

**REPORT
OF
PHASE II ENVIRONMENTAL ASSESSMENT**

**TO
YAKIMA COUNTY PUBLIC WORKS
ROOM 408 COURTHOUSE
YAKIMA, WASHINGTON 98901**

**PHASE II
ENVIRONMENTAL SITE ASSESSMENT
FORMER CREST LINEN SITE
YAKIMA, WASHINGTON 190-1961**

**PREPARED
BY
CHEN-NORTHERN, INC.
CONSULTING ENGINEERS & SCIENTISTS**

FEBRUARY 1991

This document was part of the official
Administrative Record for the Yakima
Railroad Area on October 31, 1996.
Washington State
Department of Ecology

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February 7, 1991

Yakima County Public Works Department
Room 408 Courthouse
Yakima, WA 98901

Attn: Mr. Daniel L. Hesse, P. E.

Subject: Phase II Environmental Site Assessment of the Former
Crest Linen Site, Yakima, Washington.

Gentlemen:


At your request and in accordance with our proposal dated October 17, 1990, a Phase II limited site assessment has been completed for the Crest Linen site in Yakima, Washington. Four borings were drilled and soil and groundwater samples were collected for laboratory analysis.

Samples from the excavations were submitted for analysis of total recoverable petroleum hydrocarbons (TRPH) EPA method 418.1, volatile organic constituents EPA method 8020 and 602, solvents, pesticides and herbicides. Elevated concentrations of tetrachloroethene (PCE) were found in the groundwater samples from two borings. Concentrations of PCE in the boring near the center of the Crest Linen site are above the Washington State Department of Ecology Method A Cleanup Levels.

This report describes in detail our investigation and summarizes our findings. We have provided several recommendations based on the results of this investigation.

If you have any questions regarding the contents of this report, please contact us at your convenience.

Respectfully,
Chen Northern, Inc.



Dee J. Burrie P.E.
Division Manager



Gerald G. Harper R.G.
Hydrogeologist

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1.0 INTRODUCTION

Our initial Phase I investigation of the Crest Linen Site in Yakima, Washington, revealed that adjacent or prior land use may have impacted the site. The site was previously a cleaning/laundry facility, a site of a service station and is presently near several retail gasoline facilities. To assist Yakima County in their assessment of the site as a suitable building site, a Phase II investigation was undertaken. Four borings were drilled at the site (Figure 1, Appendix A). In conjunction with this investigation, similar field activities were undertaken at the Safeway site adjacent to Crest Linen.

Soil and groundwater samples were collected from each boring and submitted for laboratory analysis. Analyses included total petroleum hydrocarbons (TPH), volatile organic constituents (BTEX), solvents, pesticides and herbicides.

2.0 SITE DESCRIPTION

As stated in our previous report, the Crest Linen site is located near the Yakima Central Business District in the NW 1/4 of Section 19, Township 13 North, Range 19 East, Yakima County, Washington (Appendix A, Figure 1). A site sketch with approximate boring locations is presented in Appendix A, Figure 2. During our field activities at the site, the Crest Linen Building was demolished. Parts of the foundation and below grade structures were still present upon completion of the borings.

2.1 GEOLOGY

The City of Yakima is situated on the western edge of the Columbia Plateau physiographic province and near the eastern foothills of

the Cascade Range. The Cascade Range and adjacent highlands are primarily composed of basalts and andesites. The Columbia Plateau is comprised of a series of flood basalts which cover most of central and eastern Washington. The basalt flows of the Columbia Basalt Group are Miocene in age, forming an extensive volcanic plateau (Camp, et. al., 1982). The Columbia River flood basalts are overlain by alluvial deposits within the study area.

The subsoil at the site is primarily alluvial material associated with the ancestral Yakima River. The current Yakima River channel is approximately two miles east of the subject site. The alluvial deposits in this area are well graded gravel with sand and silt.

3.0 FIELD ACTIVITIES

The Phase II field activities included drilling four six-inch diameter borings at the site using a cable tool drill rig. Six-inch diameter steel casing was advanced during drilling to maintain the integrity of the borings and to assist in collecting representative samples. The boring depths ranged from 18 to 20.5 feet. Groundwater was encountered in each of the borings. The borings were logged by our representative and soils were visually classified in general accordance with the ASTM Standards D2487, which is based on the Unified Soil Classification System (Logs, Appendix B).

Soil samples and groundwater samples were collected from each location for laboratory analyses. Soils were scanned with a photoionization detector (PID) for indication of volatile organic constituents. This method is considered representative of field conditions, however, concentrations detected and instrument readings are dependent on the chemical nature of any contaminant, and the field conditions including wind, temperature and humidity.

Headspace samples were prepared by placing representative soil samples in a clean glass container, covering the container with aluminum foil and sealing the container. The samples were warmed to room temperature (approximately 75 degrees F.); volatile organic constituents present will volatilize at this temperature. The headspace of each sample is then measured with the PID to detect volatile compounds.

A pressure washer was used to decontaminate the downhole drilling equipment prior to mobilizing on site and between each excavation. Additionally, stringent quality control protocols were used in decontaminating the sampling equipment prior to collecting the groundwater samples.

3.1 FIELD OBSERVATIONS

The subsoils at the site were dense well graded gravel with sand and silt (Logs, Appendix B). The groundwater was encountered in each boring between 16.5 and 18.5 feet. Based on our experience in the area and regional information from representatives of the Department of Ecology we expect the groundwater flow to be towards the southeast.

Visual staining and odor were not observed in any of the excavations. PID and headspace measurements ranged from less than 1 to 49 parts per million (ppm) (Logs Appendix D and Appendix C).

4.0 ANALYTICAL RESULTS

Representative soil and groundwater samples were collected from each boring and submitted to the laboratory for analysis (Appendix D). Analyses included total recoverable petroleum hydrocarbons (TRPH) EPA Method 418.1, volatile organic constituents (BTEX -

benzene, toluene, ethylbenzene and xylense) EPA Method 8020 and 602, and solvents method 8010 and 601. Samples from Borings 1 and 6 were also analyzed for pesticides and herbicides. The laboratory results are attached in Appendix D and are summarized in Tables 1 and 2.

TABLE 1
Summary of Analytical Test Results

VOLATILE ORGANIC CONSTITUENTS
(Soil-mg/kg & Water mg/l)1&2

SAMPLE LOCATION & SAMPLE TYPE	TPH (mg/kg or mg/l) 1&2	Benzene	Toluene	Ethyl- benzene	Total Xylenes
Boring 1 - Soil	*	<0.001	<0.001	<0.001	<0.001
Boring 1 - Water	0.25	<0.001	0.003	<0.001	<0.001
Boring 2 - Soil	<0.04	<0.002	<0.002	<0.002	<0.002
Boring 2 - Water	<0.10	U	0.0007	U	0.0039
Boring 3 - Soil	<0.2	<0.002	<0.002	<0.002	<0.002
Boring 3 - Water	<0.01	<0.001	<0.001	<0.001	<0.001
Boring 6 - Soil	*	*	*	*	*
Boring 6 - Water	<0.01	<0.001	<0.001	<0.001	<0.001

1 = Results of soil samples are expressed as a dry weight basis in milligrams per kilogram (parts per million).

2 = Results of water samples are expressed as milligrams per liter (parts per million).

* = Not Analyzed

U = Compound analyzed for but undetected.

The concentration of total petroleum hydrocarbons and volatile organic constituents were undetected or detected at low concentrations. The detected concentrations are below the Washington State Department of Ecology Method A Cleanup Levels established in The Model Toxic Control Act. The level of xylenes detected in the water sample from boring 2 approach the method A cleanup level of 5 parts per billion (ppb).

Laboratory analyses for solvents, pesticides and herbicides indicates three solvents were encountered in the downgradient borings at the site. Tetrachloroethene (PCE) was encountered in the soil samples from Boring 6 and in the water samples from Boring 3 and 6. The concentrations of PCE in the soil sample were below the Washington State Department of Ecology Method A cleanup level. The PCE concentration in the water sample from Boring 6 is above the cleanup level of 5 parts per billion. Boring 6 was drilled near the drain area of the former Crest Linen site. The PCE concentrations in the water sample from Boring 3, near the southern boundary in an apparent downgradient position, was below the state guidelines.

Chloroform was also detected in the water samples from the three down gradient wells at the site. Chloroform is not listed among the DOE Method A Hazardous substances. The Environmental Protection Agency National Primary Drinking Water Regulations (NPDWR) list includes Total Trihalomethanes which is a sum of several substances including chloroform. The NPDWR maximum contaminant level for Total Trihalomethanes is 100 ppb. The level of chloroform (trihalomethanes) observed at the Crest Linen Site is below the EPA guidelines.

TABLE 2
SUMMARY OF ANALYTICAL RESULTS
SOLVENTS, PESTICIDES AND HERBICIDES

SAMPLE LOCATION & SAMPLE TYPE	SOLVENTS (8010/601) 1&2	PESTICIDES (8080) 1&2	HERBICIDES (8150) 1&2
Boring 1 - Soil	U	n.a.	n.a.
Boring 1 - Water	U	+Dieldrin - 0.0008 +Endrin - 0.0009 +Endosulfan Sulfate - 0.0003 +Endrinetone - 0.0003 All Others Undetected	
Boring 2 - Soil	U	n.a.	n.a.
Boring 2 - Water	Chloroform - 0.004 *Dichloromethane - 0.0027 All Others Undetected	n.a.	n.a.
Boring 3 - Soil	*Dichloromethane - 0.0005 All Others Undetected	n.a.	n.a.
Boring 3 - Water	Chloroform - 0.005 Tetrachloroethene - 0.0011 All Others Undetected	n.a.	n.a.
Boring 6 - Soil	Tetrachloroethene - 0.0010 All Others Undetected	U	U
Boring 6 - Water	Chloroform - 0.009 Tetrachloroethene - 0.0078 All Others Undetected	U	U

1 = Results of soil samples are expressed as a dry weight basis in milligrams per kilogram (parts per million).

2 = Results of water samples are expressed as milligrams per liter (parts per million).

n.a = Compounds not analyzed for

U = Compound analyzed for but undetected.

+ = Compound detected below the practical quantitation limit.

* = Compound found in blank and sample.

Dichloromethane was also observed in two borings at low concentrations. This solvent was also detected in the method blank during analysis indicating possible laboratory bias. Based upon our review of present regulations and literature, a cleanup level or a maximum contaminant level is not specified for this substance. However, drinking water regulations do require monitoring for this substance

Other solvents were not detected in analysis of soil and water samples.

Laboratory analysis indicate herbicides and pesticides are not present in Boring 6. Four pesticides were detected in Boring 1, upgradient of the Crest Linen Site. The pesticides were detected below the practical quantitation limit. Endrin is the only one of the four pesticides detected that is included on the NPDWR list.

5.0 CONCLUSIONS

Based on our Phase I investigation, our field investigation and subsequent laboratory analysis of soil and water samples, it appears that previous site activities may have impacted the site. The presence of tetrachloroethene encountered at the site and in down gradient wells may be associated with the laundry facility activities. Tetrachloroethene is a common solvent used in the dry cleaning process

The Department of Ecology and the EPA has identified an area of elevated levels of tetrachloroethene and trichloroethene approximately 1/2 mile south of the subject site (Yakima Soil Gas Study, Ecology and Environment, Inc., 1989). The absence of PCE in the upgradient boring and the present limits of the identified area of elevated concentrations of PCE and TCE located south of the subject site suggest a local source.

The properties of tetrachloroethene are significant since the compound is denser than water (PCE S.G.= 1.63). The concentration of PCE could theoretically increase with depth within the aquifer. The concentration of PCE appears to be at a level below the cleanup standards at the property boundary.

Other substances tested for were either undetected or detected below present action levels.

