

DEPARTMENT OF ECOLOGY

October 29, 1996

TO: Dave Jansen
Toxics Cleanup Program, SWRO

FROM: Pam Marti *PM*
Environmental Investigations & Laboratory Services

SUBJECT: Toftdahl Drum Ground Water Monitoring, June 24, 1996

The attached document summarizes the findings from the latest sampling at the Toftdahl Drum site, conducted on June 24, 1996.

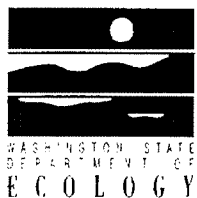
Copper and zinc were detected in the domestic wells at concentrations well below state and federal drinking water standards. Observed concentrations are consistent with previous sampling results; copper and zinc are the only analytes that are regularly detected in the private wells. These occurrences are probably related to well construction and plumbing materials.

I will be sending letters to the homeowners describing their results. The next sample round will be conducted in June 1997.

If you have any questions or comments please call me at 407-6768.

PM:jl

cc: Larry Goldstein



Toftdahl Drum Site Ground Water Monitoring June 24, 1996

Summary

This progress report is one in a series describing the results of ground water sampling at the Toftdahl Drums site near Vancouver, Washington (Chern, 1990; Marti, 1990 - Marti, 1995). Ground water samples were collected from four domestic water supply wells located near the former Toftdahl Drum site on June 24, 1996. This sampling is part of the routine ground water monitoring conducted at the site since 1987.

Samples were collected and analyzed for chromium, copper, lead, and zinc. Low concentrations of copper and zinc were detected in the domestic wells. These concentrations were all well below state and federal drinking water standards. Observed concentrations are consistent with previous sampling results; copper and zinc are the only analytes that are regularly detected in the private wells. These occurrences are probably related to well construction and plumbing materials.

Site Background

In the early 1970s, about 200 drums containing unknown quantities and types of waste were cleaned for resale on the Toftdahl property. Approximately 50 drums contained residual industrial wastes and could not be sold. These drums were buried on-site (see Figure 1). In 1985, the buried drums and wastes were removed. A Remedial Investigation conducted after drum removal concluded that no significant soil or ground water contamination existed.

Ecology has conducted routine ground water monitoring at the site since 1987. Ground water monitoring was conducted for all priority pollutants semi-annually for five years, ending in April 1991. Currently, samples are collected annually from four domestic water supply wells located near the former Toftdahl Drum Site. Each year the sample program

is re-evaluated to determine if it should be expanded based on the current year's sampling results. Routine monitoring is scheduled for the next four years, ending in 2001 as required by the Record of Decision. At the completion of the monitoring period, if no contaminants are observed other than copper, zinc and lead, long-term monitoring should be discontinued.

The hydrogeology of the site was described in detail in the Final Remedial Investigation (Dames & Moore, 1986) and is summarized as follows. Based on on-site well logs, two aquifer systems, designated the "shallow" (7 to 30 feet) and "deep" (69 to 98 feet) aquifers, have been identified beneath the Toftdahl Drum site. All four of the domestic wells that are sampled are drilled in the deep aquifer and range in depth from 72 to 110 feet. Both the shallow and deep aquifer systems consist of several discontinuous water-bearing zones separated by layers of clay and silt. The Boone well is considered to be upgradient of the site and the Bedoff, Homala and Kyle wells downgradient. Figure 1 shows the locations of the sampled wells and the approximate ground water flow direction.

Results

Field Observations

Table 1 lists field observation data: pH, temperature, specific conductance and purged volume. The average temperature was 11.4°C and pH ranged from 6.5 to 7.0, which are typical values for western Washington. Specific conductance ranged from 100 to 134 umhos/cm which represents ground water with low dissolved solids.

Laboratory Results

Table 1 summarizes laboratory results. Low concentrations of copper and zinc were detected in both the up- and downgradient wells. These concentrations were all below state and federal drinking water standards (Table 1). Observed concentrations are consistent with previous sampling results; copper and zinc are the only analytes that are regularly detected (Table 2). The laboratory reporting sheets are presented in Appendix A.

