welders are fabricating pipe for steam and water systems on the ship and making manifolds. Besides two small pipe bending machines there are a dozen pipe cutters and threaders. Many women operate the threading machines, and some of them are experts.

These pipefitters assemble a great deal of the pipe they fabricate. A heap of bent pipes, an assortment of valves, a small pile of nipples, a capable pipefitter -- and lo, a manifold takes shape as you look on. Larger pipe, a workman with a few couplings, a wrench and a drill -- and one of the magazine sprinkling systems has been created. Many pipefitters bring a job into the shop, do the required work themselves and leave with the finished article.

At the rear of the shop pipe welders are busy upon double outlets for hose connections, spud welds, reducer welds, cleanout couplings, etc.

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You leave the Dock Pipe Shop, determined upon reaching the Ways, but the guide pulls you into the Refrigeration Shop. Here about 70 pipefitters and pipe welders are fabricating and assembling manifolds, sounding and voice tubes, and the telemotor system (the hydraulic system that connects the wheel with the rudder).

You watch a man brazing copper pipes with a gas torch and a silver rod, and you notice that the valves of the manifold are wrapped in wet waste to protect them from the heat of the torch. Another man is brazing telemotor fittings.

Nearby a pipe welder is shaping and burning a sheet of lead for a wooden box that the radio room has sent over to be lined. Both brazing and lead burning are done with gas torches.

Once more you head for the Ways, and this time you reach your goal. As you descend into the hull of a ship the guide warns you that you might as well expect to get dirty. Down ladders and stairs you go to the lowest level. The engine room floor has not yet been installed, and you step down upon the tank top to find yourself knee deep in pipes that stretch across the deck to rear themselves before a manifold, a condenser or a compressor. One group runs from the double bottoms to a manifold with a set of valves that control the flow of the fuel oil, and can transfer it from any one tank into any other. There are 15 such tanks, and about 30 pipefitters and welders will be working on the fuel oil system. Another system must be installed to carry the oil to the burners. Because oil must be heated to the right consistency to be drawn off, each suction pipe is encircled by a steam heating coil. These coils mean another system of pipes, another manifold and another crew of pipefitters and welders. There is a bilge and ballast crew, a crew to connect the main circulating pump (and the twin pump that is an emergency precaution) to the main condenser, a boiler feed pump crew, and crews to install the sounding and vent, the salt water, the steam drain system, and others.

Pipefitters will swarm through the ship as long as she is on the Ways, and when you go over to the Outfitting Dock you will find crews of them all over the ships there.

As you move to more nearly completed ships you pause to watch and listen to the riveters who are rat-tat-tatting upon the side of the hull like a flock of woodpeckers upon the trunk of a huge tree. The scaffolding is swarming with them. Right up the ribs of the ship with the rhythm of machine guns they are hammering the red hot rivets into place. Approximately 20,000 rivets must be driven before the job is complete.

You follow the guide to the deck where stands a small, portable heater. Tending it is a riveter-heater who shoves the rivets into the firebox, watches them till they have attained the right heat, removes them with tongs and tosses them into the waiting cone of the riveter-helper, or "passer". Rain makes the rivet sizzle as the passer, firmly gripping it with tongs, inserts it in place. Then the holder-on holds it solid while the riveter on the outside pounds it into a watertight finish with his powerful rivet gun.

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The ship's frames, and corresponding spots in the edges of the shell, have been punched in the Plate Shop to a 13/16-inch diameter, then (after necessary welding in the vicinity has been completed, and there is no danger of further shrinkage) reamed to a 15/16-inch size.

Riveting is a noisy operation, but when an over-zealous chipper sets up a din nearby you abandon conversation. The chipper needs no helper. What he does need is a chipping gun, a wide assortment of chisels, a lot of brawn, and reinforced eardrums. The shock of the gun is powerful, and the noise is devastating.

A chipper's tools consist of a heavy number 3 gun which is used for ordinary jobs, and a number 1 gun which is used for the bobbing of rivets and caulking of seams. Into these guns he fastens chisels of the type to suit his purpose: flat chisels to flush weld, diamond chisels to remove clips and open up seams, round nosed chisels to clean out slag and leave a smooth surface for a welder to work on, a roughing tool to peen weld, to take the stress off it and knock off the slag, etc.

Chippers must bevel and groove for the welders before outside work can be done on the shell plate, and before many other jobs that welders finish. When stiffeners in adjoining sections do not match, when a weld is found faulty, or when bulkheads and frames must be refaired a chipper is sent for to cut loose the incorrect piece, clean out a seam or smooth a surface. Most mistakes would be irreparable if it were not for the chipper and his chisel.

Liberty ships have 24 tanks to be tested, and about 100 tank testers are engaged in making sure that every tank is watertight. Each is checked, dry tested and water tested before being passed. For the water test the tank is filled with water, and a hose is run from a bucket of water suspended at a forty foot height down to where it is connected with the tank cover. If the water level in the bucket drops, the testers know that the tank is leaking. Chippers can often bob down the outer seam on the tank's wall and correct the leaky spot. If they fail in this, they must chip out the seam, and a welder must do the whole job over. Then the test must be repeated.

The men of the Riveting Department laughingly say that what it takes to be a good chipper or riveter is thick muscles and a thick head. Thick muscles they must have, and thick eardrums, but you are not apt to find a thickheaded one among them. They are a good cross-section of rugged men who daily conquer a rugged job.

The entire department has about 1300 men on the payroll — and not one solitary woman.

While you were going through the Assembly Shop you saw a great deal of Unionmelt welding done. Bulkheads and deckplates are ideal material for the special features of this process because they offer a flat surface on which the machine can travel, and the seams to be made are long and uninterrupted. Although you saw both Unionmelt and Unamatic (open arc) machines at work you paid little attention to them as you passed through the Bays. But you really must have a good look at one before you leave the Ways.

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The guide takes you over to where a tank top is being installed upon a keel. Unionmelt machines have already done their work upon the keel plate, and now they are set to join sections of the double bottoms. Before this job is complete the machines must accomplish over 4,00 feet of welding, and they will get it done in a fraction of the time that it would take for welders to do it by hand. The Unionmelt Department has half a dozen machines on the Ways, for its work includes not only jobs on keel and double bottoms but on flat shell plates.

As you walk out onto the tank top you notice a Unionmelt operator stepping over to the transformer to adjust the controls. Voltage, current, speed and rod feed are all determined through those controls. Nearby sits the machine, and as it advances across the plates the operator guides its course, while he backs ahead of it on his wheeled stool.

You are intrigued by the small funnel that feeds flux (a furnaced, sand-like material) into the crack ahead of the welding rod. As you watch, the machine leaves behind it a streak of moulten metal that wriggles, snake-like, beneath its granulated covering. When a helper uncovers it by taking up the loose flux in a suction cleaner and removing a layer of slag, a beautiful line of glowing weld appears. This is of finer quality than a hand weld could be because the flux made it possible to obtain and hold greater heat than could be achieved on an exposed job. The Unionmelt operator finds his task a pleasant one because he needs no hood — not even goggles — to protect his eyes from smoke, spatter, flashes and sparks.

You notice that the man who took up the flux is pouring the material into a hopper so that the stuff can be used again. He is enthusiastic about the merits of the process, and during your conversation with him he points out that much of the work done by Unionmelt needs only to be dogged down and tack welded in preparation.

You are duly impressed, for you have watched a long seam welded in a few minutes' time. As you leave, you speculate upon how it would revolutionize welding if only the process could be improved to the point where it could be used on vertical and overhead jobs!

You need explore the engine room level of a partly finished hull, and as you cautiously cross a plank to get out of the way of a pipe that is enthusiastically spouting the news of a leaky coupling, you glance down. Across the tank top spreads an inch or so of water in which bread crusts, chicken bones, scraps of pipe, lumber and steel are soaking. The guide, noticing your expression, explains that the water will be pumped out and a gang of laborers will load all the refuse into skips and leave the place in order. Their crews pick up and clean the entire ship, sending out skiploads of stuff as it accumulates. While you wandered about the yard you probably side-stepped their winch truck or one of their department's four dump trucks with a load of salvage or refuse. You have seen small groups of women pulling loaded dollies along the craneways, and you've stepped from under the path of burdened skips that whirleys were swinging aloft. There are some 200 of these skips at the disposal of the Labor Department. You have watched crews working with shovels, siphons, and blower pipes. Their gangs are busy around the Steel Yard, Paint Storage, Oil Dock, Brick Shed, Boiler Erection and Rigging Departments. They unload firebox bricks, and lend a hand wherever needed. Their activities range from the sandy shoreline of the lower end of the Ways to the parking lot at the upper side of the shipyard.

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When you comment upon the number of women who are doing this work, your guide answers that about 3/4 of the thousand workers in the Labor Department are women. Whether it is because they are natural cleaner-uppers or because men seek jobs with fatter paychecks, the department is lucky to have women, for it would have been very short handed had not the feminine sex stepped in and manned the staff. There are big, muscular women who handle wheelbarrows of concrete; there are lithe, little women who creep around in double bottoms and, with whisk brooms and dustpans, clear away all trash. There are even leadwomen. The size of their crews depends upon the type of work being done, but the usual range is from five to fifteen.

Your attention is attracted to where an oil soaked rag, ignited by sparks falling from a burner's torch, is sending up smoke and flame. A laborer, passing through with a bucket of odds and ends, beats the fire with her broom, and pushes the smouldering remnants into the water below. The air is a little thicker from the incident, but what with the smoke and fumes from the welders' rods, no one seems to notice.

You are standing near the mouth of the shaft alley, and a man comes over to shout into your ear that you must move out of the line of vision of a couple of Marine machinists who are setting up a transit in a precarious spot across the engine room space. The newcomer smiles at your questions and leads you over to the man who is squinting through the transit. He is the Marine Department's Installation Superintendent, A. L. Anderson, who has been in charge of installing ship's machinery since the fall of '41. It is his men who assemble and line up the machinery that is installed on the Ways. It is they who prepare the bases that support those machines and see to it that the installation is absolutely true. At first such assembling was done right in the hull while men from numerous other departments seethed around them. The racket was deafening, and the bustle nerve wracking, so Anderson suggested putting the machines together out on the Ways where, with the use of special racks, cylinders could receive their pistons and valves in comparative peace and quiet. The innovation was the outgrowth of the whirleys' sturdiness, for the trams that handled material during the last war could not handle weighty objects.

The job that you have come over to watch is the running of the shaft line. Taking the center mark from the shipwrights' calculations, the machinists place a transit near the forepart of the engine room and sight aft through a couple of targets that are set up at the far end of the shaft alley, some 200 feet away. The man near you and those beside the targets converse by means of a telephone connection that they have set up for the occasion. A number of brief conversations, a lot of hand signalling and moving of sights -- and the line is drawn. Then you are allowed to peer through the transit at the pin point of light that gleams through the far target.

Crews in this department range from the four who lined up the shaft to the group of 30 or more men for large jobs. Two dozen machinists prepare the foundations for machinery and install various small tanks. A score of men install auxilliary machinery, such as condensers and pumps, a dozen workers do the same for the ship's turbines, and a crew half again as large take care of the overboard sea suctions and the boiler mountings. When the ship has reached the proper stage of construction, three dozen men will install the deck machinery and the davits, do the deck

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illing for the pipefitters, sounding lines, and test the 80 odd docks in the n and the fresh water tanks. It takes about 20 men to bore the stern frame, stall the stern tubes and the bearings for the propeller, put the shafting the shaft alley, and install the propeller shaft, the propeller, the rope rd and zinc plates along the propeller frame, and the rudder post.

en the ship leaves the ways the work of installing machinery will be about 85% plete.

hen you begin to ask questions about the huge boilers in the engine room your ide insists that if you want their story you go over to the Boiler Erection Shop. ay you go, past the southern side of the Plate Shop and on to the small building hat houses boilers in the making.

Within the shop you walk over to a temporary foundation where boilermakers have already laid the firebox brick pans, set the support posts on the front corners and completed the firebox itself. They have fitted the lower side casing panels, dded the inner front fire sheet and mounted the mud drum support bed. The sheet to which the oil burners are bolted has been attached, and the rear header channel upports and rear fire panels have been added. The mud drum has been slid into place and leveled. That mud drum is the first steam circulation unit installed.

engthwise above the firebox 22 sectional headers have been leveled, spaced and oined to the mud drum. The 5-ton steam drum sits atop the header front. Flame plates, frame blocks, and baffle (or deflection) plates have been inserted. (Tubes nd nipples used in this operation are rolled in the shop.) Brackets for the soot blowers and the elements that rest there are in place. The pre-assembled superheater has been secured on top of the rear unit.

Just as the men finish building a base between the drum and the heater, a whirley drops its gear down through a hole in the roof, for all the world like a prehistoric monster dangling bait to fish out its prey (if you can imagine a prehistoric monster fishing). With the help of riggers, it snags the boiler and lifts it onto the "boil-out" platform for a thorough cleaning. The boiler is heated, and the tubes, header and drum are steamed out and wiped clean. This is a very particular job, nd it must pass Maritime Commission inspection.

Boilers are made in pairs, and as you leave the shop you inspect a second boiler hat is almost ready to follow its twin from the shop.

ou head back for the Ways to see a boiler being installed in a ship's engine oom. Down you go into the hull of a ship that is about three days old -- that is, hree days past its keel laying. Marine machinists have leveled the boiler foundations that sit on the double bottom sections. Boilermakers have tack welded chocks to the foundations and drilled four large bolt holes in each corner. Boiler ection welders have welded the foundations to the tank top. Everything is in ddiness for the boiler. And here it comes, right through a gap above your head. marvel at the unerring instinct with which the whirley lowers its burden onto foundation -- only it isn't instinct; it is the expert knowledge of the riggers crane operator involved.

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A boiler weighs 37 tons it is truly hard work to place it exactly. The boilermakers use a sledge hammer and drift pins. There is a steady clanging of steel upon steel, and a smell of sweat in the closeness of the engine room area. When the placing is perfect, the men bolt and weld the boilers to the foundation corners. Then they jack down the brick pans and weld them to the inner foundation framework. Then metal strips are inserted and welded to close the gap the chock pads have left between the top of the foundation and the bottom of the boiler. A bit more drilling, and the job of securing the boiler to its base is completed.

If you could tarry long enough you would see scaffolding erected so the boilermakers can mount it, caulk the gaps between the headers and seal them with an air-tight compound. You would see dampers installed and four oil burners provided for the boiler. You would witness tests conducted by inspectors of the U. S. Coast Guard, the American Bureau of Shipping and the U. S. Maritime Commission. You would watch the smoke uptakes and (after the superstructure has been put in place) the stack installed.

There is also the insulation of the boilers to be done by a crew of brick macons. They use between 20 and 25 tons of material — fire brick, insulation brick, asbestos, fire tile and plastic.

It would be fun to watch the mortarmen and laborers, forming sort of human conveyor-belts, swinging tongs of brick and cartons of other material from the number 3 hold — through an access hole in the forward engine room — and over to the waiting bricklayers in the boiler.

But pshaw! If you are going to cover the yard today you must be on your way.

You brush carelessly by a painter — then glance apprehensively down. Sure enough, you are branded. Everything that stays in the yard long enough wears the painter's trademark. Each Liberty carries 3,000 gallons of it. No wonder, you reflect, that a ship is deemed feminine. Only the fair sex would use that much paint to stay young and beautiful.

The Paint Department has about 1500 painters and scalers on their payroll — and no wonder, for painters, after the scaling is done, must cover the entire ship from two to four times. There are two main offices — one on the Ways, and one on the Dock. Painters and scalers of the first group work around the New Assembly, between the craneways, and on the ship before she is launched. Those of the second group cover the work on the ship after it moors at the Dock, and busy themselves in the Mast Yard and the New Storage area, the Joiner's Building, the Fitting Stores, and the Marine Paint, Stencil, and Electric shops.

The entire yard is a garden of color. Racks to hold steel sprout forth with the orange red of the Indian paintbrush; lifeboats, hatch beams and masts bear the soft grey of the pussywillow; shaft alleys and vents sport the warm shade of marigolds; fresh water tanks wear the somber red brown shade of late autumn leaves. On a platform beside the south fence nearly 13 miles of grayed batten boards lie in readiness for the ship's holds, and the black of stacks and the white of pieces of ship's cradles add variety.

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A bay on the Ways a superstructure is receiving a gray coat over its red lead and a red lead shaft alley is being finished inside with cream gloss. Painters have cement washed the shaft alley in the stern assembly, and the chain lockers, and are pouring cement into them.

If you wish to go within that hull you will see the engine room bilges and sump receiving red deck, and the miscellaneous oil tanks taking on a cream gloss finish. Later, when water tests have proved all the seams to be tight, the unfinished spots on the hull will be touched up.

You travel down past several more ways till you come to a ship that will be launched the next day. Painters are busily spreading a coat of anti-corrosive over the hull's surface below the waterline. It is the third coat, and when it has dried for eight hours a coat of anti-fouling will be added. This must be wet when the ship enters the water, and is applied within 24 hours of launching. It is to keep barnacles from clinging to the hull.

Everywhere you have gone — in buildings, shops, in yard areas, along the Ways, and all over the ships, the yard has been vibrating with the power and light of electricity. It is spread, like a network of nerves to every nook and cranny over the whole area. If a shop's power fails everything is at a standstill till an electrician corrects the trouble; if a whirley runs over its "baloney" it stands helpless, till an electrician brings it life again; the swing and graveyard shifts are completely dependent upon the lighting system established and maintained by electricians, and even the day shift would be sadly hampered without it.

The Electric Department has a total personnel of about 2400 — which includes electricians, welders, burners, helpers, draftsmen, engineer aides, expeditors and field clerks. Their department is broken up into branches — yard maintenance, maintenance on the Ways, dock crews, engineers, shop crews, and a launching crew. Their superintendent has an assistant superintendent, and about 30 supervisors and assistant supervisors. They have a main office, a supervisor's office, an electric shop office and other small offices.

The yard maintenance crews service all electric equipment, from the IBM machines in the Administration Building to the whirleys scattered about the yard. They keep track of every electric appliance in every shop and office.

If you go to visit the main sub-station where the shipyard's electricity is brought in to be distributed to the 28 sub-stations that are scattered about the yard, Every sub-station has its oil and air circuit breaker which, in case of a surge on the line, will automatically break the circuit. It takes around 34,000 feet of underground cable to distribute power all over the yard, and 11,000 feet of 15,000 volt cable to supply all the sub-stations.

If you pass sub-station 2 you should look into the compressor house with its 200-horsepower motors that operate on a 2300 voltage. And glance into the pump house that distributes water to the shipyard. It is the yard maintenance crews that keep these motors running smoothly. They also take care of the welding machines and of some 750 electric heaters that furnish the only means of warmth for many of the workers.

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...s you were looking over the ships on the Ways you took the lighting and power ...granted. Now you are curious about how it was furnished, so you ask your ...ide to take you back and let you poke an inquisitive nose into the wiring situ-...on on the Ways.

...ll discover that each scaffold supports 7 tiers of permanent light streamers, but ...e lights used under and within the hull are suspended temporarily wherever they ...e needed. Within the ship the bulbs are strung up by hooking the leads to stiff-...er beams. "Adelines", or "Chinese hats" — floor lamps with large reflectors — ...t about on the top decks and in the Bays. Scores of racks that support drop cords, ...treamers and spare lamps stand about on the decks and the Ways.

...ong the inside of the keel blocks every other block has a plug-in for the conveni-...ce of shipwrights and painters, and there are numerous leads varying from 15 to ...0 feet always available. To amplify the light the bulbs are set in reflectors ...de from discarded welding boxes or dishpans painted white inside. The dishpans ...ld clusters of bulbs that diffuse a large circle of strong light. Every crane-...y has transformers that pass along 220 to 110 voltage for lighting, and switch-...oxes that control the systems. Aboard each ship there are from 8 to 14 load centers ...hat are main distribution points for temporary lighting. There are also, on each ...hip, two portable transformers that remain aboard till the ship leaves the Outfitting ...ock.

...aintenance on the Ways calls for a crew of boat maintenance electricians who test ...ll temporary light cords and hubbles and install and maintain all temporary light-...g on the ships.

...for power, there is a bus below the craneway on each side of every hull. Weld-...g machines, test pumps, boring bars, etc., receive power from 2,000 ampere bus ...rs that pass on 440 voltage.

...ross the yard you go to the Electric Shop where not only repair and testing but ...e manufacture of hundreds of wireways and straps is accomplished. Segments are ...de for whirley controls; streamer hangers are turned out monthly in quantities ...hat range from 12,000 to 15,000. Much drilling is done and the 5 drill presses ...re in constant use. The repairing of welding machines, blower motors, and all ...f the yard's heavy electric motors is handled here.

...the floor above, electricians are making up navigation lights, repairing and ...nstructing electrode holders, and compensating binnacles. At the end of the ...oor is a small gadget shop where labels, tags, and name plates are made by the ...ousands. There is also a radio room where radio and gyro crews do prefabrica-...on work upon battery boxes, direction finders, loops, etc. When such equipment ...s sent over to the ships these men set up and test it.

...a separate office on this same level is the Electrical Designing Office, where ...bout 50 engineers, junior engineers and engineer aides do tracing and layout ...ork and distribute print information to every branch of the department.

...descend the stairs and visit the materials room, where electrical supplies ...re stored in towering rows of bins. Half of the room is used for Marine supplies

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and half for maintenance. Each half has its own expeditors who take care of the material. Altogether there are about 35 of them, and as they receive orders for material they make out releases and send it off. Next you peek into the Material Control office, where the supplies for Oregonship's electricians are ordered, and the arrival of Marine electric supplies procured by the Maritime Commission is recorded.

As you leave the Material Control office you decide to look into the electricians' blacksmith shop. There you find layout, welding and burning tables, and all other equipment needed for the making of junction boxes, switchboxes, wiring collars, Degaussing frame riser boxes, frames and stands for radio equipment, heavy bracket lead bushing, etc.

One reflection comes to you as you bid goodbye to the shop: with so many women learning the ins and outs of wiring, madam housewife will be repairing her own ironing cords and vacuum cleaners after the war.

The Outfitting Dock

You have seen a bit of the Dock while you were investigating the offices, but you haven't been on a ship that is afloat. It is a far cry from climbing switchbacks of stairways built into scaffolding to reach the top deck of a ship on the Ways. The guide leads you up the gangplank onto a ship. Stepping on the main deck you pick your way around a spot where a painter is spreading paint across the deck with complete disregard for your sightseeing plans. You skid a little as your shoes respond to the slick film their soles have just acquired. Crowding past a shipfitter who is fairing a door, you enter the superstructure. You squeeze past an electrician who is pulling cable, shield your eyes from the sudden flare of a welder's arc, peer into a cabin where a burner's torch is sending forth a spray of sparks, and trip over a hose as you dart after your guide. Down you go to the galley, to where a group of sheet metal men are installing the range, sinks and bins. A huge metal container catches your eye, and you begin to speculate upon the reason for having a washing machine in a galley. Your guide, however, explains that you are looking at the stew kettle. On you go, not knowing where you are till you are told. You peer into the meat room. Finally you find yourself in the engine room where you pause to watch a group of men who are busily lining up machinery. Those, explains your guide, are Marine machinists, and a great deal depends upon the accuracy with which the machines are placed and leveled. Nearby, electricians are connecting the electric motors that operate the machinery. Looking over to the boiler drums, you see sheet metal men encasing the drums in metal jackets that cover heavy insulation already installed. There is so much activity that the whole scene is confusing, and your guide decides to put you in the hands of various craftsmen who will let you have the whole picture by crafts. That is a real break for you, for by the time you have followed a dozen different craftsmen all through the ship you should be truly well informed.

Pipefitting on the Dock is largely a finishing up job. Systems that have been installed only to a deck or a bulkhead are now completed. Refrigeration and galley installations and piping, and the furnishing and hooking up of washrooms, toilets, laundries, etc., however, are projects that belong to the Dock. As soon as the ship arrives about 18 pipefitters and a couple of pipe welders set to work

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connecting the manifolds that control the refrigeration system. Next, they run pipes from the manifolds to the refrigeration room and connect them with the compressor in the spare parts room.

Another refrigeration crew installs the four refrigeration rooms — the big meat room, the fish room, the vegetable room, and the small dairy room with its ice cube maker. These all have sections of pipe that are connected with silver-brazed copper tubing. The same crew also installs a small refrigerator in the officers' pantry and the crew's mess. When the refrigeration pipes are connected a special crew conducts pressure and vacuum tests to make sure there are no leaks.

A dozen men hook up the 29 gas-filled cylinders in the CO_2 (fire extinguisher) room with a firetox in the engine room, and the fire main crew installs a 5-inch pipe which runs the entire length of the ship along the cargo hatches and through the superstructure at various levels. They also install pipe sprinkling systems through the fore and aft magazine rooms. Another fire precaution that pipefitters install is a machinery-space system that draws water from outside.

About 50 workmen finish up jobs in the machinery space, install the smoke indicator and soot blowers, gauges on the boilers, and pumps, and dials on the gauge boards.

A specialty crew of about a dozen pipefitters and pipe welders lay out and burn over 900 holes for pipe to pass through. Other crews install the oily ballast line (an overboard discharge from fuel oil tanks), drains from the machinery to the bilges, and the overboard discharge from the main condenser.

There is also a crew that installs ball checks on vents, and runs pipes from a storm oil tank to outlets where there are control valves that release oil into the sea to quiet the white caps when the weather is too rough.

So far the piping has concerned mostly the control and safety of the ship, but there are crews that devote their time and attention to the welfare of the men aboard her. A sanitary wash crew of about 45 pipefitters and pipe welders bring fresh water to the wash basins, toilets and showers, and hook up pipes to carry away the waste. A steam crew of about 55 workmen brings hot water to pipes and showers, trays, basins, sinks, coffe urns, etc., and pipe steam to the radiators. They also pipe water from the scuttlebutt to the drinking fountain.

As you travel down from berth to berth the piping becomes more complete. In the fifth berth, you see a crew of about 16 pipefitters assembling and installing toilets, wash basins, showers, trays, etc. They have to work fast, for they are allotted only one day in which to complete their work.

From the wheelhouse 6 men install voice tubes to the captain's quarters, the radio room and the engine room. Other lines are run from the chief engineer's room to the engine room, and from the hurricane deck to the wheelhouse.

A crew of about 10 installs the telemotor system by running from the wheel to the steering room two copper lines to carry the oil that rises or lowers at the wheel's direction and moves pistons to operate the steam engine that controls the rudders.

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When the pipefitters finish, the veins of the ship are all ready to start her pulsing with life.

Marine electricians cover 7 different channels of activity: there are cable, shop, layout, power, lighting, intercommunication, and testing crews.

A foreman of cable crews takes you in tow and leads you to the No. 3 hold where huge reels of cable — about 4 miles of it altogether — are waiting to be unwound as the cable is pulled fore and aft from this spot. You saw raceways being made up in the shop; now you see the purpose they serve as cable is pulled along them till it lies, stretched to its full length, supported and protected within the metal frames. That heavy cable is being pulled by an air tugger, but smaller ones are pulled by hand. Each cable has been measured and marked for one special purpose and taped around the spot where it will pass through a bulkhead. On each side of the bulkhead slack is left to relieve stress, and this is supported by hangers. Horizontal cables are supported every 14 inches, and vertical ones every 18 inches. Main raceways, which are 12 to 14 inches wide, hold 3 or 4 tiers of cables. These raceways and the Degaussing system follow the second deck. It is on this level that the 400,000 circular mill conductor is reduced at junction boxes. If you go aboard the ship in the next berth you will see the raceways in the holds being covered with expanded metal shields to make them ratproof. No piece of cable is left unprotected.

All over the ship electricians are connecting winches, setting up lighting panels, junction boxes and switch telephones. They are hooking up the electric control for the anchor windlass and stringing the masts with flood lights and running lights. Crews are busy all over the superstructure, connecting an emergency generator in the generator room, setting up the intercommunication switchboard that ties in with the gyro compass, the radio, etc., installing fans, completing lighting systems throughout the cabins and halls, and finishing work in the refrigerator rooms, the galley and the scullery.

Down into the engine room you go. You find it swarming with electricians. They are wiring switchboards, hooking up motors, and testing panels, switchboards, motors and cables to make sure that everything is in perfect working order.

An SOS sent into the Electric Department's office will start men diving to the rescue, for they take great pride in keeping the nerve of the shipyard tingling with life.

Although riveting is all done on the Ways, the department is represented on the Dock by drillers and chippers, who have their own little headquarters from which their activities are directed.

All over the ship you have heard the rapid metallic tapping of drills as they make holes for the installation of doors, panels, hand rails, fans and hooks. For pipefitters and electricians they drill holes for brackets and clips, and for the shipfitters' installation of the engine room flooring they drill thousands of holes. It takes several foremen, about 10 leadmen, and 125 drillers to cover such work on the Dock.

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for chipping, about 80 chippers keep things uproarious as they remove pad eyes and launching clips, do preliminary dressing-down on the bases of machines, thrust bearings, etc. They also do grooving and beveling for welders, dress up storm rails and smooth rough metal edges wherever they discover them. You make no attempt at discussion with a chipper; he is too tumultuous for words.

In one of the nearly finished ships you peer into a refrigerated room and are intrigued by the beautiful paneling. Who, you ask, does that work? You are told that all such jobs are done by joiners who belong to the Buckler-Chapman Company. This concern worked on previous Kaiser enterprises — for example, the Bonneville Dam — and its work at Oregonship is done under a separate contract. If you watch for the joiners as you go from ship to ship you will see them installing refrigerated spaces, shelving and gratings, storeroom bins, cabin bulkheads, doors and furniture.

The guide points out Sam Ward as the fellow who has been in charge of laying out work for joiner crews since he did it on the Star of Oregon. From him you learn that at first the joiners were Oregonship employes working under the direction of Art Funk and Fred Teuscher, Buckler-Chapman's Superintendent and assistant. He tells you about how Walt Green kept the records in his portable office at the head of the Dock, and about the struggle of those early days. He knows, for he and Teuscher and Green have played a part in the finishing of every ship that has moored at the Dock. The company's work must have been good, he observes, for before one contract expired another was always signed. They were permanent enough to rate the roomy warehouse that was completed in March, '42. It sits north of the Rigging Loft, and it holds the supplies that Buckler-Chapman furnish for their work.

After a ship moors at the Dock she still needs a great deal of paint to turn her into the beautiful, smoothly finished vessel that she is upon delivery. In the first 3 berths, 20 painters work on decks and holds, coamings and deck steam line pipes. The engine room voids and reserve water tanks are scaled and given their second coat of metallic brown. Flinkote is put on the ammunition rooms, and on the hurricane deck before and after the plastic armor is applied. In the 12 large vents and escape trunks painters are lowered in Bo's'n's chairs to apply a final coat of red lead. The job is an unpopular one, for the quarters are close, and painting from a suspended seat hampers action.

Over the ship the painters go, spreading red lead here, light gray there, and cream gloss in other locations. All parts that can be seen by enemy eyes are painted gray, rooms and passageways below deck get cream gloss to lighten them, while exposed walls and ceilings in the superstructure are sprayed with cork to prevent their sweating, then painted off-white. The rough finish is as decorative as it is serviceable. The engine room, with its deck, agitator pumps, settling tanks and fan of red deck, its walls and ceiling of cream gloss, and its engine, boilers and handrails of black, is striking.

In berths 4 and 5, about 14 painters give the ship's hull its final coat of slate gray. See that big barge with four levels. It has seven men working from it, and covering the hull to a height of 35 feet. Toward the prow of the ship is a smaller barge from which men can work to a height of 20 feet. Peer down into the

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narrow space where the ship's prow lies close to the Dock. There are a couple of painters working from a narrow, flat-bottom barge. When they have finished, crew members will let down swinging stages to whatever level the men on the barges have been able to reach, and complete the covering of the ship's hull. Painters have been spilled from barges and stages, but they rarely suffer anything worse than a thorough soaking.

As you walk down the Dock you approach a man signalling a painter who, from the edge of the ship's deck, is sweeping a long-handled brush across a spot on the side of the ship. Since he cannot see the place he is touching up, he is following the directions of someone who can. The handle of his paintbrush is 12 feet long, and the brush is set at an angle that reminds you of the brush broom in the hall closet at home.

Suddenly you begin to wonder about brushes and paint supplies, so the guide leads you back toward the center of the yard to the Paint Storage Building, where such material is kept. You step into the storeroom and find yourself in the midst of what it takes to keep a painter working contentedly. Cans of paint are stacked high, for the painters withdraw nearly 41,500 gallons of paint monthly. There are about 75 different kinds of brushes; with a big supply of each kind, for painters wear out about 1500 brushes monthly. An ordinary brush, used to red lead bare metal, lasts only about 10 days, but a cabinet brush that is used for finishing work lasts around 45 days. Never have you seen such brushes. There is the "tomahawk" brush (which angles hatchet-fashion from a two foot handle in such a way as to simplify the painting of the top or lower edge of ledges), and 5-inch "block" brush, the "stubby" (trimmed off squarely for the working of paint into corked surfaces), a brush that looks like an oversized water-color brush, and other varieties too numerous to mention. You also see quantities of cleaning fluids, concrete, oil, putty, and cork, and you leave with the feeling that re-doing the garage or the kitchen might be fun if only you could dip into Oregonship's Paint Storage supplies and implements.

Back to the Dock you go, for you still have much to see there. All over the ship you have noticed crews doing odd jobs — hosing down an engine room with hot water, pouring cement around the base of a mushroom vent and into the frame of the officers' refrigerator, and cleaning and drying a gun turret in preparation for the application of non-skid footing. You have seen them loading into the No. 2 hold the steward's supplies for the Trial Trip, placing coils in the refrigerator room and bottles in the fire extinguisher rooms. These laborers are part of the Labor Department.

The job that takes the largest crew is the cleaning and polishing of cabins in the superstructure. Much of this, as well as the work of cleaning and drying just ahead of the painters, is done while the ship is making her trial trip.

The upper floor of the Outfitting Building is given over to the Marine Department. The superintendent, a number of supervisors, the captains and steward, and others have offices here. Dock problems from those encountered by the installation machinists to those of the tank testers and the trial officials are thrashed out here.

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There is still a lot of work for the Marine machinists after a ship is moored at the Dock. Besides the installation of the steering gear and all locks and reach rods, they have such jobs as the preparation of bases for and installation of galley machinery. You must have noticed them in the engine room, lining up turbines and other machines which, though alined and installed on the Ways, must be carefully checked and possibly corrected now that the ship is afloat.

Marine machinists are especially busy during Dock Trials or Trial Trips, for they are responsible for the way the machines work. Sometimes an unsatisfactory test means that the men must tear down and reassemble a machine. Always this is a busy floor, but on Trial Trip days it is like a beehive that someone has just disturbed.

That man who is standing on the boat deck is a boat supervisor from the Outfitting Department. He shoulders the job of seeing to it that the finishing and outfitting tasks of that boat run smoothly. He makes sure that the blueprint shack contains all the prints the craftsmen need. He smooths out work conflicts between the crafts, and keeps a close checkup on the progress of the boat in his berth. A ship that looks as bare as Mother Hubbard's cupboard when it arrives at the Dock acquires additional outfitting items in each berth, till, on leaving the final one, it is fully equipped. As every ship has a boat supervisor for each ship, and the Dock has one, also, there are over a score of these men in the Outfitting Department.

The department also directs the activities of production laborers on the Dock. These laborers, under a labor walker, take charge of outfitting material as it arrives from the warehouse. Articles that are dumped loose on the Dock must be placed aboard. Some of them are loaded into skips, some are swung aboard by the whirleys without having to be rehanded, and some are toted or trundled to their destination. Then the stuff has to be put where it belongs. Doors and dishes, linens and latchkeys, pillows and pans -- they all have their resting spots. The same workmen gather up and dispose of refuse and scraps that would otherwise clutter up the ship. Such stuff is carted off to their small Outfitting Storage yard at the upper end of the Dock. Here it is sorted and sent to its final destination. Some of it goes to the Salvage Yard, some to the city incinerator, and some back to any department that will have further use for it. The same group also keeps the Dock clear of unwanted things.

As you navigate the hallways of the superstructure or pick your way around the engine room you are constantly squeezing past men who are painstakingly measuring, leveling and marking steel. Upon inquiring, you are informed that they are the Dock's shipfitters. They are all over the engine room, where they install the floorplates, and check and complete over 50 items. They swarm through the superstructure, fairing bulkheads, hanging doors, putting in handrails, and installing all manner of fixtures. On the hurricane deck gun steps and tubs, lifeboat stowage and liferaft racks are all permanently established by these men. They bolt down the Louvre House on the engine room skylight, and install galley foundations and wire mesh for magnesite floor finish. They set up the DeGaussing system which runs entirely around the second deck. They place staples for rigging, and put in countless dutchmen and brackets.

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ery crew of shipfitters has a burner, a welder and a burner in their wake to do the actual job of making objects permanent or of removing unwanted steel, straining bulges, etc.

ile you were at the upper end of the Dock you should have visited the Outfitting abrication Shop, where the engine room floor is made up, bounding angle is formed rom heated steel, and brackets are turned out by the thousands. Galley founda- ions, valve protectors for the deep tanks, gland and step plates for the shaft alley, and stowage for the ammunition rooms are all constructed here. Many things of other departments — for instance, small wagons — are also made up in this hop.

the time a ship leaves the Dock everything is accurately faired, the 25 non- atertight doors and 8 watertight doors all fit snugly, and all handrails, ladders, nd similar fixtures are permanently in place.

you stand on the Dock trying to envision the number of little things it takes o make up a ship, a rigger's shrill whistle startles you. Glancing apprehensively ward, you sidestep. A whirley is triumphantly dangling a vent above you. Though he suspended object has a big circumference its walls look thin, and you remark hat it doesn't look dangerous. Your guide assures you that if it struck you just ight — or wrong — it would neatly slice you. You go aboard a ship to watch Sheet etal men at work. Much of the work, you are told, is done on the ways. The first ob is the stripping of the superstructure — the installation of 3/4 inch angle etal strips at 18-inch intervals between bulkhead stiffeners. These strips, which orm the framework of the insulation, are welded in place by Sheet Metal welders. ile the superstructure sits in front of the Ways. The fidley hatch, the ceilings the boiler casings, and the machine hatch walls are also stripped on the Ways. oard the ship on the Dock you can watch Sheet Metal men stripping the ammunition ells. Verne Nelson, Sheet Metal Superintendent, tells you that the total length stripping would line up to nearly 4/5 of a mile. He takes you to the fidley tch where the insulation has already been installed, and shows you how Sheet etal workers fasten ribbons of asbestos to the stripping with metal clips or wires. men are just ready to place a galvanized sheeting finish over the whole surface whirl the screws in to hold it secure. You wouldn't want to watch those screws talled, for there are approximately 17,000 of them.

t you do want to see is the installation of the vents that pop up from all the ks like wide mouthed fish leaping from the water. These vents and their forced systems form the lungs of the ship. Without them the crew could not carry on pots like the engine room, and all enclosed places would soon harbor foul air.

vents are made in the Sheet Metal Shop — which you should have visited while were near the upper end of the Dock. It would be interesting to watch flat l sheets run through a roller to emerge as cylinders. You would also see are vents made on the power brake machine. The giant shears, cutting through metal as the butcher's meat cutter slices bacon, would intrigue you, as ll the machine that turns out, in various shapes and sizes, patches to finish edges of cut-outs made in the sheet metal where fixtures or pipes must pass. takes about 1200 such patches for each Liberty. You might persuade one of department's layerouts to build you a tiny model of one of the vents, and (if could borrow a hood) you might like to watch Sheet Metal welders at work in a of their own at the far end of the shop.

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Cold, you watch Sheet Metal men on the boat installing two 30-inch vent pipes that run through the fidley hatch into the engine and boiler room. There will be more 30-inch vents leading from the sky light down into the engine room, and 24-inch vents that come from the hurricane deck. The ammunition rooms have vent ducts, and forced draft is installed to the boilers.

You notice a door in a large vent, and upon opening it, you discover a ladder that runs up the inside wall. It isn't pleasant to dwell upon the thought of the crew's needing an emergency escape from the depths of the ship, but it is comforting to know it is there.

You follow the superintendent up to a deck where a little coop encloses two "chuggers" and an operator. Chuggers are drums that reel out or in the line that lowers the vents into place. The operator is guided by a signal light manipulated by the workman below. While you watch, a vent is installed and topped by a yawning cowl that can be adjusted so that it will either inhale or exhale.

Sheet Metal workers are the Pied Pipers of the yard. Rats mean damaged cargo; they mean disease. Every nook and cranny, every gnawable edge, from the ship's bilges to her hurricane deck, must be sealed or screened against them. It is a painstaking job that requires the materials handled by the Sheet Metal Department, so it falls to their workmen to make each ship rat-proof.

You leave the Sheet Metal workers and pay a fleeting visit to the hurricane deck, with its running lights instruments, and its 8 gun turrets, with their long-nosed guns that keep silent watch. The bullet proof armor of the tubs adds significance. If you go to have a look at the 3-inch and the 20 millimeter guns on the aft deck. You don't gather much information concerning the Liberty's guns, for the Naval Ordnance officials (who are responsible for the working condition of those gray tokens of death) are not answering questions about them. You were obliged to skip the radio room for a similar reason.

It is growing late, and you are tired, but you have one more sight to see. Your guide has obtained permission to take you aboard a ship that has come back from her trial run. As you step onto her deck you are aware of a difference. Gone are the countless lengths of hose and rope, the buckets of paint, the miscellaneous tools and the rags. Gone are the blueprint shacks, and even the craftsmen that theretofore clogged the hallways and stairs. You find the galley furnished with pots and pans. The dry stores boast linen supplies. Handrails, doorknobs and brass fixtures are polished. The engine room, with its gay cream and black finish, is fresh as a field of blackeyed susans.

You want to linger, but your guide hurries you down the gangplank and toward the gate. As you leave the yard behind, you are filled with the wonder of having seen piles of rusty steel transformed into living ships.

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THE HOME STRETCH

CHAPTER XII

With the advent of 1945 Oregonship entered the last lap of her war effort. On August 1, 1944, she had signed a lump sum contract (MCc No. 15751) to build 62 vessels -- 32 Victorys and 30 Troop Transports. Before the new year she had completed the Transport contract and begun again on Victorys. But she had something else on her mind.