6.0 RECOMMENDATIONS

Based on the concentration of PCE detected in water samples from Boring 6 and current regulations, the site would require remediation to Method A cleanup standards or to utilize Method B to define site specific cleanup levels (WAC 173-340-720 and 730). Method B requires site characterization with a risk assessment that suggests alternate cleanup levels. Our previous field activities may satisfy many of the DOE requirements for site characterization. Based on the density of PCE being greater than water, the DOE may require definition of the vertical distribution of PCE in the aquifer.

The following are alternative activities that may be accomplished to assist in your continued plans.

- 1 Further characterization is suggested to indicate if the contamination is from previous site activities or if an upgradient source exists. Crest Linen may be held responsible for these activities if they are determined to be the liable party.
- 2 A preliminary risk assessment could be completed to determine the human health risk to exposure through drinking water sources. Again, a determination of the vertical distribution of the contaminant in the aquifer would be necessary. This

would entail installing deep monitoring wells and sampling of the groundwater for analysis of PCE.

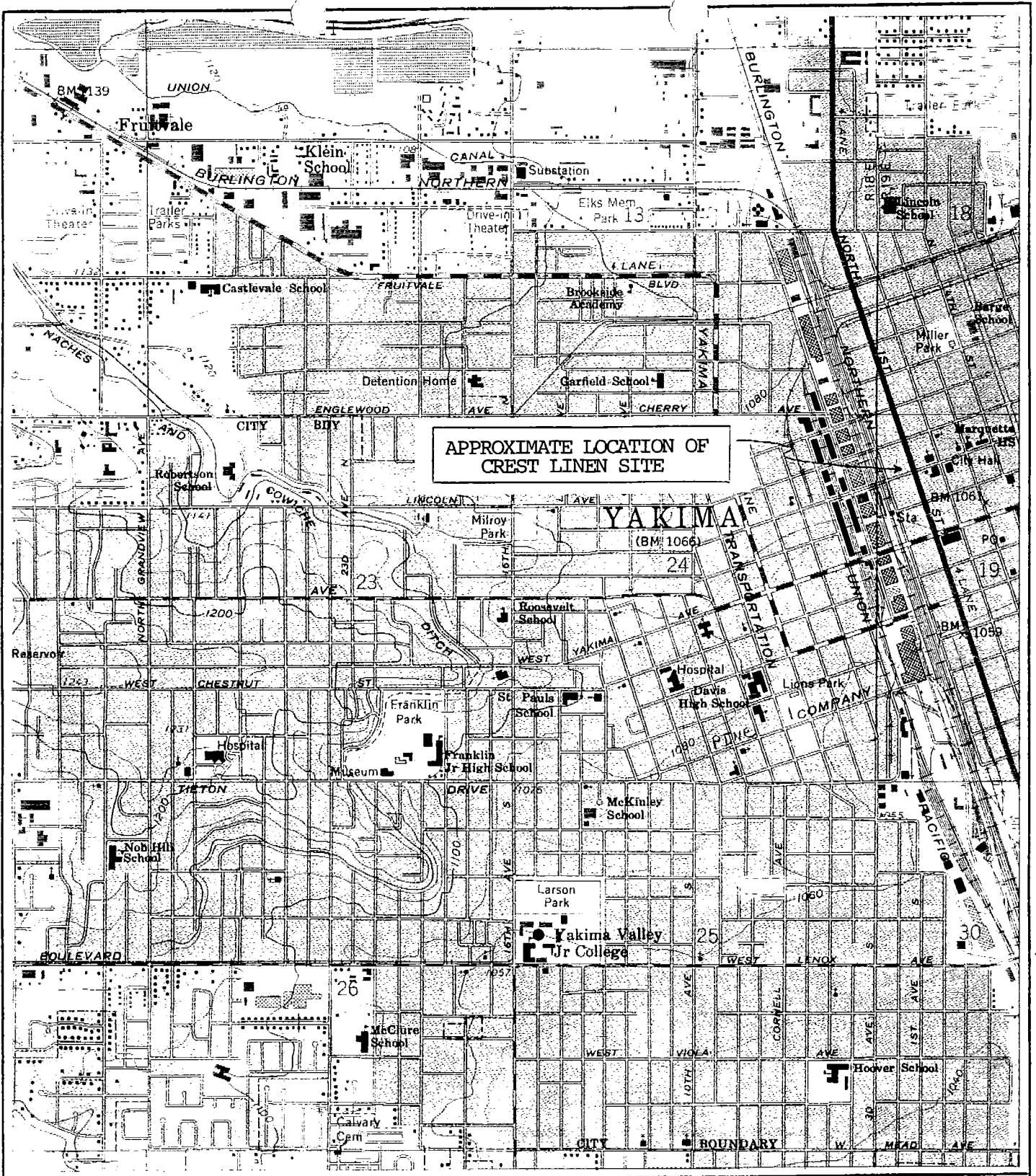
3. Institutional controls may be allowed by the Department of Ecology if a serious risk to human health is not suspected. Institutional monitoring includes restricting the land use (domestic water well installation) to minimize health risk.
4. Cleanup of the site through active treatment of the groundwater.

Compliance monitoring of the groundwater will likely be required regardless of the option chosen. Due to the cost of remediating a site and the question of responsible parties, an environmental attorney should be consulted prior to initiating site remediation activities.

7.0 LIMITATIONS

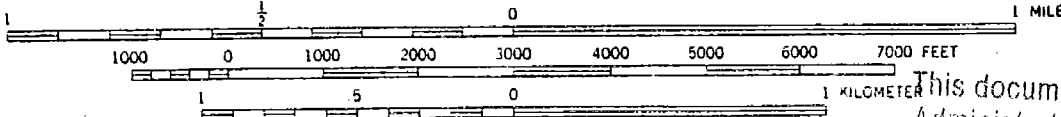
The environmental assessment for this site was performed in accordance with the generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. Chen-Northern observed that the degree of care and skill generally exercised by other consultants under similar circumstances and conditions. Chen-Northern's findings and conclusions must be considered not as scientific certainties, but as opinions based on our professional judgement concerning the significance of the data gathered during the course of the monitoring. Other than this, no warranty is implied or intended.

APPENDIX A
STATE MAPS



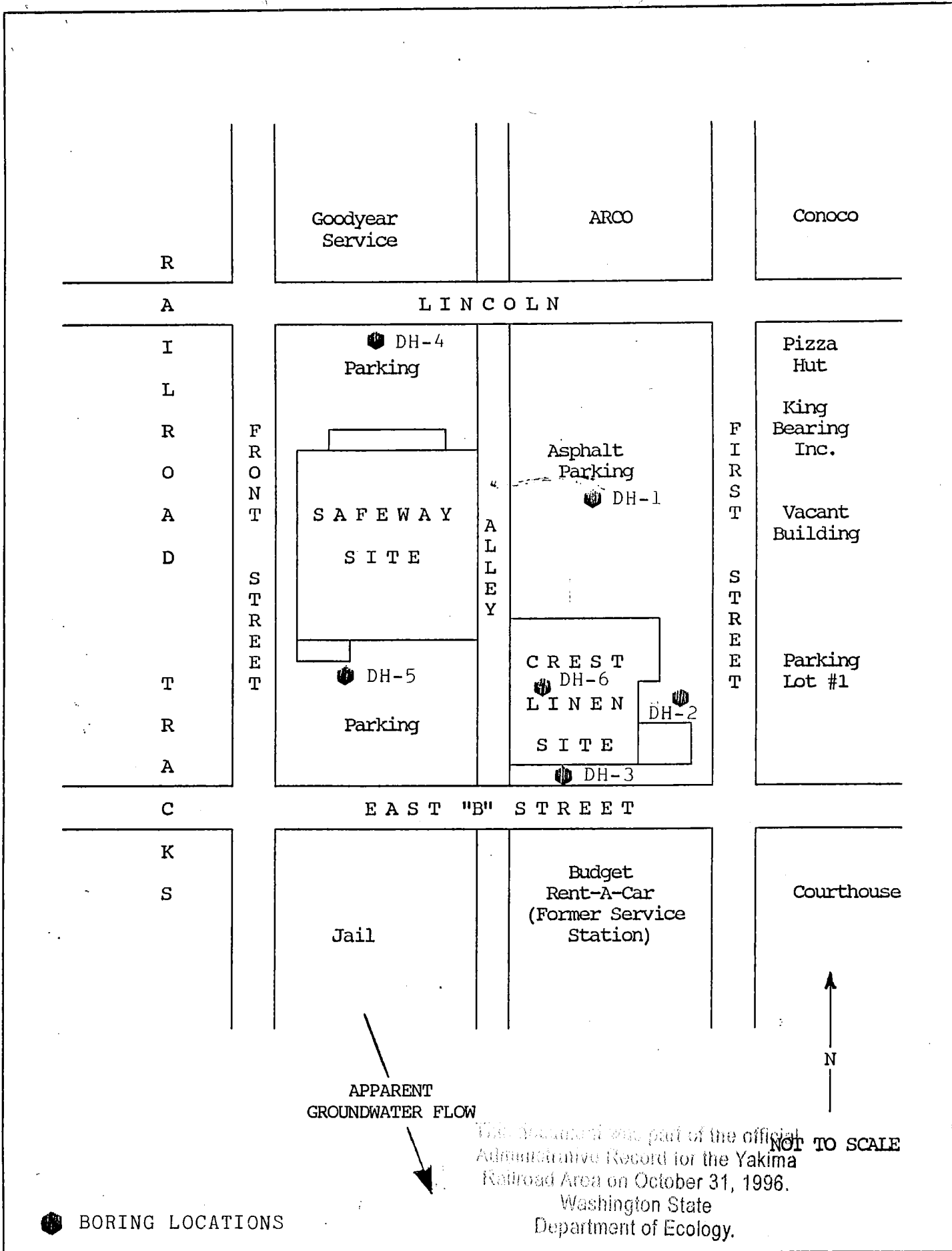
APPROXIMATE LOCATION OF
CREST LINEN SITE

SCALE 1:24 000



CONTOUR INTERVAL 20 FEET
 DOTTED LINES REPRESENT 10-FOOT CONTOURS
 DOTTED LINES CROSSING RIVERS REPRESENT 5-FOOT CONTOURS
 NATIONAL GEODETIC VERTICAL DATUM OF 1929

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APPENDIX B
LOGS

This document was part of the
archive records for the Yakima
National Forest on October 3, 1993
at the Washington State
Department of Ecology

Cohen-Northern, Inc.

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LOG OF EXPLORATION BORING

PROJECT: Yakima County Public Works
 Crest Linen Site
 JOB NO.: 190-1961
 DRILL TYPE: SOIL Cable Tool
 ROCK
 DRILLED BY: Russell Vance
 LOGGED BY: Ken Lane
 REMARKS:

HOLE NO. DH-1
 SHEET 1 OF 2
 LOCATION: Parking lot North of Crest Linen
 ELEVATION: TOP OF HOLE N/A
 GROUNDWATER 18.0 (12-15-90)
 DATE: HOLE STARTED 12-12-90
 COMPLETED 12-15-90

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	DEPTH	HEADSPACE PPM	LL %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		ASPHALT	Continuous									
0.7		FILL: GRAVEL	Sampling									
0.9		SILT, with Sand and Gravel, firm, moist, non-plastic, Brown										
					5.0	13.3						
7.0		Sandy GRAVEL, dense, moist, Non-plastic, brown-gray			7.0	12.1						
					9.0	14.6						
					10.0	12.2						
					11.0	4.1						
					12.0	0.0						
					13.0	0.0						
14.2		Well Graded SAND with Gravel, dense, moist, non-plastic, brown			15.0	5.8						
					17.0	3.8						
18.0		Sandy GRAVEL, dense saturated, non-plastic, brown			18.0	12.3						
		Groundwater Encountered 12-15-90			19.0	5.0						

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 Washington State Department of Ecology.