Methods

Ground Water Sampling

The four domestic wells were sampled from upgradient (Boone) to downgradient (Bedoff, Homala, and Kyle). Prior to sample collection, domestic wells were purged by allowing taps to run until pH, temperature, and specific conductance measurements stabilized. Samples were then collected from the tap nearest the well. All wells were sampled for selected total metals including chromium, copper, lead and zinc. Metal samples were preserved with 1 mL of nitric acid to a pH < 2.

Chain-of-custody procedures were followed in accordance with Manchester Laboratory protocol (Ecology, 1994). All samples were analyzed by the Ecology/EPA Laboratory in Manchester. Samples were analyzed for total recoverable metals using EPA Methods 200.7 and 239.2 (EPA, 1983).

Quality Assurance

Randy Knox of Manchester Laboratory evaluated laboratory quality assurance. His memorandum and the quality assurance results are included in Appendix A. The quality of the results are good with the following exceptions. Both lead and chromium were found in the procedure blanks at levels only slightly greater than the usual reported detection level. Lead data is qualified with a "B" since the sample results are less than five times the concentration detected in the blanks. The reported detection level for chromium was raised slightly to 7 µg/L. With this detection level chromium data is not qualified. The minimum quantitation limit for metals is ten times the instrument detection limit. All spike recoveries were within acceptable limits of 75-125%. Relative percent difference (%RPD) for a spike and spike duplicate was within ±20%.

In addition to laboratory calibration standards and method blanks, field quality assurance samples consisted of a blind duplicate. A blind duplicate sample, labeled "Smith", was collected from the Kyle well. Duplicate samples are two sets of samples collected from a well at the same time and submitted to the laboratory with different identification. The relative percent difference of the blind duplicate samples (Kyle and Smith) was within ±15%, and satisfying data quality objectives.

References

Chern, L., 1990. Toftdahl Drum Site Monitoring Round I - October, 1989. Department of Ecology - Environmental Investigations.

Dames and Moore, 1986. Final Report Remedial Investigation for the Toftdahl Drum Site. Volumes I&II, July 17, 1986.

Marti, P., 1990. Toftdahl Drum Site Monitoring Round II - April, 1990. Department of Ecology - Environmental Investigations.

Marti, P., 1991. Toftdahl Drum Site Monitoring Round III - October, 1990. Department of Ecology - Environmental Investigations.

Marti, P., 1992. Toftdahl Drum Site Monitoring Round IV - April, 1991. Department of Ecology - Environmental Investigations.

Marti, P., 1992. Toftdahl Drum Site Monitoring Round V - April, 1992. Department of Ecology - Environmental Investigations.

Marti, P., 1993. Toftdahl Drum Site Monitoring Round VI - April, 1993. Department of Ecology - Environmental Investigations.

Marti, P., 1995. Toftdahl Drum Site Monitoring Round VII - June, 1994. Department of Ecology - Environmental Investigations.

Marti, P., 1995. Toftdahl Drum Site Monitoring Round VIII - July, 1995. Department of Ecology - Environmental Investigations.

U.S. Environmental Protection Agency, 1983. Methods for the Chemical Analysis of Water and Wastes. Environmental Monitoring and Support Laboratory, March 1983.

Washington State Department of Ecology, 1994. Manchester Environmental Laboratory - Laboratory Users Manual. Edited by D. Huntamer and J. Hyre.

Contacts

Pam Marti Washington State Department of Ecology
 Environmental Investigations and Laboratory Services
 Toxics Investigations Section
 (360) 407-6768

For additional copies of this publication, please contact Ecology's Publications Distribution Office at (360) 407-7472 and refer to publication number 96- 346.

The Department of Ecology is an equal opportunity agency and does not discriminate on the basis of race, creed, color, disability, age, religion, national origin, sex, marital status, disabled veteran's status, Vietnam Era veteran's status or sexual orientation.