Pontons

On December 10, 1944, a call from Washington D. C. had ousted Jack Lacey, Norman Brown and several other members of the Cost Department from their Sunday morning beds and propelled them down to the office they had occupied in Oregonship's barracks ever since the Administration Building's fire. There they were joined by Ross Fletcher, Assistant Office Manager, and Paul Eyolfson, three-yard Administrative Assistant, who added their experience to the solution of problems that had suddenly been tossed into the laps of the group. At the time none of them knew it, but the figures they were amassing were to be used in forming estimates of what it would cost to build pontons at Oregonship. Their results must have been satisfactory, for two weeks later the world at large was informed that Oregonship had subcontracted from CBI the building of 4,000 half-pontons for the U.S. Army Engineers.

That was only the beginning of the Cost Department's work with ponton figures, however. In order that department superintendents might anticipate the changes and additions that would have to be made in their personnel, estimates of the time and labor a ponton would require in each phase of construction were outlined. Engineers from the Field Cost Department, under Bill McDonald, made time studies on the number of rivets driven by a pair of riveters in 15 minutes; then, knowing the number of rivets the job required, they estimated the number of riveters that would be needed on that jig. For the same purpose they took studies on each individual assembly, etc. They also kept accumulated time from fabrication to finishing work.

Other departments turned over to the Cost Department graphs and charts that showed in detail just how each phase of the ponton work was progressing. Blake Hamilton

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Quantity Production crews set up a card system that showed the time each individual ponton spent on each jig, and in the process of being tested. Their charts and graphs outlined the progress made in the rate of output. (For instance, the graph for the first 10 pontons showed a time of 6.2 days, but that for July 11 showed a cut to 3.1 days. The first 30 pontons had a time average for jigs and testing of about 57 hours. This improved till the 8th chart showed a 34 hour total.) Ten-ponton averages were charted; and a book of graphs which showed the time of construction, painting and deliveries done up in vertical blue, red and green lines that rose like the uneven pickets in a fence pictured the fluctuation of production caused by occasional shortages in materials.

Working right along with Cost and Quantity Production was the Progress Department, under Bob Waddell. Its employes kept records of general information concerning contract arrangements, production and delivery dates, force reports, etc. Its information supplemented that of the other departments so that among the three of them they knew all the answers concerning contracts and their fulfillment, down to the smallest detail.

There was another department that got a running start on the ponton contract. It was the Mold Loft. On the day after Christmas, '44, Walt Torres and a crew of his loftamen began measuring and tracing the body lines of a ponton across the central portion of the Mold Loft floor. The work was exacting, for the result had to be within 1/64th of an inch. When, in about a month, the body lines were complete, several crews began making templates. These were not of wood, as ship templates had been, but of 1/8th and 1/16th inch steel. This task employed a total of 44 loftsmen on two-shift work, for there were about 600 ponton templates to be constructed — not to mention countless small templates for dies to be used on ponton fabrication jobs in the Plate Shop.

Meanwhile, ever since the 4th of January, '45, Roy Cook's design engineers had been drawing up plans to transform the bays in the Plate and Assembly shops into workshops especially planned to accommodate the fabrication, processing and assembling of pontons. Not only did the draftsmen design the layout of the bays, they made plans for the washrooms, lunch rooms and offices that the ponton crew would need. The completed plans for the new rooms and the flooring and enclosing of the Plate Shop Bays 0 and 1 and the Assembly Bays 10 and 11 were given to George Buckler, who, on January 6, had been awarded a contract to carry out those plans. Drawings of the arrangement of proposed machinery and equipment were supplied to Chet Kinman, Facilities superintendent, whose crews were to clear the bays of unwanted material and install ponton equipment.

The construction of pontons demanded an entirely new layout of facilities. So, in the Assembly Shop on January 2, carpenters began clearing away timbers and platforms; electricians started tearing out old lines; pipe maintenance crews prepared to set up a new arrangement of pipe lines; and laborers divided excavating jobs with the No. 10-B hoe. Across all this activity engineers surveyed the footings for the bays.

The work progressed rapidly, and January 10 found Buckler's laborers removing sections of blacktop and building forms for new footings. A couple of days later

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Ironworkers began to remove unwanted machinery from Bays 10 and 11, and on January 12 they started welding, burning and erecting steel plates for the foundation of the roof. On through the month the preparation of both bays forged ahead. Piping and wiring were extended, conduit ditches were dug, blacktop was removed, and plumbing installed.

According to the management's plan, the first pontons, after being fabricated in the Plate Shop, were taken to the Columbia Aircraft plant for processing. This meant that the Assembly Shop would have to be ready to assemble the pontons as the processed material was returned to the shipyard, but allowed more time for the installation of the processing system in the Plate Shop.

The time had come, however, to "ready" the Plate Shop. About the middle of January Buckler began excavating for a foundation for Plate Shop footings in Bays 0 and 1. Breaking out blacktop was also started in Bay 0. After placing forms and foundations, these crews poured concrete in both the Plate Shop and the Assembly.

Early in February machinery was moved into Bays 0 and 1 and installed. While this was going on, 8 or 10 men from Plate Shop crews, under the supervision of Bob Porter, were making up processing tanks for the Plate Shop and test tanks for the Assembly Shop. These were later installed by Facilition crews. Early in March steam lines were connected to the processing tanks in Bay 1; electricity was carried to the boiler house nearby, and to the annealing oven in Bay 0. Two weeks later Buckler's crews removed their contractor's shack from its position north of the Assembly Shop. During the remainder of March ironworkers set the test tanks in Bays 10 and 11, and carpenters installed them.

By April attention was spread to the north storage area, where the pontons were to be spray painted. Racks were being constructed to hold the pontons, and a "pickling tank" was equipped with water, drain tanks and electricity.

At this stage ponton workers in the Plate Shop discovered that they needed more room, so it was decided that the west half of Bay 2 should be fitted up for their use. So, on April 21st Buckler reentered the Plate Shop to begin the job of enclosing the desired area. Within a week carpenters were hanging doors on the west end of the bay, electricians were wiring the place, and pipefitters were installing an airline to the equipment there. Then Buckler moved in machines to smooth the concrete flooring across the entire ponton area of the Plate Shop. Material was being fabricated in Bay 0, but the smoothing was done right around the busy saws, presses, shears and punches.

By the first of May carpenters were finishing a string of offices along the north side of Bay 0, and electricians were furnishing the rooms with light. Ten days later power was installed for the conveyor system in Bay 1. By the middle of May the boiler house was piped and wired. At last the conveyor system acquired stop-and-go buttons and an emergency switch. A No. 2 boiler was installed beside the first one and equipped with water and electricity. By the end of the month not only the boilers, but the rinse tanks were complete. At this point facilition jobs became mostly those of maintenance.

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The work just finished had required the combined skill of half a dozen departments, each of which had given its own expert ability to the undertaking. Especially was this true of the work the electricians and the pipefitters had to do on the monorail system.

Much of the Electric Department's work in the Assembly Bays had been the burying of wires left exposed by the removal of platforms and the furnishing of much light and countless outlets for the jigs. The main jigs needed about 40 outlets apiece, and the lesser ones about a dozen. As there were 30 main jigs, and small jigs galore, there was a great deal of work to be done before they were all equipped with both power and light. But this was routine work, as was the hooking up of machinery in Bay 0, in the Plate Shop.

The monorail system, however, was an intricate job that kept Mel Hord, Superintendent of the Electric Department, and several of his best electricians concentrating their skill upon for several hectic weeks. The system was reported to be the largest of its kind in the United States, and was the last word in efficiency. The entire operation was automatic, and almost foolproof in the completeness of its design; but the intricate plans needed frequent adaptation to the particular requirements of the bay. About ten electricians worked upon the conveyor system, but only three were expert enough to perform the most exacting jobs, such as the arrangement and installation of the automatic timing system. There were other tasks that required special skill -- the process tanks, the boiler house and the automatic heat treating furnace for aluminum parts.

A similar situation confronted the pipe maintenance crews. Besides the ordinary jobs, such as the installation of thousands of feet of pipe, with the necessary pumps, drains and valves, they installed steam and hot air systems that demanded special care.

Their first Assembly job -- the relocation of two water seals -- was done on a Sunday because, while they were making the change, work in the bays had to be shut down. (The air seals were safety devices for acetylene pipes.) Their biggest job was the piping of air, for it entailed the installation of over 5,000 feet of pipe that had to be cut in assorted lengths and furnished with numerous couplings and valves. The piping of the four big test tanks in Bay 12 involved the running of connections from each tank to an overhead supply tank, and the installation of a pump between each pair of tanks, and the putting in of drains to take care of overflows. Before they had finished that task they had run about 800 feet of 4-inch pipe and had installed countless fittings. All told, the pipe maintenance men installed about 400 outlets in the Assembly Bays. Each main jig had 12 air outlets, and each small jig had from three to five. To supply acetylene and oxygen to the bays pipefitters ran about 800 feet of pipe, and to meet the workman's need for air hose they put "quick-coupler" valves on 700 lengths of hose and assigned two men to keep the equipment in repair.

The pipefitters' first Plate Shop job was the laying of a 12-inch vitreous clay drainline from the front of the roadway at the east end of Bay 1 down through the bay to the last processing tank. Six laterals were run into it from the gutters, and floor drains were installed.

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The first boiler was hooked up with a circulatory system that carried steam to the acid tanks, then piped hot water back to the boiler to be used again. The handling of the steam systems required precision, and was closely supervised by Ken Siler and his foreman.

When a method proved unsatisfactory a new arrangement was necessary. At the outset of the processing program cold water was used in the rinse tanks. When cold water failed to clean the metal, another boiler was installed with a system similar to that of the first, and hot water was employed. A heat-treating furnace for aluminum parts and the cleaning process in the North Storage area claimed the services of the pipe maintenance crews.

All this time, behind the scenes, experts had been keeping track of imperfections in ponton plans, of hitches in the construction program, and of problems that stumped those in charge. So when a conference was held in Columbus, Ohio on February 5, '45, Hull Superintendent William Schinkel and Naval Architect Robert Nyborg attended it. There, in open discussion with Army Engineers and contractors many a flaw was eradicated and many a problem solved. Schinkel himself took back several pages of suggestions, most of which were accepted.

A week after their return Schinkel and Jack Anderson made a visit to the Lord and Burnham Company, in Irvington, New York, to watch pontons being turned out where those in charge had experienced the benefit of a year's production. Other trips were made, to the advantage of Oregonship's production schedule. Plans and templates were brought back, and two men from Fleetwing spent a couple of weeks at the yard, helping to get things started.

About the first of the year Nick Carter, supervisor of the general stores section of the Warehouse, assigned a foreman and 6 or 8 warehousemen to the task of caring for ponton material as it arrived. The first receival consisted of 3 carloads of plates and 3 of shapes. Through the following weeks trainloads of extrusions, rivets, belting material, etc. found temporary storage in the crane bay at the west end of the Warehouse.

Ponton work in Bays 0 and 1 was accomplished under the watchful eye of Bob Porter, an assistant superintendent of the Plate Shop. During the week ending February 25 he started material through Bay 0, to be cut, rolled or bent, as required. Much preparatory work was still going on in the next bay, but enough machinery had been installed in the fabrication bay for a start. Fully equipped, Bay 0 held 4 hydraulic presses, 4 punch presses, 4 machines for bending frames, 5 do-all band saws, two routers (for making large, curved cuts), a roll, a shear, a multiple punch that could make 100 holes at one operation, and several grinders and sanders.

The making of dies was an important feature of the work, for there were about 485 aluminum pieces in a ponton, and practically every part needed a special die in its fabrication. The plans for these dies were drawn by a couple of Plate Shop draftsmen, and the actual forming was done by machinists.

The conveyor system, in Bay 1, was still in an experimental stage of operation around the middle of March, but not long after that it began to handle part of

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the processing. To the privileged few who saw all phases of ponton construction, the monorail in operation was perhaps the most intriguing. It began with the pressing of a button which lowered a cover so that racks of material could be suspended from it. By manipulating the electric control the cover was then lifted to the track level and sent on its way to the alkaline dip tank. With that start, every operation along the entire curcuit was destined to progress according to predetermined timing. Each of the seven tanks was set to offer about five minutes of treatment to the loads submerged in them. There were six covers, and any of them could be loaded and started on its merry way without thought of the whereabouts of the load ahead. The completeness of the automatic timing prevented one cover from advancing too close to a tank that was treating material. It was uncanny to watch a second load approach an occupied tank, stop, and wait patiently till it was empty before moving in and lowering itself.

The process was a steamy one, and workmen must have acquired a turkish bath feeling as a steady procession of covers made the circuit. Pictures of the monorail in action might almost be labelled, "Lost in a Fog", and the bell that warned the unwary workmen of approaching danger was reminiscent of the signal that carries to boats word of shoals.

At the beginning of the process the material certainly needed cleaning, for it was greasy and dirty. So its first bath consisted of a boiling hot caustic liquid that left it spotless and shining. Next it was lowered into a rinse tub, where it was pelted with a dense, powerful spray of hot water which shot from a maze of pipes that lined the sides and floor of the tank. Then the cover carried the material to a tank containing a chromic acid that gave the metal a slightly oxidized finish to make a base for the coat of paint it was to receive. Another hot rinse, and a session with a hot air blast that dried it thoroughly, and the load was allowed to dangle idley for about seven minutes while it cooled. Then it was given a brief dunking in a paint tank to coat it with a zinc chromate primer. As the cover lifted from this tank it paused for a minute or so to let its burden drip before it was submitted to the final hot air blast.

At this point the pieces were stamped with the proper code numbers, counted and barreled or boxed, in readiness for their trip to the Assembly Shop.

Although Plate Shop expeditors handled materials till they were ready for the Assembly, their work stopped there. From that point on Jerry Coombs' Hull Materials expeditors were responsible for riding hard on the stuff. It was their ambition to keep the Assembly supplied with materials for about 30 hulls ahead. As the two bays were crowded, the expeditors had to learn timing so that space would not be wasted. Bow and stern sections worked through faster than main jig sections, and had to be drawn from the Plate Shop in a proportionately greater quantity. There were other timing problems. Ponton materials went through the bays much faster than the ships' materials heretofore handled. Also, stuff that had to be obtained from outside sources frequently failed to appear for four or five days, and allowance had to be made for such delays.

There were seven storage zones — one for frames, one for bow and one for stern assemblies, one for transoms (back plates of stern), one for gadgets (locking devices, chain assemblies, etc.), and east and west main jig assemblies. Each

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gang had its own leadman and about five expeditors, who sorted and kept careful check of the amounts on hand. Rivets were counted by weighing, and a daily chart was kept of them, for they were used in such quantity, and in so many varieties that it was difficult to keep the proper amount of each type on hand. There were 35 types — each with variations. On a 3/16th inch size alone lengths ran from 3/8ths to 1 1/8th inches. Except for the sorting, counting and handling of all materials was done by the expeditors.

At first the regular crews of expeditors furnished men and women to cover this work, but late in April, Coombes began to hire new expeditors. At the peak of ponton production he had acquired about 80 newcomers, and the total of men and women engaged in the work mounted to 168.

Before fabrication had started in the Plate Shop the Assembly Shop's engineers had designed 12 different types of jigs to hold the various ponton parts that would be assembled in Bays 10 and 11, and workmen had constructed the jigs. When, about the middle of March, material began to be stored in the bays, the jigs were in their allotted places.

To solve personnel problems Jack Anderson, Assembly Shop superintendent, borrowed about 20 men from other departments and assigned to them the supervision of definite phases of ponton construction. Men and women who wished to join ponton crews were sent to the Creston School to learn riveting and drilling. As the material was soft and the guns light, women could rivet as well as men; and for the first time in Oregonship's history lady riveters swarmed about the yard. Many of those who answered the call for ponton workers were transfers from other departments, for as ship contracts were nearing their close ahead of schedule, journeymen could be spared. The Electric Department loaned 150 workmen; the Shipwrights transferred over 100. And so it went, till, the first week in June, the Assembly Shop had about 2500 people on the project. Many of these received instruction on a practice table near the west end of the shop, where leadmen prepared their crews to handle the new material.

The Assembly Bays were planned so that ponton sections would progress from one stage to another with as little confusion as possible. At the west end of Bay 10 were receiving stations and material bins. A clear gangway ran the length of the bay. Along the south side of this gangway were gun'l drill jigs, gadget drill tables, work tables and bow gun'l assembly jigs. On the north side were capston jigs, riveting horses, automatic riveters, gun'l assembly jigs and transom jigs; then, on beyond the central gangway, past a sortage and marking area, were three types of bow jigs.

Bay 11 was devoted to large assemblies. On each side of the centrally located stern assembly jigs were 15 main assembly jigs, and beyond them were seven berths for pontons that needed repair. In front of the berths were a pair of test tanks and a cleaning station.

Of all places in the shipyard Bays 10 and 11 were probably the noisiest during the ponton period. Drillers, working in pairs, followed a punched pattern in the drilling of hundreds of holes into the aluminum sheet below it, and the

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racket of their drills was continuous. Sometimes, when a driller, trying to estimate the location of a hole that had been missed when the pattern was over it, missed the spot and ran her drill into the metal frame of the table below, there was an added sound. It was the snap of what had been a perfectly good drill. The turnover of drills was considerable, for added to such incidents was the fact that electric drills burned out rapidly. Because air drills are more durable there was a steady trend toward the use of them.

Over on the main jigs men and women swarmed about the upturned pontons, their drills and rivet guns agitating the air waves in riotous unison. Conversation was impossible, and messages were passed between riveters on the outside of a shell and their bucker partners on the inside by a system of raps. Although screams could not be heard, pounding could be felt. Occasional mishaps resulted from the fact that the uproar made it impossible for the workers to keep track of each other. Now and then a riveter, seated atop a shell, would get the benefit of the business end of a drill that was being used with more energy than caution by some ambitious driller beneath. Loose hair that became entangled in a whirring tool caused trouble, also. However, the universal complaint the men and women voiced concerning ponton work was of the incessant racket. Even the two women who stirred up and applied aluminum paste that was spread between the seams of the pontons said very little about the way the paste damaged their hands. They, too, were weary of noise.

When a ponton was ready to leave a main jig the overhead crane lifted it, turned it right side up, and deposited it in a nearby test tank. Here it was firmly clamped down so that water pumped into the tank would rise almost to the gun'l and quickly seep into the ponton through any loose rivet or leaky seam. Faulty pontons were then placed in a repair berth to be corrected. All tests were conducted by the Army's inspectors, who released the satisfactory boats for finishing work. These were loaded onto Willamettes by the Transportation Office and hauled over to the North Storage Yard, to be thoroughly cleaned and painted.

At first the finishing work was done under the supervision of several men who divided their attention between the tasks their departments were doing on ships and the added ponton work. "Cap" Cail, Paint superintendent, was in charge of the cleaning and painting; Ray Hausmann, Shipwright superintendent, was responsible for the installation of the duckboards and the loading out of the pontons; and Jim Butler, Rigging superintendent, assigned several riggers to work with Jack Collins' crane operators.

The customary method of cleaning pontons was to set a gang of scalers to work with scraping knives, rags, brushes and buckets of solvent. So that procedure was given a try at Oregonship. Results were discouraging. Manhours mounted — so did stacks of pontons awaiting attention. Out of the dissatisfaction of those in charge grew an idea. Why not set up a hot water system that would draw the solvent from a tank through a hose to which a brush was attached? So Ken Siler and his pipefitters commandeered the boiler of the steam crane, Chio, and connected it up as suggested. The speed and quality of the new system was such that for every ten scalers with a hose and brush, 30 were dropped from the job.

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Following the steam cleaning, the few remaining soiled spots were touched up by hand. Then, after passing another Army test, the pontons were transferred to the paint jigs, where they were sprayed first with a chromite mixture, which made the surrounding territory suggestive of an orchard that had just undergone an extra heavy sulphur spraying — only the ponton area looked even more bilious. The odor, though different, added to the impression. When the sickly greenish-yellow of the first coat had dried, the pontons received a swarthy, olive drab finish.

Here Ray Hausmann's shipwrights took over. Two of them were kept busy installing duckboards in the boats — the last operation before loading. It took about 12 men to load the pontons onto the gondolas and strap them down securely with metal bands. Average cars held one row, stacked upside down over each other, six high. Long cars (64 feet) accommodated two rows. The loading, like construction and painting, was Army inspected.

Early in June, the management, hoping to speed the output by the close coordination of the various jobs, placed one man over the whole finishing operation. Up to this time Chet Kinman had been busy supervising the Facilities men's preparation for the construction of pontons, but that phase had passed, and only maintenance jobs remained. So the management selected Kinman to take charge of the pontons from the time they arrived at the North Storage area till they left the yard.

The new arrangement improved the situation still further. By July there had been one day when 72 pontons were shipped, and a daily average of 36 had been reached. The climb in the number of pontons delivered each month had been almost unbroken. In April there were 162, in May — 708, in June — 924, in July — 894. With that number, ponton-construction at Oregonship came to a close, for on June 26 the Army had cancelled the last 1,000 of the 4,000 half-ponton contract.

The Mighty 7th

Starting with the second war loan, Oregonship had done herself proud on each drive, but she really landed in the Hall of Fame with the way she polished off the mighty 7th. With the coming of spring in '45, the Bond Sales Department plunged into a program that made the shipyard a bond-selling champion. Given a quota of $5,000,000, the yard responded to persistent persuasion to the tune of $6,000,000! Of this sum, Bond Sales clerks handled $1,791,562.50 in cash sales, finding up with a shortage of only $13.23.

The story of how it was done is one of detailed planning, splendid publicity, unceasing effort and close cooperation. The final March issue of the Bosn's Whistle carried the announcement of the $5,000,000 quota that the yard must meet. The next edition pictured a luncheon at which the heads of all departments met to map out a giant campaign. During the following weeks the breakdown of each department's share was given, the announcement of an interesting array of prizes was made, and stories of the opening of the Bond Sales cash booth, tickets to shows and games, merit awards and launching honors were played up.

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At the starting shot the management offered 31 bonds to be given as prizes to lucky bond buyers. The list contained one $1,000 and one $500 bond, three $100, six $50 and twenty $25 bonds. Various civic concerns offered prizes, also. Frank L. McGuire came forward with the biggest prize of all — a $5,000 home; Carl Greve furnished a wrist watch and the Treasury Department donated a couple of Italian rifles as superintendents' prizes; California wine industries furnished 8 cases of champagne; the Multnomah War Finance Commission presented plaques to several winning departments; leadmen whose crews were high received cartons of cigarettes — which, at a time when cigarette lines stretched for blocks, was quite a gift. Another award was made to superintendents of departments that achieved very large bond sales — Tony Robinson, Mel Hord and Harry Dyhrman were iniated into KOIN's Million Dollar Club. They found themselves among pals, for about ten Oregonship executives already belonged to the club.

From the outset Ken Moyer, War Bond manager at Oregonship had been up to the ears in devices to keep the attention of the shipyard's employes focused on bond-buying. To start the drive, time cards bore messages and reminders. Then came a succession of pledge cards, each with a special arrangement or inducement. The department, which had contained a total of about 16 workers on three shifts, acquired over three dozen members. There were three men who balanced receipts, the girls who counted money, typed bonds, processed pledge cards, and sold bonds in the Cash Sales Booth. The office was a beehive of activity, and so much money was handled that an armed guard occupied a chair in the outer office during swing and graveyard shifts.

The Bond Accounting and IBM Departments also carried a heavy burden through the drive, for they took care of the accounting and of the pledge cards turned in. Every week there was a rush to get the pledges in shape for the payroll to handle.

To spur bond sales many shows were given on the platform west of the Mold Loft. Often the performers were movie celebrities, often they were returned war heroes. The Boss's Whistle and the Public Address system both publicized such events widely, and great crowds of workers usually attended. Another affair that attracted wide attention was Open House Sunday, June 22. On that day the shipyard's gates were thrown open to the public, and visitors were escorted through the shops and ships and treated to refreshments. But the purpose of all the hospitality was to sell bonds. The girls who occupied booths which were set at focal points about the yard were well supplied with receipt books, pencils and typewriters. In response to the persuasive voice that permeated the yard via the Public Address system, crowds flocked about the booths to buy bonds — and receive, with each $25 purchase, a launching ticket. These tickets were deposited in a barrel beside the Mold Loft, and just before the time scheduled for the launching, a drawing decided the people who would act as sponsor and attendants at the event. An estimated crowd of 65,000 attended, and results were gratifying.

All the way through the drive, department competition was played up and there was a great deal of rivalry. Each department's effort was broken down to the leadman and his crew, and comparative standings were posted. Humor helped. Bets were made and paid off with much publicity. Cartoons were used. There were doghouses,

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backhouses and bathroom fixtures for Lagardo. Laughable incidents helped to disguise the prodding.

There was a good deal of interest over the drawings for the house and the bond raffle, and as the dates drew near the excitement mounted. Many thousands of yellow tickets for the bond raffle and an equal number of salmon colored tickets for the home award had been dropped into a wire mesh barrel that could be rotated by turning a crank. Among those tickets were ones carefully typed, horribly scrawled, painstakingly printed, or made out in the distinct strokes of one of the Bond Sales girls who was helping some chap whose best effort at a signature was an X, or some foreigner whose home language would not do in filling out the needed information.

On September 20, the day before the bond raffle drawing, Bond Sales girls transferred the tickets to big boxes. So full was the barrel that it would hardly turn till the little trap door could disgorge its contents. When all the loose stubs tumbled out, dozens remained wedged in the framework. Finally one slack-clad youngster wriggled herself through the small opening and, balancing in the swaying barrel like a squirrel in a cage, handed out the elusive cardboards. Though the prisoner had quite a struggle regaining freedom, she eventually emerged, undamaged.

Soon the Bond Sales office was littered with boxes of tickets, and its girls were up to their elbows in the job of sorting — salmon colored stubs into boxes destined for the downtown Victory Center drawing that would be held there a couple of days later, and yellow stubs into boxes that, on the morrow, would be poured back into the squirrel cage and set on the Mold Loft platform for the bond raffle drawing.

From mid afternoon on September 30 till noon on the following day, girls sorted frantically. As noon approached, their cry for help brought clerks from Bond Accounting and Harry Steele's Offices rushing to the rescue. The lunch hour whistle found the barrel and its contents all set for the drawing, while a crowd of workers gathered to witness the proceedings. It was a dismal day, and many ticket owners preferred the shelter of a lunchroom, but occasionally as a winner was announced a shout would go up, and a jubilant man or woman would come plunging up onto the platform.

The real thrill for the shipyard came when a final accounting of bond sales was made. Two departments had more than doubled the amount allotted to them. The Mold Loft (as usual in drives) had topped the yard. This time it had the astonishing percent of 290.57, and the Vocational Training followed with 204.47. When all the departments' sales had been totalled, Oregonship had gone over the top with a 121.10%, which established a national record for war industries with more than 27,000 employes.

At this point the big board which reared from the roof of the Bond Booth to proclaim the relative standings of the yard's departments was redone. This time it bore the Bond Sales' parting message to the workers,

"Thanks For A Job Well Done".

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V-J Day

Midsummer found the yard coming into the home stretch of its contracts. March 1, 1945, it had taken on another contract — this one a selective price agreement (MCc No. 34763) for 76 Victorys and 12 Troop Transports. With this well on the way toward fulfillment, and the ponton deal approaching an end, Oregonship was casting about for more work. The result was that she subcontracted from the Richmond yard for the building of navy barges. Secrecy cloaked the details of the agreement and the barges, and there was some speculation on why they were promptly dubbed "Dagwoods". In the July 27 issue of the Bosn's Whistle a banner line proclaimed that a contract to build barges had been let through the Maritime Commission, and that the barges must all be delivered by the end of December. A couple of weeks later it announced that seven of the ways would be widened about eight feet, and that work on the barges would probably begin by mid-October. Steel for the "Dagwoods" had already entered the yard, and the Mold Loft had constructed a model. Besides these activities, the shipyard was on the verge of contracting to build landing boats — "Chops", they were called — for tanks.

Then, on August 14, with a suddenness that left the public stunned, V-J Day descended upon the world. Overnight, Oregonship had 9 Victorys and 8 Troop Transports cancelled, and her future work was limited to finishing 9 of the former and 4 of the latter. Of these, the ways still held 5 Victorys and one Transport, and the Basin held 4 Victorys and 3 Transports.

For several days the shipyard had been on edge over rumors of Japanese surrender offers. During the preceding Friday and Saturday offices had sprouted radios that gave forth a constant stream of news flashes, and any development in the situation grapevined its way throughout the yard. Sunday, the 12th, brought a premature report of accepted terms, and Monday saw heavy absenteeism among shipyard employes. Tuesday's day shift started tensely, and the strain increased as the day wore on. Work schedules proceeded listlessly, and when word got around that President Truman would address the nation at 4:00 o'clock, coast time, the call of duty died to a whisper, and in offices and shops men and women huddled about radios, too jittery to be talkative, too hopeful to be irritable.

Suddenly, at four, the President's voice was heard making a simple announcement that Japan's surrender was official. When he stopped speaking, countless whistles blared forth in triumphant discord. Then quiet settled like smoke over the shipyard. The racket of machinery in operation did not resume, and although many workmen checked out, they seemed relieved rather than boisterous. The majority of them behaved like parents who have just been told that a sick child has passed the crisis.

However, it was probably well that the shipyard remained shut down on Thursday and Friday. Undoubtedly many Oregonship employes joined the riotous throngs that turned Portland topsy turvey for over 24 hours after the surrender announcement. When, on Friday, they returned to their jobs their enthusiasm for shipbuilding was limp, and their attitude was more of an acceptance of the work that remained to be finished. The contract cancellations made by the Maritime Commission caused many to quit the shipyard in search of post war work, and many others

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were laid off. The August 15 payroll had contained 23,000 names. One week later it carried 19,000. Bosun's whistles headlines clearly traced the handwriting on the wall. On August 3 its headline had read "2800 More Workers Needed." Its Victory Edition on August 17 announced briefly, "Work Curtailed" — that heralded the beginning of the end. It looked as if Oregonship would quietly taper off into oblivion. But unfortunately even her curtain line had to be spectacular.

The Outfitting Dock Fire

As the first few shipyard busses swept down the grade and into the yard at 7:55 on the morning of August 30, passengers speculated upon the column of smoke that pillared skyward beyond the dock shops. It must be a ship leaving on trial run. It was too bulky for that. It looked more like burning sludge oil, but it was in the wrong location. It must be a fire.

And what a fire. Starting from hot metal that dropped from the Bexar onto an oil-soaked fender log, the flames spread to the piling beside berth three and leaped across to the ship. They shut off escape by the gangplank, and a wild outcry arose from workers aboardship. An alarm brought Captain Day and his crew with the yard's fire engine. But the fire broke into dozens of blazes that, like a herd of horses, stampeded. Underneath, it sprang from pile to pile, it licked up bracing and planking. It cut off the electric light and power. Above, it skipped merrily along the dock, feasting upon everything wooden, everything oily. At each berth it spanned the gangplank and boarded the ship there. The operator of the first dock whirley ran his great crane up as far as he could, then scurried down to safety like a squirrel leaving an endangered tree.

On the heels of the first fire call sent to the office of H. E. Ahlen, Safety Engineer, came a second — this one excited. Away he dashed for berth 3, where the blaze was already skyrocketing viciously between the Bexar and the dock, and the gangplank was afire. Aboardship someone was screaming, and Ahlen, fearful lest someone be trapped below deck, bridged the gap with a ladder and boarded the ship. But the hold proved to be empty, and as the workmen had congregated aport, he returned to his ladder. Looking down he could see flames boiling vigorously beneath the dock, and he could hear the plank fire walls bursting under the pressure of the fire. His ladder was already ablaze, so he jumped ashore.

At the outset of the fire George Eggiman's stationery engineers had sprung into action, for all the yard's explosives and the care of the pumps belonged to their department. The real danger spot of the yard centered around the Acetylene Building that stood between the Garage and the Main Dock Pipe Shop (the old General Stores). Across the road from the Acetylene Plant, the Oxygen Control Building and the row of trailers with their oxygen drums increased the peril.

George Huckett, the stationery engineers' foreman, gathered up several of his men and dashed off to release the pressure in the acetylene generators and in the flometer of the Oxygen Control Building. With the pressure gone, the danger was slight — but if there had been gas in the acetylene pits when the generators were purged, an explosion would have resulted. There was another point on which

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The department remained jittery. Carbide is indifferent to heat, but give it water and it reacts violently. If a stream of water had broken a window and found the carbide a catastrophe would have resulted. So throughout the entire struggle the engineers, the Safety Department, the firemen and the guards kept watch lest that should happen.

Later, Eggiman admitted that although he knew everything should be all right after the pressure had been safely released and precaution had been taken to keep the carbide dry, he was relieved when the final results found the Acetylene Building unscathed.

As for the pumps, they were overworked. Between the demands that the fire apparatus made upon them and the fact that the water main near the head of the dock broke, water was pumped out faster than it could enter the shipyard's two huge tanks for as high as 8,400 gallons a minute was taken from them.

George Eggiman explained, "Theoretically, that can't happen; but actually, it did. I had to shut down several pumps to bring up the supply of water".

It kept two dozen stationery engineers busy checking the pumps and carrying out directions as detailed in the air raid plan that had been worked out in the early days of the war.

In the little radio room that perched atop the Dock Shop No. 1, Earl Carter and Sid Bloom were sending persistent appeals across the thousands of curious graveyard and day workers who blocked the space between the gate and the dock. For their own sake, as well as the good of the cause, the crowd was urged to leave the yard. When the power failed, Carter and Bloom made an attempt to use the emergency generator; but smoke and heat rolled up and across them in suffocating gusts. They abandoned the effort and dived for the steps that led down the northeast corner of the building. Singed and choking, they retreated to the conduit pipe on the southeast corner, and slid to safety. The part of the adventure that really hurt them was that they had no chance to save one launching record or any of their files.

The mass of onlookers was slow to move. People could not believe what their eyes were telling them, and they ignored warnings of danger from explosions. A guard car inched its way among them while one of its occupants announced that there would be no work that day, and the yard must be cleared of bystanders. Finally some of the boys from Terminal Four helped to disperse the crowd. But when they reached the parking lot, they turned again to watch in stunned silence. The Administration and Personnel Buildings stood empty while their clerks banked their walks and dotted their roofs, absorbed in the tragedy they were witnessing.

The Portland Fire Department, the Office of Civilian Defense, the Coast Guard and the Army had all rushed to the rescue with fire equipment that totalled 31 pieces, and about 50 Army, Navy and Coast Guard men had volunteered their help. Soon four fire boats appeared in the Basin, where they executed a flank attack.

Meanwhile a ship's boat and a little rowboat that the riggers kept handy for their own use were busy fishing out of the water folks who had jumped from their ships

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when they found themselves cut off from the dock. Some of the people swam across the basin and clambered to safety in front of the warehouse. However, the majority of workmen caught aboard the ships waited to be removed by rescue boats.

The seven ships in the Basin impeded the fire boats, and as soon as lines had been passed from tugboats to the vessels they were towed away. The four that had been moored alongside the dock were damaged — the Bexar and the Dothan Victory, in berths 3 and 2 respectively, were hardest hit. The Dane, in berth 1, also needed major repair, but the Jackson Victory, in berth four, escaped with minor injury.

As for the shops, though for some time most people thought they could be saved, the superintendents of departments that occupied the buildings were not so optimistic. Hardly had the fire got underway before Mel Hord collected a handful of his electricians to shut off all power feeders along the dock and to help him remove valuable prints, records and office equipment. Finally, however he refused to let his men reenter the building because of the dangerous intensity of the smoke and heat. Pipefitters, machinists and occupants of the Outfitting Building had similar experiences. Most of the files were saved, but shop equipment and tools were almost a total loss.

The fire had seemingly quieted before hidden flames licked up through the wooden foundation of the Pipe Shop No. 1 and the Fitting Stores. Soon the fire was raging about those structures, and the Ways were in danger.

The guards and their volunteer helpers from the Terminal could not sift the needed from the unneeded as they drove employes out through the gates. They had orders to clear the yard — and they cleared it. This left a number of departments wildly searching for badly needed members. The shipwrights, deeply concerned with saving the Ways and the unlaunched ships, were among the hardest hit. Chief Clerk Worrell, as he tried to corral men for the crews Superintendent Hausmann wished to form, was almost chased out of the yard, himself. Finally, however, he collected a few shipwrights to whom special duties could be assigned.

As the menace to the Ways grew in spite of the river boat that employed a water pressure strong enough to smash part of the scaffolding on Way 1, a desperate plan took shape. The Billings Victory on Way 2 was almost ready for launching. (Originally it had been scheduled for a launching on that very day, but V-J Day and the double holiday that followed had postponed the event.) Maybe an emergency launching would save her. There was little time for ramming, but if the shores were knocked out, if the dragline and its piles of chains were secured, maybe, after the plates were burned through, a jack would start her moving.

There were far too few shipwrights, so crews were formed from any group that volunteered. Men from the Administration Building were lending a hand wherever they could help, ignoring the damage the work was doing to their good suits. They tore away scaffolding, knocked out shores and helped carry files and office equipment to safer spots. (Many a typewriter, sitting outside the entrance to some little office, was tripped over and soundly cursed by some distracted workman.)

A ship cannot be launched without being christened. It just isn't done. So as preparations for the emergency launching advanced, the Public Relations Depart-

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[illegible] that [illegible] Hal Babbitt, Margery Moore, Betty Jean Sivers and the [illegible] Sentinels all gathered on the scene to see to it that the Billings did [illegible] make the plunge without a touch of ceremony. There would be at least a song, [illegible] prayer, a popbottle and a christening. Learning that the launching could not [illegible] place for at least an hour, one of the Singing Sentinels drove his car home [illegible] get flowers for the occasion. By raiding the neighbors' gardens as well as [illegible] own he returned with an armful. Even the traditional champagne bottle arrived [illegible] the scene, and all was in readiness for the most unpremeditated launching in [illegible] Coast history. Smoke poured across the little party. Hot embers settled [illegible] them. They became begrimed, but undaunted. Then, when everything was all [illegible] the wind changed, and the plan to launch the Billings was abandoned.

[illegible]

[illegible] fact that the Ways had survived till this point was due to two things — a [illegible] fireboat, and an insignificant shop that the yard had acquired as an afterthought.

[illegible]

[illegible] then, in June, '44, pipefitters moved into the Sandblast Building they felt fortun[illegible] to have a convenient little shop where pipes for the lube oil system could be [illegible] blown free of mill scale and where small pipe could be fabricated. On August 30, [illegible] 45, the shipyard had cause to feel fortunate that the building was there. Over [illegible] the framework of scrap pipe spread a sheet rock sheathing that made the building [illegible] fireproof. So while the river boat struggled valiantly to save the Ways the little Sandblast Building stood defiantly between the blazing Dock and the first Way.

[illegible]

[illegible] from the first the whirleys along the Dock were doomed, but when the Ways were threatened Jack Collins, assistant superintendent of equipment and operators, became concerned over the whirleys there. The power was off, and the great cranes were helpless. So he enlisted the aid of Grant Green, assistant superintendent of equipment maintenance. Together they seized a couple of tractors and dragged the first three whirleys as far out from the ways as their tracks would allow.

But they had little chance to enjoy the satisfaction of a job well done. The change of wind and the burning of the Machine Shop switched the danger from the ways to the Mold Loft. If the Loft caught fire the center of the yard would surely go. So Collins and Green dragged the whirleys back down, as far toward the water's edge as was possible. That done, they could only hope for the best, and return to helping the firemen.

[illegible]

The new turn of affairs alarmed employes into removing the valuable First Aid equipment and that of the offices on the floor above. Out came surgical tables, chairs and instruments. Out came adding machines, typewriters, telephones and electric wall clocks. Most of the doctors' equipment was taken to the Guard Office, and much office material was stored in the Personnel and Service Buildings.

[illegible]

[illegible] for the First Aid staff, several of them stayed right in their usual offices and took care of those who appealed to them for medical care. What though the paint [illegible] blistering on their north wall? Dr. C. C. Arvin, a swing shift doctor, rushed [illegible] to the yard as soon as he learned of the fire and spent the day in the First Aid Building. Dr. George E. Waters and several nurses set up emergency headquarters [illegible] the Guard Office and took care of everything from cinders in eyes to minor burns. [illegible] who had jumped into the water were stripped and swathed in blankets or decked [illegible] in doctors' or nurses' uniforms. Hot coffee was served. Serious injuries were [illegible] few, but the yard was shocked over the drowning of one man who jumped from the [illegible]

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through the crowd of fire fighters weaved newspaper reporters and photographers. Many spectacular shots were made, but the most ironic touch of the whole tragedy-to-be made appeared in a panorama of leaping flames and billowing smoke clouds over which hovered the "Safety First" sign of the Yard Lift.

The north side of the Basin offered a ringside view of the spectacle, but those who took advantage of the fact found it scorching hot. Burning embers were carried clear across the Basin, and bucket brigades busied themselves upon the roof of the Warehouse to supplement the effort of the sprays.

The Bosn's whistle came out with vivid pictures and stories of the disaster — but they appeared in an issue more than a week later. The fire had occurred too late for that week's edition, and the paper that came out the following day bore the headline, "Work Centers at the Dock".

When work resumed, the following Tuesday, the crucial shortage of facilities and tools caused an oversupply of labor, and the payroll did another nose dive. It dropped from approximately 12,000 on August 29 to 9,700 on September 6. Several administrative departments, however, found their work increased. The Cost Department had a whole new routine, — for instead of merely keeping direct construction cost by the hull they had to keep it by direct construction, by repair aboard ship, by replacement of ship's material loss on the dock, and finally by direct construction afterwards. The office of G. A. Wallner, supervisor of Reclamation, was swamped with reports of damaged or lost goods, with insurance claims, and with emergency requests for immediate replacements. His little group suddenly found itself struggling with ten times its normal duties. Sometimes it could supply urgent needs by borrowing material that had been made surplus by government cancellations, but more often replacements had to be procured through vendors who, since V-J Day, carried very little in stock.

