

Publication No. 73-e59

CHECK
INFORMATION
FOR ACTION _____
PERMIT _____
OTHER _____

TO: Bill Burwell
FROM: Grover Scott Jeane II
SUBJECT: Todd Shipyards Treatment of Wooden Dry Docks
with Sodium Arsenite
DATE: August 1, 1973

State of
Washington
Department
of Ecology



Todd Shipyards Seattle Division routinely (twice a year) treats each of their two wooden dry docks with sodium arsenite to eradicate deleterious marine boring organisms. A survey of the treatment of the larger dry dock (#3) was undertaken on December 5, 1973, by myself and Darrel Anderson. The survey objective was to determine if the company was meeting the requirements put forth in their waste discharge permit (#4110) pertaining to dry dock treatment and to evaluate any toxic effect upon the receiving water.

We met with Mr. H. L. Wood and Mr. R. Allen for orientation as to the treatment procedure and dry dock location. Mr. Allen is the chemist responsible for determining strength and amount of sodium arsenite to be added.

The study was complicated by high winds, rough water, and below freezing temperatures. Problems with laboratory scheduling prevented early analysis of the samples.

Treatment Procedure

The dry docks must be treated at least a week apart. First, the dry dock is pumped as dry as possible. Second, a sodium arsenite mixture is added near the inside opening of each sea cock as the dry dock is flooded to several feet below normal wet level. After 48 hours of soaking the dock is flooded to the dilution depth and then pumped dry. All discharging of the diluted sodium arsenite is to take place on an ebbing tide with a minimum exchange of 6 feet.

Evaluation of Dry Dock #3

The computed concentration of arsenite is 40 ppm at the soaking depth (10 feet draft marks) for dry dock #3. Samples taken within the dry dock at this time measured 9.7 to 40.5 ppm. The soaking solution was then diluted to the theoretical concentration of 13.6 ppm. Our samples measured the strength of the diluted solution as 1.7 to 2.3 ppm arsenite.

The diluted sodium arsenite is discharged horizontally approximately 20 feet from the 10 submerged discharge ports (5 on each side). Complete dewatering required approximately 1 hour.

Levels of arsenite observed in the receiving water from surface to 40 feet ranged from 0.003 ppm to 1.09 ppm. Concentrations were erratic and prevented drawing iso-concentration lines. Toxicity studies have shown a 48 hour TLm of 8.3 ppm for chum salmon (*O. keta*) and 20 ppm for oysters (*C. gigas*).

Memo to Bill Burwell
August 1, 1973
Page 2

The field investigation revealed that normal mixing prevents any high levels of arsenite as long as adequate dilution is achieved before discharging on a 6 foot or greater exchange ebb tide. I recommend periodic grab samples to check arsenite levels of the soaking and dilution solution. To positively discount any toxicity problems, a small in-situ bioassay study using local fish or invertebrates could be completed in the future.

GSJ:bjj

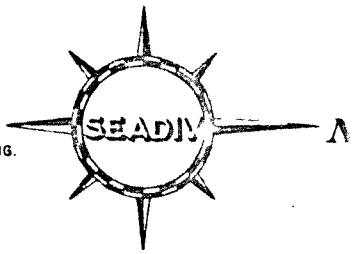
R WHIRLEY NO. 4 15 TONS 24 GAUGE

Berth 'G'

Berth 'H'

PIER NO. 4

U.S.C.G LIGHT NO. 2293 47°-35'3" N. LAT 122°-21.4' W. LONG.



Berth 'J'

WHIRLEY NO. 5 45 TONS 24 GAUGE

D R Y D O C K D A T A

DRY DOCK NO.	TYPE	LENGTH OVER ALL	WIDTH OVER ALL	PONTOON LENGTH	CLEAR WIDTH PONTOON DECK	HE. GHT OVER KEEL BLOCKS	CAPACITY IN TONS
1	3 SECTION STEEL	598	118'	528	90'	26'	14,000
2	TIMBER TROUGH	412'	90	352'	66'-7"	19'	5,700
3	5 SECTION TIMBER	531'	126'-8"	459'	92'-6"	25'	16,000

ELLIOTT

DRY DOCK NO. 3

WHIRLEY NO. 6 45 TONS 32 GAUGE

PIER NO. 6

U.S.C.G LIGHT NO. 2292 47°-35.4' N. LAT 122°-21.3' W. LONG.