OF EXPLORATION BORING

JOB NO. 190-1961

HOLE NO. DH-1

SHEET 2 OF 2

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S P T (N) (BLOWS FT.)	DEPTH	HEADSPACE PPM	LL %	PI %	GRAVEL %	SAND %	SILT %	CLAY %
20.5	S.S. D	Bottom of Hole			20.0	6.9						

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LOG OF EXPLORATION BORING

PROJECT: Yakima County Public Works
 Crest Linen Site
 JOB NO.: 190-1961
 DRILL TYPE: SOIL Cable Tool
 ROCK
 DRILLED BY: Russell Vance
 LOGGED BY: Ken Lane
 REMARKS:

HOLE NO. DH-2
 SHEET 1 OF 1
 LOCATION: See Site Map
 ELEVATION: TOP OF HOLE N/A
 GROUNDWATER 17.5'
 DATE: HOLE STARTED 12-17-90
 COMPLETED 12-17-90

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	DEPTH	HEADSPACE PPM	LL %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		ASPHALT	Continuous									
0.2		FILL: GRAVEL	Sampling									
0.5		Sandy GRAVEL, moderately dense, moist, non-plastic, brown			2.5	29.8						
3.5		Silty SAND, moderately dense, moist, non-plastic, brown			5.0	7.8						
					6.5	11.6						
8.5		Sandy GRAVEL, moderately dense, slightly moist, non-plastic, brown			8.5	8.4						
					10.0	9.0						
					11.0	11.4						
					12.0	7.6						
					13.0	23.0						
					14.0	9.8						
					15.0	9.3						
					16.0	12.3						
					17.0	4.5						
17.5		Groundwater Encountered 12-17-90			17.5	27.7						
19.0		Bottom of Hole			19.0	19.1						

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Cher Northern, Inc.

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LOG OF EXPLORATION BORING

PROJECT: Yakima County Public Works
 Crest Linen Site
 JOB NO.: 190-1961
 DRILL TYPE: SOIL Cable Tool
 ROCK
 DRILLED BY: Russell Vance
 LOGGED BY: Ken Lane
 REMARKS:

HOLE NO. DH-3
 SHEET 1 OF 1
 LOCATION: See Site Map
 ELEVATION: TOP OF HOLE N/A
 GROUNDWATER 16.5
 DATE: HOLE STARTED 1-7-91
 COMPLETED 1-9-91

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	DEPTH	HEADSPACE PPM	LL %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		CONCRETE, side walk	Continuous									
0.3		FILL: GRAVEL	Sampling									
1.6		SILT with sand, firm, moist, low plasticity, brown.										
4.0		Sandy GRAVEL, Moderately, dense, moist, non-plastic, brown-gray			3.5	15.0						
					5.5	11.0						
					6.5	9.2						
					7.5	12.5						
					9.0	5.6						
					10.0	22.2						
					11.5	15.6						
					12.0	15.2						
					13.0	3.4						
					14.0	19.0						
					15.0	9.0						
					15.5	26.5						
16.5		Groundwater Encountered 1-8-91			16.5	12.7						
18.0		Bottom of Hole			18.0	28.2						

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LOG OF EXPLORATION BORING

PROJECT: Yakima County Public Works

HOLE NO. DH-6

JOB NO.: 190-1961

SHEET 1 OF 1

DRILL TYPE: SOIL Cable Tool

LOCATION: 78' N. of B ST. 30' E. of Alley

ROCK

ELEVATION: TOP OF HOLE N/A

DRILLED BY: Russ Vance

GROUNDWATER N/A

LOGGED BY: Ken Lane

DATE: HOLE STARTED 1-9-91

REMARKS:

COMPLETED 1-10-91

DEPTH (Feet)	LEGEND	CLASSIFICATION AND DESCRIPTION	SAMPLE SYMBOL	S.P.T. (N) (BLOWS/FT.)	MOISTURE CONTENT (%)	IN-PLACE DRY DENSITY (pcf)	LL %	P.I. %	GRAVEL %	SAND %	SILT %	CLAY %
0.0		DISTURBED Sandy GRAVEL										
0.2		CONCRETE										
0.5		Sandy SILT w/Gravel and Cobbles, firm very moist, brown										
4.0		Silty SAND, compact, very moist, brown										
7.0		Silty Sandy GRAVEL w/ Cobbles, loose compact; moist, brownish gray										
10.5		Sandy GRAVEL w/silt and cobbles, very loose, moist to very moist, brown										
		<p>This document was part of the official Administrative Record for the Yakima Railroad Area on October 31, 1996. Washington State Department of Ecology.</p>										
16.8		Groundwater Encountered										
19.0		Bottom of Hole										

APPENDIX C
PID ANALYSIS

PID ANALYSES

<u>LOCATION</u>	<u>DEPTH</u>	<u>HEADSPACE</u> <u>ppm¹</u>
BORING 1	2.7 - 5.0	13.3
	5.0 - 7.0	12.1
	7.0 - 9.0	14.6
	9.0 - 10.0	12.2
	10.0 - 11.0	4.1
	11.0 - 12.5	0.0
	12.5 - 13.0	0.0
	14.0 - 15.0	5.8
	15.0 - 17.0	3.8
	17.0 - 17.5	10.8
	17.5 - 18.0	12.3
	18.0 - 19.0	5.0
	19.0 - 20.0	6.9
BORING 2	0.5 - 2.5	29.8
	2.5 - 5.0	7.8
	5.0 - 6.5	11.6
	6.5 - 8.5	8.4
	8.5 - 10.0	9.0
	10.0 - 11.0	11.4
	11.0 - 12.0	7.6
	12.0 - 13.0	2.3
	13.0 - 14.0	9.8
	14.0 - 15.0	9.3
	15.0 - 16.0	12.3
	16.0 - 17.0	4.5
	17.0 - 17.5	27.7
17.5 - 19.0	19.1	
BORING 3	0.6 - 3.5	15.0
	4.0 - 5.5	11.0
	5.5 - 6.5	9.2
	6.5 - 7.5	12.5
	7.5 - 9.0	5.6
	9.0 - 10.0	22.2
	10.0 - 11.5	15.6
	11.5 - 12.0	15.2

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BORING 3 Cont.

12.0 - 13.0	3.4
13.0 - 14.0	19.0
14.0 - 15.0	9.0
15.0 - 15.5	26.5
15.5 - 16.5	12.7
16.5 - 17.0	12.7
17.0 - 18.0	28.2

BORING 6

0.5 - 1.5	48.0
1.5 - 4.0	42.2
4.0 - 6.0	38.0
6.0 - 8.0	24.8
8.5 - 10.5	22.7
14.0 - 18.0	28.4
18.0 - 19.0	29.1

1 parts per million (ppm)

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APPENDIX D
LABORATORY ANALYSIS AND CHAIN OF CUSTODY

SOIL ANALYSIS

YAKIMA PUBLIC WORKS (190-1961)
CHEN-NORTHERN, INC. - TRI-CITIES, WA

January 4, 1991
Job No. 87-92
Sheet 2 of 2

Lab No.:	110300	110301	110302	110303	110304	110305
Sample Description:	DH-2 13'-14'	DH-2 14'-15'	DH-2 15'-16'	DH-2 16.5'-17.5'	DH-1 12'-13'	DH-1 15'-16'
Date Sampled:	12/17/90	12/17/90	12/17/90	12/17/90	12/12/90	12/13/90
Collected by:	Danielson	Danielson	Danielson	Danielson	Danielson	Danielson

Total Volatile Organics, µg/kg

Benzene						
As received:	*	<2	*	*	*	<1
Dry basis:	*	<2	*	*	*	<1
Toluene						
As received:	*	<2	*	*	*	<1
Dry basis:	*	<2	*	*	*	<1
Ethylbenzene						
As received:	*	<2	*	*	*	<1
Dry basis:	*	<2	*	*	*	<1
Xylenes						
As received:	*	<2	*	*	*	<1
Dry basis:	*	<2	*	*	*	<1
Date Analyzed:	--	12/30/90	--	--	--	12/21/90

Halogenated Volatiles,
µg/l

	**	*	*	*	**	*
Date Analyzed:	12/26/90	--	--	--	12/26/90	--

Total Recoverable
Petroleum Hydrocar-
bons, (418.1), mg/kg

As received:	*	*	<0.3	<0.3	*	*
Dry basis:	*	*	<0.4	<0.4	*	*
Date Analyzed:	--	--	12/28/90	12/28/90	--	--
Moisture, %	2.8	3.3	6.0	7.9	5.8	41
Date Analyzed:	12/28/90	12/28/90	12/28/90	12/28/90	12/28/90	12/28/90

* Analysis not requested
** See following pages for results

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Administrative Record for the Yakima
Railroad Area on October 31, 1996.
Washington State
Department of Ecology

Chen-Northern, Inc.

A member of the **HIH** group of companies

600 SOUTH 25TH STREET
P. O. BOX 30615
BILLINGS, MT 59107
(406) 248-9161
FAX (406) 248-9282

TECHNICAL REPORT



REPORT TO: ATTN: MR. PAUL DANIELSON
CHEN-NORTHERN, INC.
P O BOX 2601
TRI-CITIES, WA 99302

DATE: January 8, 1991
JOB NUMBER: 87-921
SHEET: 1 OF 2
INVOICE NO.: 108438

REPORT OF: Water Analysis - Yakima Public Works

Sample Identification:

On December 19, 1990, this sample (laboratory number 110306) was received in our laboratory for analysis. The water sample was analyzed for volatile organics in accordance with Federal Register Volume 49 No. 209, Methods 601 and 602 - Purgeable Halocarbons and Aromatics. The total petroleum hydrocarbon determination was made in accordance with Environmental Protection Agency Method 418.1. The test results are given on the following pages. A < sign indicates less than the reported value is present in the sample.

Reviewed by Kathleen Ashi

clz

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Washington State
Department of Ecology.

Water Analysis
 Yakima Public Works
 CHEN-NORTHERN, INC.