If you have special accommodation needs or require this document in alternative format, please contact Joan LeTourneau at (360) 407-6764 (voice) or (360) 407-6006 (TDD).

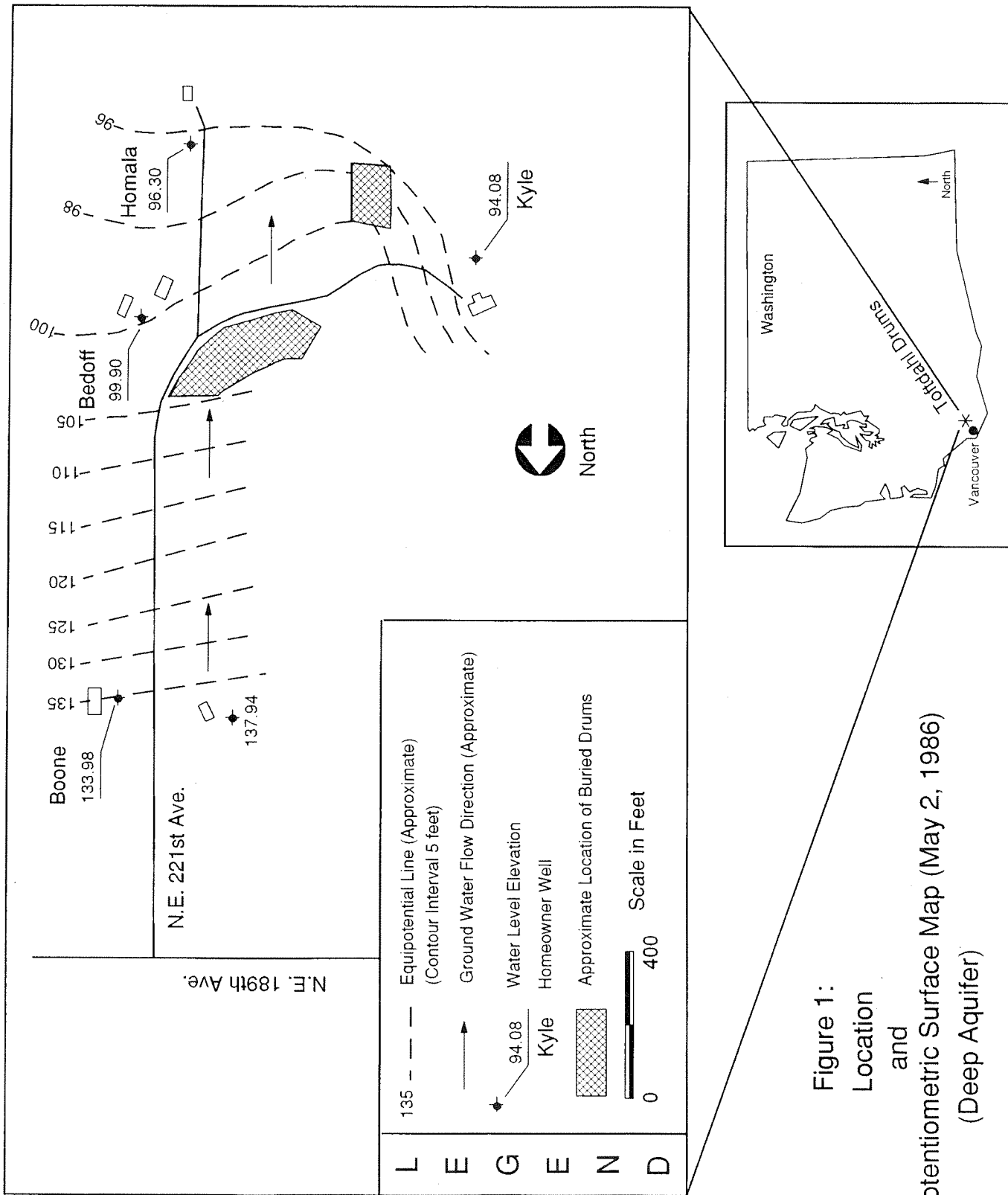


Figure 1:
Location
and
Potentiometric Surface Map (May 2, 1986)
(Deep Aquifer)