DRY DOCK NO. 1

BAY

DRY DOCK NO. 2

PIER NO. 7

Berth 'K'

WHIRLEY NO. 7 40 TONS 24 GAUGE

Berth 'M'

PIER NO. 8

Berth 'N'

BUILDING DIRECTORY

BLDG	DESCRIPTION	BLDG	DESCRIPTION
T-1	PLANT ENGR, ESTIMATING	T-59	SOUTH STEEL SHOP
T-2	CAFETERIA	T-60	FURNACE HOUSE
T-4	PORT ENGR OFFICE	T-61	SOUTH SUB-STATION
T-10	SHEET METAL SHOP	T-63	X-RAY, LOCKER ROOM
T-14	ELECTRIC SHOP	T-66	SHEET METAL STORAGE
T-14A	RIGGING LOFT	T-71	LUMBER STORAGE SH
T-14B	ELECTRIC SHOP ANNEX	T-72	WEST STEEL SHOP
T-15	JOINER SHOP	T-72A	WEST STEEL SHOP ANNE
T-16	CARPENTER SHOP	T-74	SHEET METAL SHOP
T-17	CENTRAL TOOL ROOM	T-77	PIPE SHOP QUONSET HUT
T-18	PIPE SHOP	T-86	SHIPWAYS OFFICE
T-19	YARD OFFICE	T-90	SOUTH CARPENTER SH
T-19A	MACHINE SHOP ANNEX	T-98	BABBITT STORAGE SHE
T-20	POWER HOUSE	T-110	SHEET METAL STORAG
T-22	PAINT & OIL HOUSE	T-111	SOUTH TOOL ROOM
C-47	INSIDE MACHINE SHOP	T-112	ADMINISTRATIVE OFFI
T-47A	INSIDE MACHINE SHOP	T-113	SOUTH ENTRY GUARD HO
C-48	OUTSIDE MACHINE SHOP	T-114	STEEL & ALUM FAR SH
C-49	WAREHOUSE	T-132	SAND-BLASTING HOUS
C-50	COPPER SHOP	T-133	MAIN GATE HOUSE
C-51	NORTH SUB-STATION	T-134	EAST ENTRY GUARD HO
T-55	PAINT SHOP	T-149	MAIN WAREHOUSE
T-56	ENGINEERING	T-150	SECURITY OFFICE
T-57	ENGINEERING	T-151	MAIN RECEIVING WHSE
T-58	GEN SUPT, OZALID, MOLD L	T-153	EAST STEEL SHOP