January 8, 1991
 Sheet 2 of 2
 Job No. 87-921

Lab No.: 110303
 Sample Description: DH - 1
 Date Sampled: 12/14/90
 Collected By: Paul Danielson

<u>Volatile Organics (601/602), µg/l</u>	<u>Method Blank</u>	<u>Method Detection Limit</u>	<u>Reportable Concentration mg/l mg/kg</u>
Bromodichloromethane	<4	4	<4
Bromoform	<2	2	<2
Bromomethane	<4	4	<4
Carbon Tetrachloride	<2	2	<2
Chlorobenzene	<12	12	<12
Chloroethane	<2	2	<2
2-Chloroethylvinyl ether	<2	2	<2
Choroform	<2	2	<2
Chloromethane	<2	2	<2
Dibromochloromethane	<4	4	<4
1,2 Dichlorobenzene	<12	12	<12
1,3 Dichlorobenzene	<12	12	<12
1,4 Dichlorobenzene	<12	12	<12
Dichlorodifluoromethane	*	*	*
1,1 Dichloroethane	<2	2	<2
1,2 Dichloroethane	<2	2	<2
1,1 Dichloroethene	<2	2	<2
Trans-1,2-Dichloroethene	<4	4	<4
1,2-Dichloropropane	<4	4	<4
Cis-1,3-Dichloropropene	<4	4	<4
Trans-1,3-Dichloropropene	<4	4	<4
Methylene chloride	<12	12	<12
1,1,2,2-Tetrachloroethane	<2	2	<2
Tetrachloroethene	<2	2	<2
1,1,1-Trichloroethane	<2	2	<2
1,1,2-Trichloroethane	<4	4	<4
Trichloroethene	<2	2	<2
Trichlorofluoromethane	<2	2	<2
Vinyl chloride	<4	4	<4
Benzene	<1	1	<1
Ethylbenzene	<1	1	<1
Toluene	<1	1	3
Xylenes	<1	1	<1

Total Petroleum Hydrocarbons
 (418.1) mg/l 0.25
 Date Analyzed: 12/21/90

* Not detectable under instrumental conditions

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SOIL ANALYSIS

YAKIMA PUBLIC WORKS (190-1961)
CHEN-NORTHERN, INC. - TRI-CITIES, WA

January 4, 1991
Job No. 87-921
Sheet 4 of 4

Lab No.: 110304
Sample Description: DH-1; 12' - 13'
Date Sampled: 12/12/90
Collected by: Danielson

	Method Blank	Method Detection Limit	Reportable Concentration µg/kg
<u>Volatile Organics (8010/8020), µg/kg</u>			
Bromodichloromethane	<13	13	<13
Bromoform	<7	7	<7
Bromomethane	<13	13	<13
Carbon Tetrachloride	<7	7	<7
Chlorobenzene	<40	40	<40
Chloroethane	<7	7	<7
2-Chloroethylvinyl ether	<7	7	<7
Choroform	<7	7	<7
Chloromethane	<7	7	<7
Dibromochloromethane	<13	13	<13
1,2 Dichlorobenzene	<40	40	<40
1,3 Dichlorobenzene	<40	40	<40
1,4 Dichlorobenzene	<40	40	<40
1,1 Dichloroethane	<7	7	<7
1,2 Dichloroethane	<7	7	<7
1,1 Dichloroethene	<7	7	<7
Trans-1,2-Dichloroethene	<13	13	<13
1,2-Dichloropropane	<13	13	<13
Cis-1,3-Dichloropropene	<13	13	<13
Trans-1,3-Dichloropropene	<13	13	<13
Methylene chloride	<40	40	<40
1,1,2,2-Tetrachloroethane	<7	7	<7
Tetrachloroethene	<7	7	<7
1,1,1-Trichloroethane	<7	7	<7
1,1,2-Trichloroethane	<13	13	<13
Trichloroethene	<7	7	<7
Trichlorofluoromethane	<7	7	<7
Vinyl chloride	<13	13	<13
Benzene	<3	3	<3
Ethylbenzene	<3	3	<3
Toluene	<3	3	<3
Xylenes	<3	3	<3

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EVERGREEN ANALYTICAL, INC.
 4036 Youngfield Wheat Ridge CO 80033
 (303)425-6021

Pesticide Data Report

Client Sample #	: DH-1	Client Project #	: 190-1961
Lab Sample #	: X29795	Lab Project #	: 10045
Date Sampled	: 12/14/90	Dilution Factor	: 1.250
Date Received	: 12/19/90	Method	: BOBO
Date Extracted/Prepared	: 12/22/90	Matrix	: Water
Date Analyzed	: 12/25/90	Lab File No.	: ECD1454
Percent Loss on Drying	: NA	Method Blank No.	: WB12/22/90
Level	: LOW		
pH	: 1		

Compound Name	Cas Number	Concentration ug/L		PQL* ug/L
alpha-BHC	319-84-6		U	0.063
beta-BHC	319-85-7		U	0.063
delta-BHC	319-86-8		U	0.063
gamma-BHC	58-89-9		U	0.063
Heptachlor	76-44-8		U	0.063
Aldrin	309-00-2		U	0.063
Heptachlor epoxide	1024-57-3		U	0.063
Endosulfan I	959-98-8		U	0.063
Dieldrin	60-57-1	0.08	J	0.13
4,4'DDE	72-55-9		U	0.13
Endrin	72-20-8	0.09	J	0.13
Endosulfan II	33213-65-9		U	0.13
4,4'-DDD	72-54-8		U	0.13
Endosulfan sulfate	1031-07-8	0.03	J	0.13
4,4'-DDT	50-29-3		U	0.13
Methoxychlor	72-43-5		U	0.63
Endrin ketone	53494-70-5	0.03	JB	0.13
alpha-Chlordane	5103-71-9		U	0.63
gamma-Chlordane	5103-74-2		U	0.63
Toxaphene	8001-35-2		U	1.3

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Surrogate Recovery;
 TCMX 75%

QUALIFIERS:

- U = Compound analyzed for, but not detected.
- J = Indicates an estimated value when the compound is detected, but is below the CLP Practical Quantitation Limit (PQL).
- B = Compound found in blank and sample. Compare blank and sample data.
- * = Indicates the Practical Quantitation Limit (PQL).
- NA = Not applicable or not available.

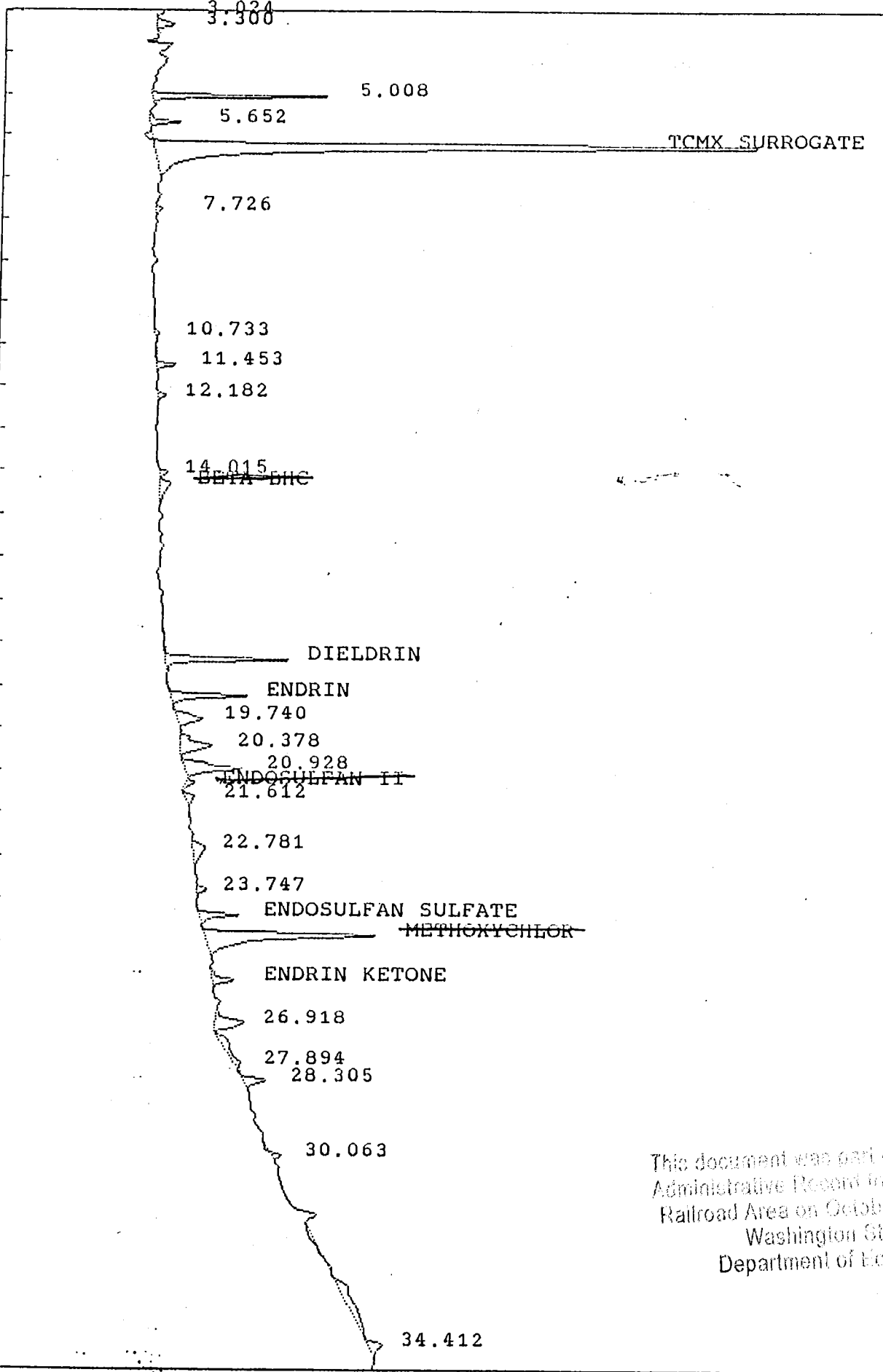
Approved: *William R. Snyder*

Currants

X29795 (confirm.)

DH-1

ECD 2454 12/25/90



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Washington State
Department of Ecology

X29795

DH-1

ECD 1454

12/25/90

3.565

3.988

5.030

5.503

TCMX SURROGATE

9.199

~~DELTA BHC~~

10.471

~~HEPTACHLOR~~

12.901

13.758

~~HEPTACHLOR EPOXIDE~~

14.749

DIELDRIN

ENDRIN

18.312

~~ENDRIN ALDEHYDE~~

19.495

ENDOSULFAN SULFATE

ENDRIN KETONE

22.299
22.556

23.844

26.110

27.342

29.264

30.629

32.040

32.436

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EVERGREEN ANALYTICAL, INC.
 4036 Youngfield Wheat Ridge CO 80033
 (303)425-6021
 Pesticide Data
 Method Blank Report

Method Blank Number	: WB10/22/90	Client Project No.	: 190-1961
Date Extracted/Prepared	: 12/22/90	Lab Project No.	: 10045
Date Analyzed	: 12/24/90	Dilution Factor	: 1,000
		Method	: 8080
		Matrix	: Water
		Lab File No.	: ECD1449

Compound Name	Cas Number	Concentration ug/L	PQL* ug/L
alpha-BHC	319-84-6	U	0.05
beta-BHC	319-85-7	U	0.05
delta-BHC	319-86-8	U	0.05
gamma-BHC	58-89-9	U	0.05
Heptachlor	76-44-8	U	0.05
Aldrin	309-00-2	U	0.05
Heptachlor epoxide	1024-57-3	U	0.05
Endosulfan I	959-98-8	U	0.05
Dieldrin	60-57-1	U	0.1
4,4'-DDE	72-55-9	U	0.1
Endrin	72-20-8	U	0.1
Endosulfan II	33213-65-9	U	0.1
4,4'-DDD	72-54-8	U	0.1
Endosulfan sulfate	1031-07-8	U	0.1
4,4'-DDT	50-29-3	U	0.1
Methoxychlor	72-43-5	U	0.5
Endrin ketone	53494-70-5	0.01 J	0.1
alpha-Chlordane	5103-71-9	U	0.5
gamma-Chlordane	5103-74-2	U	0.5
Toxaphene	8001-35-2	U	1

Surrogate Recovery;
TCMX 90%

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- B = Compound found in blank and sample. Compare blank and sample data.
- * = Indicates the Practical Quantitation Limit (PQL).
- NA = Not applicable or not available.