Table 1: Summary of Field Parameters and Detected Analytes from June 24, 1996

Location	pH (s.u.)	Temperature (°C)	Specific Conductance (umhos/cm)	Purge Volume (gallons)	Copper (ug/L)	Zinc (ug/L)	Lead (ug/L)	Chromium (ug/L)
Boone	6.5	11.9	122	100	37.4	46.2	2.0 B	7.0 U
Bedoff	7.0	11.7	134	100	58.1	13.0	4.1 B	7.0 U
Kyle	6.8	11.5	100	130	32.8	21	1.8 B	7.0 U
Smith (duplicate)	--	--	--	--	28.0	19	1.6 B	7.0 U
Homala	6.9	10.6	100	100	21	26	1.8 B	7.0 U
Maximum Contaminant Level (MCL)	--	--	--	--	1000 **	5000 **	50 *	50 *

U: The compound was not detected at or above the associated numerical value.

B: Analyte was also detected in the analytical method blank.

--: Not Analyzed

*: Primary Maximum Contaminant Levels (MCL) are based on chronic and acute health effects.

** : Secondary Maximum Contaminant Levels (MCL) are based on aesthetic factors such as taste.

Table 2: Summary of Sampling Results from September 1988 to June 1996

	Boone	Bedoff	Kyle	Smith	Homala	MCL's
September 12, 1988						
Copper	76	121	42	--	--	1000**
Zinc	389	6	52	--	--	5000**
October 17, 1989						
Copper	50	50	30	--	ND	1000**
Zinc	290	ND	20	--	20	5000**
Mercury	0.06 U	0.06 U	0.1 B	--	0.16 B	2.0*
April 11, 1990						
Copper	77.6	37.6	46.1	46.1	3.3 J	1000**
Zinc	160	5.0 U	31 B	22 JB	80.3	5000**
Mercury	0.05 J	0.08 J	0.04 J	0.02 U	0.04 J	2.0*
October 23, 1990						
Copper	83.9	45.9	25.8	28.4	2.0 U	1000**
Zinc	480	6.2 JB	12 JB	15 JB	34.0	5000**
Chromium	6 J	5.0 U	5.0 U	5.0 U	5.0 U	50*
Lead	1.1 J	1.0 U	1.0 U	1.0 U	1.5 J	50*
April 23, 1991						
Copper	120	58.4	64.1	61.9	2.0 U	1000**
Zinc	178	5.5 J	19 J	22	64.3	5000**
Lead	1.2 J	20 U	2.4 J	NAR	NAR	50*
April 14, 1992						
Copper	50.5	48.8	45.1	45.0	7.4 P	1000**
Zinc	112	4.0 U	26	25	55.4	5000**
Lead	1.0 U	2.7	1.0 U	1.0 U	1.0 U	50*
April 6, 1993						
Copper	41.5	32.4	61.6	64.5	4.0 P	1000**
Zinc	91.8 B	4.0 J	37.4 B	38.4 B	56.2 B	5000**
Lead	20 U	20 U	20 U	20 U	20 U	50*
June 21, 1994						
Copper	54.8	40 P	37 P	42.1	6 P	1000**
Zinc	86.8	4.0 U	22 P	23 P	17 P	5000**
Lead	1.9 P	1.0 U	2.1 P	1.0 U	1.0 P	50*
July 17, 1995						
Copper	41.7 P	33.4 P	31.9 P	34.8 P	12 P	1000**
Zinc	47.3	4.0 U	19 P	21 P	22 P	5000**
Lead	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	50*
June 24, 1996						
Copper	37.4	58.1	32.8	28	21	1000**
Zinc	46.2	13.0	21	19	26	5000**
Lead	2.0 B	4.1 B	1.8 B	1.6 B	1.8 B	50*

--: Not analyzed

J: Estimated Value

ND: Not Detected

U: The compound was not detected at or above the listed numerical value.

B: Analyte was also found in an analytical blank.