TODD SHIPYARDS CORPORATION
SEATTLE DIVISION

DESIGNED	DATE
DRAWN	DATE
CHECKED	DATE
APPROVED	DATE

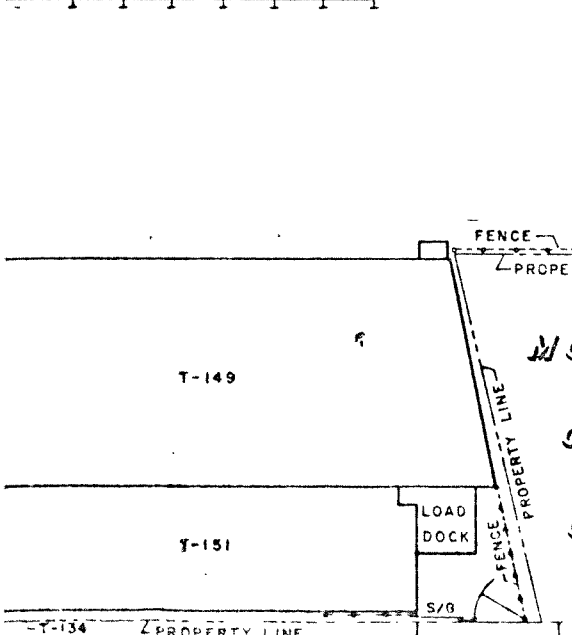
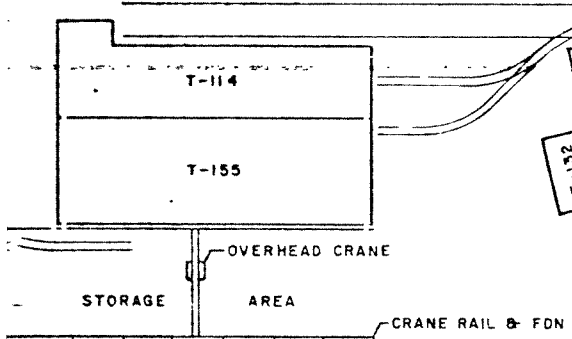
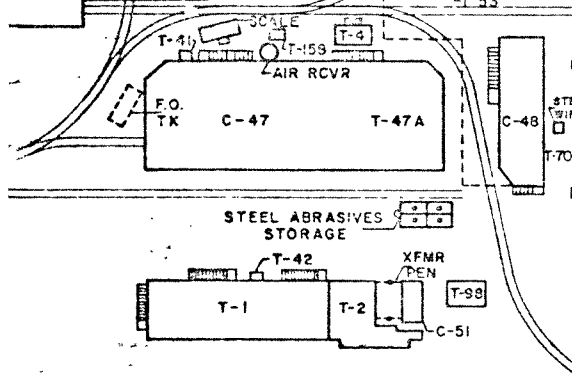
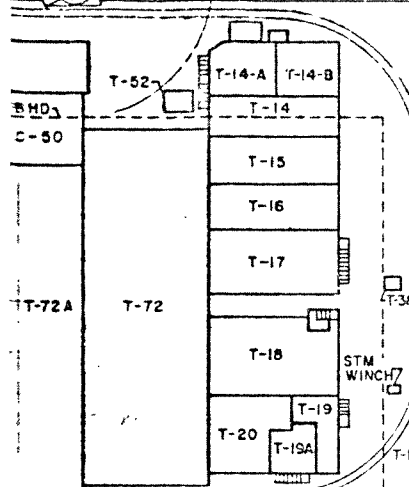
SHIPYARD
GENERAL
ARRANGEMENT

SCALE 1" = 150'-0"	TODD DWG NO. RE
SHEET 1 OF 1	Y-115-1Y

Avenue S. W.

MOBIL
OIL
CORP

INNER HARBOR LINE
S. 76°-42'-15" W



TODD SHIPYARDS CORPORATION
and Subsidiaries

INTEROFFICE CORRESPONDENCE

FROM: H. L. Wood
TO: Distribution
SUBJ: DRYDOCK TREATMENT With Sodium Arsenite, to combat marine borers.

PLANT: Seattle
PLANT: Seattle
DATE 1 December 1972

On Monday, 4 December 1972, we shall commence treatment of No. 3 Drydock, with sodium arsenite solution, to combat marine borers which have infested the normally wet portion of the drydock. *Actl Arsenite at 12N.*

#2 on 11th termination -
Refer to J.O. 922.24/25. Item 09.113. Note some changes in the wording of the Job Order, as set forth here, and as spelled out in the revision of the Job Order.

The sodium arsenite solution to be used, is "Atlas A-6, Product No. 803" which is available in Warehouse No. 2, in 30-gallon drums, rather than the Penite named in the original job order. For number 3 drydock, a total of 14.2 gallons should be put into each of the ten metering drums which will be set up on the ten wingwalls of the five sections, and piped into the incoming, fill-water at the drydock flood-valves. This total of $10 \times 14.2 = 142$ gallons, will give a uniform concentration of 40 ppm (parts per million) of solution for the soaking condition when the drydock is flooded to a DRAFT of ten feet (10'-0") The ten foot draft condition will put the chines of the pontoon sections three feet under water, and will insure coverage of the 'normally wet' portions of the drydock.

The drydock will be kept at this level for forty-eight hours, minimum, prior to deep-draft flooding, at the beginning of evening ebb-tide on Wednesday, 6 December 1972. Commence pumping out the drydock about 9:00 pm, Wednesday, 6 December, after it has been flooded to the 19' draft marks. (Keel-block draft marks)

The plant engineer at Lockheed Ship has been notified that we plan to treat our drydocks the weeks of December 4 and December 11, so no further notification is required.