Approved: William R. Snyder

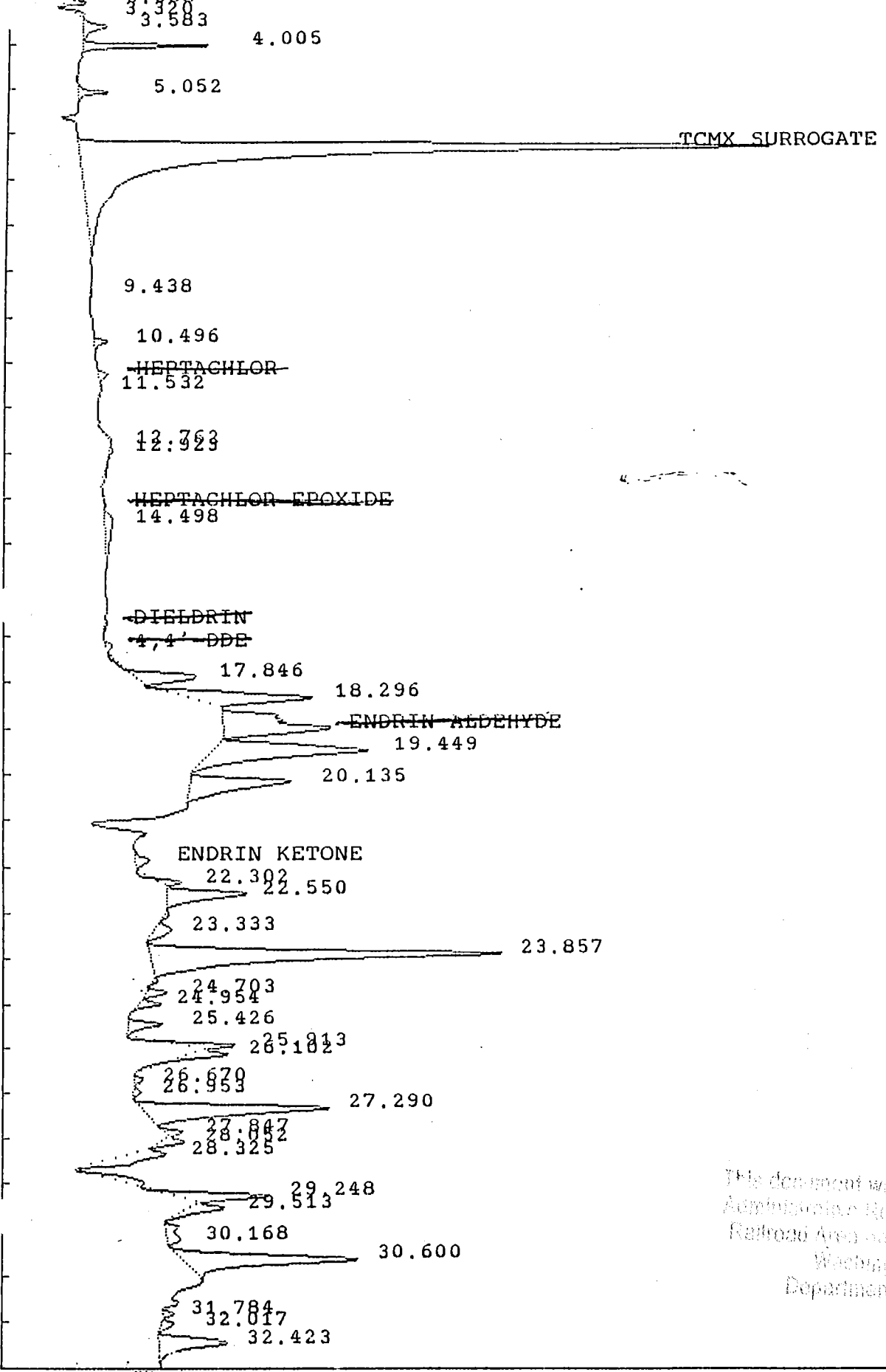
Chp hmt
 Quality Assurance Officer

3.658
3.320
3.583
WB 10/22/90

Method Blank

ECD 1449

12/24/90



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Washington State
Department of Ecology.

(Confir.)

WB 10/22/90

Method Blank

ECD 2449. 12/90

3.320
 3.802
 4.231
 4.703
 5.033
 5.689

TCMX SURROGATE

7.766

10.080
10.760

12.216

~~14.049~~
~~BETA-BHC~~

16.956

18.608

~~ENDRIN~~

19.752

20.376

20.924

21.561

22.476

~~22.806~~
~~ENDRIN ALDEHYDE~~

23.512

23.757

~~ENDOSULFAN SULFATE~~

24.844

25.702
ENDRIN KETONE

26.448

26.913

27.448

27.884

28.304

28.851

29.152

29.592

30.342

31.443

32.201

32.660

33.084

34.407

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Wendell J. O'Neil
Population Services

EVERGREEN ANALYTICAL, INC
4036 Youngfield St. Wheat Ridge, CO 80033
(303) 425-6021


TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

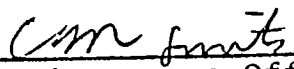
Date Received : 12/22/90 Client Project : 190-1961
Date Sampled : 12/18-20/90 Lab Project No.: 10078
Date Prepared : 12/24,26/90 Method : EPA 418.1
Date Analyzed : 12/24,26/90

<u>Evergreen Sample No.</u>	<u>Client Sample No.</u>	<u>Matrix</u>	<u>TRPH*</u>
X29927B	DH #5	Soil	<3.33 mg/Kg
X29927H	DH #5	Water :	<0.100 mg/L
X29928E	DH #2	"	<0.100 "

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Washington State
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*Reported values based on specific gravity of 1.0; Detection
limit 3.33 mg/Kg for soils, 0.100 mg/L for waters. Blank value
subtracted.


Approved


Quality Assurance Officer

EVERGREEN ANALYTICAL, INC.
4036 Youngfield St. Wheat Ridge, CO 80033
(303) 425-6021

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS
BY EPA METHOD 418.1

DATE 90/12/24 TIME 11:34

Project #
10078

Sample #
29928.000, DH #2 WATER

Matrix : Water

Volume of water (liters) extracted
1.000

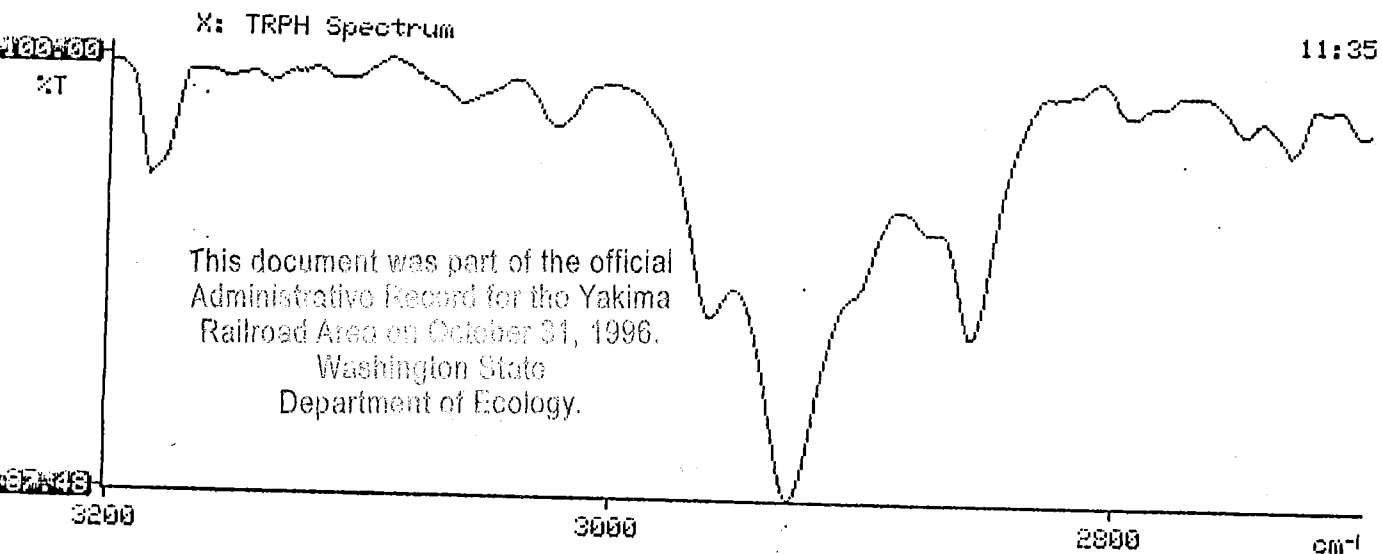
Detection limit in mg/l
0.100

Reagent blank
0.899

Dilution factor
1.000

TRPH mg/l

-0.178 = < 0.100



EVERGREEN ANALYTICAL, INC.
4036 Youngfield St. Wheat Ridge, CO 80033
(303)425-6021

Purgeable Aromatic Report

Client Sample # : DH #2
Lab Sample # : X29928A
Date Sampled : 12/18/90
Date Received : 12/22/90
Date Extracted/Prepared : 12/24/90
Date Analyzed : 12/24/90
Percent Loss on Drying : NA
Methanol extract? : No

Client Project # : 190-1961
Lab Project # : 10078
Dilution Factor : 1.000
Method : 602
Matrix : Water
Lab File No. : PID5563
Method Blank No. : MB12/24/90

Compound Name	Cas Number	Concentration ug/L		MDL* ug/L
Benzene	71-43-2		U	0.4
Toluene	108-88-3	1.2	B	0.4
Ethyl Benzene	100-41-4		U	0.4
Total Xylenes	1330-20-7	3.9		---

Surrogate Recoveries;
a,a,a-Trifluorotoluene

103%

QUALIFIERS:

U = Compound analyzed for, but not detected.
B = Compound found in blank and sample. Compare blank and sample data.
* = The Method Detection Limit. See 40 CFR Ch.1, Pt.136, App. A,
Meth. 602, Table 1 and pa. 12.1.
NA = Not applicable or not available.