Getting established again was a herculean task. Homeless departments moved in with more fortunate groups. Offices were crowded, shops were jammed. Pipefitters moved into Bay 9 of the Plate Shop; electricians took over their own little cable shop, west of the Warehouse; the Mechanical Department's machinists crowded into their old garage and spilled over into part of the generator test shop; the Marine machinists, finding their share of the generator test shop inadequate, invaded the Boiler Erection Building. And so it went. Offices moved around so much that it was hard for messenger girls to locate them.

Set up in strange surroundings, using borrowed tools and makeshift equipment, the departments continued their work of turning out those last ships. The Electric Department had lost fabricated equipment for four ships; the Pipe Department had to make up 35,000 feet of pipe to cover their loss. Original schedules were modified, but the goal was still one to require a struggle.

Salvage

To the casual observer total ruin spread itself along the Dock when the flames had finished. In several places where blacktop had caved in a crumpled Handy Andy, a cupboard from some office, or the remains of a ship stared bleakly up from the crevices. The whirleys, like lifeless prehistoric monsters, sprawled upon the wreckage, their long necks draped across the bridge of an overhead crane or dangling toward the water's edge.

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But Sven Johnson sent 10 of his ironworkers to cut up structural steel and pipe and load it onto trucks bound for Salvage, or into gondolas destined for outside buyers. A couple of cherry pickers and their operators helped in the project. Around them gangs of Facilities' laborers toiled at cleanup work.

The Salvage Department, which had cut its staff 80% immediately after V-J Day, found itself busy again. Although they continued to store steel from cancelled AP-5s (by the end of October the back yard was landscaped with 40,000 tons of it), Salvage suddenly began to handle fire-scarred steel, pipe, cable, welding machines, etc. in great quantity. The old Lima, with its powerful magnet, worked steadily over scrap piles, and office records disclosed the departure of many a string of cars burdened with mute testimony of the fire. The insurance company claimed money from the salvage of ships' material, and the Maritime Commission collected cash from the sale of facilities' material.

Outfitting

There was added work for crews on the ways, because the destruction of the dock made it necessary for the remaining ships to be about 95% complete before launching. But the core of activity was centered around the north side of the basin, where Harry Young's shipfitters were preparing to carry on with outfitting work in spite of all handicaps. On the Saturday following the fire the Bellingham Victory had been tied up at the north dock, which had long been used to load steel in and out. The following Tuesday outfitting was begun on the vessel; while just to the east subcontractors began driving a whirley dock in preparation for the berthing of another ship. On September 8 the Glynn was moored at the partly finished whirley dock, and shipfitters went to work on her, also. Cherry pickers serviced the two ships, while the No. 25 whirley (brought down from the North Storage Yard) traveled up and down the long stretch in front of the Warehouse in the transferring of material. As soon as the docks were ready No. 25 was assigned to the east dock, while No. 26, recruited from the Idle Assembly Shop yard, was moved to the north.

Out in the river, just to the north, another ship tied up at the dolphins. Portable compressors were set aboard it, and light outfitting that did not involve a crane was begun.

Under the watchful eye of Scotty Wright, Erection Superintendent, the average length of time spent in repairing the damaged ships was about 5 days and for all of inconveniences Young's shipfitters forged ahead with their outfitting work.

Vessels on the Ways

On September 28, when the Billings was finally launched, those in charge of her sighed with relief. Her schedule had been a headache for a long time. Her original launching date had been postponed from August 29 to September 1 by the double holiday that followed V-J Day. Then the fire, after almost causing a premature launching, delayed it for nearly a month. With so many ships in the basin there was no point to adding another vessel. Besides, the new policy meant that a great deal more work must be done on her while she was still on the ways. Her jinx threatened right up till the moment she was christened, but when at last she slid into the water she was as majestic and capable as her sisters.

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CHAPTER XII

With the launching of the Billings more crews were dropped from the payroll, and the launching of the Boise Victory, on October 17, reduced the ranks still further. One check station after another was closed; bus service was severely curtailed; and the ways became almost as deserted as the Plate and Assembly Shops.

The Last Launching

October 24 dawned doubtfully. Oregonship employes, hurrying to work, paused to peer upward through the heavy fog.

"I hope it will be nice," they commented.

For October 24 marked the launching of Oregonship's last vessel. The management had proclaimed open house so that the public could witness the 455th ship — the last one — glide into the water. Platforms had been built in front of adjacent ways, but as noontime neared the crowd spilled over into the craneways and scattered down to the far ends. Never before had this been allowed because of possible danger from broken scaffolding, but for this event the scaffold had been removed, and the ship stood uncaged and regal. The fog had lifted, and the weather was perfect.

Breathlessly the spectators watched the shipwrights knock out the last shores just before the ceremony began. The flag raising, the National Anthem, and Edgar Kaiser's stirring tribute to the shipyard instilled the crowd with a pride that increased during the impressive ceremony that followed. Kaiser, as Master of Ceremonies, introduced the notables who took part in it -- General Superintendent Russ Hoffman; Assistant General Manager Albert Bauer; John McEachern, president of Oregonship; Harry Dick, vice president; and Mayor Riley. Excitement rippled across the crowd when, just before the burning of the plates, half a dozen shipwrights hunched their way under the ship and released a jack so that the huge vessel could settle her full weight upon her way. Although many of the audience had watched previous launchings, they had never seen that operation, for it had been screened by scaffolding. The murmur subsided as the burning of the plates was announced, and the sponsor, Mrs. John McEachern, christened the ship. Then, as the last plates snapped with a loud report, men and women shifted their positions to gain an unimpaired view. With the thrill that always comes upon such an occasion was mingled a deep regret, for this was the final launching by a shipyard that had gained a very special place in the hearts of all who knew her.

The rest was anticlimax. The Brainerd made the sixth ship that still remained to be delivered. Tentative schedules placed the deliveries for the rest of October, and the remaining four for the first half of November.

The payroll had dwindled till there was less than 5,000 employes when, on October 29, the Victory Loan Drive was started. On November 1 a 5-day week was announced, and one week later another heavy cut was made. There was merely a handful of spectators to watch the last ship, the Brainerd, steam into the river on November 23. They gazed upon the empty basin with regretful eyes. The war was over, and that was wonderful -- but the champion shipyard of the world had just launched its last.

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CHAPTER XIII

The CBI (Consolidated Builders Incorporated) represented the same group that had carried on at Bonneville and Coulee. "Cousins, Brothers and In-laws," outsiders called them, for the group had followed the policy of promoting its employes as they proved themselves capable, and it seemed to be a "family" set-up. This family feeling was real enough to cause top men to draw lesser men along with them when the CBI came to Portland to take a flier in ships.

Ships were a brand new angle for these gravel and concrete men, but the principle of construction, of handling crews and getting things done right and done ahead of time are very similar. However, while the company hung onto its dam builders, it added to its executives several expert shipbuilders. It was one of the smarter things an experimenting bunch of contractors ever did — as the amazing history of Oregonship undisputably proves.

[illegible] construction enterprises require men to plan, men to control the finances, men to build. As General Manager, Edgar [illegible] had the good fortune of Albert Bauer, who directed engineering and financial activities, and Russ Hoffman who took charge of construction.

[illegible]er, a trained engineer of wide experience, quickly acquainted himself with the various engineering and financial offices, and began shaping the [illegible] into a smoothly running organization.

[illegible]man came down from Coulee to direct the building of the shipyard. [illegible] right down his alley. He expected to stay long enough to see the yard [illegible] then move on to another job. But when John Bullock, the original Yard Superintendent, was transferred to the Vancouver Shipyard, Hoffman found himself with a shipbuilding project in his lap. Oregonship already possessed several [illegible] shipbuilders. Hull Superintendent William Schimkel was one; John McGregor, Superintendent of Riveting, was another; and George (Scotty) Wright, Inside Erection Superintendent, was a third. For other key men Hoffman depended upon [illegible] Leaving much of the office detail to his executive assistant [illegible] a lot of leg work to his yard coordinator [illegible]

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helping his department heads merge their efforts into a definite pattern. How those top men took crews that didn't know shell plate from bulkheads or masts from smokestacks and trained them into record smashing shipbuilders is as fantastic as a story from the Arabian Nights.

According to the record of the first ships built Oregonship got off to a "suspicious" start. Although the scolding in Admiral Vickery's speech at the keel-laying of the Meriwether Lewis and the Star of Oregon was calculated as a spur to greater effort, the fact remains that so far the shipyard had not betrayed a trace of her latent possibilities. Nor were they apparent for some time to come. The 8th ship spent from July 18th, '41 to March 7th, '42 -- 232 days -- between keel-laying and delivery. The 9th ship had 171 days between those events and the 22nd ship, delivered the following month dropped to 95 days.

On May 22nd, '42, the yard celebrated Maritime day with a triple launching, triple keel-laying and triple delivery. She had really hit her stride. From then till September 26th the decrease in time was steady and almost unbroken. On that date Oregonship launched her famous 10-day ship and delivered it on the 13th day. A whole world gasped in amazement or unbelief. Mussolini came forth with a derisive "Pooh! It's ridiculous!" Oregonship basked contentedly in the spotlight. But her triumph was short lived, for Richmond No. 2 launched a 7-day ship and delivered it 3 days later.

It was just a year from then that Oregonship established her next world record -- one that no yard was able to better. In September, '43, she went on a 7-day-week schedule and sent 24 ships down her Ways! That set up a month's construction average of 23.4 days per ship, and a per Way average of 2.16 ships. Her closest rival's best average was 1.75.

When Oregonship delivered the last of the Liberty's that she had contracted to build she held both the construction and manhour records for such vessels. Her average construction time was 43.9 days against the 47.1 of her nearest competitor, and her manhour average was 439,465 against one of 477,139. Her dollar-cost record was the best on the west coast, but the North Carolina Shipbuilding Company, with a lower wage scale in her favor, forced Oregonship into second place for that particular record among the nation's shipyards.

Victory and Troop Ships

In December, 1943, the Oregon Shipyard switched from the construction of Liberty's to that of Victory cargoes. It was quite a change to make. The over-all length of the Liberty's (EC2) was 441 feet, her molded breadth was 56 feet 10 3/4 inches, and her gross tonnage was 7,176. The Victory (AP3) had an over-all length of 455 feet, a molded breadth of 62 feet, and a gross tonnage of 7,606 1/3. So the Ways were moved inboard about 20 feet and extended under the water 45 feet. The scaffolding was lengthened by a couple of bents and widened some. As was the case with the Liberty's, the heaviest pieces that came from the Assembly Shop were handled by two whirleys, but the new sections had so much tonnage that one of the whirleys was moved to another location and replaced by a more powerful one.

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CHAPTER XIII

Minor changes and additions were made. Day 7, in the Plate Shop, acquired a big annealing furnace that received and removed stress from stem parts that had been formed on a nearby press. It also heated some of the plates that had to be sharply angled. ("Hockett's Barbecue," the men labelled it.) The Sheet Metal Shop was enlarged by 1/3. The Boiler Erection Shop set up bigger jigs to accommodate the larger, weightier boilers. The Basin was altered to offer four berths instead of five. A Shell Erection area was set up east of the North Storage Annex for its former location was no longer adequate to store the Shell, frames, forward afterpeak and material for the fantail. Finally jigs were erected beside the [illegible] tracks at the upper end of the Dock so that thermit welding could be employed upon the huge stern frames of the new ships.

Thermit welding, older than welding itself, involves the use of thermit (a flaky composition of iron oxide and powdered aluminum) with steel punchings that equal about 15% of the weight of the thermit. The stern frame, which was cast in four pieces, was set up in heating boxes so that two welds could be accomplished simultaneously. It took about three shifts to prepare for the welding, and about 30 seconds to execute it.

As soon as whirleys had set the frames in the jigs machinists pressed warm wax into the space between the frame ends in the exact shape that the weld was to assume. Around this the men filled in sand, packing it firmly with air rammers. A fissure would allow the molten metal to run through it, melt its way out of the box and drop to the concrete floor. The tremendous heat (around 5,000°) caused the thermit to burn deep pits in the concrete. When things went wrong the entire weld had to be chipped out, and the whole process repeated.

Next, the frame ends were preheated by torches that connected with kerosene containers and blew fire into the heating gates that formed a passageway through the sand in the heating box to the metal. The wax melted and drained off through a spout, leaving a hollow core for the molten thermit to fill.

When the frame had been preheated for about 5½ hours, a whirley set a heavy crucible into a jig just above the heating box, and machinists poured from 450 to 750 pounds of thermit (depending upon the section to be welded) into the huge cone. About a tablespoonful of ignition powder was placed in a little hollow of the thermit. Then a man ignited the crucible's contents by thrusting a red hot poker into the powder. There was a flare, followed by showers of sparks that shot above the flames as creamy smoke billowed upward. At night the sight was spectacular, and workmen in the vicinity liked to watch it no matter how often they had previously witnessed it.

The cooling process took about three shifts, for the sand held the heat; but when the box was removed and the slag chipped away a beautiful weld was revealed. Thermit welding was the perfect answer to the rumbling of stern frames for the AP3 and the AP5.

Departments found themselves struggling with increased tasks. Electricians had pulled 19,000 feet of cable for a Liberty, pulled 37,000 for a Victory. Upset welding footage was increased from 200,356 feet to 266,381. Machine welding rose from 34,285 to 45,178. The pipefitters, accustomed to installing 36,447 feet of pipe, began to handle 47,200 feet of it.

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At the start of the Victory program, November 19, '43, Oregonship spent as high as 110 days on a ship, but by the time she had finished the 32 ships that composed the first part of her contract they had cut this to 51 days, making an average of 82.72 days. Over all the nation her nearest competitor in the building of Victorys had an average of 113 days -- which left the Oregon Yard undisputed Victory Ship champion.

On May 15, '44, Oregonship laid her first AP5 keel. Although the dimensions of the AP3 were duplicated for the AP5 there was a tremendous increase of work on the latter. The cargo holds of the AP3 were cut up into cabins and berths, and the finishing work for several departments was multiplied. Electricians found themselves with 148,100 feet -- over 28 miles -- of cable to pull; pipefitters put in 70,120 feet -- almost 13 miles -- of pipe; what with the sheet metal workers' installation of 49 large ventilation systems and increased sheet metal jobs, their work was about five times what it had formerly been; the Marine Department's responsibilities were nearly doubled; painters, accustomed to spreading paint over 337,795 square feet of steel, had almost 33,800 additional square feet to cover -- and a total amount of 5,000 gallons of paint to apply.

Vancouver was also building AP5s, and Swan Island's tankers were sorely needed, too. The extra work simply couldn't be accomplished without extra people, so recruiters were sent forth to comb any part of the nation where they were granted permission to do so. In came recruits by the hundreds. All three yards were straining to deliver the goods.

Although the summer of '44, found Oregonship progressing nicely with her program, the turn of the war created an immediate need for troop ships, and the government issued an SOS to the yards that were building them. Its request of the Oregon Yard was for 30 transports by December 30th. Edgar Kaiser called a mass meeting around the Mold Loft platform, and thousands gathered during the lunch hour to hear his brief but eloquent appeal. His announcement of a ten-week siege with no day off was accepted stoically, as was the later news that the 7-day week would be extended till the contract was fulfilled. That final drive started the 21st of August. As time went on, the workers grumbled wearily, but they stuck to their jobs. Partly, it was the knowledge of the emergency; partly, it was their habit of coming through; and partly, it was the four-yard race for a pennant that the Maritime Commission was offering to the yard that delivered the most Transports each month. Oregonship won the pennant in August, and again in September. Through October it ran neck and neck with Vancouver. The race was so close that sometimes it was a question of hours as to which was ahead. Each was planning to launch a tenth ship on the 13th of the month. When Oregonship learned that Vancouver had secretly moved up her launching schedule a few hours ahead of her rival's, the management at the Oregon Yard advanced the time of her launching one day. It was a last minute coup, and it took strenuous cooperation on the part of several departments. But it worked. However, the end of the month found Vancouver the winner by a launching. Outraged, Oregonship reclaimed the pennant in November and December, and triumphantly flaunted permanent possession of it.

It was during the hot race of October that the Erection Department broke all existing records for the amount of steel erected on an AP5 within 48 hours. In that length of time the shipfitters erected on one hull flat keel, double bottom,

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lower shell, six bulkheads, the forepeak, stern frame, and foundations for the main engine and the evaporator -- 1300 tons of steel."

Maritime Day, 1942

Each of the long line of records that Oregonship rolled up bears special significance for old-timers who were closely involved in establishing it. One of those events was the Maritime Day observance, May 22, '42, which Oregonship celebrated with a triple launching, triple keel-laying and triple delivery. The day fell on Friday, which ranked in the code of the sea as a bad day for launchings; but President Roosevelt, admittedly fond of breaking precedents, suggested that the nation's shipyards smash that superstition in one grand, defiant gesture.

The Oregon Shipyard, who by that time had the wind in her sails, planned to go all out in the way of cooperation. Each shift had a launching, followed immediately by a keel-laying. The graveyard shift started out the program at 12:30 A. M. with the launching of the Washington Irving, the 37th ship to go down an Oregonship Way. As soon as the shipwrights and the riggers had bidden goodbye to the Washington Irving they laid the keel for the next ship upon the vacant Way. A day shift launching and keel-laying at 4:30 in the afternoon, and a third during the swing shift, and the yard workers were ready to call it a day.

But it was the triple delivery that made the spectacular contribution to the day's events. One ship was waiting in Berth 6 at the Dock, a second at the far side of the Basin, and a third in the Willamette. Suddenly, shortly before 5:00 P. M., whistles from the ships, the yard, and surrounding factories lifted their many-toned voices. Three propellers began to turn, and three stately Liberty's converged their courses and began their triumphal journey. The shore was lined with spectators, and photographers were much in evidence. The cruiser Merrimac, bearing the Kaisers, their families and a crowd of friends, circled gaily about the advancing ships. It must have been the most eventful day in the entire life of the placid Willamette.

The Ten-day Ship

The story of the building of the Joseph N. Teal is an interesting one. From the laying of her keel to the moment when the water curled upward from her sides there was special significance in every detail of her creation. The Teal represented more purpose and perspiration than any other ship. It turned out to be Oregonship's ten-day wonder baby.

It was the shipyard's habit to cut and assemble pieces for several ships at once but every piece of steel, every outfitting item that would be used for the Teal was marked for her and rushed through shops and bays ahead of other material. Men and women applied special effort to pieces that bore those markings. They had already turned out more ships per Way than any other shipyard in the world had done in the same length of time -- now they were going to turn out a ship that was to spend fewer days in a yard than any ship had ever spent. They did.

Workers on the Ways of a shipyard are the only spectators who are aware of the intricate preparations that precede each launching. To most of the crowd the

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ship's graceful slide into the water in instinct. Little do they dream of the mathematical calculations of the naval architects, or the hours of work done by the shipwrights, riggers and electricians.

In the case of the Teal these preparations were speeded up. One and a half days before the time set for the launching the shipwrights began their preparations. They pulled the Sliding Way up onto the Permanent Way, moved it to one side, and poured onto the Permanent Way a covering of hot Bancote. After this was cool they added a layer of Slipcote. Last the Teal's weight squeeze out the grease from between the two Ways, grease irons were placed upon the Permanent Way. Then back in place went the Sliding Way.

When the forepoppet arrived, via a whirley, the shipwrights put a "shoe" on it and pulled it into place with air tuggers. Then they built in the aft poppet, connected the skids to the burning plates, put in the struts, and placed the wedge riders and the packing blocks. Next they secured the "barn door" just above the rudder where it would help to break the Teal's speed when she hit the water.

Then, with less than a day left before the time of launching, they knocked out the shores and placed two rows of horses on each side of the Way, nailing them to the platform. With under four hours to go, they removed the grease irons and began to drive the ramming wedges in 15 minute rallies. When they started removing the keel blocks and tearing down the cribs the yard began to throb with anticipation.

The riggers' launching crew on the deck above was hustling to put the finishing touches on their jobs. They had started their preparation the day before. The 27 launching pendants that always secure the Sliding Way to a ship were all installed. They had rigged up the barn door so that the shipwrights could make it fast. Cables and ropes were ready to serve their purpose. The dragline had been passed through the rope loops that support it as it runs along the edge of the deck till it drops to the huge bundles of chains on the sand below.

With an hour to go, riggers paddled a boat out into the water over the extended Way and waited while a diver made sure that the channel was clear. Then they helped him back into the boat and took him ashore. (This examination of the channel is a regular part of the procedure.) On the Teal's main deck riggers were hanging the rigging for the pennants that the mate would soon string up.

In the radio room everything was in readiness for the broadcasting and recording of the ceremony, and a launching crew from the Ways maintenance electricians' group was setting up the electrically controlled device that always was used to record the speed of the ship as she glided down the Ways.

The Teal was the only ship launched without a throng of outsiders to witness the ceremony. Offering no explanation, the management refused to issue passes, and only Oregonship employes were privileged to attend. An under-current of excitement was pulsing through the crowd. The day before, a ramp had been built in front of Way 5. It was a sturdy structure, horseshoe in shape, and evidently meant to support cars. Its closest curve brought it up on a level with the launching platform, about 75 feet away. Speculation on the purpose of the ramp was high.

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CHAPTER XIII

Then, when about an hour before the launching, outside telephone wires were disconnected, questions turned into rumors, and whispers into noisy buzzing.

A strange train had entered the yard. Not a train of cars bearing steel, or anchors, or lifeboats. This train pulled a passenger car, and Henry J. Kaiser's own light gray automobile was waiting to receive the guests. The top of the car was down, and the astonished crowd that was rapidly gathering could verify the rumor with their own eyes. President Roosevelt was in the yard. Accompanied by Henry and Edgar Kaiser and Governor Sprague, he was approaching that mysterious ramp. The whole surroundings bristled with guards. Oregonship's own crew had been supplemented by guards from Swan Island and Vancouver, and there were Army guards, as well.

Following that light gray car were several others that contained the political Who's Who of Oregon. The whole group rolled up onto the ramp and stopped. When the noon whistle blew, crowds of workers who had remained at their jobs grabbed up their lunches and surged toward Way 5. They could not get near enough to see much, but the amplifiers brought the music and talk to them. They laughed over the President's humorous remark, "You are not supposed to know that I am here." They thrilled to the whole proceedings, but although there were times when thousands of throats swelled with cheers, it was not as demonstrative a crowd as one might have expected. A sort of reverence was mixed with their triumph. They were awed, and honored, and very proud.

Beneath the curve of the ship's prow was Ray Hausmann, Shipwright Superintendent, waiting, as he did for every launching, for the exact spot in the program when he should signal the waiting burners to light their torches and begin the burning of the plates. The moment arrived, and, with the announcer's voice carrying to the vast crowd the details of this final task, two burners, one on each side of the prow, applied their torches to the first plate -- the second. The voice of Ann Boetiger, the President's daughter, sounded through the crowd's expectant hush -- "I christen thee the Joseph N. Teal." Another plate was severed, and another. There was the sound of crashing glass, a splash of champagne, a loud report as the ship broke loose, and Oregon's pride and joy settled into the water of the Willamette.

After the Teal had been picked up by the tow boats the President's entourage made the rounds of the yard. Before they left, they paused at the upper end of the Dock to watch the newly launched ship tie up. Then on they went to where their special train was waiting; and back went thousands of men and women to the anti-climax of resuming jobs upon what would be just "another ship".

They had entertained what was as close to royalty as Americans ever got, and they had broken another record, but there was still the matter of an unfinished contract.

Reconstruction from Ruins

By the fall of '44 the second Administration Building had acquired the settled appearance that comes to structures when they have housed a thousand-odd clerks, priceless letters, blueprints, photographs, scrapbooks, irreplaceable records, and furnishings that betray constant using. The grounds, with lawn and shrubbery, added to the impression of permanence. That was before the fire!

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CHAPTER XIII

On November 6, 1944, dawn found an angry glare illuminating the entire shipyard. It was the Administration Building. Scores of homeless office clerks who had fled their desks when the alarm had sounded were milling about the outer edge of the group of firemen and their apparatus. The Portland Fire Department was heavily represented, but the struggle was brief, and final. Within an hour the beautiful building, with its wealth of history and equipment, was gone. The surrounding territory bore grim witness to the catastrophe. Wires ragged from flaming poles and several cars that had been parked too close blazed and blackened into distorted scrap.

Within the shipyard gates the graveyard shift gasped with the shock of it; but the average day shift worker, busy with preparations for heading toward the shipyard, either missed the radio announcement of the fire, or failed to grasp the significance of it.

So it was that when they first beheld the pitiful ruins they stared in stunned silence.

"What shall we do?", the Administration clerks asked each other when they found their voices.

What they did paralleled what their great grandparents did when they fled their homes and flocked into a fort that wasn't large enough to hold them -- but did.

Record after record was made during the emergency. Here was the shipyard, in the middle of an exhausting drive for troop ships, with no administration equipment, and no shelter for their clerks. A couple of hours later, while on one hand water sprayed over the smoking remnants, a huge moving van on the other hand backed up to the auditorium (a wing of the Personnel Building, where moving pictures were shown) and began unloading office furniture.

During the day, Personnel and Service building offices were rearranged to accommodate scores of homeless clerks. All manner of technical engineers flocked in with whatever they had in the way of drawing boards, instruments and blueprints. They moved into lobbies, the ends of hallways, and into already crowded offices. They overflowed into the yard, where the First Aid Building and the Yard Office offered them shelter. They even invaded the Mold Loft, settling in a corner and turning out reproduced blueprints while around them patient Joiners squatted over templates and templates.

In the Service Building, the Progress Department (which had formerly enjoyed a couple of large offices in the Administration Building) took over three small offices and settled down to the task of assembling copies of graphs, charts, maps and pictures and of making new ones to replace those destroyed. Next door to them, girls in the Record Control Department dived themselves in washtubs slacks and toiled through half charred files that represented a complete status history of the yard's employes. Cinderella, sitting in the ashes, had nothing on their group -- but they salvaged an amazing amount of information.

The gymnasium, which till then had been used by dormitory servants, was turned into a community office that housed Time, Payroll, Cost, Tabulating, and Bond Accounting.

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departments. It was much like moving several large, active families into one room; but at least they had a roof, and desk space. They didn't like the crowded conditions and the lack of privacy, but they rose to the emergency and took things as they came -- even to the occasional wooden knot that plopped onto their desks from the overhead crossbeams.

The most dramatic story of all developed in the Time, Payroll, and Tabulating departments. Thirty thousand men and women, working seven days a week in an extended campaign to supply their government with troop ships, were expecting to receive their paychecks in just four days. Yet many current records and almost all the machinery upon which the three departments were dependent had gone up in smoke.

Timekeeper Stanley first learned of the disaster while shaving, preparatory to leaving for work that fateful morning. His wife called to him from the telephone.

"You won't have to go to work today. The Administration Building just burned down."

"You're crazy," commented her unimpressed husband.

"Well, maybe," his wife conceded sweetly, "but not half as crazy as the fellow on the other end of the line."

That roused him. He practically galloped to the telephone, where he learned the appalling truth -- a truth that introduced him to the headache that engulfed the entire Time, Payroll and Tabulating departments for many days to come.

Although most of the vital records were locked in vaults, many of the very recent ones had been destroyed. Timecheckers scurried forth to collect the check stations' rough payroll records. Assembling them at the Guard House, some 15 or 18 timecheckers began the momentous task of making out by hand countless records and computations to be used by the Tabulating department. Meanwhile the Payroll Department was frantically collecting information concerning withholding status cards, bond deduction cards, quit slips and checks that had been destroyed. Many balances still owed by recruits had to be reconstructed by a careful checking back over records that the vaults had saved. Shifts were forgotten. Both the Time and Payroll clerks worked as long as their strength would allow.

The Tabulating Department took hold where the other two departments left off. Their clerks rushed the assembled information to the Swan Island and Vancouver yards, where they proceeded to use the IBM machines during every spare minute. These men and women did a lot of around-the-clock working, too, for they had received the material late, and could use the machines only part of the time. When, 18 hours after the destruction of Oregonship's machines, a borrowed one arrived from Richmond (after a truck journey in which the driver established a record of his own) the available machinery merely meant a chance to get more work done -- and done faster. And still the weary clerks toiled on.

All three departments were struggling against the fact that for the first time since the shipyard's birth her workers were facing a payless payday, and together Time, Payroll and Tabulating clerks established the most incredible record that came out of the fire when they issued checks only three days late.

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[illegible]

[illegible]

[illegible] drafting instruments that could not be replaced at any price, and correspondence [illegible] the Public Relations Department had made up were irreparable. The [illegible] department lost correspondence files that had contained letters from internationally known people — letters that bore testimony of the shipyard's memorable events. The Naval Architects' timing records of all launchings were destroyed. Some tons of material that the Vessels' Delivery Department had stored in readiness to be placed aboard the ships just before they sailed [illegible] As a result, the first five ships that were delivered after the fire had to sail without the necessary ship's documents and certificates, and the department had a strenuous time making sure that [illegible] supplies finally overtook the ships for which they were intended. [illegible] complete records of ships already delivered were cleaned away with the [illegible]

Meanwhile, a contract for the erection of another Administration Building [illegible] let to Wagman and Son, and as soon as the remains of the fire could be [illegible] away construction on another building was started. Accustomed as they were to [illegible] way their shipyard did things, employes gasped in unbelief when they [illegible] departments would be moving into the new building before the end of [illegible] just ten weeks after the fire only the ruined lawn and shrubbery bore [illegible] disaster.

It was another record for Oregonship — a record of how she could take [illegible] the chin and rise, undaunted.

Special Awards

Oregonship was very proud of the long string of flags that she possessed, and she should have been, for she captured more than any other shipyard in the nation. On February 15, 1942 — only a year after she had started building her [illegible] — she captured the Navy "E" award. This is given only in the case of exceptional achievement, and the fact she was the only Maritime yard to receive such recognition added greatly to its significance.

The Maritime Commission had established a system of awards for shipyards that were building Liberty ships. An "M" pennant was awarded when a shipyard completed a cycle in which ships were delivered consecutively from each way in 105 days or less. Each time a cycle was accomplished a pennant with an additional star was awarded. Oregonship earned her first "M" pennant in April, 1942. By February, 1943 she had been awarded eight others, each with one more star to mark the accomplishments. In March she earned a beautiful Maritime Flag pennant which contained that the shipyard had completed 15 cycles in an unbroken chain of outstanding performances. The pennant carried the white "M" on the red blue background, golden eagle with the figure 10 upon its breast, the 10 signifying 10 [illegible]

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In the presentation speech on April 4, '43, a Maritime Commission official stated that Oregonship, having been the first of the nation's shipyards to win the Maritime "E" Burgee, had gone right on to receive the first Merit Eagle. He added that since the laying of the first keel, nearly two years previous, the yard had broken all ship production records of this or any other nation. During that period she had cut her own shipbuilding time 70%, and had, in '42, produced more than 25% of all the Liberty ships built.

That achievement only whetted the shipyard's appetite for awards. In September, she received a 250 ship pennant, and the next month brought her a 30 Day Club flag and a beautiful gold wreathed Maritime Merit Eagle pennant which had been designed especially to cover her achievements. That was the climax of her Liberty ship record.

When shipyards swung to the construction of Victory cargoes, Oregonship launched and delivered the first one. She was also the first to complete the contract, but she did not win any pennants during that phase of her building. When the program turned to Attack Transports she reverted to her pennant-winning habits by capturing, in open contest, the AP5 Champs flag in August and September. It was that pennant that Oregonship lost to the Vancouver yard in October, but won permanent possession of later.

By the end of '44 Oregonship's Ways were filled with Victory ships again, and plans were being laid for the building of 6,000 pontons for which the contract had been signed on December 14. Work on the new Administration Building was being hurried, but the 7-day-week rush of the AP5 period had been discontinued, and the yard had relaxed. Oregonship had no need to keep demonstrating what she could do in high gear. The nation knew her capabilities.

Henry J. Kaiser built roads and dams, he sponsored or owned a number of shipyards. All those enterprises contributed to his reputation. But it was the Star of Oregon that launched him into fame as a shipbuilder, and Oregonship, his "Baby Number One", and its amazing string of records that plopped him into the nation's spotlight.

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THIS is the true story of the working conditions and the people at a shipyard in the Pacific Northwest. The author, a "Government Agent," was sent into the yard in the guise of a beginning welder by the U. S. Office of Education. Her mission was to find why many women quit such jobs soon after taking them. She found the answer, and as a result many more women are today working happily at shipyard jobs.

(No, the drawing above does *not* show an inside view of a shipyard. It is a sketch of the author returning from work to her swanky hotel, where the housing shortage compelled her to live. Tough, wasn't it?)

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SHIPYARD DIARY OF A WOMAN WELDER

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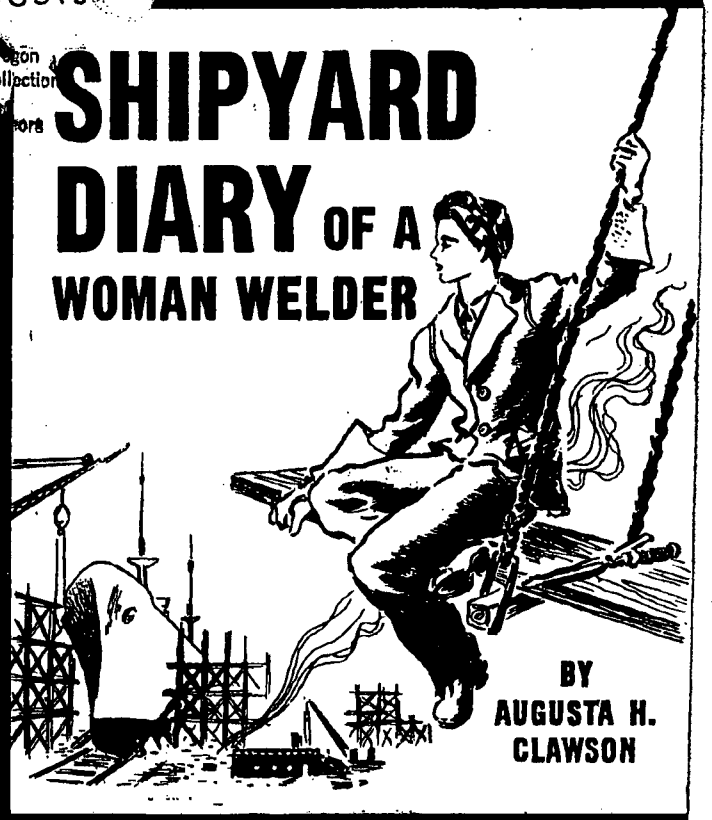
SHIPYARD DIARY OF A WOMAN WELDER



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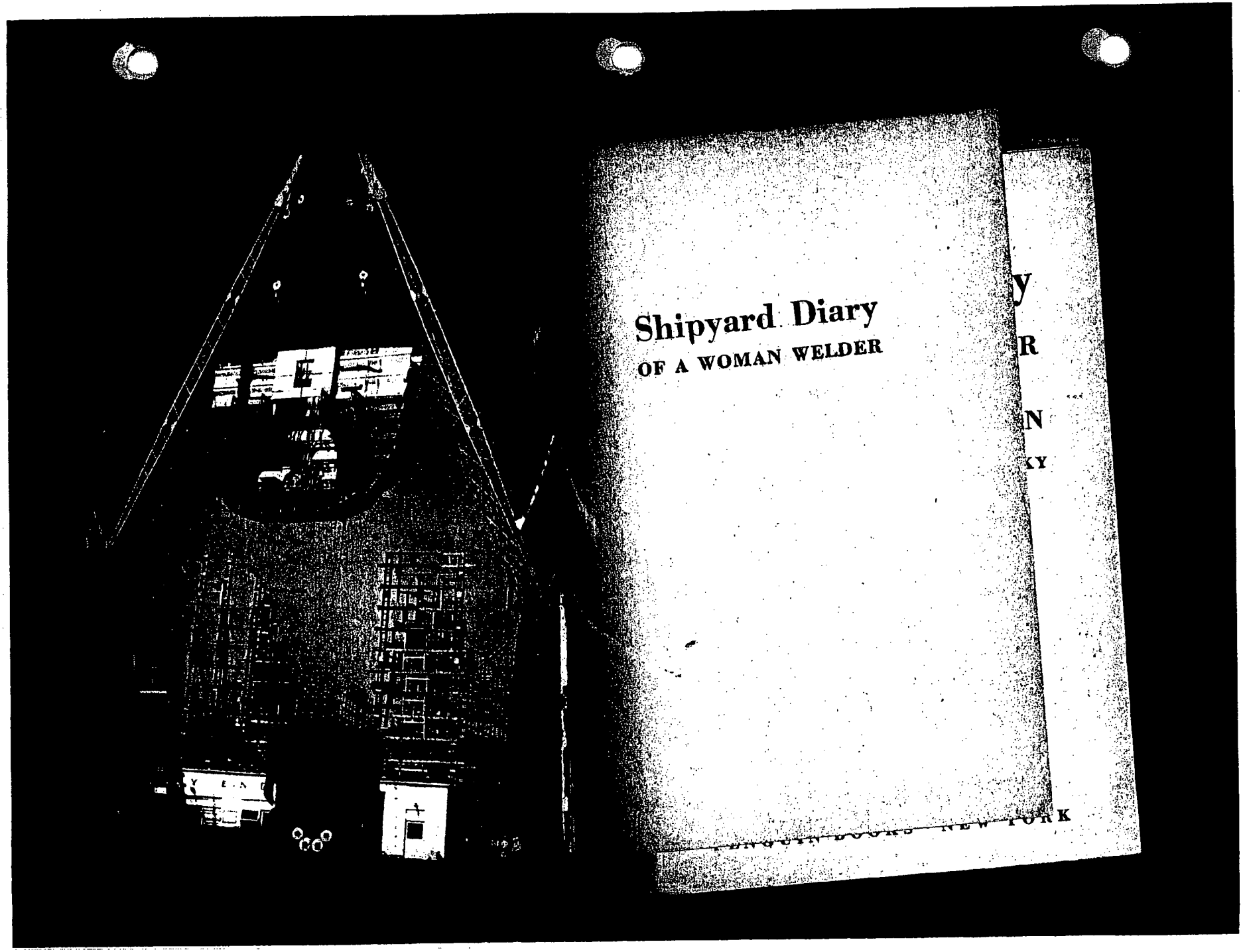

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To

MARY ELEANOR DEMAREST

Shipyard Diary

OF A WOMAN WELDER

BY AUGUSTA H. CLAWSON

ILLUSTRATED BY BORIS GIVOTOVSKY

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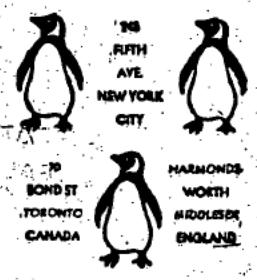

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Shipyard diary of a woman welder.

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SCHN00317970

INDUSTRIAL HYGIENE SURVEY
of the
KAISER COMPANY, INCORPORATED

PORTLAND, OREGON

SCHN00317995

C O P Y

UNITED STATES MARITIME COMMISSION

Washington

October 21, 1942

Mr. M. B. Williams, Safety Director
State Industrial Accident Commission
427 S. W. Eleventh Avenue
Portland, Oregon

Dear Mr. Williams:

The Maritime Commission and the Navy Department recently made a joint survey of industrial health in the Portland Yard of Kaiser Company, Inc. This survey was conducted by Dr. Philip Drinker, Dean of the School of Public Health at Harvard University. They have now completed their report on this yard, copy of which is attached.

You may wish to go over this report and offer any constructive criticism that might aid in the furtherance of our health program.

It would be appreciated if you would forward to me any suggestions, or amplifications on this matter at your earliest convenience.

Sincerely yours,

signed: Daniel S. Ring

Daniel S. Ring
Director
Division of Shipyard Labor Relations

Attachment

SCHN00317996

C O P Y

TO THE MARITIME COMMISSION

WASHINGTON, D.C.

INDUSTRIAL HYGIENE SURVEY

of

MEN EXPOSED TO WELDING FUMES

OREGON SHIPBUILDING CORPORATION

KAISER COMPANY, INCORPORATED

PORTLAND, OREGON

September 8-16, 1942

John F. Ege, Jr., Ens. H-V(S) U.S.N.R.

SCHN00317997

INDUSTRIAL HYGIENE SURVEY OF OREGON SHIPBUILDING CORPORATION

In the course of our visit to this shipyard, our attention was called to the fact that not only welders, but workmen in general, did not have a clear conception of what effects, if any, gas and arc welding have upon their health. This point was emphasized by the fact that the union had retained a group from a medical school to study the situation.

In our report of September 3-4 to the Maritime Commission, we quoted excerpts from the yard newspaper. The inference drawn was that conditions under which men worked at Portland were unhealthful. We stated, on the contrary, that conditions were comparatively good and generally were much better than we had seen elsewhere on our survey of shipyards in the United States. However, we lacked data for actual air analyses. As we believed the Maritime Commission should have such data, the writer was detailed to the yard to make the desired determinations. This report consists principally of his findings.

John F.

In the construction of ships of the Liberty class, there are undeniably risks from traumatic injury, but the chances of occupational illness are unusually small and easily controlled. These are facts, not theories, which we can support with figures from the many yards we have studied for the Maritime Commission.

At Portland, our attention was called to the several suits filed against the contractor, Kaiser Company, Incorporated, for alleged damage to health from working at various jobs in the yard. Most of these damage suits involved the alleged breathing of harmful substances, presumable generated by welding.

Composition of Welding Rod and Coating: In both gas and electric welding, the object is to obtain as perfect a union as is possible between two pieces of metal. The rod is coated with a variety of substances which improve the weld or union. Some of the more important functions of this coating are to exclude the oxygen of the air from the molten metal, to confine and stabilize the arc, and to provide a slag covering for the cooling bead of metal. For these purposes, carbohydrates such as sugar, starch and wood pulp, manganese compounds, titanium dioxide, and mineral silicates are used. These substances are typical of what is found in the rod and coating commonly used in Liberty Ship construction. There is a wide range of possibilities in the constituents of the coating. There is, however, no occasion to use substances as toxic as the fluorides which are used in aluminum welding rods.

In conclusion, there is no evidence from any source that the fume from the rod or coating presents any danger to the men exposed when usual common sense ventilation is provided.