Mr. Rodney Allen, Chemical Engineer, has furnished the technical guidance to insure proper solution strengths, and Mr. Scott Jean of the Washington State Department of Ecology, will monitor the operation for that Department. Mr. Dean will be in the Yard today, Friday, to acquaint himself with our plans, and our physical Plant.

All hands are reminded of the danger of handling arsenical compounds and their solutions. All supervisory personnel are enjoined to emphasize to their people the importance of cautious, competent handling of the treatment materials, and proper disposition of empty containers.

HLW:me

H. L. Wood

cc: John Galbreath
Ed Lynch Percy Wood
Rod Allen Ed Larsen
George Salisbury
Scott Dean

TODD SHIPYARDS CORPORATION
and Subsidiaries

Walt Hartung Adm ^{Ass} INTEROFFICE CORRESPONDENCE

FROM: R. B. Allen, Chemical Engineer ^{Ex 474} **PLANT:** Seattle Division
TO: H. L. Wood, Plant Engineer **PLANT:** Seattle Division
RE: WOODEN DRYDOCKS: Quantities of chemicals to attain 40 ppm concentration of elemental arsenic. **DATE** November 30, 1972

Desired concentration: 40 ppm elemental arsenic (As)

Drydock Volumes:

Soaking Condition:

8'	#2 Drydock -----	949,025	Gallons	352' Long X 70' wd
10'	#3 Drydock -----	1,898,050	Gallons	450' " X 93 " "

Parts per million is a weight/weight expression. Assuming Elliott Bay water at a specific gravity of 1.025 the weight per gallon becomes 8.54 pounds. The above volumes in terms of pounds are as follows:

#2 Drydock -----	8,080,000	Pounds
#3 Drydock -----	16,200,000	Pounds

Therefore elemental arsenic required:

No. 2 Drydock, $\frac{40}{1,000,000}$	X 8,080,000 =	323	Pounds
No. 3 Drydock, $\frac{40}{1,000,000}$	X 16,200,000 =	648	Pounds

Atlas A 6, Product No. 803, Sodium Arsenite Solution contains 6 pounds As_2O_3 per gallon

	Arsenic Required	Equivalent As_2O_3	Gallons Product 803
#2 Drydock -	323 pounds	426 pounds	71
#3 Drydock -	648 pounds	875 pounds	142

Drydock Volumes at Dilution Depth

#2 Drydock	or	2,788,170	Gallons
		23,800,000	Pounds
#3 Drydock	or	6,806,800	Gallons
		58,200,000	Pounds

Continued

WOODEN DRYDOCKS: Quantities of chemicals to attain 40 ppm concentration of elemental arsenic.

Summary:

	Gallons Product 803 added	ppm Arsenic at Soaking Conditions	ppm Arsenic at dilution depth
No. 2 Drydock -----	71	40	13.6
No. 3 Drydock -----	142	40	11.0

*Will
obtain
Lower value
by fact
10.*



R. B. Allen



RBA:gg

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

ORIGINAL TO: G.S. Jenne
COPIES TO:
.....
.....
LAB FILES



WATER QUALITY LABORATORY

DATA SUMMARY

Source Todd Dry Dock

Collected By G.S.J. + D.A

Date Collected Dec. & Jan. 1972

Goal, Pro./Obj. 3.2-23

Log No.	Station #	As	Location										
72-4771	2	9.7	H-3										
72	3	40.5	J-3										
74	4	1.7	A-1 Station										
75	5	2.3	A-2 "										
76	6	.006	K-S										
79	9	.242	K-30										
80	10	<.02	L-S										
82	12	.096	L-20										
83	13	<.2	M-S										
85	15	<.008	M-20										
86	16	.83	N-S	Due to U.W.									
88	18	<.008	N-20										
90	20	<.2	O-S										
94	24	1.09	O-30										
95	25	.12	Q-20										

Note: All results are in PPM unless otherwise specified. ND is "None Detected"

Summary by Stephen D. Robb Date 5-25-73

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
OLYMPIA, WASHINGTON

In accordance with Chapter 90.48 RCW
and Chapter 372-24 WAC
A WASTE DISCHARGE PERMIT is issued to:

Permit No. 4110

Date of Issue October 18, 1972

Date of Expiration October 18, 1977

Todd Shipyards Corporation (09630)
Seattle Division
1801 16th Avenue S.W.
Seattle, Washington 98124

Waste from the permittee's industrial operation located at 1801 16th Avenue S.W., Seattle, Washington, not exceeding 89,000 gallons per day, may be discharged to the Municipality of Metropolitan Seattle sewerage system; in addition, a maximum of 38,880 gallons per day of uncontaminated cooling water and steam condensate may be discharged to Elliot Bay.