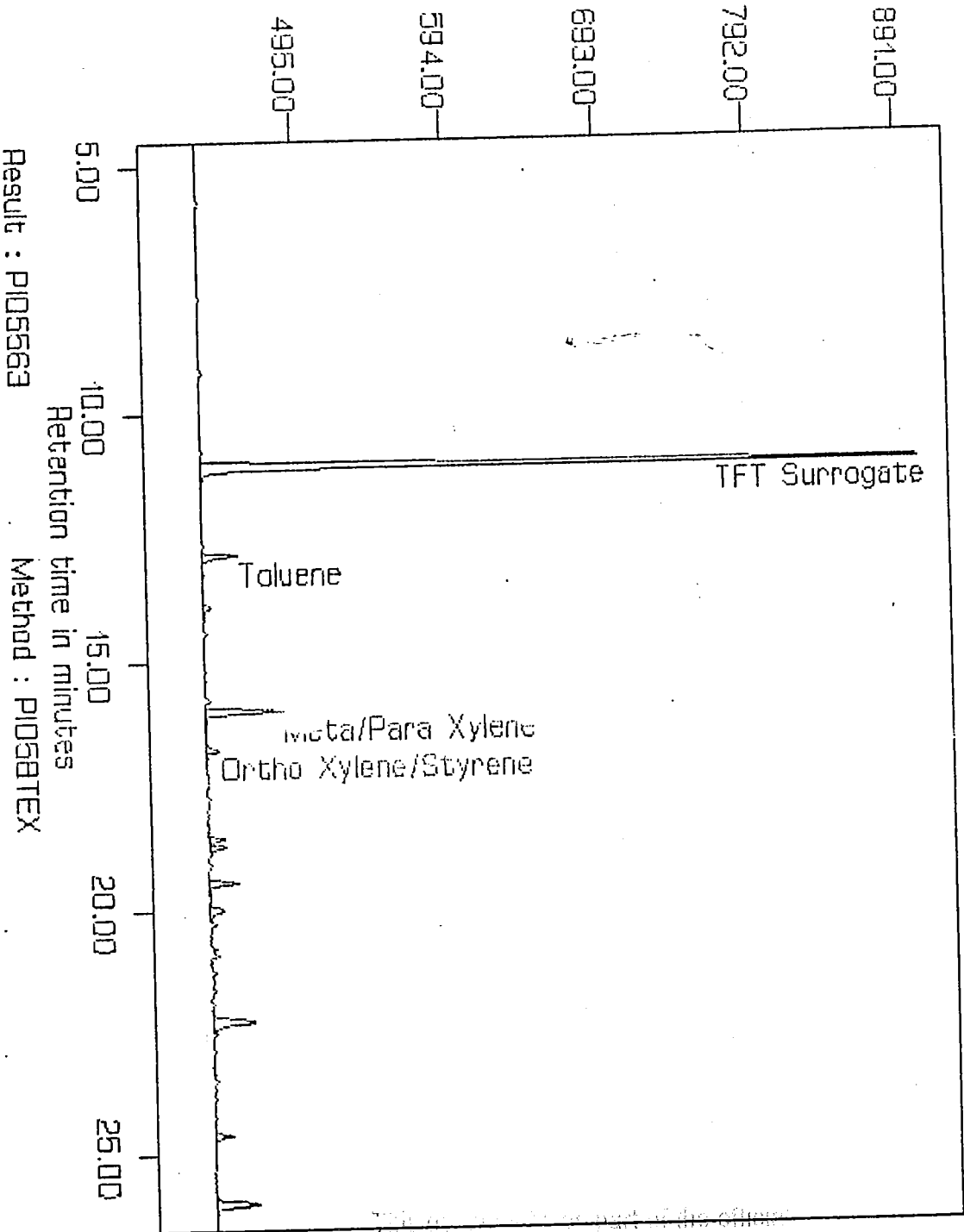
Approved: D. Spence

C. Smith
Quality Assurance Officer

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forms\purge602.pln

Amplitude / 10ED



Result : P105563

Retention time in minutes

Method : P1058TEX

Sample : 13 100781x29928A.W;DF=1 Injected : MON DEC 24, 1990 4:33:03 PM

EVERGREEN ANALYTICAL, INC.
 4036 Youngfield St. Wheat Ridge, CO 80033
 (303)425-6021
 Purgeable Aromatic Data
 Method Blank Report

Method Blank Number : MB12/24/90 Client Project No. : 190-1961
 Date Extracted/Prepared : 12/24/90 Lab Project No. : 10078
 Date Analyzed : 12/24/90 Dilution Factor : 1.000
 Method : 602
 Matrix : Water
 Lab File No. : PID5553

Compound Name	Cas Number	Concentration ug/L	MDL* ug/L
Benzene	71-43-2	U	0.4
Toluene	108-88-3	0.5	0.4
Ethyl Benzene	100-41-4	U	0.4
Total Xylenes	1330-20-7	U	---

Surrogate Recoveries;
 a,a,a-Trifluorotoluene

109%

QUALIFIERS:

- U = Compound analyzed for, but not detected.
- B = Compound found in blank and sample. Compare blank and sample data.
- * = The Method Detection Limit. See 40 CFR Ch.1, Pt.136, App. A, Meth. 602, Table 1 and pa. 12.1.
- NA = Not applicable or not available.

Approved: D. Beyer

C. Smith
 Quality Assurance Officer

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 Washington, DC
 Department of Justice

forms\purge602.pln

EVERGREEN ANALYTICAL, INC.
 4036 Youngfield St. Wheat Ridge, CO 80033
 (303)425-6021
 BTEX Data Report
 Method Blank Report

Method Blank Number	: MB12/24/90	Client Project No.	: 190-1961
Date Extracted/Prepared	: 12/24/90	Lab Project No.	: 10078
Date Analyzed	: 12/24/90	Dilution Factor	: 1.000
		Method	: 8020
		Matrix	: Water
		Lab File No.	: PID5553

Compound Name	Cas Number	Concentration ug/L		PQL* ug/L
Benzene	71-43-2		U	4
Toluene	108-88-3	0.5	J	4
Ethyl Benzene	100-41-4		U	4
Total Xylenes	1330-20-7		U	---

Surrogate Recoveries;
 a,a,a-Trifluorotoluene 109%

QUALIFIERS:

- U = Compound analyzed for, but not detected.
- J = Indicates an estimated value when the compound is detected, but is below the CLP Practical Quantitation Limit (PQL).
- B = Compound found in blank and sample. Compare blank and sample data.
- * = The Practical Quantitation Limit is equal to the dilution factor multiplied by ten times the Method Detection Limit as determined by EPA SW846, Vol. 1B, Part II, pa. 8000-14.
- NA = Not applicable or not available.

Approved: _____

D. Blaser

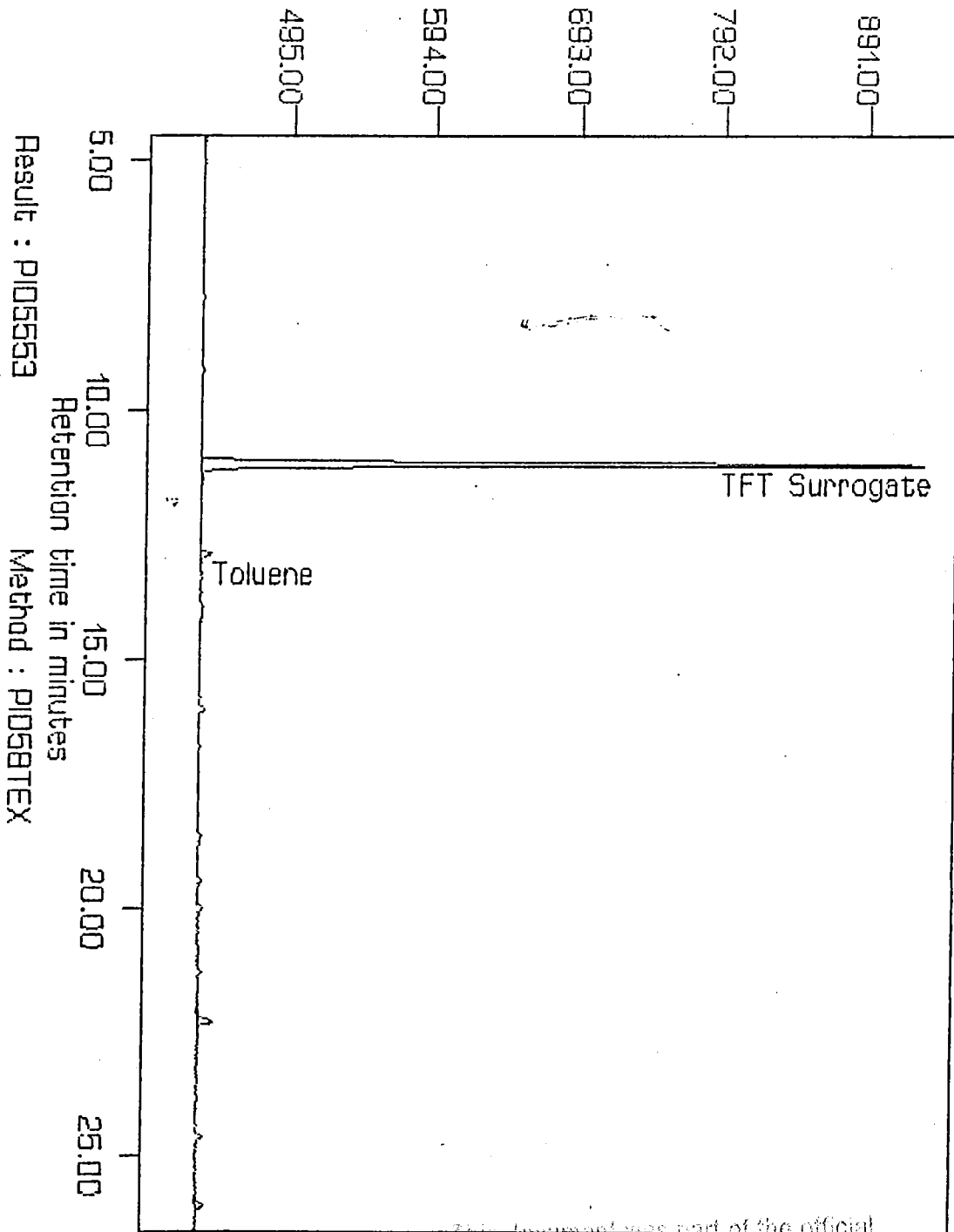
Quality Assurance Officer
 Administration Center for the Yakima
 Railroad Area on October 31, 1996.
 Washington State
 Department of Ecology.

C. [Signature]

Quality Assurance Officer

forms\btex.pln

Amplitude / 10ED



Result : PID55553

Method : PID587EX

Sample : 3 mb12/24/90 Injected : MON DEC 24, 1990 10:00:35 AM

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Washington State
Department of Ecology

SOIL ANALYSIS

YAKIMA PUBLIC WORKS (190-1961)
CHEN-NORTHERN, INC. - TRI-CITIES, WA

January 4, 1991
Job No. 87-92
Sheet 3 of 4

Lab No.: 110300
Sample Description: DH-2; 13' - 14'
Date Sampled: 12/17/90
Collected by: Danielson

	Method Blank	Method Detection Limit	Reportable Concentration µg/kg
<u>Volatile Organics (8010/8020), µg/kg</u>			
Bromodichloromethane	<9	9	<9
Bromoform	<4	4	<4
Bromomethane	<9	9	<9
Carbon Tetrachloride	<4	4	<4
Chlorobenzene	<26	26	<26
Chloroethane	<4	4	<4
2-Chloroethylvinyl ether	<4	4	<4
Chloroform	<4	4	<4
Chloromethane	<4	4	<4
Dibromochloromethane	<9	9	<9
1,2 Dichlorobenzene	<26	26	<26
1,3 Dichlorobenzene	<26	26	<26
1,4 Dichlorobenzene	<26	26	<26
1,1 Dichloroethane	<4	4	<4
1,2 Dichloroethane	<4	4	<4
1,1 Dichloroethene	<4	4	<4
Trans-1,2-Dichloroethene	<9	9	<9
1,2-Dichloropropane	<9	9	<9
Cis-1,3-Dichloropropene	<9	9	<9
Trans-1,3-Dichloropropene	<9	9	<9
Methylene chloride	<26	26	<26
1,1,2,2-Tetrachloroethane	<4	4	<4
Tetrachloroethene	<4	4	<4
1,1,1-Trichloroethane	<4	4	<4
1,1,2-Trichloroethane	<9	9	<9
Trichloroethene	<4	4	<4
Trichlorofluoromethane	<4	4	<4
Vinyl chloride	<9	9	<9
Benzene	<2	2	<2
Ethylbenzene	<2	2	<2
Toluene	<2	2	<2
Xylenes	<2	2	<2

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EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

Method 8010-Purgeable Halocarbons

Sample No. : Method Blank Client Project No. : 190-1961
Lab Sample No. : MB122490 Lab Project No. : 10078
Date Received : 12/22/90 Dilution Factor : 1
Date Analyzed : 12/24/90 Matrix : Water

Compound	Concentration (ug/L)	PQL(ug/L)*
Benzyl chloride	U	-
Bis(2-chloroethoxy)methane	U	-
Bis(2-chloroisopropyl)ether	U	-
Bromobenzene	U	-
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	-
Carbon Tetrachloride	U	1.2
Chloroacetaldehyde	U	-
Chlorobenzene	U	2.5
Chloroethane	U	5.2
2-Chloroethylvinyl ether	U	1.3
Chloroform	U	0.5
1-Chlorohexane	U	-
Chloromethane	U	0.8
Chloromethylmethyl ether	U	-
Chlorotoluene	U	-
Dibromochloromethane	U	0.9
Dibromomethane	U	-
1,2-Dichlorobenzene	U	1.5
1,3-Dichlorobenzene	U	3.2
1,4-Dichlorobenzene	U	2.4
Dichlorodifluoromethane	U	-
1,1-Dichloroethane	U	0.7
1,2-Dichloroethane	U	0.3
1,1-Dichloroethene	2.5	1.3
t-1,2-Dichloroethene	U	1.0
Dichloromethane	2.1	-
1,2-Dichloropropane	U	0.4
t-1,3-Dichloropropene	U	3.4
1,1,2,2-Tetrachloroethane	U	0.3
1,1,1,2-Tetrachloroethane	U	-
Tetrachloroethene	U	0.3
1,1,1-Trichloroethane	U	0.3
1,1,2-Trichloroethane	U	0.2
Trichloroethene	U	1.2
Trichlorofluoromethane	U	-
Trichlororopane	U	-
Vinyl Chloride	U	1.8