SCHN00317999

In the construction of Liberty ships, there is very little welding of galvanized iron except for some piping in the engine room and double bottoms, and a certain amount of it in the pipe shops in the fabricating departments. Breathing zinc oxide fumes in sufficient amounts causes metal fume fever or zinc "shakes". It is an unpleasant experience, but the effects are not cumulative, like lead poisoning, and recovery within 24 to 36 hours is complete.

An electric arc has the power to "fix" some of the nitrogen of the air and thus form acid gases, oxides of nitrogen, which are poisonous when breathed in sufficient amounts. In our shipyards, coated rods are used exclusively, and as explained earlier, a reducing atmosphere of carbonaceous smoke and gases is generated around the arc. This gas shield, designed to exclude oxygen of the air from the arc zone, also includes the nitrogen of the air, and therefore, little of it is "fixed."

The oxide of nitrogen concentrations as our tests show, and as logic would indicate, are low. It is virtually impossible to build up dangerous concentration since the air is in constant motion. Even in extremely confined spaces, harmful amounts of oxides of nitrogen can not be generated or breathed by the men when attention is paid to ventilation.

SCHN00318000

Effects of Radiation on Men: When we consider light radiations from the arc, however, we find a real health hazard. Radiations of the ultra violet class cause a flash or burn of the eyes. In such a state, the eyes are painful and sensitive to light. The condition, unfortunately, keeps welders and also non-welders off the job for a matter of several hours, or sometimes a day or more. The prevalence of these cases throughout the shipbuilding industry is inexcusable. There are two simple corrective measures: provision of workers with proper eye protection, and care that comes with experience on the part of the worker. Attention to these details has been shown to reduce markedly the incidence of eye flashes.

Working Conditions: Some production is lost when men are welding in poorly ventilated places. Here, as soon as the fumes reach a disagreeable level, the workers slow down. With reasonably good ventilation the men will resume their usual working rate.

It has been found that the easiest measurement and perhaps the most reliable index of air pollution in welding, is the weight of metal oxides in a unit volume of air. On a purely arbitrary basis, it has been decided that men should not be subjected continually to more than 30 milligrams of fume per cubic meter of air, even though higher concentrations are not harmful. At this concentration, there is a fairly dense haze in the air. The fumes begin to interfere with work but not with breathing. The men exposed will not cough.

Interpretation of Results: In the present studies, we were at some pains to find conditions in which the concentrations of visible fume were the worst obtainable in ship construction. Neither the average conditions nor the best

are sought out.

Using 30 milligrams of fume per cubic meter of air as a base line, conditions in the engine room, and at times, in the after peak are good; conditions in the after peak and deep tank are passable; and conditions in the fore peaks at times range from two to three times the recommended level, while the double bottoms show concentrations about twice this level.

These judgments are based on a continuous exposure. Welders at this shipyard are rotated on their jobs. At most, any worker probably spends only ten per cent of his time in these relatively confined spaces.

The study indicated that the working atmospheres of the welders on the whole is not substandard. Manganese and lead concentrations did not exceed more than a small fraction of concentrations usually accepted as the safe limit. In the case of oxides of nitrogen, the highest concentrations measured were only one-fifth the accepted safe limit.

It must be concluded that any claim of a chronic condition of health caused by welding or working in the vicinity of welders, even in the confined spaces studied in this report is without foundation. In general, the health of welders at this yard should not be very different from that of other workers. The existing ventilation given the welders at this yard is far and away better than most yards visited on the general survey of yards in the United States.

Sampling and Analytical Methods: Thirty-eight samples were taken with the U.S.A. Electrostatic Precipitator for total fumes which were transferred and weighed. In addition, representative samples were put into solution and analyzed for lead by the Fairhall method after separation of the iron. On these same samples, manganese was determined colorimetrically as permanganate by the periodate method. Nineteen samples were collected for oxides of nitrogen

in grab sampling tubes. The oxides were absorbed in acid peroxide and the nitrogen was determined colorimetrically by the phenoldisulfonic acid method.

These samples covered five general types of exposures. It should be emphasized that in making these tests it was necessary to do considerable planning and searching to get high fume concentrations. All ships on the ways naturally involved these five conditions only once in the process of building. Samples in the double bottoms, for instance, were taken on the recent ten-day record ship when there were said to be 60 welders per shift in the double bottoms. Similarly, efforts were made to get the worst conditions in the forepeak, afterpeak, engine room, and deep tank. Along with the samples, consequently, considerable visual comparisons were made of similar jobs on other hulls.

In general, the fume concentrations appearing in the tables at the end of this report are much higher than found anywhere else in ship construction.

SCHN00318003

DISTRIBUTION OF WELDERS

On a typical day at this yard on three shifts, welders were divided up as follows:

		Welders	Helpers
Day:	Ways	708	64
	Outfitting	106	14
Swing:	Ways	650	82
	Outfitting	133	16
Grave Yard:	Ways	519	74
	Outfitting	115	14
Total:	Ways	1877	220
	Outfitting	354	44

The study was therefore limited to the ways - other exposures are expected to be even less significant. Visible inspection of the yard confirmed these expectations.

The highest concentrations are to be found in the forepeak, double bottoms, afterpeak, deep tanks, and engine rooms. These places are discussed in detail.

SCHN00318004

SUMMARY OF AIR ANALYSES

Forepeak - Average Conditions

	Fume - mgs. / cu. m. of air	Oxides of nitrogen PPM
	47.	3.8
	70.	—
	74.	14.2

The forepeak is about fifteen feet long and ten feet wide tapering to a point. On each side of the ship there are six welders and six fitters per shift at work for one day. Then, three welders per shift work for one and a half days. Pick up work requiring a few men intermittently for four days finishes this job.

Table 1 and 2: During this period, 5000 cubic feet per minute of air was supplied to the forepeak which was almost completely enclosed. There was a fairly high concentration of fumes. Six to eight welders were working at the time of these tests.

Table 3: Ventilation rate was the same as in table 1. Twelve to fifteen welders were at work "pushing" the job on this hull. The tests here probably indicate the order of the exposures of the welders on this type of work.

Table 7 and 13: The ventilation was shut off for the period represented by samples #21 and 22, and turned on for that of #23. Five men were welding on this deck alone.

SCHN00318005

Afterpeak - Average Conditions

Tables	Fume - mgs. / cu. m. of air	Oxides of Nitrogen PPM
[illegible]	3.9	—
6 & 12	26.0	13.3

Working schedule is about identical with that for the forepeak.

[illegible] 3. Welders had just about slowed down when this test was made. There were only two very small openings in the peak. The ventilation rate was [illegible] at 300 cfm. These were said to be the usual conditions.

[illegible] 6 and 12. Ventilation rate estimated at 5000 cfm. on the day shift and [illegible] cfm. on the swing shift. About eight welders were in the peak.

SCHN00318006

SUMMARY OF AIR ANALYSES
Afterpeak - Average Conditions
Forepeak - Average Conditions

Tables	Fumes mg/cu. ft. of air	Oxides of Nitrogen PPM
3	14.	3.8
1 & 2	47.	3.8
6 & 12	26.	19.3
7	70.	

Working schedule is about identical with that for the forepeak. Table 7: & 13 Welders had just about finished down when this test was made. There were only two very small openings in the peak. The ventilation rate was estimated at 2,000 cfm. These tests are to be the same conditions.

The forepeak is about fifteen feet long and ten feet wide tapering to a point. On each side of the ship there are six welders and six fitters per shift at work for one day. Then three welders per shift work for one and a half days. Pick-up work requiring a few men intermittently for four days finishes this job.

Table 1 and 2: During this period, 5000 cubic feet per minute of air was supplied to the forepeak which was almost completely enclosed. There was a fairly high concentration of fumes. Six to eight welders were working at the time of these tests.

Table 3: Ventilation rate was the same as in table 1. Twelve to fifteen welders were at work "pushing" the job on this hull. The tests here probably indicate the order of the exposures of the welders on this type of work.

Table 7 and 13: The ventilation was shut off for the period represented by samples #21 and 22, and turned on for that of #23. Five men were welding on this deck alone.

Deep Tanks - Average Conditions

Tables	Fume - mgs. / cu. m. of air	Oxides of Nitrogen PPM
5	24.	--

The size of each tank is approximately 25 feet by 25 feet by 18 feet. is tank, as is commonly the case, was completely closed off except for one tchway. Six to eight welders were working here per shift.

ble 5: Ventilation rate was judged to be 5000 cfm. Two compressed air oses and two supplied air were in use. Visual inspection indicated that ons in both tanks, port and starboard, were nearly the same. The mosphere at these concentrations is hazy.

Forward ballat deep tanks were not studied. Visual inspections indicated onditions comparable to the above.

Engine Room - Average Conditions

	Fume - mgs. / cu. m. of air	Oxides of Nitrogen PPM
[illegible]	14	1-4

[illegible] welders per shift work here for a week. At times, however, [illegible] here may be twelve.

[illegible] Table 8 and 14. The men as a whole judged atmospheric conditions to be [illegible] but a few complain of conditions here especially when painters [illegible] This hull was being "pushed." Of all the hulls on the ways, [illegible] were in this stage.

SCHN00318009

Double Bottoms - Average Conditions

Table	Fume - mgs. / cu. m. of air	Oxides of Nitrogen PPM
9 & 10	170.	4.2
11	60.	—

Usually four or five welders per shift were said to work in the double bottoms for six days.

Tables 9 and 11. In the bay in which the test were taken, one welder was working with no ventilation other than natural convection currents. This welder, on request, tried to make conditions as bad as possible. No. 29 represents pretty well what men can be exposed to as a maximal value. The bottom was twice jacked up and welded to the ribs.

Table 10. One supplied air hose (about 1250 cfm.) about ten feet from two welders was provided for ventilation. These tests give a good estimation of the exposure of the welders in these sections. The end of the bay was just about jacked up. Approximately seven welders were working in a radius of 15 feet.

No. 33 was taken further inside. The condition was visibly the worst in the double bottom. Here, in fourteen bays, there were thirteen welders working. Air test indicated the order of maximal exposure. The welders adjusted their welding rods to keep the fume concentrations down to this level.

It was very hot here (95° F.) and the heat provided convectional ventilation. The artificial ventilation on this job was not too plentiful. This was the ten day ship and its construction was being "pushed". For example,

SCHN00318010

[illegible] welders were said to be working on the double bottoms on the day [illegible]. No. 3 No. 38 were taken in cubicle 4 feet by 4 feet by 4 feet.

Personnel Room: Two men per shift work here for two or three day. No measurements were made.

Conditions: Pick-up work is done here. The worst conditions are reportedly present in dry spaces (Carpenters and Boatsmen) and in superstructure (Painters, Coamal). No measurements were made. There is probably a few days work at most here.

SCHN00318011

[illegible] In general, ventilation at this shipyard is better than at [illegible] Eighty-eight 5000 cfm. units and two hundred and seventy 600 cfm. [illegible] are available. Distribution of this equipment was judged to be effici-[illegible]

[illegible] The adequacy of the ventilation around welders should be judged by the [illegible] the ventilation department on the basis of visible smokiness of the [illegible] atmosphere. The fume concentrations should preferably be kept below the level [illegible] that exists in the deep tanks when six welders are working there. [illegible] confined spaces where the fume may be very thick at times, working is [illegible] but not dangerous to health.

[illegible] In several of the locations, men obviously reduced their working rate [illegible] keep the fume level down, usually in the vicinity of 50 milligrams. It [illegible] therefore appears that production alone is suffering when concentrations [illegible] than say 70 milligrams per cubic meter of air prevail. In all [illegible] probability, since such a small percentage of welding is carried out in the [illegible], airspace, and double bottoms, the overall welding production of this [illegible] is not affected.

SCHN00318012

APPENDIX

AIR ANALYSES - METALLIC FUMES

	Date	Time	TOTAL FUME mg/m³	MANGANESE mg/m³	LEAD mg/10m³	TOTAL FUME - Weighted Average
		TABLE 1 - FORETEAK				
1	9/9	12:53 - 1:29 PM	40.	0.3	*	
2	9/9	1:49 - 2:04 PM	28.			47.
3	9/9	2:05 - 2:15 PM	89			
4	9/9	2:16 - 2:31 PM	99.			
		TABLE 2 - FORETEAK				
5	9/9	9:30 - 9:47 PM	71.	0.5	*	
6	9/9	9:50 - 10:05 PM	118.	2.7	*	70.
7	9/9	10:15 - 10:25 PM	62.			
8	9/9	10:27 - 11:02 PM	43.	1.6		
		TABLE 3 - AFTERPEAK				
9	9/10	4:19 - 4:35 PM	3.			3.
		TABLE 4 - DEEP TANKS				
10	9/10	7:58 - 8:18 PM	36.	1.5	*	
11	9/10	8:40 - 8:61 PM	23.			
12	9/10	9:24 - 9:39 PM	20.			24.
13	9/10	9:45 - 9:55 PM	24.	0.7	*	
14	9/10	10:04 - 10:16 PM	25.			
15	9/10	10:21 - 10:31 PM	16.	0.6	*	

* This sample analyzed for lead and showed less than 0.1 mg. per 10 cubic meters of air.

SCHN00318013

Date	Time	TOTAL FUME mg/m³	MANGANESE mg/m³	LEAD mg/10m³	TOTAL FUME - Weighted Average
		TABLE 1 - FOREPEAK			
9/11	9:15 AM	32.			
9/11	9:47 AM	22.			
9/11	10:00 AM	34.	0.2	*	26.
9/11	7:45 PM	37.			
9/11	8:07 PM	21.	1.8	*	
		TABLE 2 - FOREPEAK			
9/12	7:16 - 8:16 PM				
	7:17 - 9:17 PM	38.			
9/12	9:17 - 9:47 PM				74.
	9:18 - 10:03 PM	111.	4.7	*	
9/12	10:03 - 10:32 PM	33.			
		TABLE 3 - ENGINE ROOM			
9/12	2:49 - 3:14 PM	18.	0.8	*	
9/12	3:35 - 4:00 PM	18.			14.
9/12	7:55 - 8:30 PM	15.	0.5	*	
9/13	9:45 - 9:55 PM	10.			
		TABLE 4 - DOUBLE BOTTOMS			
9/12	9:57 - 9:58 AM				
	10:10 - 10:20 AM	83.			
9/12	10:29 - 10:53 AM	213.	5.6	*	170.
9/12	11:05 - 11:31 AM	208.			
9/12	11:35 - 11:49 AM	115.	6.3	*	

* This sample analyzed for lead and showed less than 0.1 mg. per 10 cubic meters of air.

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COPY

Sample	Date	Time	TOTAL FUME mg/m^3	MANGANESE mg/m^3	LEAD mg/10m^3	TOTAL FUME - Weighted Average
		TABLE 10 - DOUBLE BOTTOMS				
32	9/14	5:53 - 6:18 PM	67.			
33	9/14	6:35 - 6:56 PM	133.	5.6	*	
34	9/14	7:47 - 8:07 PM	49.			
35	9/14	8:11 - 8:21 PM	31.			
36	9/14	9:20 - 9:53 PM	47.	1.3	*	60.
37	9/14	10:36 - 10:56 PM	28.			
38	9/14	10:57 - 11:17 PM	58.	2.7	*	

* This sample analyzed for lead and showed less than 0.1 mg. per 10 cubic meters of air.

AIR ANALYSES - OXIDES OF NITROGEN

Sample	Date	Time	Parts per Million Parts of Air	
	TABLE 11 - FOREPEAK			
1	9/9	1:00 PM	0.	*
2	9/9	1:20 PM	0.	*
3	9/9	1:45 PM	8.7	*
4	9/9	2:10 PM	6.1	*
5	9/9	2:30 PM	4.3	
	TABLE 12 - AFTERPEAK			
6	9/12	3:35 PM	2.7	
7	9/12	3:45 PM	13.1	*
8	9/12	4:00 PM	24.0	*
	TABLE 13 - FOREPEAK			
9	9/12	8:30 PM	4.4	*
10	9/12	10:00 PM	24.0	*
	TABLE 14 - ENGINE ROOM			
11	9/13	3:10 PM	0.	*
12	9/13	3:15 PM	0.	*
13	9/13	4:00 PM	0.	
14	9/13	8:00 PM	0.	
15	9/13	9:30 PM	7.0	*

* This sample taken in breathing vicinity of welder.

Sample	Date	Time	Parts per Million Parts of Air	
TABLE 15 - DOUBLE BOTTOMS				
16	9/14	10:15 AM	5.0	*
17	9/14	10:40 AM	0.	*
18	9/14	11:10 AM	4.9	*
19	9/14	11:30 AM	7.0	*

* This sample taken in breathing vicinity of welder.

No. 1

Beginning April 23, 1942

FIRM NO. 104025 FIRM NAME OREGON SHIPBUILDING CORP. ADDRESS PORTLAND INDUSTRY SHIPBUILDING

Claim No.	Claimant	Date of Accident	Class	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P	U
790010	(b) (6)	2-27-42	5351	RIGGER	56	RIGGING GAVE WAY JERKING CLAIMENTS WRIST	634	0923	X			
790011		3-11-42	"	SHIP FITTER	33	ARC FLASH BURN	939	0213			X	
790012		3-18-42	"	SHIP FITTER	19	STEPPED ON LOOSE 2x4--FELL	125	0721	X			
790013		3-24-42	"	GEN. HELPER	57	WELDERS SPARK IGNITED LEAKING GAS-EXPLOSION-THROWN TO GROUND	220	0307	X	X		
790014		3-25-42	"	CHIPPER	24	CHIPPING--STEEL IN RT. EYE	227	1112			X	
790015		3-28-42	"	SHIPWRIGHT	22	CARRYING TIMBER**STUMBLED--STRAINED ABDOMENAL MUSCLES--HERNIA	638	1305	X		X	
790016		3-28-42	"	LABORER	44	SLIPPED ON LADDER & TWISTED KNEE	653	0916			X	
790017		3-29-42	"	WELDER	29	CHIPPING -- SLAG IN RT. EYE	227	1112			X	
790018		3-30-42	"	PLATER	61	CAUGHT BETWEEN STEEL ROLLS & PLATE IN PLATE SHOP**FINGERS	356	0327			X	
790019		3-30-42	"	LABORER	33	PULLING & PUSHING TURNBUCKLE--STRAIN	634	0918			X	
790020		4-1-42	"	CLERK	52	SLIPPED ON WET PAVEMENT - TEARING MUSCLE IN LEFT LEG	123	0328			X	
790021		4-2-42	"	SHIPWRIGHT	50	STRUT FELL STRIKING NOSE	224	0311	X		X	
790022		4-2-42	"	CHIPPER	23	CHIPPING--STEEL IN LEFT EYE	227	1112			X	
790023		4-3-42	"	WELDER	33	PIECE OF SLAG IN EYE	227	1112			X	
790024		4-3-42	"	RODMAN	51	STEPPED INTO MANHOLE - CONTUSION, RIBS	452	0318	X		X	
790025		4-5-42	"	WELDER	24	WELDING--SLAG IN RT. EYE	227	1112			X	
790026		4-5-42	"	DRILLER HELPER	57	PULLING AIR HOSE--STEPPED INTO MANHOLE	552	0328	X		X	
790027		4-7-42	"	PAINTER	25	STEPPED ON A WIRE--SLIPPED--SPRAINED ANKLE						
790028		4-9-42	"	LABORER	24	IRRITATED EYE--APPARENTLY AN ARC FLASH	939	0213			X	
790029		4-10-42	"	SHIP FITTER	37	ARC FLASH BURN	0939	0213	X		X	
790030		4-10-42	"	FOREMAN	47	WELDER DROPPED STINGER--SAFETY GLASSES OFF AT THAT TIME	0939	0213		X		
790031		4-12-42	"	BURNER	21	HOT SLAG UNDER GLASSES WHILE BURNING	237	0212	X		X	
790032		4-12-42	"	SHEET METAL	76	TRIPPED ON WIRE MESH--STRIKING RT. KNEE	438	0328	X		X	
790033		4-12-42	"	CHIPPER	42	STEPPED ON 4 X 4 - FELL - BRUISED CHEST	438	0318	X		X	
790034		4-13-42	"	SHIP FITTER	35	ARC FLASH BURN	0930	0213			X	
790035		4-13-42	"	SHIP FITTER	18	SLIPPED ON LADDER--FELL 6 TO 8 FT.--STRUCK WITH ALL WEIGHT ON FOOT	553	0932			X	
790036		4-13-42	"	ELECT. HELPER	45	ARC FLASH BURN	0939	0213		X	X	
790037		4-13-42	"	BOLTER UP	22	REMOVING BOLT WITH MACH. -- STEEL IN RT. EYE	227	1112	X		X	
790038		4-13-42	"	HOOK TENDER	47	CLAMPS TAKEN FROM PLATES - PLATES FELL ON FOOT	256	0334		X	X	
790039		4-14-42	"	RIGGER	40	TAKING SLING FROM CRANE - FELL 5 FT. - TRIPPED	523	0328			X	
790129		4-5-42	"	RIVETER	35	SLIPPED OFF SCAFFOLD - BRUISED RT. LEG	457	0328			X	
790130		4-7-42	"	CHIPPER	52	CHIPPING--WEDGE FROM ABOVE FELL ON FOOT	224	0734	X	X		
790131		4-10-42	"	CARPENTER	20	TEARING DOWN SCAFFOLD--STEPPED ON NAIL IN BOARD	123	0832	X		X	
790132		4-16-42	"	SHIP FITTER	37	STEPPED ON WELDING ROD--FELL	422	0528	X		X	
790133		4-21-42	"	SHIP FITTER	48	CARRYING MATERIAL DOWN SCAFFOLD--STEPPED ON HOSE--TURNED ANKLE	638	0931	X		X	
790040		4-14-42	"	WELDER	28	ARC FLASH--DROPPED STINGER	0939	0213			X	
790041		4-15-42	"	SHIP FITTER	34	ARC FLASH BURN	0939	0213		X		
790043		4-15-42	"	WELDER	18	ARC FLASH--WORKING TOO CLOSE--CLAIMANT RAISED HOOD	0939	0213		X	X	
790042		4-15-42	"	CHIPPER	38	GRINDING RE-WELD --FOREIGN BODY IN LEFT EYE	0227	1112			X	

SCHN00318019

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P	U
797744	(b) (6) [redacted]	5351	6-14-42	WELDER	27	WAS KNOCKING WEDGE OFF OF PLATE, PLATE SPRUNG & HIT THUMB	256	0326			X	
797745		"	6-14-42	SHIP WRIGHT	37	ARC FLASH, BOTH EYES	958	0213			X	
797746		"	6-14-42	MACHINIST	47	FELL ON GANG PLANK	461	0528			X	
797747		"	6-14-42	CLEAN-UP	51	CO-WORKER DROPPED TIMBER ON FOOT WHILE HE WAS HELPING HIM	260	0332		X		
797748		"	6-14-42	RIVETER	37	RIVET GUN STARTED BEFORE READY, HAMMERED AGAINST HIS SHOULDER	123	0917			X	
797749		"	6-14-42	SHIP FITTER	37	ARC FLASH-BOTH EYES	958	0213			X	
797750		"	6-14-42	WELDER	28	ARC FLASH, BOTH EYES	958	0213			X	
797751		"	6-14-42	PIPE FITTER	28	DALLY FELL PINING HAND BETWEEN PIPE & SHOE, AMPUTATION, FRACTURE	222	1027			X	
797752		"	6-15-42	WELDER	25	SHIP WRIGHT FELL FROM CABLE WITH CROW BAR IN HAND, HIT MIDDLE OF BACK	245	0316		X		
797753		"	6-15-42	SHIP FITTER	40	FLAT BARS GAVE WAY CAUSING FALL, HIT SLEDGE HAMMER	561	0328			X	
797754		"	6-15-42	BURNER	26	FOREIGN BODY IN EYE	227	1112			X	
797755		"	6-15-42	RIGGER	33	WAS SPOTTING A SLING OF STEEL, END SLIPPED & HIT FOOT	234	0332			X	
797756		"	6-15-42	WELDER	51	SLIPPED & FELL ON PLANK	460	0339			X	
797757		"	6-15-42	LABORER	30	FOREIGN BODY IN EYE	227	1112			X	
797758		"	6-15-42	PIPE FITTER	50	ARC FLASH, BOTH EYES	958	0213			X	
797759		"	6-15-42	MACHINE OP.	31	SLIPPED PLANK & FELL ON HAND, FRACTURED WRIST	660	0723			X	
797760		"	6-15-42	SHIP FITTER	24	ARC FLASH, BOTH EYES	958	0213			X	
797761		"	6-15-42	WELDER	40	FOREIGN BODY IN EYE	227	1112			X	
797762		"	6-16-42	CHIPPER	43	FOREIGN BODY IN EYE	227	1112			X	
797763		"	6-16-42	WELDER	33	FOREIGN BODY IN EYE	227	1112			X	
797764		"	6-16-42	SHIP FITTER	35	AIR HOSE JOINT BROKE & HIT FOREHEAD	231	0508	X			
797765		"	6-16-42	LABORER	42	WAS LIFTING HEAVY PLANK, INDIRECT INGUINAL HERNIA	660	1318			X	
797766		"	6-16-42	MACHINIST	42	ARC FLASH, ONE EYE	958	0212			X	
797767		"	6-16-42	BOLTER	51	FOREIGN BODY IN EYE	227	1112			X	
797768		"	6-17-42	WELDER	22	STRUCK KNEE AGAINST STEEL FRAME, INFECTION	256	1236			X	
797769		"	6-17-42	ELECTRICIAN	32	WAS INSTALLING A GUTTER BOX, IT BLEW UP & BUMPED FACE	939	0208	X			
797770		"	6-17-42	RIGGER	53	THROWN BACKWARDS, FRACTURED RIBS, PUNCTURED LUNG	423	0739			X	
797771		"	6-17-42	PIPE FITTER	25	PIPE ROLLED ON FOOT, FRACTURED TOE	255	0734			X	
797772		"	6-18-42	LABORER	58	MANHOLE GRAT, ROLLED OUT OF TRUCK & FRACTURED TOE	222	0734			X	
797773		"	6-18-42	REAMER	63	WAS TIGHTENING CLIP, WHILE PULLING IT GAVE WAY, SUDDEN JERK TO BACK	623	0916			X	
797774		"	6-19-42	HOOK TENDER	22	HOOK SLIPPED OFF PLATE, PLATE FELL ON FOOT, FRACTURE	256	0734	X			
797775		"	6-20-42	SHEET METAL WK.	29	CAUGHT ONTO CRANE TO KEEP FROM SLIPPING, CAUGHT HAND IN BELL ON CRANE	335	0724			X	
797942		"	3-18-42	SHIP FITTER	--	ARC FLASH, BOTH EYES	958	0213			X	
798543		"	4-20-42	SHIP WRIGHT	34	ARC FLASH, BOTH EYES	958	0213			X	
798544		"	5-15-42	SHIP FITTER	31	SEVERE ARC FLASH, BOTH EYES AND FACE	958	0213			X	
798545		"	6-16-42	CHIPPER	36	FOREIGN BODY IN EYE, INFECTION	227	1212			X	
798546		"	5-17-42	SHIP FITTER	34	ARC FLASH, BOTH EYES	958	0213			X	
798547		"	5-19-42	RIGGER	37	SLIPPED AND FELL AGAINST STEEL PLATE, FRACTURED RIB	656	0739			X	

SCHN00318020

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P	U
798548	(b) (6)	5351	6-1-42	PAINTER	31	FOREIGN BODY, BOTH EYES	227	1113			X	
798549		"	6-4-42	PIPE FITTER	25	WORKMAN DROPPED PIPE ON HAND	255	0727		X		
798550		"	6-5-42	BURNER LEADMAN	25	FOREIGN BODY IN EYE	227	1112			X	
798551		"		CHIPPER	37	ARC FLASH, BOTH EYES	956	0213			X	
798552		"	6-14-42	SHIP FITTER	46	STEPPED INTO HOLE, BRUISED LEG	052	0228			X	
798553		"	6-16-42	BURNER	34	FOREIGN BODY IN EYE	227	1112			X	
798554		"	6-17-42	BURNER	39	FOREIGN BODY IN EYE	227	1112			X	
798555		"	6-17-42	SHEET METAL	31	STEPPED ON PILE OF IRON, SPRAINED FOOT	038	0932			X	
798556		"	6-19-42	BURNER	35	FOREIGN BODY IN EYE	227	1112			X	
798557		"	6-18-42	REAMER	56	FOREIGN BODY IN EYE	227	1112			X	
798558		"	6-19-42	SLABMAN	28	CO-WORKER HIT TOE WITH HAMMER, FRACTURE	245	0734		X		
798559		"	6-19-42	SHIP FITTER	54	FOREIGN BODY IN EYE	227	1112			X	
798560		"	6-20-42	SHIP FITTER	49	SLIPPED AND FELL, SPRAINED ANKLE	461	0731			X	
798561		"	6-20-42	SHIP FITTER	39	FOREIGN BODY IN EYE	227	1112			X	
798562		"	6-20-42	SHIP FITTER	26	DRILL CAME LOOSE AND STRUCK THUMB, FRACTURE	231	0726	X			
798563		"	6-21-42	SHEET METAL	27	ARC FLASH, BOTH EYES	958	0213			X	
798564		"	6-21-42	SCALER	29	FOREIGN BODY IN EYE	227	1112			X	
798565		"	6-21-42	SHIP FITTER	51	STUMBLED ON SCAFFOLD, WRENCHED SHOULDER TRYING TO REGAIN BALANCE	657	0317			X	
798566		"	6-21-42	PAINTER	32	CO-WORKER STUMBLED CAUSING HIM TO LOSE HOLD ON RADIATOR, FELL ON FOOT	224	0734		X		
798567		"	6-22-42	SHIP FITTER	35	FELL AND LANDED ON STEEL GIRDER, BRUISED HIP	523	0319			X	
798568		"	6-22-42	SHIP FITTER	66	ARC FLASH, BOTH EYES	956	0213			X	
798569		"	4-11-42	SHIP FITTER	40	FOREIGN BODY IN EYE	227	1112			X	
798570		"	4-12-42	WELDER	36	ARC FLASH IN EYE	956	0212			X	
798571		"	4-28-42	WELDER	25	SPARK FELL IN SHOE, INFECTION IN ANKLE	237	1231			X	
798572		"	5-30-42	SHIP FITTER	53	SHOREING FLEW OUT AND STRUCK FOOT, FRACTURED TOES	254	0734			X	
798573		"	6-1-42	SHIP FITTER	47	FLASH BURN, BOTH EYES	958	0213			X	
798574		"	6-2-42	ELECTRICIAN	53	FELL ON FINGER, DISLOCATION	423	0627			X	
798575		"	6-3-42	CHIPPER	49	FOREIGN BODY IN EYE, INFECTION	227	1212			X	
798576		"	6-8-42	PAINTER	32	FELL FROM LADDER, INJURED BACK	553	0316			X	
798577		"	6-12-42	SHIP FITTER	30	FLASH BURN IN EYE	958	0212			X	
798578		"	6-13-42	ELECTRICIAN	21	PIECE OF HOT STEEL IN EYE	227	0212			X	
798579		"	5-15-42	RIGGER		FOREIGN BODY IN EYE	227	1112			X	
798580		"	6-17-42	BURNER	31	TWISTED NECK TO AVOID BEING HIT BY FALLING OBJECT	600	0915			X	
798581		"	6-18-42	CHIPPER	39	FOREIGN BODY IN EYE	227	1112			X	
798582		"	6-18-42	BURNER	21	FELL TO KNEES AND STRAINED HIP	461	0919			X	
798583		"	6-19-42	SHIP FITTER	34	STRUCK ON TOE BY BAR, FRACTURE	224	0734			X	
798584		"	6-20-42	MACHINIST	26	DRESSING TRIGGER PIN WITH FILE ON MULTI-MOTOR-FILE SLIPPED HIT ELBOW	130	0737	X			
798585		"	6-20-42	HOOK TENDER	37	STEPPED ON PIECE OF STEEL & SPRAINED ANKLE	062	0931			X	
798586		"	6-22-42	RIGGER	25	CAUGHT LEG BETWEEN TWO PLATES, FRACTURE	356	0728			X	
798587		"	6-22-42	TOOL CHECKER	47	FELL BACK INTO SOME STAGING & FRACTURED CHEST	460	0739			X	

SCHN00318021

FIRM NO 104025 FIRM NAME OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P	U
798588	(b) (6)	5351	6-22-42	PIPE FITTER	64	TOOK AHOLD OF HANGER & DISLOCATED SHOULDER	623	0617			X	
798589		"	6-22-42	SHIP FITTER	24	HAMMER SLIPPED & FRACTURED HAND	245	0724			X	
798590		"	6-23-42	WELDER	35	FELL BETWEEN DOOR & RAIL, CUT HEAD & FRACTURED ELBOW	423	0737			X	
798591		"	6-23-42	SHIP FITTER	17	OTHER WORKMAN DROPPED BULKHEAD ON HAND, FRACTURE	254	0727		X		
798592		"	6-24-42	WELDER	24	SLIPPED & TURNED ANKLE	657	0931			X	
798593		"	6-25-42	SHIP FITTER	26	WEDGE FELL FROM ABOVE & STRUCK HEAD, CONCUSSION	245	0410			X	
798594		"	6-25-42	CHIPPER	44	CRANE CAME & CAUGHT LEG BETWEEN IT & GUARD RAIL, FRACTURE	323	0728			X	
798595		"	5-8-42	PIPE FITTER	34	SLIPPED ON PASTE & TRYING TO CATCH SELF, SPRAINED BACK	661	0916			X	
798596		"	5-24-42	RIGGER	39	STEPPED ON LOOSE RAIL, FELL, CUT LEG	460	0528			X	
798597		"	5-28-42	PIPE FITTER	47	FOREIGN BODY IN EYE	227	1412			X	
798598		"	6-1-42	CARPENTER	31	TIMBER FELL OFF TURN BUCKLE & JERKED BACK	660	0916			X	
798599		"	6-6-42	TRUCK DRIVER	43	FOREIGN BODY IN EYE	227	1112			X	
798600		"	6-8-42	CHIPPER	35	STRUCK BACK OF NECK ON SCAFFOLDING	157	0015			X	
798601		"	6-10-42	FOREMAN	20	STEPPED ON SOME PLYWOOD & FELL, SPRAINED BACK	460	0916			X	
798602		"	6-11-42	CHIPPER	46	TRIPPED OVER WELDERS CABLE	434	0339			X	
798603		"	6-13-42	PIPE FITTER	37	PIECE OF WOOD EMBEDDED IN HAND		1224			X	
798604		"	6-14-42	RIGGER	36	STEPPED ON RUSTY NAIL	163	0832			X	
798605		"	6-16-42	CHIPPER	22	FOREIGN BODY IN EYE	227	1112			X	
798606		"	6-16-42	CHIPPER	46	FOREIGN BODY IN EYE	227	1112			X	
798607		"	6-16-42	WELDER	40	WORKMAN TURNED TORCH ON LEG	915	0231		X		
798608		"	6-16-42	LAYOUT	49	ARC FLASH, BOTH EYES	958	0213			X	
798609		"	6-17-42	BURNER	21	PUT HAND ON HOT STEEL	137	0224			X	
798610		"	6-18-42	WELDER	32	SPARK BURN IN EYE	237	0212			X	
798611		"	6-18-42	BOILERMAKER	29	RIGGER THREW 4X4 OUT OF CAR & IT HIT HIM ON HEAD	260	0510		X		
798612		"	6-18-42	LABORER	29	FOREIGN BODY IN EYE	227	1112			X	
798613		"	6-19-42	WELDER	19	WEDGE FELL FROM ABOVE 30' & STRUCK HEAD	245	0510		X		
798614		"	6-21-42	CHIPPER	52	2X4 FELL & HIT SHOULDER & BACK	260	1739			X	
798615		"	6-21-42	CRANE OPERATOR	39	BOT ELECTRIC SHOCK FROM UNPROTECTED WIRES	239	0010			X	
798616		"	6-21-42	SHIP FITTER	32	STEEL PLATE LOOSENED FROM CLIP & HIT CHEST	256	0339	X			
798617		"	6-22-42	SHIP FITTER	41	SCAFFOLDING GAVE WAY, FELL 30 FEET	561	0007			X	
798618		"	5-22-42	SHIP FITTER	22	FOREIGN BODY IN EYE	227	1112			X	
798619		"	6-23-42	SHIPFITTER	46	SLEDGE HAMMER GLANCED & HIT HAND, FRACTURED FINGER	245	0727			X	
798865		"	4-5-42	SHIP WRIGHT	50	IRON BAR STRUCK FOOT	255	0334			X	
798866		"	4-29-42	LABORER	36	LIFTING HEAVY STEEL, SPRAINED BACK	656	0916			X	
798867		"	5-18-42	SHIP WRIGHT	30	PLACING PLANK ON SCAFFOLD, TWISTED WRIST	660	0923			X	
798868		"	5-28-42	RIVETER	40	FOREIGN BODY IN EYE	227	1112	P			
798869		"	5-28-42	MACHINIST	28	PICKING UP HEAVY CHAIN & STRAINED BACK	634	0916			X	
798870		"	6-3-42	SHIP WRIGHT	50	SLIPPED ON GREASE & SPRAINED BACK	661	0916	P		X	
798871		"	5-5-42	WELDER	34	HOT SLAG IN EYE	227	0212	P		X	

SCHN00318022

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P	U
798872	(b) (6)	5351		CLEAN UP	49	CLEANING VENETIAN BLINDS, VARICOSE VEINS	638	0901			X	
798873		"	6-9-42	ELECTRICIAN	38	REMOVING TEMPORARY WING FROM SCAFFOLD & SPRAINED KNEE	657	0936			X	
798874		"	6-11-42	SHIP WRIGHT	46	DROPPED PLANK ON FOOT	260	0334	P		X	
798875		"	6-11-42	CHIPPER	22	FOREIGN BODY IN EYE	227	1112			X	
798876		"	6-11-42	LAY OUT	33	CO-WORKER PULLED HOSE, HIT HIM ON BACK, HE TURNED & TWISTED BACK	659	0916		X	X	
798877		"	6-12-42	TRUCK DRIVER	26	LIFTING HEAVY PIPE, STRAINED BACK	655	0916			X	
798878		"	6-12-42	RIGGER	47	STEEL PLATES FELL OVER, HIT ANKLE	256	0931	P		X	
798879		"	6-13-42	BOCTER	64	SCAFFOLDING GAVE WAY	557	0339	P		X	
798880		"	6-14-42	WELDER	48	TWISTED BACK WHILE WELDING	661	0916			X	
798881		"	6-16-42	WAREHOUSEMAN	58	SPLINTER IN ARM	163	0820			X	
798882		"	6-17-42	WELDER	36	ARC FLASH, BOTH EYES	958	0213		X	X	
798883		"	6-17-42	SHIP WRIGHT	37	CAUGHT FINGER BETWEEN STEEL PLATE AND TIMBER	360	0727			X	
798884		"	6-18-42	PIPE FITTER	44	STEPPED DOWN TO OTHER LEVEL, STRAINED KNEE	661	0936			X	
798885		"	6-18-42	CHIPPER	25	SLIPPED AND FELL, FRACTURED FINGER	461	0727	P		X	
798886		"	6-20-42	LAYOUT	18	STRUCK THUMB WITH HAMMER, FRACTURE	245	0726			X	
798887		"	6-20-42	SHIP FITTER	21	SLIPPED AND FELL, TWISTED KNEE	461	0636			X	
798888		"	6-20-42	WELDER	23	ARC FLASH, BOTH EYES	958	0213		X	X	
798889		"	6-21-42	PUNCHER	18	CAUGHT FINGER BETWEEN PUNCH AND METAL	330	0327			X	
798890		"	6-21-42	SHIP FITTER	20	SLIPPED ON PIECE OF WELDING LEAD, FELL THREW RAILS, CAUGHT WITH HANDS	562	0727	P		X	
798891		"	6-22-42	SCALER	19	FELL 75' OFF LEDGE, WAS BLINDED BY LIGHTS ON A DISHPAN	561	0923	P		X	
798892		"	6-23-42	SHIP FITTER	38	WEDGE CAME OUT OF FRAME AND STRUCK FACE	245	0308	P		X	
798893		"	6-23-42	SHIP FITTER	17	STEPPED ON EDGE OF BOARD AND SPRAINED ANKLE	660	0931	P		X	
798894		"	6-23-42	WELDER	26	ARC FLASH, BOTH EYES	958	0213			X	
798895		"	6-23-42	LABORER	63	HIT FINGER WITH HAMMER	245	0727			X	
798896		"	6-23-42	SHIP FITTER	33	ARC FLASH, BOTH EYES	958	0213	P			
798897		"	6-25-42	HOOK TENDER	43	STEEL SLIPPED AND FELL ON HIM	256	0728	P		X	
798898		"	6-25-42	BURNER	58	FOOT SLIPPED AND HE FELL ABOUT 10 FEET	561	0328			X	
798899		"	6-27-42	SHIP WRIGHT	43	SLIPPED & FELL 4', INJURING BOTH LEGS & FEET, FRACTURED RIGHT FOOT	561	0732			X	
799066		"	5-3-42	BLACKSMITH	64	FLASH BURN, BOTH EYES	958	0213			X	
799067		"	6-11-42	BOILERMAKER	51	LOST BALANCE AND FELL AGAINST SCAFFOLD, BRUISED CHEST	157	0339			X	
799068		"	6-21-42	CLEAN UP	25	LIFTING CAN OF SCRAP METAL ON TRUCK, STRAINED BACK	638	0916			X	
799140		"	4-22-42	WELDER	44	FELL STRADDLING RAILS, SPRAINED SHOULDER	455	0917			X	
799305		"	4-20-42	WELDER	24	HANGING UP LEAD LINE, IT CAUGHT ON STEEL, THREE OFF-BAL., CAUGHT SELF, HER.	634	1318			X	
799306		"	5-5-42	WELDER	23	FELL AND STRAINED BACK	461	0916			X	
799307		"	5-9-42	STEAM FITTER	21	PLANK FELL ON HAND, FRACTURED FINGER	260	0727			X	
799308		"	6-3-42	SHIP FITTER	25	ARC FLASH, BOTH EYES	958	0213	P		X	
799309		"	6-8-42	SLAB LEADER	44	SHOVING BAR OF STEEL IN FIRE, BACK STRAIN	656	0916			X	
799310		"	6-10-42	SHIP FITTER	52	CARRYING DOORWAY, SPRAINED BACK	601	0916			X	