Said discharge is authorized subject to the following conditions:

1. The word "waste" in the above statement refers to the total volume of cooling and contaminated waters to be discharged to the sanitary sewer.
2. Chemical cleaning processes are to be operated in a manner that will prevent excessive loss of chemicals to the sanitary sewer. These shall include:
 - A. Suspend treated parts above chemical solutions for a reasonable time to minimize drag out.
 - B. Collect contaminated chemical solutions and rinse waters containing an excessive amount of heavy metals for reprocessing or disposal in a manner that will prevent their entry into waters of the State.
3. The combined effluent to the sanitary sewer shall have the following characteristics:
 - A. A pH above 5.5
 - B. Less than 6.0 parts per million cadmium
 - C. Less than 6.0 parts per million chromium
 - D. Less than 3.0 parts per million copper
 - E. Less than 6.0 parts per million nickle
 - F. Less than 3.0 parts per million lead
 - G. Less than 6.0 parts per million zinc
 - H. Less than 100 parts per million total oils

Date of Issue October 12, 1972Todd Shipyards Corporation
Seattle, WashingtonDate of Expiration October 12, 1977

4. Waste oils and solvents, spent chemical solutions, chemical sludges, residue from sand blasting operations and other solid waste material shall be collected for reprocessing or disposal in a manner that will prevent their entry into waters of the State.
5. In the event of a discharge of oil into waters of the State, representatives of this Department and the U. S. Coast Guard shall be contacted immediately.
 - A. Cleanup of oil spills shall be in accordance with recommendations of this Department or the U. S. Coast Guard.
 - B. No emulsifiers or dispersants are to be used on waters of the State without approval from this Department.
6. Loss of proteinaceous fire retardant chemicals to the waters of the State shall be held to a minimum during fire drills and tests.
7. Prior to field testing of sonar devices, the State Departments of Fisheries and Game shall be contacted relative to proper timing to avoid damage to migrating fish.
8. Prior to the chemical treatment of a dry dock, a written request for approval shall be submitted to this Department a minimum of ten days in advance of such treatment. The amount of chemicals to be used, the treatment period and the date of discharge shall be included in the request. The following points are to be considered in such a request:
 - A. Dock treatments are to be scheduled between June 15 and August 15 or between December 1, and March 15.
 - B. Discharges of contaminated waters are to be during the maximum flow of an ebb tide in which the change in water elevation is a minimum of six feet.
 - C. The contaminated contents of only one dry dock may be discharged to the West Waterway or the adjacent waters of Elliot Bay in any seven day period.
9. Drydock No. 2, during the chemical treatment period, is to contain a maximum of 1,800,000 gallons of water with an average concentration of less than 50 parts per million sodium arsenite. After the treatment period, the dock contents are to be diluted to a minimum of 3,600,000 gallons prior to discharge to the receiving water.
10. Drydock No. 3, during the chemical treatment period, is to contain a maximum of 5,400,000 gallons of water with an average concentration of less than 50 parts per million sodium arsenite. After the treatment period, the dock contents are to be diluted to a minimum of 9,000,000 gallons prior to discharge to the receiving water.

Todd Shipyards Corporation
Seattle, Washington

Date of Issue October 12, 1972Date of Expiration October 12, 1977

11. "Empty" sodium arsenite containers are to be processed in accordance with hazardous material requirements.
12. Contaminated waters except as provided for in Conditions 9, 10, and 11 shall not be discharged to the storm sewer, the West Waterway, or Elliot Bay.
13. Sanitary sewage is to be discharged into the sanitary sewer system.
14. Sanitary wastes from vessels in dry dock or moorage are to be discharged into the sanitary sewer system or into holding tanks that are periodically emptied into a sanitary sewer system.
15. All requirements and ordinances of the city pertaining to the discharge of wastes into the city sewer system are hereby made a condition of this permit.
16. In the event the permittee is temporarily unable to comply with any of the above conditions of this permit, due to breakdown of equipment or other cause, the permittee is to immediately notify this Department. This report is to include pertinent information as to the cause and what steps are being taken to correct the problem and prevent its recurrence.