Surrogate Recovery (1,3-Dichloropropane) : 105%

J = Detected, but below PQL

*PQL = Practical Quantitation Limit

U = None detected

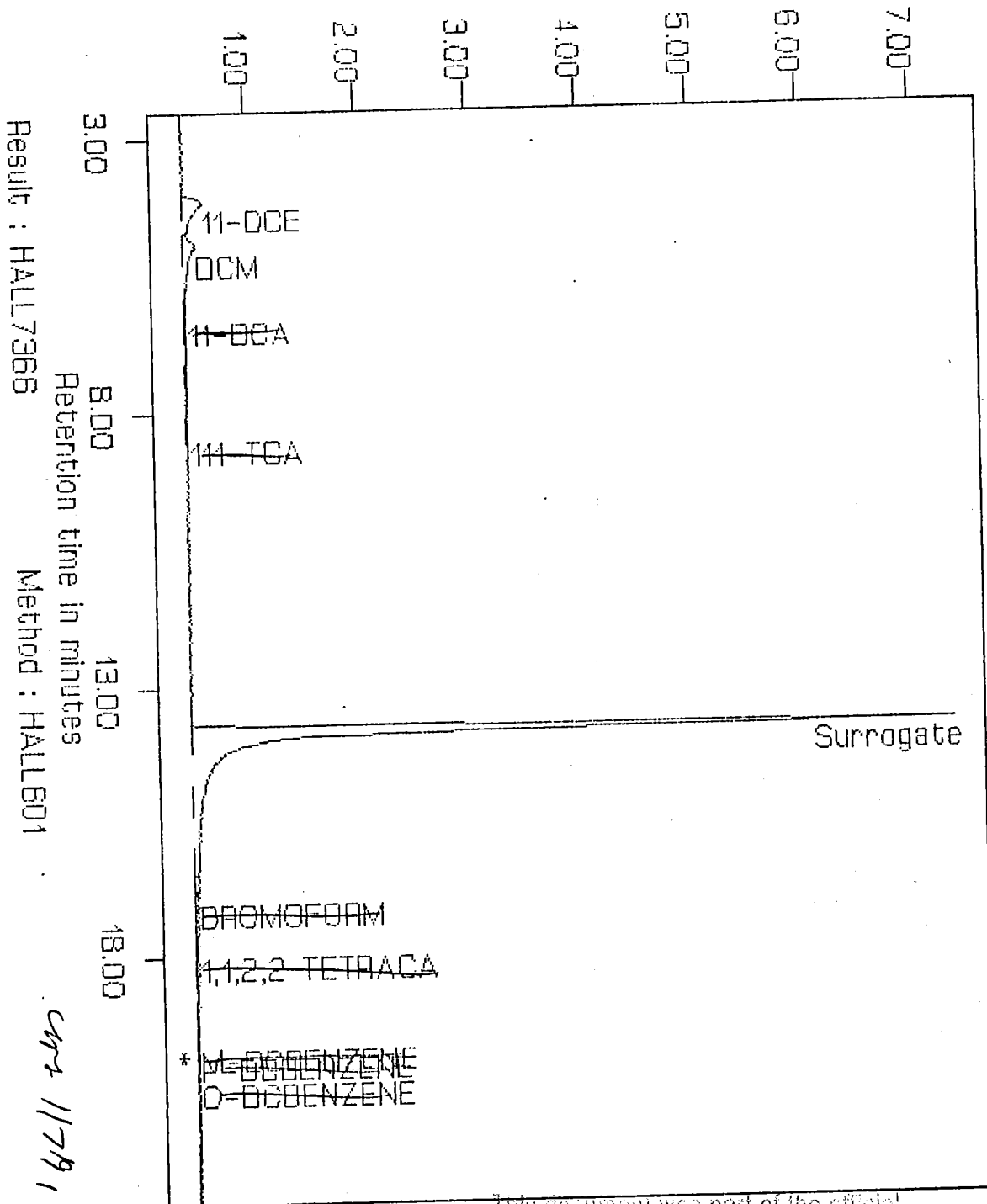
B = Also found in blank

Approved Steve L. Ryan QAO cmj smts

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 Railroad Area on October 31, 1996.
 Washington State
 Department of Ecology

Amplitude / 10E3

Sample : Method Blank Injected : MON DEC 24, 1990 6:47:21 PM



cap 11791

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Washington State
Department of Ecology.

EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

Method 8010-Purgeable Halocarbons

Sample No. : DH #2 Client Project No. : 190-1961
 Lab Sample No. : x29928 Lab Project No. : 10078
 Date Received : 12/22/90 Dilution Factor : 1
 Date Analyzed : 12/24/90 Matrix : Water

Compound	Concentration (ug/L)	PQL(ug/L)*
Benzyl chloride	U	-
Bis(2-chloroethoxy)methane	U	-
Bis(2-chloroisopropyl)ether	U	-
Bromobenzene	U	-
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	-
Carbon Tetrachloride	U	1.2
Chloroacetaldehyde	U	-
Chlorobenzene	U	2.5
Chloroethane	U	5.2
2-Chloroethylvinyl ether	U	1.3
Chloroform	4.0	0.5
1-Chlorohexane	U	-
Chloromethane	U	0.8
Chloromethylmethyl ether	U	-
Chlorotoluene	U	-
Dibromochloromethane	U	0.9
Dibromomethane	U	-
1,2-Dichlorobenzene	U	1.5
1,3-Dichlorobenzene	U	3.2
1,4-Dichlorobenzene	U	2.4
Dichlorodifluoromethane	U	-
1,1-Dichloroethane	U	0.7
1,2-Dichloroethane	U	0.3
1,1-Dichloroethene	1.3 B	1.3
t-1,2-Dichloroethene	U	1.0
Dichloromethane	4.8 B	-
1,2-Dichloropropane	U	0.4
t-1,3-Dichloropropene	U	3.4
1,1,2,2-Tetrachloroethane	U	0.3
1,1,1,2-Tetrachloroethane	U	-
Tetrachloroethene	U	0.3
1,1,1-Trichloroethane	U	0.3
1,1,2-Trichloroethane	U	0.2
Trichloroethene	U	1.2
Trichlorofluoromethane	U	-
Trichlororopane	U	-
Vinyl Chloride	U	1.8

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Surrogate Recovery (1,3-Dichloropropane) : 98%
 J = Detected, but below PQL
 *PQL = Practical Quantitation Limit

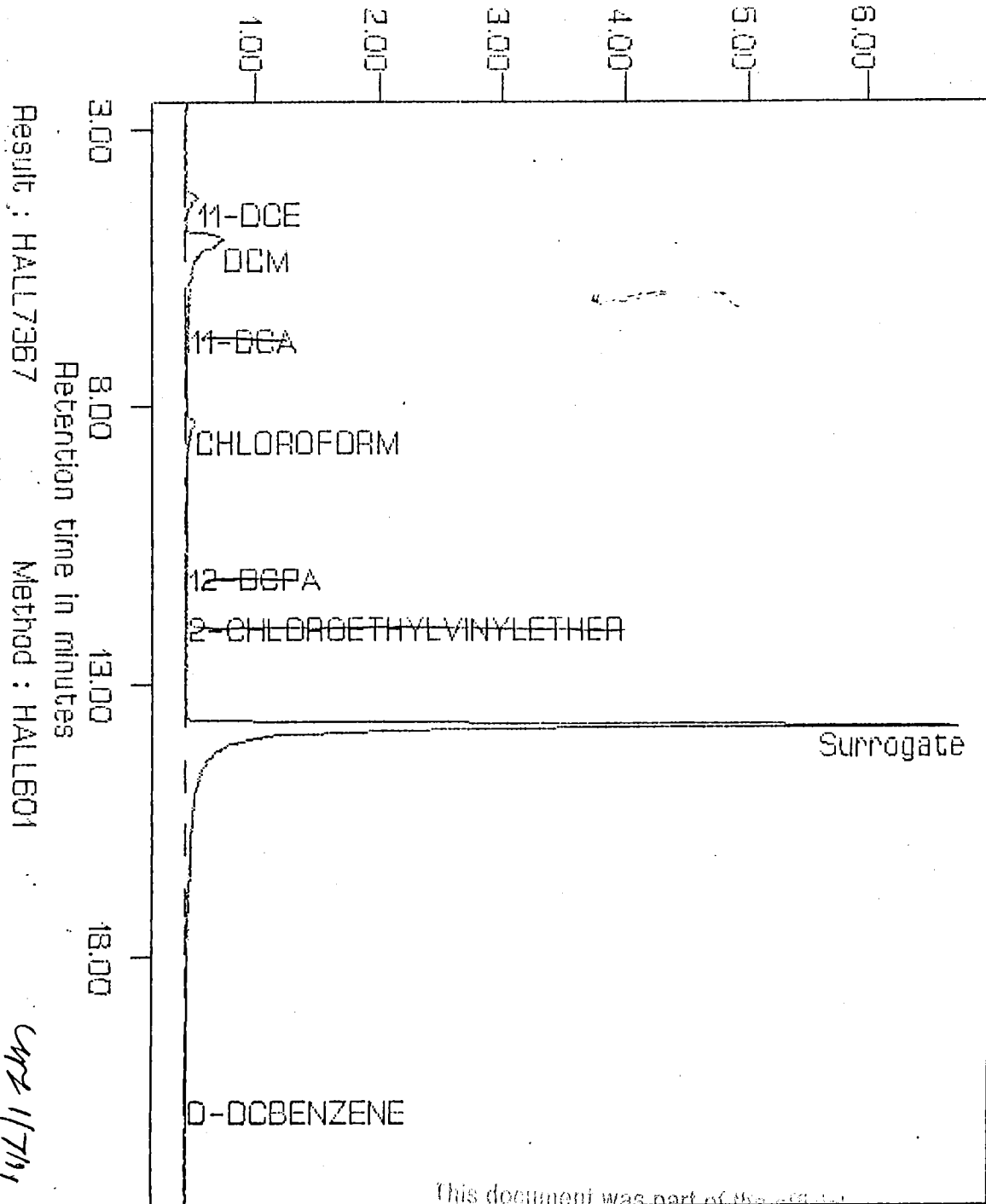
U = None detected
 B = Also found in blank

Approved Steven L. Ryan

QAO

Comment
 MB010x29928.FMT::DATA

Amplitude / 10E3



Result : HALL7367

Method : HALL601

1/7/91

Sample : X29928 Client # DH #2 Injected : MON DEC 24, 1990 7:29:19 PM

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Chen-Northern, Inc.

member of the **HIH** group of companies

600 SOUTH 25TH STREET
P. O. BOX 30615
BILLINGS, MT 59107
(406) 248-9161
FAX (406) 248-9282

TECHNICAL REPORT



REPORT TO: ATTN: MR. KEN LANE
CHEN-NORTHERN, INC.
P O BOX 2601
TRI-CITIES, WA 99302

DATE: January 23, 1991
JOB NUMBER: 87-921
SHEET: 1 OF 2
INVOICE NO.: 108677

REPORT OF: Soil Analysis - Yakima Public Works (190-1961)

Sample Identification:

On January 11, 1991, these soil samples (laboratory numbers 111199 and 111200) were received in our laboratory for analysis. The samples were analyzed for volatile organics in accordance with Environmental Protection Agency Manual SW-846, Test Methods for Evaluating Solid Waste, Third Edition, November 1986; Method 8020.