SCHN00318023

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P	U
799311	(b) (6)	5351	6-14-42	ELECTRICIAN	47	SCRATCHED FINGER ON POWER CABLE, INFECTION	134	1227			X	
799312		"	6-17-42	WELDER	19	HIT HEAD AGAINST IRON BEAM	155	0310			X	
799313		"	6-18-42	CHIPPER	28	BURNS, FOREIGN BODY IN EYE	227	0212			X	
799314		"	6-22-42	WELDER	37	FELL BETWEEN WAYS AND SPRAINED WRIST	461	0923			X	
799315		"	6-24-42	SHIP FITTER	65	SLIPPED AND FELL ON CASTING, FRACTURED RIBS	456	0739	P		X	
799316		"	6-24-42	SHEET MET. WKR.	37	PLANK FELL FROM SCAFFOLDING, HIT LEG	260	0329	P			
799317		"	6-25-42	CHIPPER	30	FOREIGN BODY IN EYE	227	1112			X	
799318		"	6-26-42	WAREHOUSEMAN	28	SIDE GATE SLIPPED OUT OF HANDS & HIT TOES, FRACTURE	201	0734			X	
799319		"	6-26-42	WELDER	25	FOREIGN BODY IN EYE	227	1112			X	
799483		"	6-20-42	REAMER	56	FOREIGN BODY IN EYE	227	1112			X	
799736		"	7-3-42	RIGGER	36	JUMPED OFF TRUCK AND TURNED ANKLE	561	0931			X	
800163		"	2-17-42	SOLTER	28	FOREIGN BODY IN EYE	227	1112	P			
800164		"	3-15-42	MACHINIST	27	EYE INFECTION	900	1213	P			
800165		"	3-20-42	RIGGER	41	FOREIGN BODY IN EYES	227	1113	P			
800166		"	3-30-42	CHIPPER	32	CHIPPING OFF STRONG BACK, IT SLIPPED AND FELL ON TOE, FRACTURE	255	0734			X	
800167		"	4-17-42	WELDER	21	ARC FLASH, BOTH EYES	958	0213			X	
800168		"	4-30-42	WELDER	48	RECEIVED ELECTRIC SHOCK, FELL ON PILE OF STEEL & SPRAINED BACK	939	0916			X	
800169		"	5-5-42	SHIP WRIGHT	44	JACKING UP TIMBER & IT FELL ON FOOT, BRUISE	260	0332	P			
800170		"	5-15-42	BURNER	33	BUMPED AGAINST SCAFFOLD & BROKE GLASSES, GLASS IN EYE	227	1112			X	
800171		"	5-18-42	PIPE FITTER	58	INFECTION IN EYES	900	1213	P			
800172		"	5-20-42	CHIPPER	47	AIR HOSE CUT LOOSE, FOREIGN BODY IN EYE	227	1112	P			
800173		"	5-26-42	WELDER	22	SLIPPED ON AIR HOSE & STRAINED BACK	659	0916	P			
800174		"	6-20-42	BURNER	34	SLIPPED AND THREW HIP OUT OF JOINT	661	0619			X	
800175		"	5-21-42	LABORER	21	FOREIGN BODY IN EYE	227	1112	P			
800176		"	6-14-42	SHIP FITTER	21	RECEIVED BURNS ON ARM FROM WELDING TORCH	958	1220			X	
800177		"	5-23-42	CHIPPER	42	FOREIGN BODY IN EYE	227	1112	P			
800178		"	5-27-42	SHIP FITTER	30	FLASH BURN, BOTH EYES	958	0213			X	
800179		"	5-30-42	PIPE FITTER	48	JUMPED OVER TOP OF ENGINE & TWISTED ANKLE	561	0931			X	
800180		"	5-30-42	WELDER	35	CUTTING OFF PIECE OF PIPE, PIECE FELL ON TOE, DISLOCATION	255	0634			X	
800181		"	5-31-42	ENGINEER	28	HAND STRUCK AGAINST STEEL PLATE, CUT THUMB	156	0526	P			
800182		"	6-2-42	WELDER	59	SLIPPED ON AIR HOSE & FELL BETWEEN RAILS, FRACTURED RIBS	523	0739	P			
800183		"	6-4-42	SHIP WRIGHT	60	PLACING PLANK ON REPAIR SCAFFOLD, SPRAINED BACK	660	0916			X	
800184		"	6-14-42	WELDER	27	SLIPPED THROUGH RAILS, BRUISED SHIN	623	0320			X	
800185		"	6-5-42	PIPE FITTER	55	DROPPED PIECE OF PIPE ON TOE, LACERATIONS	255	0534			X	
800186		"	6-9-42	ELECTRICIAN	26	PULLED LIGHT SWITCH RECEIVED FLASH BURN	958	0213			X	
800187		"	6-9-42	SHIP FITTER	58	STANDING ON BLOCK, IT SLIPPED, HE FELL ON STEEL PLATE, BRUISED RIBS	556	0339			X	
800188		"	6-10-42	ELECTRICIAN	25	STRUCK HAND AGAINST PIECE OF WIRE, LACERATIONS	163	1224			X	
800189		"	6-10-42	WELDER	33	FOREIGN BODY IN EYE	227	1112			X	
800190		"	6-10-42	WELDER	19	STANDIN ON CLIP, GAVE WAY, HE FELL, STRUCK ELBOW & KNEES, INFECTION	561	1235	X			

SCHN00318024

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
800191	(b) (6) [redacted]	351	6-10-42	WELDER	24	SLIPPED ON WELDERS LEAD & FELL, FRACTURED ELBOW	461	0737	P		
800192	[redacted]	"	6-11-42	SHIP FITTER	53	ARC FLASH, INFECTION	958	1212			X
800193	[redacted]	"	6-11-42	SHIP FITTER	20	FOREIGN BODY IN EYE	227	1112			X
800194	[redacted]	"	6-13-42	WELDER	34	INHALED FUMES FROM GALVANIZED IRON WELDING ELECTRIC	820	0002	P		
800195	[redacted]	"	6-13-42	SHIP FITTER	23	CARRYING PIECE OF STEEL, SLIPPED & FELL, STEEL CAUGHT FINGER, TORE NAIL	461	0527			X
800196	[redacted]	"	6-13-42	LEADMAN	44	HELPING TO LAND 6X6, HELPERS SWUNG IT AROUND & IT HIT KNEE	260	0336		X	
800197	[redacted]	"	6-14-42	TRACTOR DRIVER	22	FELL ON SIDE RAIL WHILE GOING TO TRACTOR	423	0336			X
800198	[redacted]	"	6-14-42	WELDER	24	SLIPPED ON STEEP GANG PLANK, FRACTURED FOOT	453	0732			X
800199	[redacted]	"	6-14-42	BURNER	28	HOT SLAG FELL IN EYE	237	0212			X
800200	[redacted]	"	6-15-42	WELDER	40	LIFTING & SLIDING DEGAUSING BOX	638	0916			X
800201	[redacted]	"	6-15-42	SHIP FITTER	57	FOREIGN BODY IN EYE	227	1112			X
800202	[redacted]	"	6-16-42	PIPE FITTER	33	STRAINED SHOULDER TRYING TO CATCH SLIDING PIPE	625	0917			X
800203	[redacted]	"	6-18-42	MACHINIST	28	FOREIGN BODY IN EYE	227	1112			X
800204	[redacted]	"	6-19-42	CHIPPER	37	CLIMBING THRU BOTTOM INNER SECTION, RAISED UP, STRUCK BACK ON SECTION	156	0916			X
800205	[redacted]	"	6-19-42	CHIPPER	42	FOREIGN BODY IN EYE	227	1112			X
800206	[redacted]	"	6-20-42	SHIP FITTER	36	TRIPPED & FELL WHILE GETTING OFF SCAFFOLD, SPRAINED ANKLE	457	0931			X
800207	[redacted]	"	6-20-42	HOOK TENDER	16	FOOT SLIPPED & GOT CAUGHT BETWEEN MOVING CAR & TRACK	322	0334			X
800208	[redacted]	"	6-20-42	CHIPPER	46	FOREIGN BODY IN EYE	227	1112			X
800209	[redacted]	"	6-21-42	SHIP FITTER	23	WRENCH FELL FROM ABOVE & HIT FOOT	245	0734	P		
800210	[redacted]	"	6-21-42	WELDER LEADMAN	42	ARC FLASH, BOTH EYES	958	0213			X
800214	[redacted]	"	6-21-42	RIGGER	39	SLIPPED & FELL OFF SCAFFOLD ON TO 3X6	560	0339			X
800212	[redacted]	"	6-22-42	CHIPPER	40	FOREIGN BODY IN EYE	227	1112			X
800213	[redacted]	"	6-22-42	SHIP FITTER	57	FLASH BURN, BOTH EYES	958	0213			X
800214	[redacted]	"	6-22-42	SHIP FITTER	35	INHALED GASFUMES	820	0002	P		
800215	[redacted]	"	6-22-42	WELDER	25	FLASH BURN, BOTH EYES	958	0213			X
800216	[redacted]	"	6-23-42	MACHINIST	42	FOREIGN BODY IN EYE	227	1112			X
800217	[redacted]	"	6-23-42	BURNER	26	MOVING AIR HOSE, IT CAUGHT, HE JERKED ON IT, STRAINED BACK	659	0916			X
800218	[redacted]	"	6-23-42	SHIP FITTER	30	STEPPED ON WET RAIL & FELL BETWEEN THE RAILS, HITTING RIBS	555	0339	P		
800219	[redacted]	ER"	6-23-42	SHEET MET. WKR.	30	FOREIGN BODY IN EYE	227	1112			X
800220	[redacted]	"	6-24-42	WELDER	39	LAYING ON R. SIDE, TWISTED TO L. & COULDN'T STRAIGHTEN UP, SPRAINED BACK	638	0916			X
800221	[redacted]	"	6-24-42	CHIPPER	32	FOREIGN BODY IN EYE	227	1112			X
800222	[redacted]	"	6-24-42	CHIPPER	46	FOREIGN BODY IN EYE	227	1112	P		X
800223	[redacted]	"	6-24-42	FOREMAN	38	STEPPED ON LOOSE PIPE, IT ROLLED & TURNED ANKLE	655	0931	P		X
800224	[redacted]	"	6-25-42	SHIP FITTER	45	FEET SLIPPED OUT FROM UNDER HIM, DISLOCATED SHOULDER	466	0617	P		X
800225	[redacted]	"	6-25-42	PIPE FITTER	59	LIFTING HEAVY PIPE UP TO OTHER WORKMAN, TWISTED BACK	655	0916			X
800226	[redacted]	"	6-25-42	SHIP FITTER	23	FELL FROM PLATFORM, BRUISED WRIST	557	0323			X
800227	[redacted]	"	6-25-42	PAINTER	46	SLIPPED FROM SCAFFOLD, BRUISED LEG & BACK	557	0816			X
800228	[redacted]	"	6-25-42	SHIP FITTER	30	PUSHING BOOM FOUNDATION, WORKMAN TIPPED OVER ACETILYNE TANK ON TOE, FRA.	223	0734		X	
800229	[redacted]	"	6-25-42	SHIP FITTER	30	SLIPPED ON DECK, FELL STRIKING ROCK ACROSS EDGE OF FLAT BAR	123	0315			X

SCHN00318025

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	Na. & Loc.	Unsafe Act M	O	P
800230	(b) (6)	5351	6-25-42	WELDER	29	JUMPED FROM DECK TO SCAFFOLD, RUPTURED BLOOD VESSEL OF LESTULES	557	0918			X
800231		"	6-25-42	PAINTER	57	STRUCK ELBOW ON BEAM, BRUISE	123	0337			X
800232		"	6-25-42	SHIP FITTER	56	FLASH BURN IN EYE	958	0212			X
800233		"	7-1-42	SHIP FITTER	56	DRIVING A WEDGE, PLATE SPRUNG & HIT THUMB, FRACTURE	256	0726	P		
800234		"	6-25-42	MACHINIST	32	FOREIGN BODY IN EYE	227	1112			X
800235		"	6-25-42	HAMMER OPR.	32	WIPING A FLILANGE, IT SLIPPED, HIT HAMMER WHICH HIT FINGER, FRACTURED	330	0727	P		
800236		"	6-26-42	BOILERMAKER	31	HAMMER SLIPPED & STRUCK FINGER, FRACTURE	245	0727			X
800237		"	6-26-42	SHIP FITTER	28	FLASH BURN, BOTH EYES	958	0213			X
800238		"	6-26-42	PLATE MOVER	47	CAUGHT FINGER BETWEEN STEEL PLATES, LACERATIONS	356	0527			X
800239		"	6-26-42	SHIP FITTER	39	CO-WORKER PUSHED STIFFENER, CAUGHT HAND BETWEEN 2 STIFFENER, INFECTION	355	1224		X	
800240		"	6-26-42	MACHINIST	38	HELPING TO CARRY WORK BENCH, SPRAINED BACK	638	0916			X
800241		"	6-26-42	REAMER	45	FOREIGN BODY IN EYE	227	1112			X
800242		"	6-26-42	WELDER	39	SLIPPED WHILE WALKING ON RAILS, BRUISED & CUT LEG	461	0528			X
800243		"	6-26-42	RIVETER	69	LEANED OVER SIDE OF BOAT WITH LOAD OF RIVETS, FRACTURED RIBS	638	0739			X
800244		"	6-26-42	ELECTRICIAN	50	FELL FROM HIGH HORSE, BRUISED ELBOW	551	0337			X
800245		"	6-26-42	SCALER	28	CHIPPER LET I-BEAM FALL & IT STRUCK WORKER ON BACK, BRUISE	255	0316		X	
800246		"	6-26-42	ELECTRICIAN	42	FELL FROM PLATFORM, MULTIPLE CUTS & BRUISES	557	0307			X
800247		"	6-26-42	RIGGER	47	FELL FROM HIGH TRUCK, BRUISED CHEST	512	0339			X
800248		"	6-26-42	RIGGER	56	LIFTING STEEL, SPRAINED BACK	638	0916			X
800249		"	6-27-42	LABORER	22	STANDING ON STOOL, STOOL TIPPED & FELL ON TOE, BRUISE	561	0334			X
800250		"	6-27-42	REAMER	45	REAMER SLIPPED, CAUSED HIM TO STRIKE SIDE AGAINST IT, BRUISED CHEST	145	0339			X
800251		"	6-27-42	SHIP FITTER	58	BOARD GAVE WAY, FELL TO GROUND, FRACTURED SHOULDER	551	0717			X
800252		"	6-27-42	PLUMBER	42	4X6 FELL ON TOE, BRUISE	260	0334			X
800253		"	6-27-42	CHIPPER	47	SLIPPED & GREASE & FELL, BRUISED LEG	461	0328	P		
800254		"	6-27-42	BURNER	29	LIGHTING TORCH, BURNED STOMACH, LEGS, & GENITALIA	215	0207			X
800255		"	6-27-42	PAINTER	32	TRIPPED OVER WELDING LEAD & FRACTURED WRIST	461	0723			X
800256		"	6-28-42	BURNER	26	KNOCKED MACHINERY ON FOOT, BRUISE	224	0332			X
800257		"	6-28-42	BOLTER	71	STEPPED ON RIS & CHIP BROKE CAUSING FALL, BRUISED HIP	551	0319	X		
800258		"	6-28-42	SHIP FITTER	29	STIFFNER FELL ON HIM	238	0336	P		
800259		"	6-28-42	CRANE OPERATOR	54	HOOK CAME OUT OF STEEL PLATE & HIT HIS FACE	234	0307	X		
800260		"	6-28-42	WELDER	38	FOREIGN BODY IN EYE.	227	1112			X
800261		"	6-28-42	SHIP FITTER	31	PARTNER&S WRENCH SLIPPED & HIT TOOTH	245	0738		X	
800262		"	6-28-42	SHIP FITTER	20	WEDGE SLIPPED OUT WHEN STRONG BACK BROKE, HIT FACE	245	0011	P		
800263		"	6-28-42	BURNER	45	HOT SLAG DROPPED INTO GLOVE, INFECTED BURN	237	1224		X	
800264		"	6-28-42	CHIPPER	32	INCOURSE OF DUTIES	958	0212			X
800265		"	6-28-42	SHIP FITTER	27	ARC FLASH, BOTH EYES	958	0213			X
800266		"	6-28-42	CHIPPER	54	FELLOW WORKMAN DROPPED LINE ON HIS FINGER	334	0327		X	
800267		"	6-28-42	REAMER	55	PLANK FELL FROM ABOVE & HIT HEAD, HURT NECK	260	0315	P		
800268		"	6-28-42	CAULKER	32	FOREIGN BODY IN EYE	227	1112			X
800269		"	6-29-42	WELDER	18	SPARK FROM WELDING ROD DROPPED ON FINGER	237	0227			X

SCHN00318026

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
800270	(b) (6)	5351	6-29-42	BURNER	30	HOT SLAG FELL IN SHOE	237	0232			X
800271		"	6-29-42	CHIPPER	34	CO-WORKER STEPPED ON HOSE, FLEW UP & HIT HIM IN MOUTH, BROKE TOOTH	259	0739		X	
800272		"	6-29-42	SHIP FITTER	45	ARC FLASH, BOTH EYES	958	0213			X
800273		"	6-30-42	CHIPPER	21	FOREIGN BODY IN BOTH EYES	227	1113			X
800274		"	6-30-42	SHIP WRIGHT	27	WAS LIFTING PLANK FROM OVERHEAD, PLANK SLIPPED & HIT GROIN	260	0318			X
800275		"	6-30-42	SHIPW. LEAD.	45	BLINDED BY SUN, COULDN'T SEE VENTILATOR, STEPPED IN IT, HIT SHOULDER ON DECK	052	0617			X
800276		"	7-1-42	RIGGER	26	HOOKS ON SPREADER CAUGHT IN PLATES & THEN FLEW OFF & HIT FACE	234	0508			X
800277		"	7-1-42	WELDER	34	STAIRS SLIPPED & HE FELL ON RIGHT SIDE	553	0339	P		
800278		"	7-1-42	WELDER	31	ARC FLASH, BOTH EYES	958	0213			X
800279		"	7-1-42	CHIPPER	22	FOREIGN BODY IN EYE	227	1112			X
800280		"	7-1-42	SHIP FITTER	41	STEPPED ON ROD & FELL BETWEEN TWO RAILS	455	0331			X
800281		"	7-1-42	WELDER	23	ARC FLASH, ONE EYE	958	0212			X
800282		"	7-1-42	WELDER	19	ARC FLASH, BOTH EYES	958	0213			X
800283		"	7-1-42	WELDER	50	FAINTED FROM HEAT & FELL OFF SCAFFOLD	516	0510	P		
800284		"	7-2-42	PAINTER	38	FELL ON WORKMAN, DROPPED PAINT BRUSH WHICH HIT HIS NECK	245	0315		X	
800285		"	7-2-42	LAYOUT	18	SLIPPED & FELL ON RAILS, KNOCKED OUT TEETH	455	0738			X
800286		"	7-3-42	MACHINIST	26	STRAINED KNEE ON STAIRS	653	0936			X
800287		"	7-3-42	SHIP FITTER	31	PLANK FELL ON FOOT	260	0734			X
800288		"	7-3-42	WELDER	20	SLEDGE HAMMER FELL 15 FEET & HIT HEAD	245	0510		X	
800289		"	7-3-42	BURNER	57	FRAME FELL ON TOE	255	0734			X
800290		"	7-4-42	CHIPPER	52	CHISEL WENT THROUGH PLATE & HIT FINGER HIT AGAINST PLATE, FRACTURE	156	0727			X
800291		"	7-4-42	SHIP FITTER	53	SLIPPED & CAUGHT HIMSELF, STRAINING BACK	661	0916			X
800292		"	7-4-42	RIGGER	30	HIT FINGER WITH WRENCH	245	0327			X
800293		"	7-4-42	CHIPPER	36	FOREIGN BODY IN EYE	227	1112			X
800294		"	7-4-42	RIGGER FOREMAN	31	BEAM FELL OVER WHICH HIT 2X6, WHICH HIT HIS CHIN	260	0508			X
800295		"	7-5-42	PIPE FITTER	40	STEPPED ON RUBBER HOSE, SLIPPED, HERNIA	659	1318			X
800296		"	7-5-42	WELDER	24	FOREIGN BODY IN EYE	227	1112			X
800297		"	7-6-42	CHIPPER	32	FOREIGN BODY IN EYE	227	1112			X
800298		"	7-6-42	WELDER	32	FOREIGN BODY IN EYE	227	1112			X
800299		"	7-7-42	RIGGER	38	MAGNET FELL OFF CRANE	224	0735	P		
800300		"	7-7-42	BURNER	22	FOREIGN BODY IN EYE	227	1112			X
800486		"	6-26-42	LABORER	44	FOREIGN BODY IN EYE	227	1112	P		
800664		"	6-28-42	MACHINIST		FOREIGN BODY IN EYE & BURN	227	1112			X
800799		"	6-2-42	LABORER	62	MAN ABOVE PUSHED A PIECE OF STEEL OFF SCAFFOLD & IT FELL ON FINGER	224	07 27		X	
800930		"	5-19-42	MACHINIST	28	INFECTION IN EYE	227	1212			X
800931		"	5-29-42	WELDER	44	ARC FLASH, BOTH EYES	958	0213			X
800932		"	6-7-42	CLEAN UP	19	SEVERAL WEDGES DROPPED ON HAND	245	0724			X
800933		"	6-12-42	FIELD CLERK	48	LOST BALANCE & FELL HITING RIBS ON RAILS	455	0739			X

SCHN00318027

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
800934	(b) (6)	5351	6-14-42	PIPE FITTER	35	CAUGHT FINGER BETWEEN WRENCH & BOLT CHIP, FRACTURE	345	0727			X
800935		"	6-19-42	ELECTRICIAN	36	SLIPPED ON CHIP & FELL AGAINST FLOOR BEAMS	455	0339			X
800936		"	6-20-42	LABORER	19	STEPPED IN HOLE & SPRAINED ANKLE	062	0931			X
800937		"	6-20-42	WELDER	31	ARC FLASH, BOTH EYES	958	0213			X
800938		"	6-21-42	WELDER	17	HOT SPARK FELL ON WRIST	237	0223			X
800939		"	6-23-42	CHIPPER	35	FOREIGN BODY IN EYE	227	1112			X
800940		"	6-23-42	CHIPPER	35	TURNER OVER FELL ON FOOT	224	0332			X
800941		"	6-24-42	WELDER	54	SLAG CUT EYE	227	0512			X
800942		"	6-26-42	BURNER	19	STRAINED BACK LIFTING BURNING MACHINE	638	0916			X
800943		"	6-26-42	WELDER	21	CRAWLING THRU HOLE, DOUBLED UP AIR HOSE TO TAKE OUT, FLEW UP, HIT FACE	226	0308			X
800944		"	6-28-42	CHIPPER	27	CLIP FROM ABOVE FELL & FRACTURED FINGER	224	0727			X
800945		"	6-29-42	RIGGER	25	JUMPED OUT OF WAY OF LOAD OF PIPE, STEPPED ON 4x4, TURNED ANKLE	660	0931			X
800946		"	6-30-42	LABORER	58	SLIPPED & STRAINED BACK	661	0916			X
800947		"	6-30-42	MACHINIST	37	HOLDING PIECE OF STEEL, IT FELL & HIT HIM IN THE RIBS	256	0339			X
800948		"	7-1-42	WELDER	25	ARC FLASH, BOTH EYES	958	0213			X
800949		"	7-1-42	SHIP WRIGHT	36	HIT ON HEAD BY SCAFFOLDING	257	0915	P		
800950		"	7-2-42	BURNER	23	WALKING ON A RAIL, SLIPPED AND FELL	555	0310			X
800951		"	7-2-42	WELDER	34	ARC FLASH, BOTH EYES	958	0213			X
800952		"	7-3-42	CHIPPER	28	TRIPPED OVER AIR HOSE, FELL, HIT HEAD ON A BULK HEAD	459	0316	P		X
800953		"	7-5-42	SHIP WRIGHT	31	TIGHTENING TURN, BUCKLES**IT SPUN AND HIT LEG	226	0528			X
800954		"	7-7-42	MACHINIST	46	BOLT FELL FROM ABOVE, FRACTURED TEETH AND CUT LIP	224	0738	P		
801186		"	6-29-42	ELECTRICIAN	41	WORKING IN REFRIGARATOR PASSAGE WELDING GAS OVER CAME HIM, STRE. THROAT	844	1202			X
801431		"	3-14-42	SHIP FITTER	21	LIFTED BUCKET OF NUTS, BOLTS, & WASHERS, SPRAINING BACK	638	0916			X
801432		"	4-24-42	SHIP FITTER	41	LIFTING HEAVY PIECE OF STEEL, KNEE LOCKED	638	0636			X
801433		"	5-10-42	CHIPPER	29	FOREIGN BODY IN EYE	227	1112			X
801434		"	5-14-42	CHIPPER	25	FOREIGN BODY IN EYE, ULCER	227	1212			X
801435		"	5-27-42	BURNER	58	CROW BAR STRUCK HIM IN GROIN	245	0318			X
801436		"	6-11-42	SHIP FITTER	30	TIMBER FELL ON FOOT	260	0332			X
801437		"	6-18-42	LAY OUT	54	CO-WORKERS WRENCH SLIPPED, RAIL THEY WERE LIFTING STRUCK FINGER, FRAC.	238	0727		X	
801438		"	6-28-42	SHIP FITTER	24	FOREIGN BODY IN EYE	227	1112	P		
801439		"	7-1-42	LABORER	46	SLIPPED ON DECK, STRAINED BACK	661	0916			X
801440		"	7-1-42	SHIP FITTER	28	SPRAINED BACK LIFTING CHANNEL IRON	655	0916			X
801441		"	7-3-42	CLEAN UP MAN	29	FOREIGN BODY IN EYE	227	1112	P		
801442		"	7-4-42	ELECTRICIAN	49	STEPPED ON OBJECT & FELL AGAINST RAIL, BRUISED CHEST & KNEE	423	0307	P		
801443		"	7-5-42	DUPLICATOR	49	CAUGHT FOOT IN WELDERS LEADS, FELL & SPRAINED ANKLE	359	0931	P		
801444		"	7-7-42	CHIPPER	44	FOREIGN BODY IN EYE	227	1112	P		
801445		"	7-7-42	CHIPPER	42	STEPPED ON SMALL OBJECT & SPRAINED ANKLE	062	0931	P		
801446		"	7-8-42	SHEET METAL	39	CAUGHT HAND BETWEEN SHEET METAL PLATES, FRACTURE	356	0724			X
801447		"	7-8-42	WELDER	50	FLASH BURN, BOTH EYES	958	0213			X

SCHN00318028

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P	U
801448	(b) (6)	5351	7-8-42	BURNER	37	FLASH BURN, BOTH EYES	958	0213			X	
801449		"	7-8-42	SHIP FITTER	34	WORKING ON JAG & HANDLE SLIPPED & STRUCK TEETH, FRACTURE	245	0738	X			
801450		"	7-9-42	SHIP FITTER	59	SLIPPED & FELL FROM TABLE, MULTIPLE BRUISES & LACERATIONS	661	0307	P			
801451		"	7-10-42	RIGGER	49	PLATE FELL ON TOE, FRACTURE	256	0734	P			
801452		"	7-11-42	GRINDER	63	PIECE OF STEEL FELL OFF TABLE & FRACTURED TOES	224	0734			X	
801453		"	7-13-42	SHIP FITTER	22	AIR HOSE SNAPPED & BRUISED FACE	259	0308	X			
801489		"	3-3-42	CHIPPER	55	STEPPED ON BOARD, END FLEW UP & STRUCK FINGER	260	0327			X	
801490		"	4-25-42	MACHINIST	42	FOREIGN BODY IN EYE	227	1112	P			
801491		"	5-2-42	PAINTER	52	FOREIGN BODY IN EYE	227	1112	P			
801492		"	5-10-42	FITTER	32	FLASH BURN IN EYE	958	0212		X		
801493		"	5-22-42	SHIP FITTER	54	FELL OFF PLATFORM, SPRAINED ANKLE	557	0931			X	
801494		"	6-1-42	PIPE FITTER	45	LIFTING PIPES, HERNIA	638	1318			X	
801495		"	6-5-42	SHIP FITTER	27	FOREIGN BODY IN EYE	227	1112			X	
801496		"	6-6-42	SLABMAN	40	HAMMER GLANCED & HIT LEG, BRUISE	245	0328			X	
801497		"	6-9-42	BURNER	37	FOREIGN BODY IN EYE	227	1112			X	
801498		"	6-10-42	WELDER	21	FOREIGN BODY IN EYE	227	1112			X	
801499		"	6-10-42	UNION MELT OP.	20	BURNED LEG WITH TORCH	915	0228			X	
801500		"	6-11-42	RIVETER	34	RIVET GUN KICKED & BRUISED KNEE	222	0336	P			
801501		"	6-12-42	WELDER	44	FOREIGN BODY IN EYE	227	1112			X	
801502		"	6-12-42	MACHINIST	39	ARC FLASH, BOTH EYES	958	0213		X		
801503		"	6-14-42	WELDER	46	STEPPED ON LOOSE PLANKINGS ON SCAFFOLD, FELL, MULTIPLE BRUISES	557	0307			X	
801504		"	6-14-42	SHIP FITTER	19	ARC FLASH, BOTH EYES	958	0213		X		
801505		"	6-14-42	PIPE FITTER	25	ASBESTOS FELL & HIT EYE	227	1112	P			
801506		"	6-15-42	CARPENTER	65	BRACE BROKE & HE FELL BETWEEN FORM AND BANK, SPRAINED KNEE	561	0936	P			
801507		"	6-15-42	SHIP WRIGHT	61	PLANK HE WAS WALKING ON TIPPED, FELL TO SCAFFOLD, BRUISED CHEST & BACK	560	0307	P			
801508		"	6-15-42	WELDER	38	PIECE OF HOT SLAG DOWN SLEEVE BURNED ARM, INFECTION	237	1228	P			
801509		"	6-15-42	RIGGER	38	SMALL PLATE FELL ON FOOT, FRACTURE	224	0732	P			
801510		"	6-16-42	BURNER	37	FOREIGN BODY IN EYE	227	1112			X	
801511		"	6-16-42	PIPE FITTER	36	FOREIGN BODY IN EYE	227	1112	P			
801512		"	6-16-42	CHIPPER	39	FOREIGN BODY IN EYE	227	1112			X	
801513		"	6-19-42	SHIP FITTER	26	FOREIGN BODY IN EYE	227	1112	P			
801514		"	6-19-42	WELDER	39	SLIPPED & LEG CAUGHT IN BETWEEN PIPES, LACERATIONS	323	0528			X	
801515		"	6-19-42	SHIP FITTER	50	FOREIGN BODY IN EYE	227	1112	P			
801516		"	6-22-42	SHIP WRIGHT	30	SLIPPED & PUT FULL WEIGHT ON KNEE, BRUISE	161	0336			X	
801517		"	6-23-42	REAMER	43	ARC FLASH, BOTH EYES	958	0213		X		
801518		"	6-25-42	RIVETER	38	SPRAINED BACK WHILE BUCKING RIVETS	600	0916			X	
801519		"	6-25-42	SHIP FITTER	50	SLIPPED AND CAUGHT FOOT BETWEEN RAILS, SPRAIN	323	0932			X	
801520		"	6-29-42	WELDER	34	HIT FINGER AGAINST GUARD ON PUNCH PRESS	123	0327			X	

SCHN00318029

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature Of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P	U
801521	(b) (6)	5351	6-29-42	RIGGER	46	STUMBLED & BUMPED KNEE ON PIECE OF IRON, BRUISE	123	0336			X	
801522		"	6-30-42	WELDER	35	HIT ON NECK BY A PLANK THAT FELL FROM ABOVE, SPRAINED NECK	260	0915		X		
801523		"	6-30-42	LABORER	61	STUMBLED OVER DALY BAR & BRUISED CHEST	623	0339			X	
801524		"	6-30-42	SHIP FITTER	28	BUMPED ELBOW AGAINST SCAFFOLD, BRUISE	157	0320			X	
801525		"	6-30-42	SHIP WRIGHT	61	LIFTING SCAFFOLD, SPRAINED BACK	657	0916			X	
801526		"	6-30-42	WAREHOUSEMAN	28	STRUCK ON FOOT BY FALLING OBJECT, BRUISE	224	0332	P			
801527		"	7-1-42	CHIPPER	24	FELL THROUGH SHAFT ON DECK, BRUISED SHIN	552	0328	P			
801528		"	7-1-42	CHIPPER	27	HIT FOOT WITH HAMMER, BRUISE, STRAIN	245	0932			X	
801529		"	7-1-42	TRUCK DR. EHLP.	18	FELL FROM BACK DOOR STEPS, BRUISED BACK	553	0316			X	
801530		"	7-1-42	WELDER	21	WELDING WITHOUT JACKET, BURNED ARMS	958	0220			X	
801531		"	7-1-42	PIPE FITTER	25	BURNED ARM FROM WELDERS SPARKS	227	0220		X		
801532		"	7-1-42	CHIPPER	42	FOREIGN BODY IN EYE	227	1112			X	
801533		"	7-1-42	HOOK TENDER	62	BUCKET OF SCRAP STEEL FELL ON TOE, FRACTURE	224	0734	P			
801534		"	7-1-42	SHEET METAL	24	HOT SLAG FROM ABOVE, WENT DOWN INSIDE OVERALLS, BURNED ABDOMEN	237	0218		X		
801536		"	7-2-42	ROD MACH. OPR.	42	JUMPED FROM BULKHEAD, LANDED ON FOOT, BRUISE	561	0332			X	
801536		"	7-2-42	STEAM FITTER	25	HEAT PROSTRATION	916	0007	P			
801537		"	7-2-42	OILER	35	GRINDER TURNED ON TRUCKION WHICH CAME IN CONTACT WITH LEG, BRUISE	222	0326	P			
801538		"	7-2-42	WELDER	60	FLASH BURN, BOTH EYES	958	0213			X	
801539		"	7-2-42	WELDER	45	STRUCK BY FALLING WELDERS CONDUIT, CAUSING FALL TO DECK, HERNIA	561	1318	P			
801540		"	7-3-42	SLABMAN	30	FOOT SLIPPED WHILE PICKING UP MOLD, IT JERKED & STRAINED SHOULDER	661	0917			X	
801541		"	7-3-42	WELDER	65	SWUNG SLEDGE HAMMER, STEPPED ON LEADS & INJURED HIP	645	0919	P			
801542		"	7-4-42	SHIP WRIGHT	41	FELL DOWN MAN HOLE, BRUISED LEG	552	0928			X	
801543		"	7-4-42	GUARD	54	SLIPPED & FELL, (ON STEPS), BRUISED BACK	453	0316			X	
801544		"	7-4-42	SHIP FITTER	29	ARC FLASH, BOTH EYES	958	0213			X	
801545		"	7-4-42	CRANE OPERATOR	29	FOREIGN BODY IN EYE	227	1112	P			
801546		"	7-4-42	OFFICE, INSIDE	47	CAUGHT FINGERS WHILE MOVING FAN, LACERATIONS	330	0527			X	
801547		"	7-5-42	WELDER	42	STRAINED SHOULDER WHILE CLIMBING PIPE	600	0917			X	
801548		"	7-5-42	WELDER	29	SLAG BURNED EYE LIDS	237	0208	P			
801549		"	7-5-42	SHIP FITTER	38	FOREIGN BODY IN EYE	227	1112	P			
801550		"	7-5-42	BURNER	26	FOREIGN BODY IN EYE	227	1112	P			
801551		"	7-6-42	SHIP FITTER	23	BOLTING GUN WAS KNOCKED AGAINST CHEST, BRUISE	245	0339		X		
801552		"	7-6-42	REAMER	51	FOREIGN BODY IN EYE, ULCER	227	1212			X	
801553		"	7-6-42	WELDER	41	FELL BETWEEN RAILS, BRUISED LEG	423	0328			X	
801554		"	7-6-42	WELDER	29	KNEE THROWN OUT OF JOINT WHILE WALKING OVER STEEL BEAMS	061	0936			X	
801555		"	7-7-42	SHIP FITTER	64	FLASH BURN, BOTH EYES	958	0213	P			
801556		"	7-7-42	GUARD	37	SLIPPED ON HOSE, FELL TO DECK & STRAINED SHOULDER	461	0917	P			
801557		"	7-7-42	LABORER	55	FOREIGN BODY IN EYE	227	1112	P			
801558		"	7-7-42	ELECTRICIAN	39	OLD WOUND IN WRIST BROKE OPEN FROM WORKING	600	0523				X

SCHN00318030

FIRM NO. 104025 FIRM NAME: OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	Q	P
801559	(b) (6)	5351	7-7-42	BURNER	23	FOOT SLIPPED & FELL ACROSS CABLE, BRUISED BACK	459	0316			X
801560		"	7-7-42	CHIPPER	30	SLIPPED & CAUGHT SELF ON ANOTHER PLANK, SPRAINED BACK	660	0916			X
801561		"	7-7-42	REAMER	42	FOREIGN BODY IN EYE	227	1113			X
801562		"	7-7-42	STEAM FITTER	40	PIPE FELL ON TOE, FRACTURE	255	0734	P		
801563		"	7-8-42	WELDER	26	FLASH BURN, BOTH EYES	958	0213			X
801564		"	7-8-42	SHIPFITTER	22	STIFFENER FELL ON TOES, FRACTURE	255	0734	P		
801565		"	7-8-42	SHIPFITTER	28	METAL PLATE FELL ON THUMB, FRACTURE	256	0726	P		
801566		"	7-8-42	CHIPPER	29	CHIPPING WHEN CHISEL SLIPPED & WRENCHED SHOULDER	645	0917	P		
801567		"	7-8-42	REAMER	53	FOREIGN BODY IN EYE	227	1112			X
801568		"	7-8-42	SHIPWRIGHT	67	WRENCH SLIPPED & ELBOW STRUCK TIMBER, BRUISE	160	0337	P		
801569		"	7-9-42	SHIPFITTER	18	FOREIGN BODY IN EYE	227	1112			X
801570		"	7-9-42	SHIPFITTER	20	FOREIGN BODY IN EYE	227	1112	P		
801571		"	7-9-42	CLEAN UP	62	FELL OVER PIECE OF IRON & BRUISED RIBS	462	0339			X
801572		"	7-9-42	CHIPPER	62	FOREIGN BODY IN EYE	227	1112	P		
801573		"	7-9-42	SHIPFITTER	20	FLASH BURN, BOTH EYES	958	0213		X	
801574		"	7-9-42	CHIPPER	42	FOREIGN BODY IN EYE	227	1112			X
801575		"	7-10-42	CHIPPER	22	STRAINED SIDE FROM REACHING	600	0918			X
801576		"	7-10-42	SHIPWRIGHT	61	PUT KNEE DOWN ON SMALL PIECE OF SCRAP METAL, BRUISE	162	0336			X
801577		"	7-11-42	WELDER	35	TRIPPED OVER STIFFENER & FELL ON ARM, SPRAINED SHOULDER	461	0917			X
801578		"	7-11-42	REAMER	52	FOREIGN BODY IN EYE	227	1112			X
801579		"	7-11-42	CHIPPER	28	FOREIGN BODY IN EYE	227	1112	P		
801580		"	7-12-42	SHIPFITTER	28	WRENCH SLIPPED & HIT JAW, BRUISE	245	0308	P		
801581		"	7-12-42	LAY OUT	54	HALF ROUND FELL ON FOOT, FRACTURED TOE	224	0734	P		
801583		"	7-12-42	WELDER	35	BUMPED HEAD ON GIRDER, LACERATIONS & BRUISE	123	0510			X
801584		"	7-13-42	WELDER	59	SLIPPED OFF SCAFFOLD, STEPPED ON AIR HOSE & BRUISED ANKLE	059	0331			X
801585		"	7-13-42	SHEET METAL	34	USING SLEDGE MALLET, STRAINED BACK	645	0916			X
801586		"	7-13-42	LAY OUT	41	ARC FLASH & FOREIGN BODY IN EYE	227	1112	P		
801 587		"	7-14-42	WELDER	27	FOREIGN BODY IN EYE	227	1112	P		
801588		"	7-14-42	CHIPPER	47	FOREIGN BODY IN EYE	227	1112			X
801589		"	7-14-42	BURNER	53	PIECE OF HOT SLAG IN EAR	227	0214			X
801590		"	7-14-42	SHIPFITTER	18	AIR HOSE BROKE LOOSE & CUT CHIN	259	0508	P		
801591		"	7-14-42	WELDER	23	SCAFFOLD BROKE, HANGED ON WRIST, FRACTURE	557	0723	X		
801592		"	7-15-42	SHIPFITTER	18	STUMBLED ON STEEL PLATES, FELL & FRACTURED THUMB	461	0726			X
801593		"	7-15-42	LABORER	59	DROPPED MOLD ON TOE, FRACTURE	224	0734	P		
801594		"	7-15-42	ENGINEER	47	HERNIA FROM LIFTING HEAVY MATERIAL & CONTINUALLY CLIMBING (NO ACCIDENT)	638	1318			X
801807		"	7-3-42	LABORER	18	FELL ON AN IRON RAIL, BRUISED SIDE	428	0318			X
801895		"	5-20-42	SHIPFITTER	22	WEDGE FELL ON ANKLE, OPENED OLD WOUND	224	0531			X
801896		"	6-5-42	SHIPWRIGHT	62	PLANK FELL FROM OVER HEAD, HURT NECK	260	0315			X
801897		"	6-14-42	BURNER	44	FOREIGN BODY IN EAR	237	1114			X