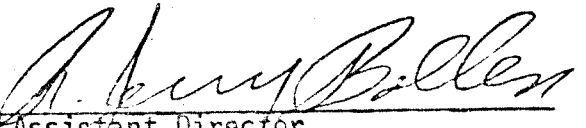
This permit does not allow the discharge of wastes other than those mentioned herein. A new application shall be submitted whenever a change in the waste to be discharged is anticipated.

This permit is subject to termination if the Department finds: (1) That it was procured by misrepresentation of any material fact or by lack of full disclosure in the application; (2) That there has been a violation of the conditions thereof; (3) That a material change in quantity or type of waste disposal exists.

In the event that a material change in the conditions of the State waters utilized creates a dangerous degree of pollution, the Department may specify additional conditions to this permit.

Nothing in this permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971.

Signed


Assistant Director
Department of Ecology



SHIPYARDS CORPORATION

Seattle Division: 1801 16th Avenue, S.W. • Seattle, Washington 98124 • MA 3-1635 (206)

11 July 1974

Mr. Thomas McCann
Department of Ecology
15345 NE 36th Street
Richmond, Wn. 98052

RE: Chemical Treatment of TODD-operated Wooden Drydock; Scheduling

My dear Mr. McCann:

This is to confirm a change of plan concerning our Drydock Chemical-treatment Schedule from that set forth in our letter of 28 June 1974, as discussed by telephone with your Mr. John McDonald yesterday.

To take advantage of a favorable ebb tide, insuring adequate run-out, we have established the following schedule for treating our No. 2 wooden drydock with sodium arsenite:

- 15 July 1974; Early hours Make physical set-up and check of charging drums and piping array.
- 0800 ----- Introduce sodium arsenite into drydock chambers.
- 18 July 1974; 0400 ----- Flood drydock chambers to achieve maximum dilution of sodium arsenite solution preparatory to pumping-out drydock chambers
- 0530 ----- Pump-out drydock. Treatment complete.

Discharge of the diluted treatment solution will be during the early phase of an ebb tide having a range of 13.9 feet.

Very truly yours,

TODD SHIPYARDS CORPORATION
Seattle Division

RECEIVED

JUL 15 1974

DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

HLW:mcr

H. L. Wood
Facilities Manager

cc: Mr. Ron Pine, Olympia Office

TODD SHIPYARDS CORPORATION

Seattle Division: 1801 16th Avenue, S.W. • Seattle, Washington 98124 • MA 3-1635 (206)

28 June 1974

Mr. Thomas McCann
Department of Ecology
15345 NE 36th Street
Richmond, Wn 98052

RE: Chemical Treatment of TODD-operated Wooden Drydock; Scheduling

My dear Mr. McCann:

We plan to treat the second of our two wooden drydocks with sodium-arsenite solution in accordance with the provisions of our current Waste Discharge Permit, No. 4110, following the schedule set forth below:

- 8 July 1974; forenoon -- Make physical set-up and check of charging-drums and piping array
- 1130 ----- Introduce sodium arsenite into drydock chambers


- 11 July 1974; 1330 ----- Flood drydock chambers to achieve maximum dilution of sodium arsenite solution preparatory to pumping-out drydock chambers
- 1430 ----- Pump-out drydock. Treatment complete.

Discharge of the diluted treatment solution will be during the early phase of an ebb tide having a range of 7.9 feet.

We hope that this schedule will not be changed by reason of emergent drydocking of vessels or other untoward incidents, and that your monitoring teams will find the hours convenient. We shall welcome them, offering all possible assistance, and, should some unforeseen event necessitate a change of plan, we'll advise your office and the Olympia office without delay.

Very truly yours,

TODD SHIPYARDS CORPORATION
Seattle Division


H. L. Wood
Facilities Manager

RECEIVED

JUL 1 1974

DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

HLW:mc

cc: Mr. Ron Pine, Olympia Office