P: Analyte detected above the instrument detection limit but below the minimum quantitation limit.

*: Primary Maximum Contaminant Levels (MCL) are based on chronic and acute health effects.

** : Secondary Maximum Contaminant Levels (MCL) are based on factors such as taste, odor or color.

APPENDIX A

Analytical Results
Toftdahl Drums
June 24, 1996

July 18, 1996

To: Pam Marti

From: Randy Knox, ^{RJK}Metals Chemist

Subject: Toftdahl Drums Project Water

QUALITY ASSURANCE SUMMARY

Data quality for this project is generally good except traces of lead and chromium are found in the procedure blank. No other significant quality assurance issues are noted with the data.

SAMPLE INFORMATION

The samples from the Toftdahl Drums were received by the Manchester Laboratory on 6/25/96 in good condition.

HOLDING TIMES

All analyses were performed within the USEPA Contract Laboratory Program (CLP) holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification standards were within the relevant USEPA (CLP) control limits. AA calibration gave a correlation coefficient (r) of 0.995 or greater, also meeting CLP calibration requirements.

Manchester Environmental Laboratory
Department of Ecology
Analysis Report for
Inductively Coupled Plasma, Total Recoverable

Project Name: Toftdahl Drums

LIMS Project ID: 1425-96

Sample: BLN62201

Method: EPA200.7

Blank ID: WPB2701

Date Prepared: 07/03/96

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/08/96

Units: ug/L

Analyte	Result	Qualifier
---------	--------	-----------

Chromium	7	U
----------	---	---

Copper	3	U
--------	---	---

Zinc	4	U
------	---	---

Authorized By: Randy S. Knox

Release Date: 7/18/96

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Inductively Coupled Plasma, Total Recoverable

Project Name: Toftdahl Drums

LIMS Project ID: 1425-96

Sample: 96268005

Date Received: 06/25/96

Method: EPA200.7

Field ID: BOONE

Date Prepared: 07/03/96

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/08/96

Units: ug/L

Analyte	Result	Qualifier
---------	--------	-----------

Chromium	7	U
----------	---	---

Copper	37.4	
--------	------	--

Zinc	46.2	
------	------	--

Authorized By: Randy S. Knox

Release Date: 7/18/96

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Inductively Coupled Plasma, Total Recoverable

Project Name: Toftdahl Drums

LIMS Project ID: 1425-96

Sample: 96268006 (Matrix Spike - LMX1)

Date Received: 06/25/96

Method: EPA200.7

Field ID: BEDOFF

Date Prepared: 07/03/96

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/08/96

Units: % Recovery

Analyte	Result	Qualifier
Chromium	104	
Copper	105	
Zinc	108	

Authorized By: Randy J Knox

Release Date: 7/18/96

Page:

2

Manchester Environmental Laboratory
Department of Ecology
Analysis Report for
Inductively Coupled Plasma, Total Recoverable

Project Name: Toftdahl Drums	LIMS Project ID: 1425-96	
Sample: 96268007	Date Received: 06/25/96	Method: EPA200.7
Field ID: HOMALA	Date Prepared: 07/03/96	Matrix: Water
Project Officer: Pam Marti	Date Analyzed: 07/08/96	Units: ug/L

Analyte	Result	Qualifier
Chromium	7	U
Copper	21	
Zinc	26	

Authorized By: Randy J. Knox

Release Date: 7/18/96

Manchester Environmental Laboratory
Department of Ecology
Analysis Report for
Inductively Coupled Plasma, Total Recoverable

Project Name: Toftdahl Drums

LIMS Project ID: 1425-96

Sample: 96268009

Date Received: 06/25/96

Method: EPA200.7

Field ID: SMITH

Date Prepared: 07/03/96

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/08/96

Units: ug/L

Analyte	Result	Qualifier
---------	--------	-----------

Chromium	7	U
----------	---	---

Copper	28	
--------	----	--

Zinc	19	
------	----	--

Authorized By: Randy L Knox

Release Date: 7/18/96

Page: 1