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Page 40 FIRM NO. 104025 FIRM NAME: OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
801898	(b) (6)	5351	6-23-42	CHIPPER	57	FOREIGN BODY IN EYE	227	1112			X
801899		"	6-25-42	SLABMAN	30	FOREIGN BODY IN KNEE	226	1136			X
801900		"	7-1-42	WELDER	23	RAISED UP & BUMPED HEAD, HEADACHE	123	0011			X
801901		"	7-2-42	WELDER	21	HOT SLAG FELL IN GLOVE, INFECTED BURN	237	1227			X
801902		"	7-5-42	SHIP FITTER	29	FELL INTO PIPE HOLE ON DECK	562	0528			X
801903		"	7-6-42	SHIP FITTER	43	FOREIGN BODY IN EYE	227	1112			X
801904		"	7-8-42	SHIP FITTER		FOREIGN BODY IN EYE	227	1112			X
801905		"	7-9-42	WELDER	49	FLASH BURN, BOTH EYES	958	0213			X
801906		"	7-10-42	CHIPPER	21	FELL INTO DOUBLE BOTTOM HOLD ONTO A BARRELL OF TOOLS, CHISELS	545	0539			X
801907		"	7-10-42	MACHINIST	33	LOOSE SCAFFOLDING BROKE, FELL STRIKING CHEST ON PROTRUDING PIPE	555	0339	P		
801908		"	7-12-42	CHIPPER	43	FOREIGN BODY IN EYE	227	1112			X
801909		"	7-12-42	SHIP FITTER	20	HIT LEG WITH SLEDGE HAMMER	245	0328			X
801910		"	7-12-42	BURNER	25	FOREIGN BODY IN EYE	227	1112			X
801911		"	7-13-42	SCALER	24	FOREIGN BODY IN EYE	227	1112			X
801912		"	7-14-42	SHIP FITTER	43	FOREIGN BODY IN EYE	227	1112			X
801913		"	7-14-42	SHIP FITTER	52	CARRYING RAIL, SLIPPED & ALMOST FELL, HERNIA	661	1318			X
801914		"	7-14-42	RIVETER	43	HOT SPARKS IN EYE	237	0212			X
801915		"	7-15-42	CHIPPER	49	GRINDER FELL ON FOOT	224	0332			X
801916		"	7-15-42	CRANE OP.	21	PUSHING CAR INTO BAY & WHEEL RAN OVER FOOT	222	0734			X
802029		"	7-14-42	CHIPPER	40	FOREIGN BODY IN EYE	227	1112			X
802118		"	7-25-42	WAREHOUSEMAN	25	LIFTING HEAVY LOAD, HERNIA	660	1318			X
802119		"	5-11-42	ELECTRICIAN	42	FOREIGN BODY IN EYE, INFLAMMED	227	1212			X
802120		"	6-9-42	BOLTER MAN	48	FOREIGN BODY IN EYE, INFECTION	227	1212			X
802121		"	6-19-42	SHIP WRIGHT	19	CLIMBING STEEL STEPS, FOOT SLIPPED, HIT LEG AGAINST STEP	153	0328			X
802122		"	7-7-42	WELDERS HELPER	18	CAUGHT HEEL ON IRON BAR, LOST BALANCE, FELL, SPRAINED KNEE	461	0936			X
802123		"	7-7-42	SHIP FITTER	35	SCAFFOLDING GAVE WAY FELL 5 FEET	557	0316	P		
802124		"	7-13-42	SHIP FITTER	23	FOREIGN BODY IN EYE	227	1112			X
802125		"	7-15-42	SHIP FITTER	16	ARC FLASH, BOTH EYES	958	0213			X
802139		"	4-24-42	SHIP WRIGHT	26	STEPPED OVER PLANK, BUMPED KNEE, INFECTION	260	1236			X
802140		"	5-27-42	SHIP FITTER	40	2 MEN & HE LIFTING BULKHEAD, ONE LET GO, HE HELD MOST OF THE WEIGHT	659	0916	X		
802141		"	5-30-42	WELDER	44	STEPPED THROUGH RAILS, BRUISED KNEE	055	0336			X
802142		"	6-11-42	SHIP WRIGHT	36	BUMPED HEAD ON SPRAWL, STRAINED CERVICAL VERTEBRAE, HEADACHE	157	0915			X
802143		"	6-12-42	PIPE FITTER	37	STEPPED INTO HOLE, STRAINED SHOULDER MUSCLES TRYING TO CATCH HIMSELF	062	0917			X
802144		"	6-14-42	CHIPPER	40	SLIPPED ON WET DECK & FELL ON PILE OF WIRE CABLE	459	0336			X
802145		"	6-15-42	WELDERS HELP.	39	STEPPED ON LOOSE PLANK & FELL STRIKING AGAINST RAILS	460	0917			X
802146		"	6-18-42	WELDER	20	SLIPPED & FELL, STRAINED SHOULDER	461	0917			X
802147		"	6-22-42	SHIP WRIGHT	59	HELPING LOWER A SCAFFOLD, IT SLIPPED & HIT BACK	257	0916			X
802148		"	6-29-42	LABORER	60	STEPPED ON END OF LOOSE PLANK, OTHER END FLEW UP AND HIT FACE	260	0308			X
802149		"	7-4-42	WELDER	32	FOREIGN BODY IN EYE, INFECTION	227	1213			X

SCHN00318032

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	Na. & Loc.	Unsafe Ac M	O	P
802150	(b) (6)	5351	7-7-42	WELDER	46	BUMPED KNEE	223	0336			X
802151		"	7-9-42	CARPENTER	48	LADDER SLIPPED OUT FROM UNDER HIS HE FELL AND FRACTURED RIBS	561	0739	P		
802152		"	7-10-42	RIGGER	39	JUMPED OUT OF WAY OF PIECE OF STEEL, LANDED WITH WEIGHT ON ONE LEG	056	0928			X
802153		"	7-10-42	WELDER	28	STEPPED AND TWISTED ANKLE	661	0931			X
802154		"	7-11-42	SHIP FITTER	30	WEDGE FELL FROM ABOVE AND HIT TOE	224	0334	P		
802155		"	7-11-42	SHIP FITTER	40	ARC FLASH, INFECTION	958	1212			X
802156		"	7-11-42	CHIPPER	21	GOT FINGER CAUGHT BETWEEN CHIPPING GUN AND STEEL WEDGING	323	0327			X
802157		"	7-11-42	BURNER	55	BUMPED HEAD ON BOX, BLINDNESS, BRUISE	238	0311			X
802158		"	7-14-42	SHIP WRIGHT H.	27	SLIPPED AND FELL BACKWARDS ONTO KEEL BLOCK	423	0316			X
802159		"	7-16-42	ELECTRICIAN	26	TURNED NECK QUICKLY, POSSIBLE DISLOCATION	600	0915			X
802160		"	7-16-42	BURNER	18	FOREIGN BODY IN EYE	227	1112			X
802161		"	7-21-42	SCALER	33	SOMEONE DROPPED PLANK ON HANDS, FRACTURE(REACHED OVERHEAD ON SCAFFOLD)	260	0725		X	
802162		"	7-21-42	RIGGER	45	LIFTING HEAVY PIPE, FELL OUT OF HANDS & STRUCK ABDOMEN, HERNIA	255	1318			X
802301		"	6-5-42	SHIP WRIGHT	35	LIFTING PLANK, STRAINED NECK	638	0915			X
802302		"	6-12-42	RIVETER	40	BRUISED KNEE WHILE BUCKING	123	0336			X
802303		"	6-28-42	MAINTENANCE	49	STEPPED ON LOOSE PLANK, FELL AND BRUISED LEG	060	0328	P		
802304		"	7-1-42	SHIP FITTER	30	BURNERS BURNED THROUGH DECK & BURNED HIS BACK WITH HOT METAL	242	0216		X	
802305		"	7-2-42	SHIP FITTER	40	CO-WORKER SLIPPED JACK UNDER TOO QUICKLY, CAUGHT FINGER, FRACTURE	345	0723		X	
802306		"	7-2-42	CHIPPER	52	JUMPED ON COUNTER-BALANCE, FELL AND BRUISED CHEST	461	0339			X
802307		"	7-3-42	SHIP FITTER	59	SLIPPED AND FELL, BRUISED KNEE	461	0336			X
802308		"	7-3-42	LABORER	50	LOST BALANCE AND STRAINED BACK TRYING TO KEEP ON FEET	661	0916			X
802309		"	7-3-42	MACHINIST	28	WORKING ON ENGINE, CAUGHT FINGER BETWEEN JOURNAL & ECCENTRIC, LACERATION	330	0527			X
802310		"	7-6-42	SHIP FITTER	50	PUTTING STIFFNER IN PLACE, FINGER STRUCK RAW EDGE, PUNCTURE WOUND, INFECTION	163	1227		X	
802311		"	7-8-42	SHIP FITTER	39	FOREIGN BODY IN ONE EYE, FLASH BURN IN BOTH EYES	227	1112	P		
802312		"	7-8-42	PIPE FITTER	50	FELL DOWN MANHOLE, BRUISED CHEST AND RIBS	552	0339			X
802313		"	7-8-42	SHIP FITTER	42	SLIPPED ON RAIL AND FELL 4 FEET, SPRAINED ANKLE	551	0731			X
802314		"	7-8-42	SHEET METAL	36	SPARKS FROM WELDER BURNED ARM, ABUSS	237	1220	P		
802315		"	7-9-42	WELDER	32	WELDING AND SPARKS FLEW UP SLEEVE, BURNED ELBOW, INFECTION	237	1237	P		
802316		"	7-10-42	SHIP FITTER	21	WRENCH SLIPPED AND HAND STRUCK AGAINST THE PLATE, INFECTION	123	1224			X
802317		"	7-10-42	RIGGER	47	SLIPPED AND FELL IN HOLE AND BRUISED RIBS, HIPS, AND ELBOW	552	0939			X
802318		"	7-10-42	SHIP FITTER	31	SLIPPED ON PIECE OF PIPE & FELL AGAINST RAIL, BRUISED RIBS AND BACK	423	0339			X
802319		"	7-12-42	CHECKER	42	SLIPPED AND FELL ON STEEL RAIL, BRUISED BACK	423	0316			X
802320		"	7-13-42	WELDER	31	HOT SLAG BURNED EAR	237	0214		X	
802321		"	7-16-42	SHIP FITTER	39	SOME WORKMEN LET POST FALL, STRUCK FOREHEAD, LACERATION	260	0508		X	
802322		"	7-17-42	UNION MECT H.	17	ON PLATFORM-BOARD WAS LOOSE CAUSING FALL, HIT AND DISLOCATED NOSE	557	0608	X		
802323		"	7-17-42	PIPE FITTER	50	50 LB. STEEL FLANGE FELL ON THUMB, FRACTURE	224	0726	P		
802324		"	7-17-42	SHIP FITTER	20	BLOCK SLIPPED FROM UNDER BEAM CAUSING IT TO FALL ON FINGER, FRACTURE	260	0727	P		
802325		"	7-17-42	TESTER	33	AIR HOSE CAME LOOSE AND STRUCK FACE, BRUISE	259	0308	P		

SCHN00318033

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
801894	(b) (6)	5351	7-14-42	RIGGER	52	FATAL: DECEASED FELL FROM TRACK BEAM IN ASSEMBLY BUILDING OF STEEL PLATES, SKUL FRACTURE AND INTERNAL INJURIES.	556	0710			X
802389		"	7-3-42	FRAME BLDG.		FOREIGN BODY IN EYE	227	1112	P		
802390		"	7-6-42	RIGGER	40	LOWERING STANCHION, SLIPPED OFF HOOK, FELL ON FINGER, FRACTURE, PARTIAL AMP.	238	0727			X
802391		"	7-6-42	BURNER HELPER	59	FELL BETWEEN SOME RAILS	455	0317			X
802392		"	7-9-42	WELDERS HELPER	22	SAND IN EYES, INFECTION	227	1213			X
802393		"	7-10-42	BURNER	22	STEEL PLATE FELL IN THUMB, FRACTURE	256	0726			X
802394		"	7-10-42	SHIP FITTER	54	FELL AGAINST SOME RAILS, FRACTURED RIBS	455	0737			X
802395		"	7-14-42	CHIPPER	62	CHIPPING STIFF BACK, IT GAVE AND JUMPED UP AND HIT HAND, FRACTORE	238	0724	P		
802396		"	7-15-42	RIGGER	44	SLIPPED AND FELL CATCHING WEIGHT ON THUMB, FRACTURE	461	0726			X
802397		"	7-15-42	SHIP FITTER	20	SLIPPED ON WET BOARDS AND FELL, HURT KNEE	461	0336			X
802398		"	7-17-42	REAMER	61	FELL OFF WET BAR 10', LACERATED & CONTUSED SHOULDER, ARM, AND LEG	561	0617			X
802399		"	7-17-42	MACHINIST	37	TRIPPED WHILE COMING DOWN LADDER IN ENGINE ROOM	553	0318			X
802400		"	7-17-42	LABORER	16	STRUCK ON BACK OF HEAD BY TIMBER	260	0510			X
802401		"	7-18-42	SHIP WRIGHT	41	ADZ SLIPPED AND CUT ANKLE	245	0531			X
802626		"	7-24-42	REAMER	48	FOREIGN BODY IN EYE	227	1112			X
802691		"	6-3-42	SCALER	41	WAS HIT ON HEAD BY WOODEN WEDGE	245	0311			X
802692		"	6-23-42	SHEET METAL	44	FOREIGN BODY IN EYE	227	1112			X
802693		"	6-27-42	WELDER	24	BURNED NECK, ABSCESS	237	1215			X
802694		"	6-30-42	LABORER	17	PIECE OF METAL ON CRANE WAS IN HIS TOE	226	0734			X
802695		"	7-1-42	HOOK TENDER	42	SKINNED ELBOW, INFECTION	138	1237			X
802696		"	7-2-42	CHIPPER	30	DOING HEAVY CHIPPING WORK, BENT OVER, COLLASPED, BACK STRAINED--HOSPITAL	638	0916			X
802697		"	7-5-42	SHIP FITTER	35	GLASS AND STEEL IN KNEE FROM CRAWLING ON HANDS AND KNEES, INFECTED	163	1236			X
802698		"	7-8-42	CHECKER	19	LIFTING STEEL BEAMS FROM ONE PILE TO ANOTHER, CAUGHT HEEL, SPRAINED BACK	655	0916			X
802699		"	7-8-42	BURNER	43	BURNED KNEE ON HOT STEEL	137	0236			X
802700		"	7-10-42	WELDER	31	HOT SLAG FELL IN SHOE, BURNED HEEL	237	0232			X
802701		"	7-14-42	CHIPPER	37	FOREIGN BODY IN EYE	227	1112			X
802702		"	7-16-42	SHIP FITTER	33	ARC FLASH, BOTH EYES	958	0213			X
802703		"	7-16-42	WELDER	26	STRUCK IN EYE BY PIECE OF STEEL	227	0312			X
802704		"	7-18-42	WELDER	46	FOREIGN BODY IN EYE	227	1112			X
802705		"	7-19-42	SHIP FITTER	31	SLIPPED ON WELDING ROD, STRAINED BACK	655	0516			X
802706		"	7-19-42	WELDERS HELPER	60	ARC FLASH, BOTH EYES	950	0213			X
802707		"	7-19-42	SHIP FITTER	49	LONGITUDENAL GIRDER 21 X 27 FELL ON FOOT, FRACTURED TOE	255	0734			X
802708		"	7-20-42	SHIP FITTER	38	LOST BALANCE DODGING BRACKET & FELL FORWARD AGAINST BRACKET, CONCUSSION	155	0409			X
802709		"	7-22-42	BOILERMAKER	51	CARRYING HEAVY LOAD, STEPPED ON IRREGULAR PIPE, UNABLE TO WALK	055	0332			X
802869		"	4-1-42	SHIP FITTER	30	CRANE OPERATOR DID NOT RIASE HIS BOOM & HE WAS STRUCK ON HEAD BY A CHIP	255	0510			X
802870		"	6-4-42	SHIP FITTER	63	USING SLEDGE HAMMER TO FARE UP A SHELL PLATE, SEVERE BACK STRAIN	648	0966			X
802871		"	7-4-42	SHIP FITTER	54	PUT OUT HAND TO PROTECT HEAD FROM SWINGING CRANE HOOK, FRACTURED FINGER	234	0727			X

SCHN00318034

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	Na. & Loc.	Unsafe Act W	O	P
802891	(b) (6)	5351	5-19-42	BURNER	46	EQUIPMENT SLIPPED AND BRUISED LEG	222	0328		X	
802892		"	6-12-42	SHIP WRIGHT	34	PLANK FELL ON THUMB, FRACTURE	260	0726			X
802893		"	6-24-42	HOOK TENDER	56	GUIDING PLATE ON PRESS & IT BALANCED OFF TO RIGHT & AMPUTATED FINGER	256	1027	P		
802913		"	6-29-42	CHIPPER	44	STRUCK HEAD ON DOOM WHILE COMING UPSTAIRS, TENDERNESS CEVIRCAL VERTEBRAE	123	0315			X
803018		"	4-15-42	SHIP FITTER	34	GHIPPING ON KNEE, BRUISED KNEE	661	0336			X
803019		"	6-25-42	SHIP FITTER	52	ARC FLASH IN EYE	958	0212			X
803020		"	6-28-42	PIPE FITTER	59	FOREIGN BODY IN EYE	227	1112			X
803021		"	7-1-42	SHIP FITTER	39	ARC FLASH, CORNEAL ULCER	958	0312			X
803022		"	GRADUAL	RIVETER	41	UNABLE TO EXTEND ELBOW FULLY, CAN HARDLY RIVET AT TIMES	638	0937			X
003023		"	7-5-42	RIVETER	46	SPARKS BURNED ARM, INFECTED WRIST, HAND, AND FINGER	237	1224			X
803024		"	7-6-42	BURNER	39	SLIPPED ON SCAFFOLD, SPRAINED BACK	657	0916			X
803025		"	7-8-42	DRILLER	54	FOREIGN BODY IN EYE	227	1112			X
803026		"	7-8-42	WELDER	19	ARC FLASH, BOTH EYES	958	0213			X
803027		"	7-9-42	RIVETER	56	SLIPPED AND FELL OVER ON RIM OF HATCH	452	0339			X
803028		"	7-10-42	ELECTRICIAN	22	SCAFFOLDING BROKE, HE FELL ABOUT EIGHT FEET, SPRAINED BACK, LACERATED ARM	557	0916	P		
803029		"	7-10-42	REAMER	57	PUSHING REAMER, IT SLIPPED & HIT RIBS	222	0339			X
803030		"	7-11-42	BURNER	42	STUMBLED ON NAILS AND FELL ON THEM, INFECTED ARM	455	1220			X
803031		"	7-13-42	HANGER HELPER	67	WRENCH SLIPPED, HIT PIPE WHICH HIT ELBOW	255	0537			X
803032		"	7-13-42	MACHINIST H.	47	RAN INTO SCAFFOLDING, CUT LIPS AND GUMS	157	0508			X
803033		"	7-13-42	WELDER	31	FOREIGN BODY IN EYE	227	1112			X
803034		"	7-14-42	SHIP FITTER	30	HOT SLAG FLEW IN GLOVE AND BURNED HAND, BECAME INFECTED	237	1224			X
803035		"	7-14-42	BURNER	44	SETTING ACETYLENE GAUGE AND IT IGNITED, BURNING HAND	215	0224			X
803036		"	7-15-42	SHIP FITTER	30	FELL OFF SCAFFOLD, FACE HIT SCAFFOLD ON WAY DOWN	557	0308			X
803037		"	7-16-42	WELDER	33	WELD LEAD CAUGHT ON CHIP, JERKED IT FLEW UP, HIT MOUTH, LAC. LIP, CRACKED	238	0508			X
803038		"	7-16-42	CHIPPER	23	ARC FLASH, ONE EYE /FOUR TEETH.	958	0212			X
803039		"	7-17-42	TRUCK DRIVER	40	UNLOADING PIPES, ONE FELL ON HAND	255	0527			X
803040		"	7-18-42	SHIP FITTER	74	CRANE KNOCKED OVER POLES ON CANVAS IT FELL ON HIM, CONTUSED LEG, ELBOW	224	0328	X		
803041		"	7-19-42	WELDER	34	SLIPPED ON STEEL PLATE, STRAINED BACK	656	0916			X
803042		"	7-19-42	CHIPPER	18	FOREIGN BODY IN EYE	227	1112			X
803043		"	7-19-42	BURNER	42	FLASH BURN, BOTH EYES	958	0213			X
803044		"	7-20-42	MACHINIST	35	SLIPPED AND FELL LEFT, FRACTURED SKULL?	561	0710			X
803045		"	7-20-42	CHIPPER	27	STEPPED ON NAIL	163	0832			X
803046		"	7-20-42	CHIPPER	45	CLIMBED OVER OBSTACLE, FELL DOWN, PAIN IN SIDE AFTER GETTING UP, HERNIA	561	1318			X
803047		"	7-20-42	SHIP FITTER	36	CRAWLING THROUGH MANHOLE, HIT HEAD ON BEAM	123	0915			X
803048		"	7-20-42	ELECTRICIAN	52	CAUGHT BETWEEN POST & PLATE WHICH WAS BEIGN LOWERED, PLATE HIT CHEST	256	0339			X
803049		"	7-21-42	SHIP FITTER	27	MOVING MATERIAL, STRAINED BACK	638	0916			X
803050		"	7-21-42	SHIP FITTER	25	FOREIGN BODY IN EYE	227	1112			X
803051		"	7-22-42	BURNER	54	FOREIGN BODY IN EYE	227	1112			X

SCHN00318035

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
803052	(b) (6)	5351	7-23-42	ELECTRICIAN	20	THREW SWITCH ON 440 LINE AND IT BLEW UP, ELECTRIC SHOCK	939	0007	X		
803053		"	7-23-42	SHIP FITTER	37	FLASH BURN, BOTH EYES	958	0213			X
803054		"	7-25-42	RIGGER	52	CRANE MAN LET LINES SLACKEN, LOAD OF STEEL PLATES FELL ON ARM, FRACTURE	256	0720		X	
803055		"	7-25-42	SHIP FITTER	41	LIFTING STEEL PLATES, HERNIA	656	1318			X
803056		"	7-26-42	SHEET METAL	21	HAMMERING, IN BACK SWING HIT HAND AGAINST BULKHEAD, FRACTURE	123	0724			X
803057		"	7-26-42	WELDER HELPER	62	STANDING ON HORSE CHANGING LEADS, SLIPPED OFF, FRACTURED HEEL BONE	561	0732			X
803058		"	7-28-42	SHIP FITTER H.	16	COOKED UP & FELL BETWEEN 2 RAILS, POSSIBLE MARILLARY, SKULL FRACTURE	455	0330			X
803254		"	6-25-42	SHIP FITTER	30	FOREIGN BODY IN EYE	227	1112	P		
803255		"	6-27-42	CHIPPER	55	SHIPYARD EYE INFECTION	900	1213	P		
803256		"	6-30-42	LABORER	25	LIFTING ACETYLENE TANK, DROPPED ONE ON TOE, FRACTURE	224	0734			X
803257		"	7-1-42	SCALER	66	FELL ACROSS RAIL, BRUISED CHEST	123	0339			X
803258		"	7-6-42	CHIPPER	34	HIT KNEE WITH SLEDGE HAMMER, BRUISE	245	0336			X
803259		"	7-7-42	SHIP FITTER	26	BRUISED KNEE WHILE WORKING, INFECTION	123	1236			X
803260		"	7-9-42	ENGINEER	39	PIECE OF CHANNEL IRON FELL ON LEG, BRUISE	255	0328			X
803261		"	7-10-42	RIGGER	49	PIECE OF STEEL FELL ON LEG, BRUISE	256	0328			X
803262		"	7-10-42	CHECKER	38	STRAIGHTENING STEEL PLATES, STRAINED BACK	638	0916			X
803263		"	7-11-42	PIPE FITTER	53	FELL OFF SCAFFOLD, AIR HOSE WAS TOO POWERFUL, BRUISED BACK	561	0316			X
803264		"	7-11-42	LABORER	46	LOADING BLOCKS OF PLASTIC AND ONE FELL ON TOE, FRACTURE	224	0734	P		
803265		"	7-12-42	CHIPPER	41	FOREIGN BODY IN EYE	227	1112			X
803266		"	7-13-42	LABORER	20	FLASH BURN, BOTH EYES	958	0213	P		
803267		"	7-13-42	CHIPPER	25	FOREIGN BODY IN EYE	227	1112			X
803268		"	7-13-42	MACHINIST	23	FLASH BURN, BOTH EYES	958	0213	P		
803269		"	7-14-42	ELECTRICIAN	25	SLIPPED THROUGH RAILS, BRUISED LEG	123	0228			X
803270		"	7-16-42	RIGGER	49	SETTING CLAMPS AND CRANE OPERATOR TOOK UP SLACK LINE AND CAUGHT FINGER	334	0327		X	
803271		"	7-16-42	PAINTER	26	FOREIGN BODY IN EYE	227	1112	P		
803272		"	7-16-42	LABORER	49	CARRYING PIECE OF IRON, STUMBLED & IRON FELL ON FOOT, CUT TOE	224	0534			X
803273		"	7-16-42	WELDER	40	SCAFFOLD BROKE, FELL AND BRUISED CHEST	557	0339	P		
803274		"	7-16-42	ELECTRICIAN	36	CABLE SLIPPED, SPRAINED THUMB	334	0926	P		
803275		"	7-16-42	SHIP FITTER	44	ARC FLASH, BOTH EYES	958	0213			X
803276		"	7-17-42	RIGGER	35	HOOK SLIPPED OFF PLATE, FELL, HIT 4X4'S ON DOLLY, WHICH FELL ON TOE, FRACT.	260	0734	X		
803277		"	7-17-42	BURNER	27	BUMPED KNEE AGAINST STEEL PLATE	156	0336			X
803278		"	7-17-42	DUPLICATOR	50	CO-WORKER WAS RUNNING POAST HIM & HIT HIM ON SHOULDER, FELL, HURT KNEE	204	0336		X	
803279		"	7-17-42	SHIP FITTER	35	CO-WORKER STEPPED ON PLATE HE WAS LIFTING, CAUSING STRAINED BACK	638	0916		X	
803280		"	7-18-42	SHIP FITTER	35	SLIPPED AND FELL, BRUISED SIDE	661	0318			X
803281		"	7-18-42	SHIP FITTER	50	THREW RAIL UP ON DECK, IT SPRUNG BACK AND HIT FOOT	224	0332	P		
803282		"	7-17-42	PIPE FITTER	57	WRENCH SLIPPED, BRUISED HAND	123	0324			X
803283		"	7-19-42	SHIP FITTER	36	FLASH BURN, BOTH EYES	958	0213	P		
803284		"	7-19-42	CHIPPER	39	FOREIGN BODY IN EYE	227	1112	P		

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FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
803285	(b) (6)	5351	7-19-42	WELDER	63	SOMEONE PULLED ROPE, WORKER GOT FOOT CAUGHT IN IT, FELL-BR. SHOULDER	356	0317		X	
803286		"	7-19-42	MACHINIST	34	PUTTING DRILL IN MOTOR, CO-WORKER TURNED IT ON, FRACTURED FINGERS	330	0727		X	
803287		"	7-19-42	WELDER	31	BURNED HAND WHILE WELDING, INFECTION	215	1224			X
803288		"	7-20-42	LABORER	49	FLASH BURN, BOTH EYES	958	0213	P		
803289		"	7-20-42	BURNER	62	MOVING MOTOR, HERNIA	638	1318			X
803290		"	7-22-42	SCALER	36	FOREIGN BODY IN EYE	227	1112	P		
803291		"	7-22-42	SHIP WRIGHT	28	PLANK FLEW UP, HIT HIM UNDER CHIN, CUT LIP, CHIPPED MOLAR BONE	260	0508			X
803292		"	7-23-42	SCALER	19	GOING UP LADDER, HIT HEAD ON SCAFFOLDING	157	0311			X
803293		"	7-24-42	ELECTRICIAN	48	WIRING CONDUIT AND CRANE HIT FOOT, FRACTURE	235	0732			X
803294		"	7-26-42	RIGGER	26	CHANNEL IRONS FELL ON ANKLE, FRACTURE	256	0731			X
803446		"	5-15-42	LABORER	51	ARC FLASH, BOTH EYES	958	0213			X
803447		"	6-5-42	CHIPPER	42	FOREIGN BODY IN EYE	227	1112			X
803448		"	6-18-42	PAINTER	43	SLIPPED ON WET DECK AND FELL ON KNEE	461	0336			X
803449		"	7-3-42	LABORER	42	OVER COME BY HEAT	916	0007			X
803450		"	7-3-42	HOOK TENDER	32	HIT ELBOW AGAINST A STEEL PLATE	156	0337			X
803451		"	7-8-42	WELDER	31	HOT SLAG FELL IN SLEEVE, INFECTED BURN ON ELBOW	237	1237			X
803452		"	7-9-42	LABORER	17	FOREIGN BODY IN EYE	227	1112			X
803453		"	7-9-42	RIGGER	28	SLIPPED BETWEEN 2X8 AND HIT KNEE ON TIMBERS.	160	0336			X
803454		"	7-10-42	CHIPPER	47	HOT CHIP FELL AGAINST ARM, BURN	237	0220			X
803455		"	7-10-42	SHIP FITTER H.	30	PIECE OF STEEL FELL ON TOE, FRACTURE	224	0734			X
803456		"	7-12-42	PIPE FITTER	28	BOX TIPPED OVER ONTO FINGER, CONTUSED, LACERATED AND INFECTED	338	1227			X
803457		"	7-15-42	CHIPPER	36	FOREIGN BODY IN EYE	227	1112			X
803458		"	7-15-42	LABORER	65	SLIPPED & FELL ON WET, GREASY PLANK, RIB & CARTILEGE SEPARATION	460	0939			X
803459		"	7-16-42	RIGGER	33	FOREIGN BODY IN EYE	227	1112			X
803460		"	7-16-42	SHIPWRIGHT H.	52	BOARD FROM SCAFFOLDING FELL AND HIT FACE	260	0508			X
803461		"	7-16-42	CRANE OP.	29	SLIPPED WHILE CLIMBING IN CRANE	135	0339			X
803462		"	7-17-42	SCAler	18	FOREIGN BODY IN EYE	227	1112			X
803463		"	7-18-42	SHIP FITTER H.	34	FELL OFF SCAFFOLD, BRUISED ANKLE	557	0331			X
803464		"	7-18-42	SHIP FITTER H	33	ARC FLASH, BOTH EYES	958	0213			X
803465		"	7-18-42	SHIP FITTER H	73	FELL THROUGH SOME RAILS, BRUISED CHEST AND ABDOMEN	555	0339			X
803466		"	7-18-42	CHIPPER	47	FOREIGN BODY IN EYE	227	1112			X
803468		"	7-19-42	SHIP FITTER	60	FOREIGN BODY IN EYE	227	1112	P		
803469		"	7-19-42	MACHINIST	43	FOREIGN BODY IN EYE	227	1112	P		
803470		"	7-19-42	CHIPPER	30	SLIPPED AND BRUISED SIDE	661	0318			X
803471		"	7-20-42	LABORER	41	SLIPPED AND STRUCK ELBOW AGAINST A SKIFF, BRUISE	123	0337			X
803472		"	7-20-42	WELDER	20	FELL BETWEEN IRON BARS, FRACTURED TEETH	461	0738			X
803473		"	7-20-42	LABORER	47	WORKMAN STEPPED OFF PLANK, IT FLEW UP, HE LOST BALANCE, FELL THRO RAILS	560	0528		X	
803474		"	7-21-42	SHIP FITTER	19	RAISED UP, HIT HEAD ON STEEL, LACERATIONS. /CUT LEG.	123	0510			X

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FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
803475	(b) (6) [redacted]	351	7-21-42	WELDER	53	FLASH BURNS, BOTH EYES	958	0213			X
803476		"	7-21-42	SLABMAN	33	SWINGING SLEDGE HAMMER, MOVED BAR TOO SOON, MISSED, SPRAINED SHOULDER	645	0917		X	
803477		"	7-21-42	SHIP FITTER	30	LAID HAND AGAINST PIECE OF IRON, IT SLIPPED & FELL ON FOOT, BRUISE	224	0332			X
803478		"	7-22-42	BOLTER UP	37	FOREIGN BODY IN EYE	227	1112			X
803479		"	7-22-42	SHEET METAL	30	FOREIGN BODY IN EYE	227	1112			X
803480		"	7-22-42	SWITCH MAN	50	CAUGHT FOOT ON ROCK STEPPING OFF FOOT BOARD OF ENGINE ROOM, SPR. ANKLE	561	0931			X
803481		"	7-23-42	BURNER	41	SLIPPED ON A RAIL, TWISTED ANKLE	623	0331			X
803482		"	7-23-42	SHIP FITTER	67	PIECE OF STEEL PLATE FELL ON TOE, FRACTURE	256	0734			X
803483		"	7-23-42	SHIP FITTER	60	FOREIGN BODY IN EYE	227	1112			X
803484		"	7-23-42	PIPE FITTER	19	LIFTING A PIPE, STRAINED SIDE	661	0918			X
803485		"	7-23-42	LABORER	48	FELL ON AN IRON BEAM, CUT LEGS	423	0528			X
803486		"	7-23-42	PIPE FITTER	16	WEDGE FELL FROM ABOVE & STRUCK TOE, BRUISE	224	0334	P		
803487		"	7-24-42	WELDER	30	SLIPPED ON LOOSE HOSE, BRUISED BACK	059	0316			X
803488		"	7-24-42	WELDER	19	OVERCOME WITH WELDING SMOKE	944	0102	P		X
803489		"	7-24-42	BURNER	41	WELDERS MOVED STAGING, CAUSING HIM TO FALL, BRUISED BACK	557	0316		X	
803490		"	7-25-42	CHIPPER	26	FOREIGN BODY IN EYE, WAS WEARING GOGGLES	227	1112	P		
803491		"	7-25-42	LABORER	22	PLANK FELL FROM ABOVE & BRUISED FOOT	260	0332	P		
803492		"	7-25-42	WELDER	34	FOREIGN BODY IN EYE	227	1112			X
803493		"	7-25-42	SHIP WRIGHT	36	JACKING UP A SHORE, JACK SLIPPED OUT & SHORE FELL ON TOE, FRACTURE	238	0734			X
803494		"	7-25-42	SHIP FITTER	32	SLIPPED ON WET DECK & ARM HIT JACK A MAN WAS CARRYING, FRACTURE	661	0720			X
803495		"	7-26-42	WELDER	27	FOREIGN BODY IN EYE	227	1112			X
803496		"	7-26-42	RIGGER	35	REACHED UNDER ST. PIPE, CRANE LET STEEL DOWN ON THUMB, AMPUTATION	256	1026			X
803497		"	7-27-42	SHIP FITTER	52	FOREIGN BODY IN EYE	227	1112			X
803498		"	7-28-42	CHIPPER	30	FOREIGN BODY IN EYE	227	1112			X
803499		"	7-31-42	LABORER	16	STIFFENER FELL ON FOOT	238	0734			X
803500		"	6-8-42	HOOK TENDER	57	SHIFTING HEAVY PLATES AFTER THEY HAVE BEEN DEPOSITED	656	0739			X
803501		"	6-22-42	ELECTRICIAN	52	LIFTING MOTOR FROM FLOOR, SOMEONE OPENED DOOR & HIT HIS ELBOW	201	0337			X
803648		"	7-6-42	RIVETER	56	HOLDINGRIVET, FOOT SLIPPED & HE SPRAINED BACK	661	0916			X
803649		"	7-7-42	TIME CHECKER	48	STEPPED ON PIECE OF PLANK & TURNED ANKLE	060	0931			X
803760		"	7-22-42	PIPE FITTER H	43	HERNIA FROM HOLDING COIL	638	1318			X
803761		"	7-23-42	WELDER	21	HOT SLAG POURED DOWN SLEEVE, INFECTED BURN ON ELBOW	242	1237			X
803762		"	7-26-42	CHIPPER	38	FOREIGN BODY IN EYE	227	1112			X
804073		"	3-12-42	PIPE FITTER	43	PIPE FELL ON TOE	255	0334			X
804074		"	4-15-42	WELDERS LD.MAN	21	HOT NOSE ON SCAFFOLD, KNOCKED HIM DOWN, NOSE BLEED	157	0308			X
804075		"	5-11-42	CHIPPER	56	BRUISED ELBOW DUE TO CONTINUOUS CHIPPING	661	0337			X
804076		"	5-28-42	CHIPPER	31	FOREIGN BODY IN EYE	227	1112			X
804077		"	6-7-42	CAULKER	49	STARTED COUGHING AND IT CAUSED HERNIA	600	1318			X
804078		"	6-11-42	WELDER	29	INFECTED BURN ON ARM FROM HOT SLAG	237	1220			X
804079		"	6-10-42	JOINER	46	STRAINED WRIST AND HAND TO KEEP FROM FALLING ON PIECE OF LEAD	654	0924			X

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FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	Na. & Loc.	Unsafe Act M	O	P
804080	(b) (6)	5351	6-15-42	SHIP FITTER H	19	FOREIGN BODY IN EYE	227	1112			X
804081		"	6-6-42	SHIP FITTER H	20	LARGE PIECE OF STEEL FELL ON TOE	224	0334			X
804082		"	7-7-42	BURNER	24	TRYING TO CATCH HIMSELF & HAND WENT THROUGH FLAME OF HIS TORCH	915	0226			X
804083		"	7-13-42	SHIP FITTER	27	FOREIGN BODY IN EYE	227	1112			X
804084		"	7-13-42	SHIP FITTER H	19	WEDGE FELL FROM ABOVE & HIT ON FOOT	245	0334	P		
804085		"	7-16-42	RIGGER	40	STEPPED BACKWARD IN HOLE, SHOULDER LIT ON SOME RAILS, ALSO BACK.	062	0316			X
804086		"	7-17-42	PAINTER	58	MAN HOLE COVER FELL ACROSS FOOT	252	0334			X
804087		"	7-18-42	WELDER	43	ARC FLASH, BOTH EYES	958	0213			X
804088		"	7-18-42	SHIP FITTER H	57	ARC FLASH, BOTH EYES	958	0213			X
804089		"	7-19-42	RIGGER	33	KNOCKED OFF PIPE STACK BY CRANE, FRACTURED TAIL BONE	555	0716	P		X
804090		"	7-20-42	RIGGER	33	STEPPED IN HOLE & FELL TWO FEET	561	0339			X
804091		"	7-20-42	SHIP FITTER	28	FOREIGN BODY IN EYE	227	1112			X
804092		"	7-20-42	PIPE FITTER	50	LIFTING PIPE, SPRAINED BACK	655	0915			X
804093		"	7-21-42	RIGGER	43	WORKING AS RIGGER, LOAD HIT CHEST	238	0739			X
804094		"	7-21-42	WELDER	46	ARC FLASH, BOTH EYES	958	0213			X
804095		"	7-22-42	CHIPPER	39	FOREIGN BODY IN EYE	227	1112			X
804096		"	7-22-42	PIPE FITTER	32	FOREIGN BODY IN EYE	227	1112			X
804097		"	7-23-42	WELDER	37	INFECTED BURN ON ARM	237	1220			X
804098		"	7-23-42	WELDER	28	FELL OFF SCAFFOLD, SPRAINED BACK AND SACNIM	557	0916			X
804099		"	7-23-42	HOOK TENDER	42	BENT OVER AND BACK GAVE WAY, COULDN'T STRAIGHTEN UP	600	0916			X
804100		"	7-23-42	REAMER	47	ARC FLASH, BOTH EYES	958	0213			X
804101		"	7-23-42	CHIPPER	55	FOREIGN BODY IN EYE	227	1112			X
804102		"	7-25-42	CHIPPER	50	STEPPED INTO OPEN MANHOLE, ABSCESS IN LEG	052	1220			X
804103		"	7-25-42	TRANKTESTER	41	FOREIGN BODY IN EYE	227	1112			X
804104		"	7-25-42	FOREMAN	37	CUT EYE BAD, INFECTION	227	1212			X
804105		"	7-26-42	CHIPPER	48	FRACTURED FINGER BETWEEN STRONGBACKS WHEN WEDGE CAME OUT	323	0727			X
804106		"	7-26-42	WELDER H	55	FOREIGN BODY IN BOTH EYES	227	1113			X
804107		"	7-26-42	RIGGER	36	UNLOADING I BEAMS, CLAMP FLIPPED AND CAUGHT FINGER	234	0727			X
804108		"	7-26-42	WAREHOUSEMAN	29	WIRE HOLDING PIPE BROKE, HURT BACK TRYING TO HOLD PIPES TOGETHER	655	0916			X
804109		"	7-27-42	MACHINIST	25	STEPPED IN HOLE & FELL DOWN TO BOTTOM OF TANK	561	0528			X
804110		"	7-27-42	PIPE FITTER	29	WORKER TURNED HIS TRUCK ON HIS FLANK AS HE WAS WALKING BY, BRUISE	215	0218		X	
804111		"	7-27-42	SHIP FITTER	24	FOREIGN BODY IN BOTY EYES	227	1112			X
804112		"	7-27-42	RIGGER	31	PLANK FELL FROM SCAFFOLD, FRACTURED ARM, STRAINED ELBOW	260	0720			X
804113		"	7-27-42	BURNER	45	STEEL PLATE TURNED AND FELL ON FOOT, FRACTURE	256	0534			X
804114		"	7-28-42	CHIPPER	31	CORNEAL ULCER FOLLOWING FOREIGN BODY IN EYE	227	0312			X
804115		"	7-28-42	RIGGER	19	CRANE LET LOAD DOWN, HE CAUGHT BETWEEN 2 STEEL PLATES, FRACTURED CLAVICLE	356	0717			X
804116		"	7-28-42	WELDER	34	FELL 15' FROM LADDER, HIT CHEST ON IT & BACK AGAINST HATCH COVER	553	0339			X
804117		"	7-28-42	SHIP FITTER	30	FLASH BURN, BOTH EYES	958	0213			X
804118		"	7-28-42	CHIPPER	29	FOREIGN BODY IN EYE	227	1112			X
804119		"	7-29-42	CHIPPER	27	AIR HOSE FLEW UP & HIT NOSE	259	0308			X

SCHN00318039

FIRM NO. L04025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act N	O	P
804120	(b) (6) [redacted]	5351	7-28-42	PIPE FITTER	51	FOREIGN BODY IN EYE	227	1112			X
804121		"	7-29-42	ELECTRICIAN	38	LIFTING HEAVY CABLE, SPRAINED BACK	634	0916			X
804122		"	7-29-42	LABORER	64	DROPPED PLANK ON THIGH	260	0328			X
804123		"	7-29-42	LABORER	53	PIECE OF IRON, SLIPPED AND FELL ON TOE, FRACTURE	225	0734			X
804124		"	7-30-42	WELDER	32	PUSHING PIPE INTO PLACE, CRANE HOOKED & PIPE FELL ON THUMB, FRACTURE	255	0726			X
804125		"	7-30-42	RIGGER	51	SCAFFOLD BROKE & HE FELL 15', CONTUSED HEAD & SHOULDER & BACK	557	0316	P		
804263		"	6-29-42	LABORER	65	SLIPPED AND FELL, INJURED SHOULDER	561	0317			X
804264		"	6-29-42	RIVETER	47	HEAT POSTRATION	916	0007	P		
804265		"	7-29-42	LABORER	35	WELDING FUMES, LUNGS	944	0002	P		
804266		"	7-7-42	SHIP FITTER	29	HEAT POSTRATION	916	0007	P		
804267		"	7-14-42	WELDER	36	SLIVER IN FINGER, INFECTION	163	1227			X
804268		"	7-18-42	MACHINIST	37	LIFTING HEAVY MAT RIAL, STRAINED HIP	638	0919			X
804270		"	7-23-42	SCALER	56	FOREIGN BODY IN EYE	227	1112			X
804271		"	7-25-42	LABORER	65	CO-WORKER KNOCKED HIM DOWN, BRUISED ELBOW, INFECTION	461	1237		X	
804272		"	7-27-42	SHIP WRIGHT	48	BOARD WITH NAIL IN IT FELL ON HAND, PUNCTURE WOUND IN THUMB	263	0826	P		
804273		"	7-28-42	SHIP FITTER	28	FOREIGN BODY IN EYE	227	1112	P		
804274		"	7-30-42	RIGGER	45	OP. PUT CRANE IN REVERSE CAUSING CAR CRANE WHEELS TO RUN OVER FOOT	235	0734		X	
804275		"	8-6-42	BURNER	45	BURNER DROPPED PIECE OF RIM ON WORKERS FOOT, FRACTURE	224	0732		X	
804276		"	8-6-42	CHIPPER	49	STEP-LADDER TIPPED OVER, FELL ON LEG, FRACTURE	561	0728	P		
804509		"	7-23-42	SHIP FITTER	31	ARC FLASH, BOTH EYES	958	0213			X
804588		"	7-23-42	WELDER	47	ARC FLASH, BOTH EYES	958	0213			X
804589		"	8-4-42	WELDER	48	ARC FLASH, BOTH EYES	958	0213			X
804590		"	5-26-42	MACHINIST	31	FELL OFF SCAFFOLD, HIT ANKLE ON STOP VALVE	557	0331			X
804591		"	6-13-42	SHIP FITTER	37	ARC FLASH, BOTH EYES	958	0213			X
804592		"	6-15-42	SHIP FITTER H	19	THUMB CAUGHT BETWEEN WEDGES AND DECK	336	0726			X
804593		"	6-30-42	BOLTERMAN H	18	SPLINTER IN FINGER, INFECTION	163	1227			X
804594		"	7-2-42	RIGGER	20	SLIPPED THROUGH RAILS, CUT LEG	555	0528			X
804595		"	7-5-42	MACHINIST	45	SLIPPED THROUGH RAILS, CAUGHT HIMSELF AND PULLED HIMSELF UP	555	0916			X
804596		"	7-8-42	REAMER	57	FOREIGN BODY IN EYE	227	1112			X
804597		"	7-10-42	MACHINIST	46	FOREIGN BODY IN EYE	227	1112	P		
804598		"	7-11-42	WELDER	37	BUMPED ELBOW WHILE WELDING	123	0337			X
804599		"	7-11-42	GRINDER	57	FOREIGN BODY IN EYE	227	1112			X
804600		"	7-13-42	MACHINIST	48	BRUISED KNEE WHILE WORKING ON THEM, INFECTED	161	1236			X
804601		"	7-15-42	RIGGER	38	PUSHING ON PLATE, FOOT SLIPPED, SPRAINED BACK	638	0916			X
804602		"	7-6-42	PIPE FITTER	40	CRAWLING THROUGH DOUBLE BOTTOM, GOT SPLINTER IN KNEE, INFECTION	163	1236			X
804603		"	7-16-42	WELDER	40	PLANK SLIPPED AND FELL ON FINGER, FRACTURE	260	0727	P		
804604		"	7-17-42	WELDER	32	ARC FLASH, BOTH EYES	958	0213			X
804605		"	7-18-42	SHIP FITTER H	17	BUMPED ARM AGAINST HOT PIECES OF METAL, INFECTED BURNS	137	1220			X

SCHN00318040

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
804606	(b) (6) [redacted]	5351	7-19-42	WELDER	39	ARC FLASH, BOTH EYES	958	0213			X
804607	[redacted]	"	7-20-42	WELDER H.	20	LADDER SLIPPED AND HE FELL 15 FEET	561	0316	P		
804608	[redacted]	"	7-22-42	CHIPPER	40	FOREIGN BODY IN EYE	227	1112			X
804609	[redacted]	"	7-23-42	BURNER	16	FELL OVER A PIECE OF STEEL, FRACTURED LEG	455	0728			X
804610	[redacted]	"	7-23-42	CHIPPER	18	HOT PIECE OF METAL FELL DOWN NECK & BURNED WAISTLINE	237	0218			X
804611	[redacted]	"	7-23-42	LABORER	19	FELL AND CUT LEG ON BEAM	155	1231			X
804612	[redacted]	"	7-24-42	MACHINIST	31	FOREIGN BODY IN EYE	226	1112	P		
804613	[redacted]	"	7-25-42	WELDER	59	CAUGHT FOOT IN HOSE AND FELL AND CUT KNEE ON RAIL	455	0536			X
804614	[redacted]	"	7-25-42	RIGGER	37	STEPPED ON BUTTERFLY AND SPRAINED ANKLE	038	0931			X
804615	[redacted]	"	7-26-42	PIPE FITTER	52	WELD ON HANGER GAVE WAY CAUSING HANGER TO STRIKE LEFT KNEE	255	0336			X
804616	[redacted]	"	7-26-42	LAYOUT	51	HIT CORNER OF PLATE WITH ELBOW	156	0537			X
804617	[redacted]	"	7-30-42	MACHINIST	16	BURNED FINGERS ON GENERATOR PLATFORM	920	0224			X
804618	[redacted]	"	7-26-42	CHIPPER	19	WHILE CHIPPING PIECE OF STEEL FLEW IN SIDE OF GLASSES IN EYE	227	1112	P		
804619	[redacted]	"	7-27-42	SHIP FITTER	20	FANS & WELDING FLASHED CAUSED DIRT AND RUST TO FLY IN EYE	227	1112	P		
804620	[redacted]	"	7-27-42	CHIPPER	28	PIECE OF STEEL IN LEFT EYE	227	1112	P		
804621	[redacted]	"	7-28-42	WELDER	32	WELDING, ARC FLASH, BOTH EYES	958	0213			X
804622	[redacted]	"	7-28-42	CHIPPER	30	CHIPPING, SOMETHING FLEW IN EYE	227	1112			X
804623	[redacted]	"	7-28-42	CHIPPER	25	CHIPPING, FOREIGN BODY IN EYE	227	1112			X
804624	[redacted]	"	7-28-42	LAYOUT	18	FELL ON PIPE AND STRUCK SHOULDER	455	0317			X
804625	[redacted]	"	7-29-42	CHIPPER	19	CHIPPING FOREIGN BODY IN EYE	227	1112			X
804626	[redacted]	"	7-29-42	WELDER	49	ARC FLASH, BOTH EYES	958	0213			X
804627	[redacted]	"	7-29-42	WELDER	33	HOT METAL WAS DROPPED FROM OVERHEAD, BURNED LEGS	937	0230	P		
804628	[redacted]	"	7-29-42	CHIPPER	55	CHIPPING, FOREIGN BODY IN EYE	227	1112			X
804629	[redacted]	"	7-30-42	SHIP WRIGHT	25	PILE OF BLOCKS FELL ON TOE, FRACTURED	160	0734			X
804630	[redacted]	"	7-20-42	RIVETER	39	WRENCH DROPPED AND STRUCK LEFT ELBOW	245	0337			X
804631	[redacted]	"	7-31-42	BURNER	20	BURNING PIPE AND PIECE OF MATERIAL FLEW IN EYE	227	1112			X
804632	[redacted]	"	7-31-42	SHIP FITTER	45	HELPING WELDER, BURNED BOTH EYES	958	0213			X
804633	[redacted]	"	8-1-42	ELECTRICIAN	36	LIFTING, INJURED BACK	638	0916			X
804634	[redacted]	"	8-2-42	SHIP WRIGHT	51	DROPPED HEAVY PLANK , MASHED TOE	260	0334			X
804635	[redacted]	"	8-2-42	CHIPPER	60	GRINDING AND LOOSE PARTICLES DROPPED IN EYE	227	1112			X
804636	[redacted]	"	7-2-42	RIGGER	28	FOREIGN BODY IN EYE	227	1112			X
804637	[redacted]	"	8-2-42	BURNER	21	SLIPPED AND STRUCK LEFT SIDE AGAINST SCAFFOLD	657	0039			X
804638	[redacted]	"	8-2-42	PIPE FITTER	43	WRENCH SLIPPED OFF BOLT AND FRACTURED TOOTH	245	0738			X
804639	[redacted]	"	8-4-42	BURNER	31	BURNING PIECE OF METAL FLEW INTO LEFT EYE	227	1112			X
804639	[redacted]	"	8-6-42	MACHINIST	34	FOREIGN BODY IN EYE	227	1112			X
804791	[redacted]	"	7-29-42	PIPE FITTER	38	SLIPPED OVER PIPE AND SPRAINED LEFT ANKLE	655	0931			X
804792	[redacted]	"	7-12-42	RIGGER	42	UNLOADING GIRDERS AND FELL AND CUT LEG	255	0528			X
804793	[redacted]	"	7-18-42	PIPE FITTER	67	PLANK FELL AND SCRAPPED LEG, BRUISE	260	0328			X

SCHN00318041

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act W	O	P
804794	(b) (6)	5351	7-18-42	SHIP FITTER	57	SLIPPED & FELL, BURNED HAND	556	0224			X
804795		"	7-19-42	SHIP FITTER	36	SLIPPED, STRUCK SHIN AGAINST CLIP	162	0531			X
804796		"	7-20-42	RIGGER	19	STRUCK LEG AGAINST STEEL, CUT	156	0528			X
804797		"	7-20-42	RIGGER	47	STRUCK CHEST AGAINST STEEL GRATING	156	0339			X
804798		"	7-21-42	SHIP FITTER	74	BUMPED KNEE AGAINST IRON	516	0536			X
804799		"	7-23-42	LABORER	34	FELL & STRUCK KNEE ON HOSE	159	0336			X
804800		"	7-24-42	RIGGER	50	CRANE CLAMP SLIPPED & LACERATED THUMB	256	0524			X
804801		"	7-25-42	PAINTER	39	SLIPPED, WHILE COMING DOWN LADDER, SPRAINED KNEE	653	0936			X
804802		"	7-25-42	CLEANUP	17	STEEL BRACE FELL ON HAND & FRACTURED IT	256	0724	P		
804803		"	7-25-42	RIVETER	37	BOARD WAS PULLED OUT FROM UNDER HIM AND CUT BODY	155	0307	P		
804804		"	7-25-42	SHIP FITTER	57	SHIP FITTING & TIPPING A STEEL OVER FOOT, CUT	256	0332	P		
804805		"	7-25-42	LABORER	42	SLIPPED OVER A PIECE OF STEEL & SPRAINED ANKLE	656	0931			X
804806		"	7-26-42	RIGGER	52	WAS CAUGHT BETWEEN LOAD OF STEEL, SPRAINED LEG	356	0928			X
804807		"	7-27-42	REAMER	43	WAS REAMING ON SCAFFOLD WHEN SLIPPED & STRUCK CHEST	245	0339			X
804808		"	7-28-42	SHIP FITTER	16	AIR HOSE FLEW LOOSE & HIT SIDE OF HEAD	259	0511	X		
804809		"	7-28-42	WELDER	54	WELDING & HOT SLAG FELL IN SLEEVE, BURNED ARM	937	0220	P		
804810		"	7-28-42	CLEAN UP	24	RIVET WAS DROPPED & HIT & CUT FOREHEAD	245	0511	P		
804811		"	7-28-42	PIPE FITTER	33	STEEL SPLINTER IN FINGER, INFECTION	163	1227			X
804812		"	7-28-42	CHIPPER	55	STEEL SPLINTER IN FINGER, INFECTED	163	1227			X
804813		"	7-29-42	OFFICE INSIDE	56	WAS STRUCK BY THIRD PARTY, CUT FACE	205	0508	P		
804814		"	7-29-42	SHEET METAL	36	RAN PIECE OF IRON IN LEFT WRIST, CUT	159	0523			X
804815		"	7-30-42	BURNER	49	BURNING HAND TOO CLOSE TO TORCH, CAUSING BLISTER ON HAND	945	0224			X
804816		"	7-30-42	HOOKER	19	WAS KNOCKED DOWN BY THIRD PARTY, BRUISED KNEE	205	0336		X	
804817		"	7-30-42	SHIP FITTER	29	WAS STRUCK BY TURNBUCKLE IN RIBS	245	0339			X
804818		"	7-30-42	CHIPPER	40	TRYING TO SHIFT TO LOWER POSITION, DISLOCATED SHOULDER	657	0617			X
804819		"	7-31-42	RIGGER	48	FELL IN MANHOLE & INJURED BACK	552	0316			X
804820		"	7-31-42	LABORER	31	LIFTING STEEL RAILS, HERNIA IN LEFT SIDE	656	1319			X
804821		"	7-31-42	ELECTRICIAN	44	SLIPPED ON WET PAINT & SPRAINED WRIST	461	0924			X
804822		"	7-31-42	WELDER	35	PULLING, INJURED BACK	638	0916			X
804823		"	7-31-42	RIGGER	29	WAS CAUGHT BETWEEN MACHINE, DEEPLY CUT KNEE	330	0536	P		
804824		"	7-31-42	BURNER	17	WAS BURNED BY TORCH ON BUTTOCKS	245	0218			X
804825		"	8-1-42	PRESSMAN	50	CAUGHT FINGER BETWEEN BLOCK & PRESS, CUT	238	0527			X
804826		"	8-1-42	PRESSMAN	39	CLAMP FLEW OUT, BREAKING UPPER BISCUSPID	252	0538			X
804827		"	8-1-42	SLABMAN	30	BENDING IRON, PIECE OF STEEL CUT KNEE	256	0536			X
804828		"	8-1-42	SHIP FITTER	28	GETTING BRACKETS OUT OF RACK, PILE FELL, FRACTURED HAND	238	0724			X
804829		"	8-2-42	SHIP FITTER	35	RUST OR SLAG IN EYES	227	1113	P		
804830		"	8-2-42	SHIP FITTER	18	SEVERE ARC FLASHES	958	1113	P		
804831		"	8-2-42	RIGGER	38	FINGER CAUGHT BETWEEN STEEL PLATE, CUT	256	0527			X
804832		"	8-2-42	LABORER	56	TRUCK KNOCKED PIPE ON BIG TOE, FRACTURED	255	0734	P		

SCHN00318042

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
804833	(b) (6)	5351	8-2-42	SHIP WRIGHT	25	STRUCK BY TIMBERS, BRUISED FOOT	260	0332	P		
804834		"	8-2-42	SHIP FITTER	22	TRIPPED OVER HOSE, SPRAINED ANKLE	159	0931			X
804835		"	8-3-42	RIGGER	45	LOADING STEEL ON TRUCK, CHANNEL FRACTURED HAND	255	0724	P		
804836		"	8-3-42	SHIP FITTER	43	STEPPED ON CLIP, SPRAINED ANKLE	062	0931			X
804837		"	8-3-42	LABORER	52	JUMPED OFF TRUCK, CHIPPED BONE ON LEG	012	0728			X
804838		"	8-3-42	SHIP FITTER	52	SLIPPED OFF BRACKET, TWO WRENCHED IN HAND, HERNIA	645	1318			X
804839		"	8-3-42	BURNER	59	PLATE SLIPPED & STRUCK LEG, CONTUSION	256	0328	P		
804840		"	8-4-42	LAY OUT	22	CHANNEL BARS FELL FROM TRUCK & FRACTURED FOOT	255	0732	P		X
804841		"	8-4-42	BURNER	34	PIECE OF METAL FELL ON FOOT, SPRAINED ANKLE	224	0931			X
804842		"	8-5-42	PAINTER	32	WORKER DROPPED PIECE OF STEEL, STRUCK HIM ON SHOULDER, BRUISE	224	0317		X	
804843		"	8-6-42	RIGGER	29	WRENCH SLIPPED, CUT FACE	245	0508			X
804844		"	8-6-42	MACHINIST	28	CHANGING CONTROL RODS ON SKYLIGHT DOOR, SKYLIGHT FELL ON ARM, LACERAT.	224	0520	P		X
804587		"	8-6-42	ELECTRICIAN	17	PICKING UP STICK, ELBOW CAME IN CONTACT WITH ELECTRICAL CONNECTION	239	0007			X
805834		"	8-3-42	LABORER	17	FINGERS CAUGHT BETWEEN TWO PIECES OF STEEL, BRUISE	238	0327			X
805300		"	8-11-42	SHIP WRIGHT	35	FOREIGN BODY IN EYE	227	1112			X
805895		"	8-10-42	ELECTRICIAN	58	CONTACTED ELECTRIC CURRENT, ACCIDENT 8-10-42	239	0007			X
806012		"	1-8-42	CHIPPER	34	STEPPED INTO MAN HOLE WITH ONE FOOT, HERNIA	052	1318			X
806013		"	4-26-42	PAINTER	48	PIPE GUARD FELL & FRACTURED FINGER WHILE PAINTING PIPES	255	0727			X
806014		"	5-9-42	MACHINIST	42	CLEAN UP MAN BLEW DUST IN EYES	227	1112		X	
806015		"	5-13-42	REAMER	50	FOREIGN BODY IN EYE WHILE HAMMERING	227	1112			X
806016		"	5-28-42	WELDER	39	FLASH BURN, BOTH EYES	958	0213			X
806017		"	6-4-42	FITTER	48	HIT LEG WITH HAMMER, INFECTION	245	1228			X
806018		"	7-4-42	FITTER	65	STEPPED IN HOLE IN DECK CARRYING STEEL, FRACT. RIB & INTERNAL INJURY	052	0739			X
806019		"	7-7-42	WELDER	23	BUMPED INTO BEAM, SPRAINED NECK	156	0915			X
806020		"	7-7-42	RIVETER	41	FELL ON RIVETING HAMMER, INTERNAL INJURIES	445	1306			X
806021		"	7-9-42	FITTER	27	STRAINED BACK LIFTING ON PLATE	656	0916			X
806022		"	7-9-42	CHIPPER	39	SLIPPED & FELL ON PLATE, SPRAINED GROIN	456	0918			X
806023		"	7-14-42	PIPE FITTER	37	WRENCHED BACK FITTING PIPE	655	0916			X
806024		"	7-16-42	WELDER	34	FLASH BURN, ONE EYE	958	0212			X
806025		"	7-16-42	PLUMBER	46	FOREIGN BODY IN EYE	227	1012			X
806026		"	7-16-42	ELECTRICIAN	39	DITCH CAVED, FELL, CUT EYE, SCRAPED LEG, BR. FGRS, POSSIBLE INT. INJURY	461	0328	P		
806027		"	7-18-42	TESTER	42	FOREIGN BODY IN EYE	227	1112			X
806028		"	7-20-42	SLABMAN	18	SLAG IN EYE FROM BURNERS	227	1112			X
806029		"	7-21-42	WELDER	42	BRUISED ELBOW ON WALL	123	0337			X
806030		"	7-21-42	FOREMAN	22	HOT STEEL FELL ON FOOT	237	0232			X
806044		"	7-29-42	SHIP WRIGHT	46	LOOKING UP, ARC FLASH IN EYES	958	0213	P		
806045		"	8-8-42	SHIP WRIGHT	46	WAS STRUCK ON SPINE BY BOLT UP WASHER, CONTUSION	245	0318			X
806046		"	7-29-42	RIGGER	38	CAUGHT THUMB BETWEEN RIVETING GUN & PIN, FRACTURE	345	0724			X

SCHN00318043

FIRM NO. L04025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
806047	(b) (6)	5351	7-31-42	WELDERS H	56	FALLING OBJECT ON TOE, FRACTURE	224	0734			X
806048		"	7-31-42	SCALER	44	BUMPED ELBOW ON BOAT, BRUISES	122	0337			X
806049		"	7-31-42	PIPE FITTER	56	RADIATOR FELL ON FOOT, FRACTURE	224	0732			X
806050		"	7-3-42	CHIPPER	23	FOREIGN BODY IN EYE	227	1112			X
806051		"	8-1-42	RIGGER	38	FOREIGN BODY IN EYE	226	1112			X
806052		"	8-1-42	DUPLICATOR H.	51	STEEL PLATE STRUCK ANKLE, CUT	256	0531			X
806053		"	8-2-42	CHIPPER	41	FOREIGN BODY IN EYE	227	1112			X
806054		"	8-2-42	SHIP FITTER	42	INHALING FUMES FROM WELDERS TORCH	844	0000	P		
806055		"	8-2-42	BURNER	44	BURNED FINGERS WHILE KNOCKING OFF SLAGS ON BOAT	237	0327			X
806056		"	8-2-42	SHIP FITTER	41	CARRYING STEEL, FELL BUMPED SHOULDER ON LUMBER, SPRAINED BACK	160	0916			X
806057		"	8-2-42	WELDING	32	FELL, BRUISED LEG	562	0328			X
806058		"	8-3-42	MACHINIST H	26	FALLING OBJECT HIT FOREHEAD, CUT	224	0311			X
806060		"	8-3-42	MACHINIST	18	FALLING OBJECT, CUT FINGER	224	0527			X
806061		"	8-3-42	SHIP FITTER	23	STRUCK KNEE ON IRON RAIL, ABRASIONS	155	0336			X
806062		"	8-3-42	LABORER	44	FOREIGN BODY IN EYE	227	1112			X
806063		"	8-4-42	RIVETER	41	STRUCK ON WRIST, BRUISED, BECAME INFECTED	245	1224			X
806064		"	8-4-42	WELDER	30	PIPE STRUCK FOOT, FRACTURE	255	0732			X
806065		"	8-21-42	LABORER	38	FELL ACROSS RAILS, ABRASIONS OF NOSE	452	0308			X
806066		"	8-4-42	BURNER H.	23	STEEL BURNED ARM	937	0300			X
806067		"	8-5-42	SHIP FITTER	24	HAMMERING, FORCE OF IT CAME BACK STRIKING TEETH, FRACTURED	245	0708			X
806068		"	8-5-42	BOLTER	67	FELL OVER PUMP, FRACTURED RIBS	123	0739			X
806069		"	8-15-42	LAYOUT H.	48	FOREIGN BODY IN EYE	226	1113			X
806070		"	8-5-42	SHIP FITTER	29	FELL, STRUCK KNEE, SWELLING, BRUISED	155	0336			X
806071		"	8-5-42	WELDER	30	FOREIGN BODY IN EYE	227	1112			X
806072		"	8-6-42	HOOK TENDER	48	HANDS CAUGHT BETWEEN PLATES OF STEEL, FRACTURED FINGERS	356	0725			X
806073		"	8-6-42	RIGGER	33	FELL FROM LADDER, STRUCK RIBS ON STEEL LADDER	453	0739			X
806074		"	8-7-42	WELDER	28	ARC FLASHES	958	0212			X
806075		"	8-7-42	MACHINIST	34	FOREIGN BODY IN EYE	224	1112			X
806076		"	8-7-42	MECHANIC	54	FOREIGN BODY IN EYE	227	1112			X
806077		"	8-7-42	WELDING	36	HOT SPARKS BURNED ARM	237	0220			X
806078		"	8-8-42	HOOK TENDER	42	DROPPED STEEL ON LEFT FINGER, LACERATION	256	0527			X
806079		"	8-8-42	WELDER	27	FOREIGN BODY IN EYE	226	1112			X
806080		"	8-8-42	BURNER	50	LIFTING HEAVY OBJECTS, CAUSED HERNIA	538	1318			X
806081		"	8-8-42	PIPE FITTER	40	FOREIGN BODY IN EYE	226	1112			X
806031		"	7-21-42	LABOR	20	FOREIGN BODY IN EYE WHILE WATCHING TORCH	227	1112			X
806032		"	7-21-42	WELDER	29	FOREIGN BODY IN EYE	227	1112			X
806033		"	7-23-42	PIPE FITTER	26	CO-EMPLOYEE MOVED PIPE & SMASHED FINGER, CHIP FRACTURE	355	0727		X	
806034		"	7-23-42	FITTER	34	CLIMBING DOWN LADDER, OTHER LADDER TIPPED OVER AND STRUCK LEG	253	0328			X
806035		"	7-23-42	MACHINIST	44	FOREIGN BODY IN EYE	227	1112			X

SCHN00318044

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
806036	(b) (6)	5351	7-25-42	WELDER	20	FLASH FROM OTHER WELDER	958	0212			X
806037		"	7-25-42	FIELD CLERK	18	JUMPED OVER SIDE OF BOAT & SPRAINED ANKLE	061	0931			X
806038		"	7-25-42	REAMER	56	STEEL IN EYE	227	1112			X
806039		"	7-25-42	FITTER	34	BURN OF EYES FROM WELDERS	958	0213			X
806040		"	7-26-42	FITTER	19	FLASH BURN OF BOTH EYES	958	0213			X
806041		"	7-27-42	WELDING	50	SLIPPED ON STEEL PLATE & FELL, BRUISING KNEE	456	0936			X
806042		"	7-28-42	FITTER	35	WRENCH SLIPPED OFF & HE FELL AGAINST BULKHEAD, SPRAINED BACK	154	0916			X
806043		"	7-28-42	PIPE FITTER	56	SLIPPED WHILE GOING ACROSS SCAFFOLDS & SPRAINED KNEE	653	0936			X
806082		"	8-8-42	RIGGER	58	PACKING JUNK IRON, SPRAINED BACK	645	0916			X
806083		"	8-9-42	SHIP FITTER	26	PULLING ON CHAIN, SPRAINED TRUNK	659	0918			X
806084		"	8-9-42	WELDER	30	STRUCK ON HEAD WITH 2X6, LACERATION	260	0511			X
806085		"	8-10-42	SHIP FITTER	22	STEPPED ON NAIL, PUNCTURED WOUND	063	0832			X
806086		"	8-10-42	MACHINIST	44	PUTTING PIERS UNDER SLAB, STRUCK FROM ABOVE ON HEAD WITH NAIL, LAC. SCALP	263	0510	P		
806087		"	8-10-42	RIGGER	37	PUTTING PISTON SLEEVE IN FINGER CAUGHT, AMPUTATION	345	1027			X
806088		"	8-11-42	LEADER	47	FLANGE WAS DROPPED ON TOE, FRACTURE	255	0734			X
806089		"	8-11-42	SHIP FITTER	41	HELPED TO LIFT VENTILATOR IN PLACE, STRAINED BACK	622	0916			X
806090		"	8-11-42	RIGGER	53	WAS STRUCK ON ELBOW BY FALLING OBJECTS, FRACTURE	224	0737			X
806091		"	8-11-42	SHIP WRIGHT	49	SHORE POST WAS LOOSENED, FELL ON FOOT, FRACTURE	260	0732			X
806092		"	8-12-42	PIPE FITTER	59	PIPE STRUCK FOOT, LACERATED TOES	255	0334			X
806093		"	8-12-42	SHIP FITTER	49	HIT BY BLOCK OF STEEL ON TOE, BRUISE	226	0334			X
806094		"	8-12-42	MARINE MACH.	22	FELL, PINNING WRIST BETWEEN WALL & BODY, FRACTURE	561	0723			X
806095		"	8-12-42	SLABMAN	47	CAUGHT FINGERS IN DIES, FRACTURED & AMPUTATED INDEX FINGER	330	1027			X
806096		"	8-5-42	SHIP FITTER	23	HIT THUMB WITH HAMMER, LACERATIONS & CONTUSIONS	245	0326			X
806617		"	4-9-42	MACHINIST	47	ARC FLASH, BOTH EYES	958	0213			X
806618		"	6-7-42	RIGGER	47	STEEL PLATE FELL ON FOOT	256	0734			X
806619		"	6-25-42	BOILER MAKER	66	ARC FLASH, CONJUNCT WITIS	958	1213			X
806620		"	7-19-42	SHIP FITTER	43	ARC FLASH, BOTH EYES	958	0213			X
806621		"	7-21-42	RIGGER	48	CLAMP SLIPPED & HIT LEG	234	0328			X
806622		"	7-28-42	REAMER	44	ARC FLASH BOTH EYES, ALSO FOREIGN BODY'S	958	0213			X
806623		"	7-29-42	FIELD CHECKER	38	STEPPED FROM ONE RAIL TO ANOTHER ON ASSEMBLY, SLIPPED & FELL	455	0934			X
806624		"	7-30-42	SHIP FITTER	42	FOREIGN BODY IN EYE	227	1112			X
806625		"	7-31-42	MACHINIST	40	FELL IN MANHOLE, SPRAINED BACK	552	0916			X
806626		"	8-3-42	HOOK TENDER	59	SLIPPED & FELL OFF TABLE, 20 FEET	557	0736			X
806627		"	8-4-42	MILL WRIGHT	49	STEEL SLIVER IN HAND	163	0824			X
806628		"	8-6-42	SHIP FITTER H	26	LADDER WAS NOT SECURE & IT FELL WITH HIM	553	0339	P		
806629		"	8-7-42	TANK TESTER	33	CHIPPER IN TANK KNOCKED SAW HORSE OFF & IT FELL ON HIS BACK	238	0316		X	
806630		"	8-8-42	SHIP FITTER	44	ARC FLASH, BOTH EYES	958	0213			X
806631		"	8-8-42	HOOK TENDER	55	STEEL PLATE FELL ON FOOT	256	0734			X

SCHN00318045

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	Na. & Loc.	Unsafe Act M	O	P
806632	(b) (6)	351	8-8-42	SHIP FITTER	46	LIFTING PLATE, HELPER LET HIS END DROP & IT FELL ON HIS FOOT	256	0732		X	
806633		"	8-9-42	WELDER	33	WEDGE FELL ON HAND	245	0324	P		
806634		"	8-10-42	SHIP FITTER H	20	FOREIGN BODY IN EYE	227	1112	P		
806577		"	7-11-42	BURNER	24	FOREIGN BODY IN EYE	227	1112			X
806578		"	8-1-42	SHIP FITTER	18	STEPPED ON WELDERS LEAD, WRENCHED KNEE	062	0936	P		
806579		"	8-6-42	ELECTRICIAN	26	SLIPPED & CAUGHT A OLD OF A CABLE, STRAINED BACK	655	0916			X
806580		"	8-10-42	DRILLER	28	FOREIGN BODY IN EYE	227	1112			X
806634		"	8-10-42	FITTER	20	STEEL IN EYE WHILE BOLTING	227	1112			X
806635		"	8-11-42	MACHINIST	36	SLIPPED WHILE CRAWLING UNDER JACK, BUMPED NOSE	123	0308			X
806636		"	8-11-42	FITTER	51	DROPPED BEAM ON FOOT, ONE END BROKE	255	0732	P		
806637		"	8-12-42	PIPE FITTER	27	SLIPPED & PIPE FELL ON HIS TOE	255	0734			X
806947		"	5-21-42	WELDER	47	HOT SLAG FELL ON GLOVE, BURNED WRIST	237	0223			X
806948		"	7-1-42	SHIP FITTER	56	STEPPED INTO MAN HOLE	052	0916			X
806949		"	7-15-42	WELDERS H	42	TRIPPED WHILE CARRYING WELDING ROD, HURT BACK LEGAMENTS	661	0916			X
806950		"	7-19-42	SCALER	41	FOREIGN BODY IN EYE	227	1112			X
806951		"	7-24-42	SHIP FITTERS H	46	PUTTING MAN HOLE COVER ON, SLIPPED & COVER HIT SIDE	252	0739			X
806952		"	7-17-42	SHIP FITTER	48	HIT KNEE ON HATCH	152	0336			X
806953		"	7-22-42	SHIP WRIGHT	33	ARC FLASH, BOTH EYES	958	0213			X
806954		"	7-31-42	SHEET METAL WKR.	49	PAN RACK FELL ON THUMB, FRACTURE	238	0726			X
806955		"	8-1-42	GRINDER H	49	FOREIGN BODY IN EYE	227	1112			X
806956		"	8-2-42	SHIP FITTER H	20	SLEDGE HAMMER FELL FROM ABOVE & HIT FINGER, FRACTURE	245	0727	P		
806957		"	8-3-42	BURNER	31	FOREIGN BODY IN EYE	227	1112			X
806958		"	8-4-42	WELDER'S H.	20	ARC FLASH, BOTH EYES	958	0213			X
806959		"	8-4-42	CAULKER	31	FOREIGN BODY IN EYE	227	1112			X
806960		"	8-4-42	SCALER	52	FOREIGN BODY IN EYE	227	1112			X
806961		"	8-5-42	RIGGER	36	VALVE HANDLE BROKE & SMASHED FINGER	238	0327	P		
806962		"	8-5-42	CHIPPER	45	FOREIGN BODY IN EYE	227	1112			X
806963		"	8-5-42	PAINTER H	24	FOREIGN BODY IN EYE	227	1112			X
806964		"	8-6-42	RIVETER	16	CATCHING RIVETS, BOARD BROKE & HE FELL 8, 10 FEET	557	0339	P		
806965		"	8-6-42	SHIP FITTER H	18	ARC FLASH, BOTH EYES	958	0213			X
806966		"	8-6-42	BURNER	31	FOREIGN BODY IN EYE	227	1112			X
806967		"	8-6-42	TESTER	29	PICKED UP HOT PIPE THAT WAS NOT MARKED	137	0224		X	X
806968		"	8-6-42	WELDER	21	HOT SLAG BURNED HAND, INFECTED	237	1224			X
806969		"	8-7-42	SHIP WRIGHT	31	SLIPPED & FELL ON DECK	457	0316			X
806970		"	8-7-42	SHIP WRIGHT H	60	6X6 ROLLED OFF PILE & HIT FOOT	260	0734	P		
806971		"	8-7-42	SHIP WRIGHT	66	CROW BAR HIT HAND	245	0727			X
806972		"	8-8-42	RIGGER	28	BARRELL FELL ON TOE, FRACTURE	238	0734			X
806973		"	8-8-42	ENGINEERS AID	24	PIECE OF IRON FELL ON FOOT, FRACTURED TOE	238	0734			X
806974		"	8-8-42	BURNER H	19	STEPPED ON ROCK & TURNED ANKLE	662	0931			X
806975		"	8-9-42	WELDER	29	FOREIGN BODY IN EYE	227	1112			X

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FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Page 55 Claimant	Class	Date of Accident	Occupation	Age	Cause & Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
806976	(b) (6)	5351	8-9-42	WELDER	33	ARC FLASH IN EYE	958	0212			X
806977		"	8-10-42	SHIP FITTER H	16	TRIPPED OVER A WEDGE & FELL, STRUCK ARM ON A CLIP, FRACTURE	426	0720			X
806978		"	8-10-42	BURNER	19	BURNED EYE WHILE WELDING	958	0212			X
806979		"	8-11-42	PIPE FITTER	25	ARC FLASH, BOTH EYES	958	0213			X
806980		"	8-11-42	SHIP FITTER H	22	HIT HAND AGAINST HOT CLIP, INFECTION	137	1224			X
806981		"	8-11-42	WELDER	32	FOREIGN BODY IN EYE	227	1112			X
806982		"	8-11-42	BLACKSMITH	50	FOREIGN BODY IN EYE	227	1112			X
806983		"	8-11-42	ELECTRICIAN H	30	LIGHT GLOBE EXPLODED, FOREIGN BODIES IN EYES	227	1113	P		
806984		"	8-12-42	CHIPPER	26	FOREIGN BODY IN EYE	227	1112			X
806985		"	8-12-42	BURNER	45	ARC FLASH, BOTH EYES	958	0213			X
806986		"	8-14-42	WELDER	33	CLIMBED UP ON BENCH TO LEAVE CROWDED LOCKER ROOM, HIT KNEE ON BENCH	523	0536			X
806987		"	8-14-42	MACHINIST	32	STEPPED OVER GRINDER, SLIPPED & KNEE HIT GRINDER	130	0536			X
806988		"	8-14-42	CHIPPER	28	2X6 FELL FROM ABOVE & HIT HEAD, MASHED HAT	260	0311	P		
806989		"	8-14-42	WELDER	22	FOREIGN BODY IN EYE	227	1112			X
806990		"	8-16-42	WELDER		ARC FLASH, BOTH EYES	958	0213			X
806991		"	8-17-42	BURNER	18	ARC FLASH, BOTH EYES	227	1112			X
806992		"	8-18-42	WELDER	43	FOREIGN BODY IN EYE	227	0312			X
807218		"	8-9-42	WAREHOUSEMAN	17	HAND TRUCK STRUCK THUMB - FRACTURE	245	0727			X
807308		"	8-20-42	SHIPFITTER	17	ARC FLASH, BOTH EYES	958	0213			X
807392		"	3- -42	LABORER	47	MISSED STEP, WRENCHED KNEE	653	0936			X
807393		"	6-11-42	PIPE FITTER	23	DROPPED BOX OF FITTINGS ON TOE, CRUSHED	238	0334			X
807394		"	6-15-42	SHIP FITTER	52	FOREIGN BODY IN EYE	227	1112			X
807395		"	7-1-42	LABORER	56	WHILE WORKING ON WELD THE WELD GAVE AWAY, STRAINED BACK	645	0916	P		X
807396		"	7-11-42	CHIPPER	61	SLIPPED & FELL AGAINST IRON BOXES, BRUISED CHEST	139	0339			X
807397		"	7-11-42	MACHINIST	29	SLIPPED & HURT ELBOW, CONTUSIONS	138	0337			X
807398		"	7-14-42	ROLLER MAN	49	SLIPPED & BRUISED KNEE LATER INFECTION	461	1236			X
807399		"	7-15-42	SHIP FETTER	17	ARC BURN IN EYE	958	0212			X
807400		"	7-23-42	BOILERMAKER	59	LACERATION OF HAND, STRIKING IT AGAINST HAND TOOLS	145	0524			X
807401		"	7-23-42	SHIPFITTER	42	STEPPED ON BOARD WHICH WASN'T SECURE, FELL, HIT KNEE AGAINST RAIL	155	0336	P		
807402		"	7-28-42	CHIPPER	22	SPLINTER IN KNEE, INFECTION	163	1236			X
807403		"	7-29-42	SHIPFITTER	25	WRENCHED KNEE, TRIPPED OVER WELDING CORD	659	0936			X
807404		"	7-30-42	CHIPPER	19	FOREIGN BODY IN EYE	227	1112			X
807405		"	7-31-42	ENGINEER	35	STEPPED ON LINES, SPRAINED ANKLE & TWISTED BACK	059	0916			X
807406		"	8-2-42	WELDER	59	BURN ON INSTEP WITH HOT SLAG	937	0232			X
807407		"	8-2-42	SHIP WRIGHT	39	FLASH BURN IN EYE	958	0212			X
807408		"	8-2-42	WELDER	52	BUMPED ELBOW & BRUISED	123	0337			X
807409		"	8-3-42	SHIP FITTER	28	SLIPPED, FELL ON RAILS, STRAINED BACK	655	0916			X

SCHN00318047

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	Na. & Loc.	Unsafe Act M	O	P
807410	(b) (6)	5351	8-3-42	SHIP FITTER	47	FOREIGN BODY IN EYE	227	1112			X
807411		"	8-5-42	SHIP FITTER	26	FOREIGN BODY IN EYE	227	1112			X
807412		"	8-5-42	WELDER H	61	STRUCK BY WELDING ROD IN LEG, BURN	237	0228			X
807413		"	8-6-42	SHIP WRIGHT	24	HELPING TO BUILD STAGING, FELL THROUGH SPACE IN PLANKING	557	0916			X
807414		"	8-7-42	TIMEKEEPER	44	STEPPED ON PIECE OF PIPE, FELL & TWISTED ANKLE	455	0331			X
807415		"	8-7-42	WELDER	58	FELLOW WORKMAN BUMPED HIS HAND WITH HIS LUNCH BASKET	238	0324		X	
807416		"	8-8-42	WELDER	29	WORKMAN DROPPED A TIMBER IN HER ANKLE	260	0331		X	
807417		"	8-8-42	PIPE FITTER	47	PUSHING PIPE WITH FOOT, SLIPPED & TORE MUSCLES IN LEG	655	0928			X
807418		"	8-8-42	PAINTER	38	LADDER SLIPPED & HE FELL, FRACTURED TOE	553	0734			X
807419		"	8-8-42	PIPE FITTER H	18	DROPPED PIPE ON FOOT	255	0732			X
807420		"	8-9-42	FOREMAN	64	STEPPING IN OPEN HOLE, HIT HEAD AGAINST EDGE	152	0508			X
807421		"	8-9-42	CHIPPER	46	FOREIGN BODY IN EYE	227	1112			X
807422		"	8-9-42	WELDER	23	FELL DOWN, BRUISED KNEE	461	0336			X
807423		"	8-10-42	BURNER	18	SLIPPED & FELL, CUT KNEE	461	0536			X
807424		"	8-10-42	LABORER	--	GUN SLIPPED, STRUCK MOUTH, BROKE TWO TEETH	245	0008			X
807425		"	8-10-42	SHIP WRIGHT	23	SCAFFOLD BROKE, FELL & BRUISED SHOULDER & BACK	557	0307	P		
807426		"	8-10-42	CHIPPER	40	FELL OFF FRAME WORK & FRACTURED PUBIS BONE, MULTIPLE INJURIES	561	0718			X
807427		"	8-11-42	SCALER	18	BUMPED KNEE WHILE WORKING, BRUISE	123	0336			X
807428		"	8-11-42	MACHINIST	50	BUMPED ANKLE ON PIECE OF STEEL, BRUISE	123	0331			X
807429		"	8-11-42	SHIP WRIGHT	33	CAUGHT FALLING PIPE & STRAINED BACK	638	0916	P		
807430		"	8-12-42	SHIP FITTER	59	FALLING OBJECT HIT TOE, FRACTURE	224	0734			X
807431		"	8-12-42	CHIPPER	28	CO-WORKER DROPPED GRINDER ON HIS KNEE, LACERATIONS & CONTUSIONS	224	0536		X	
807432		"	8-12-42	WAREHOUSEMAN	30	SLIPPED & STRAINED NECK	661	0915			X
807433		"	8-12-42	DRILLER	53	PUSHED TOO HARD ON DRILLING GUN, SPRAINED BACK	638	0916			X
807434		"	8-13-42	SHIP FITTER	21	SLIPPED & WRENCHED KNEE	661	0936			X
807435		"	8-13-42	SHIP FITTER	54	FELL OFF PLATFORM, HIT KNEE PIECE OF METAL, PUNCTURE WOUND	557	0836			X
807436		"	8-13-42	PIPE FITTER	45	LIFTING PIPES, STRAINED SIDE	638	0916			X
807437		"	8-13-42	SHIP FITTER	59	ARC FLASH, BOTH EYES	958	0213			X
807438		"	8-13-42	CHIPPER	26	FELL DOWN STAIRS, BRUISED KNEE	553	0336			X
807439		"	8-14-42	SHIP FITTER	57	FOREIGN BODY IN EYE	227	1112			X
807440		"	8-14-42	WELDER	27	SCAFFOLD BROKE & FELL ON HEAD, HEADACHE	257	0311	P		
807441		"	8-14-42	CARPENTER	31	SLIPPED OFF SCAFFOLD, TURNED ANKLE	061	0932			X
807442		"	8-15-42	SHIP FITTER	41	FOREIGN BODY IN EYE	227	1112			X
807443		"	8-15-42	BURNER	36	BURNING & PIECE OF METAL PLATE FELL ON FOOT, FRACTURED TOE	224	0732			X
807444		"	8-15-42	WELDER	66	WRENCH FELL FROM ABOVE & HIT TOE, FRACTURE	224	0734	P		
807445		"	8-15-42	CHIPPER	50	PACKING HEAVY LOADS & STRAINED BACK	638	0916			X
807446		"	8-16-42	SHIP FITTER	22	FOREIGN BODY IN EYE	227	1112			X

SCHN00318048

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	Q	P
807447	(b) (6)	351	8-16-42	MACHINIST	25	FOREIGN BODY IN EYE	227	1112			X
807448		"	8-16-42	SHIP FITTER	53	SOMEONE JUMPED ON SCAFFOLD, LOST BALANCE, HAMMER HIT FINGER, FRACTURE	245	0727			X
807449		"	8-16-42	RIGGER	20	FELL ON STEEL PLATE, CUT SHOULDER & ELBOW	456	0517			X
807450		"	8-16-42	SCALER	22	FOREIGN BODY IN EYE	227	1112			X
807451		"	8-16-42	SCALER	44	FOREIGN BODY IN EYE	227	1112			X
807452		"	8-16-42	SWITCHMAN	58	WAS HIT IN HEAD BY CRANE	235	0311			X
807453		"	8-16-42	CHIPPER	36	FOREIGN BODY IN EYE	227	1112			X
807454		"	8-17-42	SHIP WRIGHT	43	FELL DOWN, BROKE LEG	438	0728			X
807455		"	8-17-42	CHIPPER	48	FOREIGN BODY IN EYE	227	1112		X	
807456		"	8-17-42	CHIPPER	21	FOREIGN BODY IN EYE	227	1112			X
807457		"	8-17-42	CHIPPER	39	STIFFENER FELL ON LEFT FOOT	224	0532			X
807458		"	8-17-42	REAMER	41	CAUGHT GLOVE IN MACHINERY, FRACTURED FINGER	330	0727			X
807459		"	8-17-42	SHIP FITTER	18	ARC FLASH IN BOTH EYES, CAUSED BY WELDER DROPPING HIS STINGER	958	0213		X	
807460		"	8-18-42	BURNER	21	FOREIGN BODY IN EYE	227	1112			X
807461		"	8-18-42	SHIP FITTER	20	ARC FLASH IN EYE	958	0212		X	
807462		"	8-13-42	DRILLER	17	FOREIGN BODY IN EYE	227	1112			X
807463		"	8-18-42	WELDER	25	RAN NAIL INTO FOOT	163	0832			X
807464		"	8-18-42	CHIPPER	--	FOREIGN BODY IN EYE	227	1112			X
807465		"	8-18-42	BOILERMAKER	52	CONTUSION OF LEFT HIP, WHEN HE FELL	456	0319			X
807466		"	8-19-42	WELDER	41	FELL BACKWARD, INJURED BACK	561	0316			X
807467		"	8-19-42	WELDER	47	ANOTHER MAN CAUSED A STIFFENER TO TURN, HITTING HIS FOOT	256	0332		X	
807468		"	8-19-42	SHIP FITTER	18	BOILER PLATE SLIPPED & HIT ANKLE, SPRAIN	256	0931			X
807469		"	8-19-42	SHIP FITTER	41	HIT BY SLEDGE HAMMER, CUT MOUTH & KNOCKED TEETH OUT	245	0008		X	
807470		"	8-20-42	TESTER	55	FOREIGN BODY IN EYE	227	1112	P		
807471		"	8-20-42	SHIP FITTER	55	SOMEONE PULLED HOSE, TRIPPED HIM, INJURED BACK, POSSIBLE FRACTURE	659	0315		X	
807472		"	8-20-42	SHIP FITTER	18	FOREIGN BODY IN EYE	227	1112			X
807473		"	8-22-42	WELDER	30	FOREIGN BODY IN EYE	227	1112		X	
807638		"	8-20-42	WELDER	32	HIT KNEE AGAINST PLANK, BRUISE	160	0336			X
807905		"	7-19-42	MACHINIST	31	FINGER CAUGHT IN FLY WHEEL, FRACTURE	330	0727			X
807906		"	7-25-42	MACHINIST	33	LADDER SLIPPED, FELL & CONTUSED BACK	553	0316	P		
807907		"	7-25-42	SCALER	41	SQUEESED BETWEEN TWO PLANKS, SPRAINED BACK	360	0916			X
807908		"	7-25-42	LABORER	68	LIFTING STEEL, SLIPPED & STRAINED SIDE	638	0918			X
807909		"	7-26-42	WELDER	52	ARC FLASH, BOTH EYES	958	0213			X
807910		"	8-7-42	RIGGER	42	SLIPPED & FELL, BRUISED BACK & ELBOW	461	0307			X
807911		"	8-8-42	DUPLICATOR	25	STRUCK FINGER WITH HAMMER, BRUISE	245	0327			X
807912		"	8-10-42	BURNER	22	CO-WORKER BUMPED INTO HIM CAUSING FALL, BRUISED LEG	204	0328		X	
807913		"	8-10-42	MACHINIST	36	FOREIGN BODY IN EYE	227	1112			X
807914		"	8-10-42	SHIP FITTER	38	FLASH BURN, BOTH EYES	958	0213			X
807915		"	8-10-42	SWITCHMAN	62	TRIPPED ON WIRE, FELL & HIT CHEST ON STEEL, CONTUSION	423	0339			X

SCHN00318049

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	Na. & Loc.	Unsafe Act M	Unsafe Act O	Unsafe Act P
807916	(b) (6)	5351	8-10-42	LABORER	39	CHEMICAL CONJUNCTIVITIS	236	1213			X
807917		"	8-10-42	SHIP FITTER	16	FLASH BURN, BOTH EYES	958	0213			X
807918		"	8-10-42	BURNER	44	TRIPPED OVER IRON ROD & HIT LEG AGAINST IRON BEAM, LACERATION	123	0528			X
807919		"	8-11-42	OILER	37	FOREIGN BODY IN EYE	227	1112	P		
807920		"	8-11-42	WELDER	35	HOT METAL ON FINGER, INFECTED BURN	242	1227			X
807921		"	8-11-42	WELDER	30	DROP OF MOLTEN METAL IN SHOE, BURNED FOOT	242	0232			X
807922		"	8-11-42	SHIP FITTER	16	FOREIGN BODY IN EYE	227	1112			X
80792 3		"	8-12-42	LABORER	33	FOREIGN BODY IN EYE, INFECTION	227	1212	P		
807924		"	8-12-42	CHIPPER	30	FOREIGN BODY IN EYES	227	1113	P		
807925		"	8-12-42	CHIPPER	18	FOREIGN BODY IN EYE	227	1112			X
807926		"	8-13-42	SHIP FITTER	16	IRON BAR FELL ON TOE, FRACTURE	224	0734		X	
807927		"	8-13-42	SHIP FITTER	43	ARC FLASH, BOTH EYES	958	0213			X
807928		"	8-13-42	MACHINIST	25	FOREIGN BODY IN EYE	227	1112			X
807929		"	8-16-42	DUPLICATOR	16	FOREIGN BODY IN EYE	227	1112			X
807930		"	8-17-42	CHIPPER	62	FOREIGN BODY IN EYE	227	1112			X
807931		"	8-17-42	LAY OUT	38	FOREIGN BODY IN EYE	227	1112			X
807932		"	8-17-42	SCALER	42	FOREIGN BODY IN EYES	227	1113			X
807933		"	8-17-42	RIVETER	29	FOREIGN BODY IN EYE	227	1112			X
807934		"	8-18-42	WELDER	22	FOREIGN BODY IN EYE	227	1112			X
807935		"	8-18-42	LAY OUT	23	FOREIGN BODY IN EYE	227	1112	P		
807936		"	8-18-42	ELECTRICIAN	41	FOREIGN BODY IN EYE	227	1112	P		
807937		"	8-18-42	CLEAN UP	50	TRIPPED & FELL, STRAINED SHOULDER	461	0917			X
807938		"	8-18-42	CHIPPER	19	FOREIGN BODY IN EYE	227	1112			X
807939		"	8-18-42	MACHINIST	39	FOREIGN BODY IN EYE	227	1112			X
807940		"	8-18-42	LAY OUT	48	FOREIGN BODY IN EYE	227	1112			X
807941		"	8-19-42	SCALER	20	FOREIGN BODY IN EYE	227	1112	P		
807942		"	8-19-42	CHIPPER	38	FOREIGN BODY IN EYE	227	1112			X
807943		"	8-19-42	SHIP FITTER	38	JUMPED TO DECK TO KEEP FROM FALLING, STRAINED BACK	061	0916			X
807944		"	8-19-42	SHIP FITTER	26	BOARD FLEW UP & HIT FACE, MULTIPLE LACERATION, BROKEN DENTAL PLATE	260	0508	P		
807945		"	8-19-42	BURNER	19	PLATE DROPPED ON FOOT, FRACTURE	224	0732	P		
807946		"	8-19-42	SHEET METAL	41	FOREIGN BODY IN EYE	227	1112	P		
807947		"	8-20-42	SHEET METAL	66	FOREIGN BODY IN EYE	227	1112	P		
807948		"	8-20-42	LABORER	43	FOREIGN BODY IN EYE	227	1112			X
807949		"	8-20-42	SHIP WRIGHT	68	STRAINED SHOULDER	123	0917			X
807950		"	8-20-42	SHIP FITTER	46	FOREIGN BODY IN EYE	227	1112	P		
807951		"	8-20-42	CLEAN UP	16	BOARD HIT HIM IN MOUTH, LACERATION	260	0508	P		X
807952		"	8-20-42	SHIP FITTER	61	BOARD FELL ON TOE, FRACTURE	260	0734			X
807953		"	8-21-42	LABORER	38	FOREIGN BODY IN EYE	227	1112	P		

SCHN00318050

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
807954	(b) (6)	5351	8-21-42	CHIPPER	28	FOREIGN BODY IN EYE	227	1112	P		
807955		"	8-21-42	SHIP FITTER	45	AIR HOSE FELL ON HIS EYES, INFLAMATION	259	1113	X		
807956		"	8-21-42	HOOK TENDER	18	CABLES BROKE & FELL ON FOOT, LACERATIONS	234	0532	X		
807957		"	8-21-42	WELDER	22	TWO DOGE WELDER FELL TOGETHER & HIT HIM ON HEAD, LACERATION	224	0510	P		
808068		"	1-29-42	PIPE FITTER	52	CO-WORKER HIM HIM IN CHEST WITH PIPE, CONTUSION	255	0339		X	
808069		"	4-1-42	RIVETER	41	BUMPED KNEE ON CLIP, BRUISE	123	0336			X
808070		"	4-20-42	BURNER	42	PIECE OF HOT SLAG IN EAR, BURN	237	0214			X
808071		"	6-8-42	LABORER	65	PIECE OF STEEL HIT TOE, BLOOD BLISTER	224	0334			X
808072		"	7-2-42	TESTER	42	FOREIGN BODY IN EYE	227	1112			X
808073		"	7-3-42	MACHINIST	39	DROPPED PULLEY ON KNEE, CONTUSION	224	0936			X
808074		"	7-13-42	SLABMAN	25	OPERATING POWER JACK & HANDLE HIT GROIN & LEG, BRUISE	222	0318	P		X
808075		"	7-18-42	SHIP FITTER	17	CARRYING METAL GOING UP LADDER, TRIPPED, BURNED ARM, INFECTION	237	1220			X
808076		"	7-22-42	SLAB MAN	32	PIECE OF METAL FELL & HIT TOE, BRUISE	224	0334			X
808077		"	7-24-42	PIPE FITTER	25	SLIPPED & FELL, HIT JAW ON BOARD, BRUISE	460	0308			X
808078		"	7-25-42	BURNER	21	LEAVING YARD & WALKED INTO BUCK RAIL ON PARKING LOT, BRUISED SHIN	123	0323			X
808079		"	7-31-42	PIPE FITTER	41	PIPE ROLLED IN HAND, HAND CAUGHT BETWEEN PIPE & FLANGE, SPRAIN	355	0924	P		X
808080		"	8-1-42	WELDER	37	WELDING SPARK BURNED FOOT	237	0232			X
808081		"	8-1-42	ELECTRICIAN	38	WRENCHED KNEE WHILE WORKING	600	0936			X
808082		"	8-3-42	WELDING	32	ARC FLASH, BOTH EYES	958	0213			X
808083		"	8-4-42	WELDER	34	FOREIGN BODY IN EYE	227	1112			X
808084		"	8-5-42	MACHINIST	21	TRIPPED OVER WELDER'S LINE, FELL ABOUT SIX FEET, BRUISED CHEST	561	0339	P		X
808085		"	8-7-42	WELDER	20	FELL ON STAIRWAY, SPRAINED ANKLE	553	0931			X
808086		"	8-9-42	WELDER	27	CLIMBING OVER SCAFFOLD, WRENCHED KNEE	657	0936			X
808087		"	8-10-42	BURNER	16	FOREIGN BODY IN EYE	227	1112			X
808088		"	8-11-42	RIGGER	47	SLIPPED & CAUGHT LEG BETWEEN TWO PIECES OF STEEL, CONTUSION	355	0328			X
808089		"	8-11-42	SHIP WRIGHT	31	ARC FLASH IN EYE, BURN	258	0213			X
808090		"	8-12-42	PAINTER	17	FOREIGN BODY IN EYE	227	1112	P		
808091		"	8-13-42	CHIPPER	18	FOREIGN BODY IN EYE	227	1112			X
808092		"	8-14-42	SHIP WRIGHT	44	SLIPPED & JERKED BACK OUT OF PLACE	661	0916			X
808093		"	8-14-42	HOOK TENDER	60	STEEL PLATE FELL ON TOE, FRACTURE	256	0734	P		X
808094		"	8-14-42	SHIP WRIGHT	30	FOREIGN BODY IN EYE	227	1112	P		
808095		"	8-15-42	SHIP FITTER	33	STEEL FELL ON TOE, FRACTURE	238	0734			X
808096		"	8-16-42	CHIPPER	26	FOREIGN BODY IN EYE	227	1112	P		
808097		"	8-16-42	TIME CHECKER	37	TRIPPED & FELL ON STEEL PLATE, HERNIA	656	1318			X
808098		"	8-16-42	BOLTER UP	61	FOREIGN BODY IN EYE	227	1112	P		
808099		"	8-17-42	SHIP FITTER	24	ARC FLASH IN EYES, BURN	258	0213			X
808100		"	8-17-42	SHIP FITTER	20	ARC FLASH IN EYES, BURN	258	0213			X
808101		"	8-18-42	SHIP FITTER	22	FOREIGN BODY IN EYE	227	1112	P		

SCHN00318051

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	O	P
808102	(b) (6)	5351	8-18-42	SHIP WRIGHT	23	FOREIGN BODY IN EYE	227	1112	P		
808103		"	8-18-42	CHIPPER	38	FOREIGN BODY IN EYE	227	1112			X
808104		"	8-18-42	BURNER	18	FOREIGN BODY IN EYE	227	1112	P		
808105		"	8-18-42	BURNER	38	FOREIGN BODY IN EYE	227	1112			X
808106		"	8-18-42	MACHINIST	29	OTERH MEN LET GO OF PIPE, IT DROPPED ON HIS FOOT, FRACTURED TOES	255	0734		X	
808107		"	8-18-42	MACHINIST	29	STEPPED OFF PAVEMENT, SPRAINED ANKLE	061	0931			X
808108		"	8-18-42	SHEET METAL	32	FOREIGN BODY IN EYE	227	1112			X
808109		"	8-19-42	RIGGER	49	GLOVE CAUGHT IN ROPE, PULLING HAND, FRACTURED FINGERS	334	0727			X
808110		"	8-19-42	MACHINIST	36	FOREIGN BODY IN EYE	227	1112			X
808111		"	8-19-42	SHEET METAL	30	FOREIGN BODY IN EYE	227	1112			X
808122		"	8-19-42	CHIPPER	30	FOREIGN BODY IN EYE	227	1112			X
808113		"	8-20-42	PIPE FITTER	25	TRIPPED & FELL ON WRIST, FRACTURE	461	0923			X
808114		"	8-20-42	CHIPPER	46	FOREIGN BODY IN EYE	227	1112			X
808115		"	8-20-42	SHIP FITTER	34	DROPPED STRONG BACK ON TOE, FRACTURE	224	0734			X
808116		"	8-20-42	CHIPPER	43	HOT STEEL IN EYE, BURNING EYE	227	0212			X
808117		"	8-21-42	CROKER	41	FOREIGN BODY IN EYE	227	1112			X
808264		"	5-13-42	WELDER	41	PNEUMONIA CAUSED FROM INHALING FUMES	844	0002	P		X
808265		"	5-30-42	REAMER	50	FOREIGN BODY IN EYE	227	1112			X
808266		"	6-4-42	WELDER	25	BUMPED KNEE & THEN SPRAINED IT	154	0936			X
808267		"	6-14-42	TESTER	34	FOREIGN BODY IN EYE	227	1112			X
808268		"	7-5-42	BOLTER MAN	53	FOREIGN BODY IN EYE	227	1112	X		
808269		"	7-20-42	RIVET	37	BOARD BROKE, FELL FIVE FEET, LANDED ON HIP, CONTUSIONS	561	0319	P		
808270		"	6-25-42	WELDER	29	RECEIVED ARC FLASHES, BOTH EYES	258	0213		X	X
808271		"	7-1-42	WELDER	--	FOREIGN BODY IN EYE	227	1112	P		
808272		"	7-21-42	MACHINIST	37	STRIKING TAIL BONE, BRUISES	123	0316			X
808273		"	7-29-42	MACHINIST	54	CROW BAR FELL ON FINGER, CRUSHED	245	0327			X
808274		"	8-1-42	SHIP FITTER	18	ARC BURN IN EYES	258	0213			X
808275		"	8-1-42	WELDER	60	FELL & BRUISED LEG	461	0328			X
808276		"	8-3-42	SHIP FITTER	38	FRACTURED FINGER WHEN DRAIN WELL FELL ON IT	238	0727			X
808277		"	8-5-42	WELDER	--	FOREIGN BODY IN EYE	227	1112			X
808278		"	8-5-42	ELECTRICIAN	49	LIFTING CABLE THAT WAS TOO HEAVY, STRAINED BACK	634	0916			X
808279		"	8-6-42	SHIP WRIGHT	62	BUMPED LEG, BRUISES	123	0328			X
808280		"	8-7-42	ELECTRICIAN	49	STEPPED ON NAIL, PUNCTURE	063	0832			X
808281		"	8-8-42	DRILLER	56	FRACTURED OF TOE WHEN PLATE FELL ON IT	256	0734	P		
808282		"	8-8-42	PIPE FITTER	52	HIT ELBOW ON NAIL & BRUISED IT	163	0337			X
808283		"	8-8-42	LOADER	42	HERNIA DEVELOPED FROM LIFTING STEEL PLATES	656	1318			X
808284		"	8-8-42	MACHINIST	36	LUMBAGO	461	0916			X
808285		"	8-9-42	CHIPPER	36	FOREIGN BODY IN EYE	227	1112			X
808286		"	8-11-42	WELDER	37	MOVING WELDING CABLE, STRAINED BACK & SHOULDER	638	0916			X

SCHN00318052

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

CLAIM No.	CLAIMANT	CLASS	DATE OF ACCIDENT	OCCUPATION	AGE	CAUSE AND NATURE OF ACCIDENT	TYPE & AGENCY	NA. & LOC.	UNSAFE ACT M	O	P
808287	(b) (6)	5351	8-11-42	PAINTER	46	CRAWLING THROUGH BRACES ON DOUBLE BOTTOMS, STRAINED BACK	600	0916			X
808288		"	8-12-42	SHIP FITTER	34	ARC FLASH, BOTH EYES	958	0213			X
808289		"	8-12-42	WELDER	49	SCAFFOLD BROKE, FELL & SPRAINED LEG	557	0928	P		
808290		"	8-13-42	CHIPPER	32	FOREIGN BODY IN EYE	227	1112	P		
808291		"	8-13-42	SHIPFITTER	17	2x6 DROPPED ON HAND FROM ABOVE, BRUISE	260	0324		X	
808292		"	8-13-42	WELDER	47	STEPPED ON BD. HE THOT WAS PART OF SCAFFOLD, FELL & BRUISED RIBS	557	0339	P		X
808293		"	8-13-42	ELECTRICIAN	25	GOING THROUGH BULKHEAD HIT ELBOW, INFECTION	154	1237			X
808294		"	8-14-42	ELECTRICIAN	38	GLASSES BECAME STEAMED, HE STEPPED OFF PLATFORM, CONTUSED LEG	057	0328	P		X
808295		"	8-14-42	BURNER	20	FOREIGN BODY IN EYE	227	1112			X
808296		"	8-14-42	BLUEPRINT DEPT.	29	CONTACT WITH ASCETIC ACID, DERMATITIS ON HANDS	936	1245			X
808297		"	8-14-42	SHIP WRIGHT	21	SLIPPED & SPRAINED BACK	661	0916			X
808298		"	8-14-42	LABORER	16	PUT HAND AGAINST HOT BURNERS BENCH, BURN & INFECTION	137	1224			X
808299		"	8-15-42	MACHINIST	42	WRENCH SLIPPED, FELL FORWARD & SPRAINED BACK	661	0916			X
808300		"	8-16-42	CHIPPER	22	FOREIGN BODY IN EYE, GOGGLES ON	227	1112	P		
808301		"	8-17-42	LABORER	47	PULLING GRINDER & FELL, GRINDER FELL ON LEG, BRUISED & INFECTION	224	1228			X
808302		"	8-18-42	WELDER	37	ARC FLASH, BOTH EYES	958	0213			X
808303		"	8-18-42	SHIPFITTER	37	CO-WORKER HIT HIM ON KNEE WITH HAMMER, BRUISE	245	0336		X	
808304		"	8-18-42	SHIPFITTER	38	FOREIGN BODY IN EYE, INFECTED	227	1212	P		
808305		"	8-18-42	CHIPPER	48	FELL OFF SCAFFOLD, BRUISED ELBOW	557	0337			X
808306		"	8-19-42	PIPEFITTER	51	FOREIGN BODY IN EYE	227	1112			X
808307		"	8-20-42	RIVETER	53	SLIPPED & FELL AGAINST RAIL, CUT KNEE	423	0536			X
808308		"	8-20-42	RIVETER	21	PIECE OF HOT SLAG FLEW & BURNED ARM	227	1220			X
808309		"	8-20-42	MACHINIST	16	HOSE HIT MOUTH, FRACTURED TEETH	259	0738	P		
808310		"	8-20-42	PIPE FITTER	50	SLIPPED BETWEEN 2 PIPES, WRENCHED KNEE	355	0936			X
808311		"	8-20-42	CHIPPER	32	FOREIGN BODY IN EYE	227	1112			X
808312		"	8-20-42	CHIPPER	54	FOREIGN BODY IN EYE	227	1112			X
808313		"	8-20-42	LAYOUT	59	FOREIGN BODY IN EYE	227	1112			X
808314		"	8-20-42	CHIPPER	24	FOREIGN BODY IN EYE	227	1112			X
808315		"	8-21-42	GRINDER	65	ROLLING PLATES ON ROLLER, CAUGHT FINGER UNDER PLATE, TRAUMATIC AMP.	329	1027			X
808316		"	8-21-42	DRILLER	56	FOREIGN BODY IN EYE	227	1112			X
808317		"	8-12-42	SHIPFITTER	19	ARC FLASH, BOTH EYES	958	0313			X
808318		"	8-21-42	PIPEFITTER	31	PIPE FELL ON ANKLE, BRUISE	224	0331		X	
808319		"	8-21-42	SHIPFITTER	24	FOREIGN BODY EYE	227	1112			X
808320		"	8-21-42	BURNER	29	FOREIGN BODY IN EYE	227	1112			X
808321		"	8-21-42	WELDER	42	FOREIGN BODY IN EYE	227	1112			X
808322		"	8-21-42	SCALER	56	FOREIGN BODY IN EYE	227	1112			X
808323		"	8-21-42	SHIPFITTER	54	FOREIGN BODY IN EYE	227	1112			X
808324		"	8-21-42	SHIPFITTER	37	FOREIGN BODY IN EYE	227	1112			X

SCHN00318053

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	Claimant	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	Na. & Loc.	Unsafe Act M	O	P
808325	(b) (6)	5351	8-22-42	PIPE FITTER	61	FOREIGN BODY IN EYE	227	1112	P		
808326		"	8-22-42	SHIP FITTER	27	FOREIGN BODY IN EYE	227	1112	P		
808327		"	8-22-42	WELDER	19	INFECTED SHOULDER FROM HOT METAL BURN	137	1217			X
808328		"	8-22-42	LAY OUT	29	FOREIGN BODY IN EYE	227	1112	P		
808329		"	8-22-42	SHIP FITTER	32	FOREIGN BODY IN EYE	227	1112			X
808330		"	8-22-42	REAMER	48	FOREIGN BODY IN EYE	227	1112			X
808331		"	8-22-42	SHIP FITTER	44	FOREIGN BODY IN EYE	227	1112			X
808332		"	8-22-42	WELDER	41	FELL & FRACTURED HIS HAND	461	0724			X
808333		"	8-30-42	CHIPPER	30	FOREIGN BODY IN EYE	227	1112			X
808334		"	8-22-42	REAMER	43	FOREIGN BODY IN EYE	227	1112	P		
808335		"	8-22-42	BURNER	49	ARC FLASHES, BOTH EYES	258	0213			X
808336		"	8-23-42	CHIPPER	16	FOREIGN BODY IN EYE	227	1112			X
808337		"	8-23-42	RIVETER	21	RIVETER FAILED TO CATCH RIVET, IT HIT HIM ON WRIST, BURN	226	0223	P		
808338		"	8-23-42	BOLTER UP	53	FOREIGN BODY IN EYE	227	1112			X
808339		"	8-23-42	MACHINIST	40	FOREIGN BODY IN EYE	227	1112			X
808340		"	8-23-42	SHIP FITTER	17	CRAWLING THROUGH ROUND PLASTIC & SLIPPED, SPRAINED ANKLE	661	0932			X
808341		"	8-23-42	MACHINIST	45	FOREIGN BODY IN EYE	227	1112			X
808342		"	8-23-42	CHIPPER	37	FOREIGN BODY IN EYE	227	1112			X
808343		"	8-23-42	LABORER	54	STEPPED ON STEEL PLATE & SPRAINED ANKLE	056	0931			X
808344		"	8-23-42	BURNER	30	WELDERS SPARK EXPLODED GAS FUMES, BURNS ON HANDS, ARMS, AND FACE	921	0207	XP		
808346		"	8-23-42	WELDER	27	HIT ON EYE BY PIECE OF FALLING SLAG	224	0312			X
808347		"	8-23-42	SCALER	16	FOREIGN BODY IN EYE	227	1112			X
808348		"	8-23-42	LABORER	52	HOOK SLIPPED ON CRANE & STRUCK THUMB, LACERATIONS	238	0526	P		
808349		"	8-23-42	WELDER	20	FELL OFF SCAFFOLD 25', DOESN'T REMEMBER ANYTHING, CONTUSED SCALP	557	0316			X
808350		"	8-23-42	SCALER	53	FOREIGN BODY IN EYE	227	1112	P		
808351		"	8-23-42	MACHINIST	42	FOREIGN BODY IN EYE	227	1112			X
808352		"	8-24-42	STEAM FITTER	35	ARC FLASHES IN EYE, BURNS	958	0213			X
808353		"	6-24-42	SHIP FITTER	31	WEDGE FELL & HIT WRIST, SPRAIN	224	0923	P		
808354		"	8-24-42	SHIP FITTER	16	FOREIGN BODY IN EYE	227	1112			X
808355.		"	8-24-42	BOLTERMAN	47	FOREIGN BODY IN EYE	227	1112			X
808356		"	8-24-42	WELDER	33	LEAD CONNECTION BROKE, FELL TO GROUND, BRUISED LEG & BACK	461	0307	P		
808357		"	8-24-42	CHIPPER	37	PLANK FELL FROM ABOVE & HIT BACK, POSSIBLE FRACTURE	260	0916		X	
808358		"	8-24-42	LABORER	22	FOREIGN BODY IN EYE	227	1112			X
808359		"	8-24-42	CHIPPER	57	FOREIGN BODY IN EYE	227	1112			X
808360		"	8-24-42	LAY OUT	46	FOREIGN BODY IN EYE	227	1112	P		
808361		"	8-24-42	BOLTER UP	49	FOREIGN BODY IN EYE	227	1112			X
808362		"	8-24-42	RIGGER	34	PLATE FELL ON SCAFFOLD THROWING HIM IN AIR, FELL & FRACTURED LEG	561	0728			X
808363		"	8-24-42	CHIPPER	57	FOREIGN BODY IN EYE	227	1112			X
808364		"	8-24-42	CHIPPER	26	FOREIGN BODY IN EYE	227	1112			X
808365		"	8-24-42	CHIPPER	29	FOREIGN BODY IN EYE	227	1112			X

SCHN00318054

FIRM NO. 104025 OREGON SHIPBUILDING CORP.

Claim No.	CLAIMANT	Class	Date of Accident	Occupation	Age	Cause and Nature of Accident	Type & Agency	No. & Loc.	Unsafe Act M	C	P
808366	(b) (6) [redacted]	5351	8-24-42	ELECTRICIAN	34	CIRCUIT BREAKER WAS SHORTED & BLEW UP IN FACE, BURNED FACE	921	0208	P		
808367	[redacted]	"	8-25-42	SCALER	49	FOREIGN BODY IN EYE	227	1112			X
808368	[redacted]	"	8-25-42	BURNER	51	FOREIGN BODY IN EYE	227	1112			X
808369	[redacted]	"	8-25-42	CHIPPER	54	FOREIGN BODY IN EYE	227	1112			X
808370	[redacted]	"	8-25-42	WELDER	37	FOREIGN BODY IN EYE	227	1112			X
808371	[redacted]	"	8-25-42	SHIP FITTER	18	ARC FLASHES IN EYE, BURN	958	0213			X
808372	[redacted]	"	8-25-42	TESTER	62	FOREIGN BODY IN EYE	227	1112	P		
808373	[redacted]	"	8-25-42	SHIP FITTER	--	FOREIGN BODY IN EYE	227	1112			X
808374	[redacted]	"	8-25-42	SHIP FITTER	35	FOREIGN BODY IN EYE	227	1112			X
808375	[redacted]	"	8-25-42	CHIPPER	45	FOREIGN BODY IN EYE	227	1112			X
808376	[redacted]	"	8-26-42	CHIPPER	52	FOREIGN BODY IN EYE	227	1112			X
808377	[redacted]	"	8-26-42	CHIPPER	30	STRONG BACK FELL ON ARM, ABRASIONS	255	0320			X
808924	[redacted]	"	7-14-42	STEAM FITTER	62	STRUCK HEAD ON PIPE, STRAINED NECK	123	0915			X
808925	[redacted]	"	8-22-42	RIGGER	22	DROPPED STEEL PLATE ON TOES, FRACTURE	256	0734			X
809084	[redacted]	"	7-29-42	SHIP WRIGHT	43	STUMBLED OVER A CABLE, FELL & BRUISED KNEE	461	0336			X
809085	[redacted]	"	8-4-42	SHIP FITTER	16	TRIPPED & FELL, BRUISED WRIST	461	0323			X
809086	[redacted]	"	8-6-42	TOOL KEEPER	50	HIT ON FOOT WITH AIR GUN, FRACTURED TOE	222	0734		X	
809087	[redacted]	"	8-6-42	CHIPPER	22	FOREIGN BODY IN EYE	227	1112			X
809088	[redacted]	"	8-8-42	BURNER	43	FOREIGN BODY IN EYE	227	1112			X
809089	[redacted]	"	8-8-42	BURNER	60	LIFTING BLOCK OF WOOD, STRAINED BACK	660	0916			X
809090	[redacted]	"	8-9-42	MACHINIST	38	INSTALLING TANKS, IT SLIPPED & HIT SIDE, POSSIBLE FRACTURE	225	0339			X
809091	[redacted]	"	8-9-42	SHIP FITTER	22	FOREIGN BODY IN EYE	227	1112	P		
809092	[redacted]	"	8-10-42	SHIP FITTER	39	FELL THROUGH RAILS ON PLATFORM, BRUISED SHOULDER	557	0317			X
809093	[redacted]	"	8-10-42	SHIP FITTER	20	TURNED HEAD QUICKLY & BUMPED FACE ON HOLD, ABSCESS	123	1208			X
809094	[redacted]	"	8-14-42	SHIP FITTER	70	CO-WORKER STOPPED HIS FALL, HIT HIM IN RIBS WITH HAMMER, FRACTURE	245	0739		X	
809095	[redacted]	"	8-16-42	SHIP FITTER	36	HIT ELBOW AGAINST CLIP, CONTUSED	123	0337			X
809096	[redacted]	"	8-16-42	CHIPPER	38	FOREIGN BODY IN EYE, INFECTION	227	1212			X
809097	[redacted]	"	8-17-42	LABORER	17	CONJUNCTIVITIS, EYE	227	1212			X
809098	[redacted]	"	8-18-42	CHIPPER	30	FOREIGN BODY IN EYE	227	1112			X
809099	[redacted]	"	8-19-42	SHIP FITTER	35	ARC FLASH IN EYE	958	0212			X
809100	[redacted]	"	8-19-42	PIPE FITTER	45	LIFTING HEAVY PIPE, HIT BACK AGAINST SCAFFOLD, SPRAIN	157	0916			X
809101	[redacted]	"	8-19-42	SHIP FITTER	57	HIT AGAINST PIECE OF STEEL, BRUISED LOWER SACRUM	123	0318			X
809102	[redacted]	"	8-19-42	PIPE FITTER	31	HELPING CARRY PIPE, IT SLIPPED & STRAINED ABDOMEN MUSCLES	638	0918		X	
809103	[redacted]	"	8-20-42	LABORER	16	STEPPED ON BOARD, IT CAME UP & HIT HIM, KNOCKED OUT TOOTH	260	0038			X
809104	[redacted]	"	8-21-42	LABORER	39	ARC FLASH IN EYE	958	0213			X
809105	[redacted]	"	8-21-42	SHIP FITTER	63	SLEDGE HAMMER HIT FOOT, FRACTURE	245	0732			X
809106	[redacted]	"	8-21-42	DRILL PRESS OP.	26	SPLINTER IN FINGER, INFECTION	163	1227			X
809107	[redacted]	"	8-22-42	SHIP FITTER	25	FOREIGN BODY IN EYE	227	1112	P		
809108	[redacted]	"	8-22-42	RIGGER	60	CO-WORKER HOLLERD TO LET GO & STEEL PLATE FELL ON TOE, FRACTURE	256	0734	P		

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FIRM NO. 104025 OREGON SHIPBUILDING CORP.

CLAIM No.	CLAIMANT	CLASS	DATE OF ACCIDENT	OCCUPATION	AGE	CAUSE AND NATURE OF ACCIDENT	TYPE & AGENCY	NA. & LOC.	UNSAFE ACT M	O	P
809109	(b) (6)	5351	8-22-42	REAMER	56	FOREIGN BODY IN EYE	227	1112			X
809110		"	8-22-42	BURNER	48	STEEL PLATE ON TOE, FRACTURE	256	0734			X
809111		"	8-22-42	SCALER	27	FOREIGN BODY IN EYE	227	1112	P		
809112		"	8-23-42	WELDER	28	BUMPED THUMB WHILE CLIMBING LADDER, INFECTION	123	1226			X
809113		"	8-25-42	BURNER	43	FOREIGN BODY IN EYE	227	1112			X
809114		"	8-23-42	LABORER	80	CAUGHT HEEL & FELL TO DECK, SPRAINED BACK	561	0916			X
809115		"	8-24-42	BURNER	47	FOREIGN BODY IN EYE	227	1112			X
809116		"	8-24-42	CHIPPER	19	FOREIGN BODY IN EYE	227	1112	P		
809117		"	8-24-42	SHIPWRIGHT	25	SPRAINED ANKLE WHEN HE STEPPED ON WELDER'S LEAD	062	0931			X
809118		"	8-24-42	SHIPFITTER	36	FOREIGN BODY IN EYE	227	1112	P		
809119		"	8-24-42	RIGGER	49	CAUGHT FINGER BETWEEN STEEL PLATES, FRACTURE	356	0727	P		
809120		"	8-25-42	CHIPPER	40	FOREIGN BODY IN EYE	227	1112			X
809121		"	8-25-42	WELDER	34	HOT SLAG BURNED CORNER OF EYE	227	1112			X
809122		"	8-25-42	CRANE OPR.	43	FOREIGN BODY IN EYE	227	1112			X
809123		"	8-25-42	CHIPPER	36	FOREIGN BODY IN EYE	227	1112			X
809124		"	8-25-42	MACHINIST	46	WORKMAN MOVED BLOCK & IT FELL OVER ON FOOT, BRUISE	224	0332		X	
809125		"	8-25-42	BURNER	18	FOREIGN BODY IN ETE	227	1112			X
809126		"	8-25-42	WELDER	23	FOREIGN BODY IN EYE	227	1112			X
809127		"	8-25-42	REAMER	46	FOREIGN BODY IN EYE	227	1112			X
809128		"	8-25-42	LAYOUT	16	WRENCH SLIPPED & HIT EYEBROW, LACERATIONS	245	0508	P		
809129		"	8-25-42	MACHINIST	24	FOREIGN BODY IN EYE	227	1112	P		
809130		"	8-25-42	SHIPWRIGHT	63	SLIPPED ON GREASE & FELL OFF DOCK, CONTUSED LEG	557	0328			X
809131		"	8-25-42	SHIPFITTER	31	FOREIGN BODY IN EYE	227	1112			X
809132		"	8-26-42	CLEAN UP	54	CO-WORKER TIPPED OVER LARGE FLOOR FAN, CUT FINGER	130	0527		X	
809133		"	8-26-42	CHIPPER	36	FOREIGN BODY IN EYE	227	1112			X
809134		"	8-26-42	PIPEFITTER	58	FOREIGN BODY IN EYE	227	1112			X
809135		"	8-26-42	SHIPFITTER	49	FOREIGN BODY IN EYE	227	1112			X
809136		"	8-26-42	CHIPPER	31	FOREIGN BODY IN EYE	227	1112			X
809137		"	8-26-42	WELDER	16	FOREIGNBODY IN EYE	227	1112			X
809138		"	8-26-42	WELDER	38	ARC BURN IN EYES	956	0213			X
809139		"	8-26-42	BURNER	39	HOT SLAG IN EYE, INFECTION	227	1212			X
809140		"	8-26-42	RIGGER	35	SLIPPED & FELL, STRAINED ABDOMINAL MUSCLES	461	0918			X
809141		"	8-26-42	LAYOUT	43	FOREIGN BODY IN EYE	227	1112			X
809142		"	8-26-42	SHIPFITTER	29	STEPPED ON BD. WHICH GAVE WAY, FELL 11', LANDED ON HEAD, FRAC. SKULL	561	0710	P		
809143		"	8-26-42	REAMER	59	PLATE FELL ON ANKLE, SPRAINED	256	0931			X
809144		"	8-27-42	LAYOUT	52	FOREIGN BODY IN EYE	227	1112			X
809145		"	8-27-42	CHIPPER	21	FOREIGN BODY IN EYE	227	1112			X
809146		"	8-29-42	BOILERMAKER	52	FOREIGN BODY IN EYE	227	1112			X
809147		"	8-31-42	SUPERINTENDANT	35	TIN HAT FELL OFF CO-WORKER, HIT HIM ON MOUTH, KNOCKED TEETH OUT	224	0038			X

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THE OREGONIAN, FRIDAY, OCTOBER 2, 1942

President Was Here All Right to Wit

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Spectator Ring Out of Hearing

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Kaisers Plan For Big Event

Executives Assist In Setting Stage

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SECTION TWO

14 PAGES

The Sunday Oregonian

NO. 28 PORTLAND, OREGON, JULY 11, 1943 VOL. LXXXII

Kaiser Brought 2500 New Yorkers; Most of Them Stuck—Some Didn't

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U. S. Weather Report

Wednesday temperatures—Maximum, 85 degrees; minimum, 58 degrees.

Thursday forecast—Fair and continued warm. Full weather report on page 8.

The Oregon

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58 Vessels Announced For Yards

Transport Ships, Tankers Among Types Designated

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