The total petroleum hydrocarbon determinations were made in accordance with Environmental Protection Agency Method 418.1. The test results are shown on the following page.

A < sign indicates less than the reported value was present in the sample.

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Washington State

Department of Ecology.

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Reviewed by Kathleen Smith

SOIL ANALYSIS
YAKIMA PUBLIC WORKS
CHEN-NORTHERN, INC. - TRI-CITIES, WA

January 23, 1991
Job No. 87-921
Sheet 2 of 2

Lab No.:	111199	111200
Sample Description:	DH#3	DH#3
	1-9	1-9
	15.5'-16.5'	15.0'-15.5'
Date Sampled:	1/09/91	1/09/91
Time Sampled:	3:00 PM	3:00 PM
Collected by:	Ken Lane	Ken Lane

Volatile Organics (8020), $\mu\text{g}/\text{kg}$

Benzene - as received:	*	<2
dry basis:	*	<2
Toluene - as received:	*	<2
dry basis:	*	<2
Ethylbenzene - as received:	*	<2
dry basis:	*	<2
Xylenes - as received:	*	<2
dry basis:	*	<2
Date Analyzed:	-	1/14/91

Total Recoverable Petroleum
Hydrocarbons (418.1), mg/kg

as received:	<0.2	*
dry basis:	<0.2	*
Date Analyzed:	1/18/91	-

Moisture, %	4.4	4.2
Date Analyzed:	1/18/91	1/14/91

* Analysis not requested.

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FAX (406) 248-9282

TECHNICAL REPORT



REPORT TO: ATTN: MR. KEN LANE
CHEN-NORTHERN, INC.
P O BOX 2601
TRI-CITIES, WA 99302

DATE: January 23, 1991
JOB NUMBER: 87-921
SHEET: 1 OF 1
INVOICE NO.: 108668

REPORT OF: Water Analysis - Yakima Public Works (190-1961)

Sample Identification:

On January 11, 1991, this water sample was received in our laboratory for analysis. The sample was analyzed for volatile organics in accordance with Federal Register Volume 49 No. 209, Method 602 - Purgeable Aromatics.

The total petroleum hydrocarbon determination was made in accordance with Environmental Protection Agency Method 418.1. The test results are as follows.

A < sign indicates less than the reported value was present in the sample.

Lab No.: 111201
Sample Description: DH #3B
Surface H₂O Level
Date Sampled: 1/09/91
Collected by: Ken Lane

Volatile Organics (602), mg/l

Benzene <1
Toluene <1
Ethylbenzene <1
Xylenes <1
Date Analyzed: 1/14/91

Total Recoverable Petroleum
Hydrocarbons (418.1), mg/l <0.01
Date Analyzed: 1/18/91

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Washington State
Department of Ecology

Reviewed by Kathleen A. Smith

rmyr

EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

Method 8010-Purgeable Halocarbons

Sample No. : DH#3 Client Project No. : 190-1961
Lab Sample No. : x30355 Lab Project No. : 91-0087
Date Received : 01/11/91 Dilution Factor : 1
Date Analyzed : 01/13/91 Matrix : Water

Compound	Concentration (ug/L)	PQL(ug/L)*
Benzyl chloride	U	-
Bis(2-chloroethoxy)methane	U	-
Bis(2-chloroisopropyl)ether	U	-
Bromobenzene	U	-
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	-
Carbon Tetrachloride	U	1.2
Chloroacetaldehyde	U	-
Chlorobenzene	U	2.5
Chloroethane	U	5.2
2-Chloroethylvinyl ether	U	1.3
Chloroform	5.0	0.5
1-Chlorohexane	U	-
Chloromethane	U	0.8
Chloromethylmethyl ether	U	-
Chlorotoluene	U	-
Dibromochloromethane	U	0.9
Dibromomethane	U	-
1,2-Dichlorobenzene	U	1.5
1,3-Dichlorobenzene	U	3.2
1,4-Dichlorobenzene	U	2.4
Dichlorodifluoromethane	U	-
1,1-Dichloroethane	U	0.7
1,2-Dichloroethane	U	0.3
1,1-Dichloroethene	0.6 JB	1.3
t-1,2-Dichloroethene	U	1.0
Dichloromethane	2.1 B	-
1,2-Dichloropropane	U	0.4
t-1,3-Dichloropropene	U	3.4
1,1,2,2-Tetrachloroethane	U	0.3
1,1,1,2-Tetrachloroethane	U	-
Tetrachloroethene	1.1	0.3
1,1,1-Trichloroethane	U	0.3
1,1,2-Trichloroethane	U	0.2
Trichloroethene	U	1.2
Trichlorofluoromethane	U	-
Trichlororopane	U	-
Vinyl Chloride	U	1.8

Surrogate Recovery (c-1, Dichloroethene):105%
J = Detected, but below PQL
*PQL = Practical Quantitation Limit

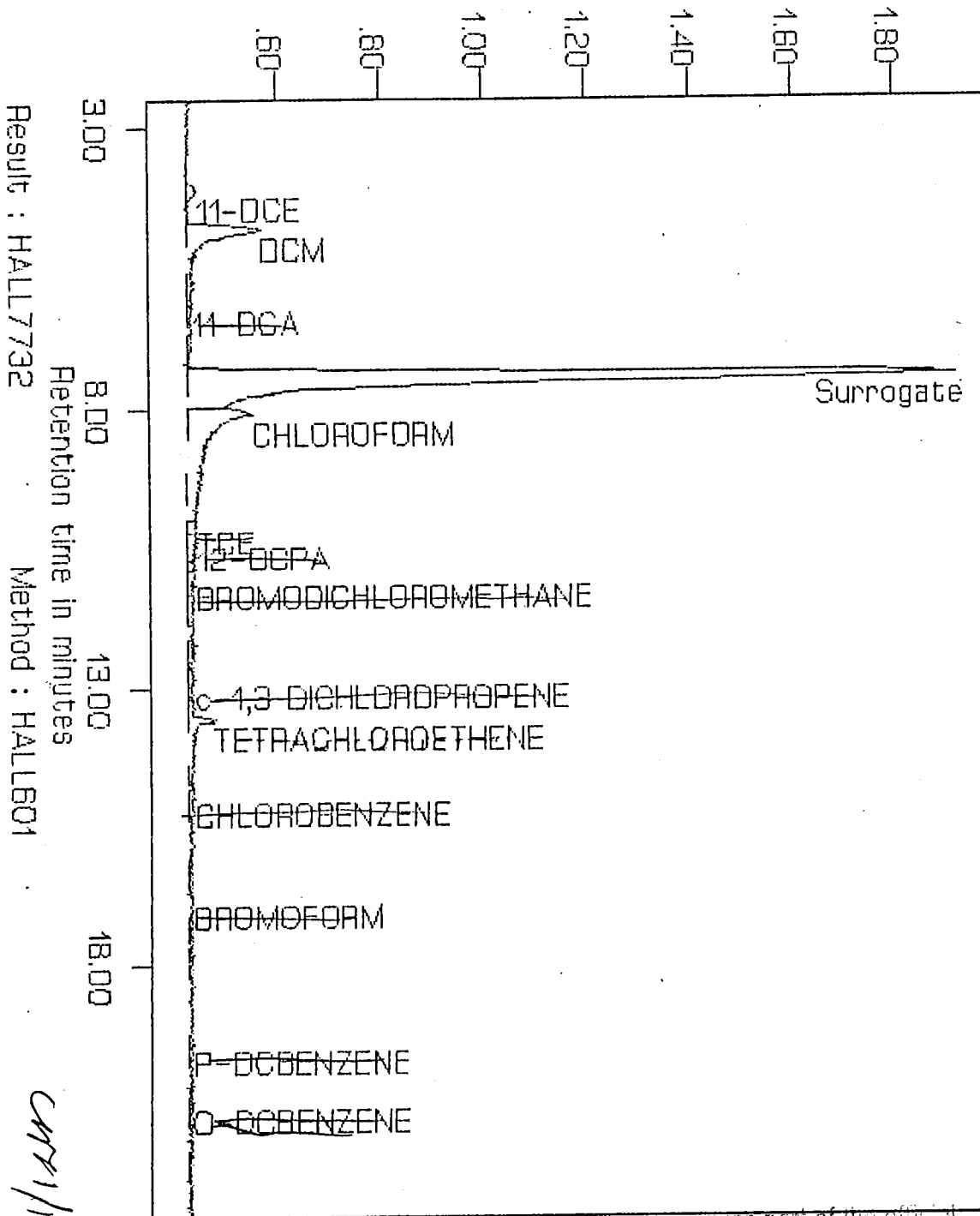
U = None detected
B = Also found in blank

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Approved John L. Ryan QAO CMH

Amplitude / 10E3

Sample : X30355 Client # DH#3 Injected : SUN JAN 13, 1991 7:16:48 PM



CH 1/14/91

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EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

Method 8010-Purgeable Halocarbons

Sample No. : Method Blank Client Project No. : 190-1961
 Lab Sample No. : MB011391 Lab Project No. : 91-0087
 Date Received : 01/11/91 Dilution Factor : 1
 Date Analyzed : 01/13/91 Matrix : Soil & Water

Compound	Concentration (ug/Kg or L)	PQL(ug/Kg or L)*
Benzyl chloride	U	-
Bis(2-chloroethoxy)methane	U	-
Bis(2-chloroisopropyl)ether	U	-
Bromobenzene	U	-
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	-
Carbon Tetrachloride	U	1.2
Chloroacetaldehyde	U	-
Chlorobenzene	U	2.5
Chloroethane	U	5.2
2-Chloroethylvinyl ether	U	1.3
Chloroform	U	0.5
1-Chlorohexane	U	-
Chloromethane	U	0.8
Chloromethylmethyl ether	U	-
Chlorotoluene	U	-
Dibromochloromethane	U	0.9
Dibromomethane	U	-
1,2-Dichlorobenzene	U	1.5
1,3-Dichlorobenzene	U	3.2
1,4-Dichlorobenzene	U	2.4
Dichlorodifluoromethane	U	-
1,1-Dichloroethane	U	0.7
1,2-Dichloroethane	U	0.3
1,1-Dichloroethene	2.4	1.3
t-1,2-Dichloroethene	U	1.0
Dichloromethane	4.2	-
1,2-Dichloropropane	U	0.4
t-1,3-Dichloropropene	U	3.4
1,1,2,2-Tetrachloroethane	U	0.3
1,1,1,2-Tetrachloroethane	U	-
Tetrachloroethene	U	0.3
1,1,1-Trichloroethane	U	0.3
1,1,2-Trichloroethane	U	0.2
Trichloroethene	U	1.2
Trichlorofluoromethane	U	-
Trichlororopropane	U	-
Vinyl Chloride	U	1.8

Surrogate Recovery (c-1,2 Dichloroethene):133%
 J = Detected, but below PQL
 *PQL = Practical Quantitation Limit

U = None detected
 B = Also found in blank

Approved Alan L. Ryan QAO CMH/mts

M8010b0087a.FMT::DATA

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P. O. BOX 30615
BILLINGS, MT 59107
(406) 248-9161
FAX (406) 248-9282

TECHNICAL REPORT



REPORT TO: ATTN: MR. KEN LANE
CHEN-NORTHERN, INC.
P O BOX 2601
TRI-CITIES, WA 99302

DATE: January 22, 1991
JOB NUMBER: 87-921
SHEET: 1 OF 1
INVOICE NO.: 108660

REPORT OF: Water Analysis - Yakima County

Sample Identification:

On January 16, 1991, this water sample was received in our laboratory for analysis. The sample was analyzed for volatile organics in accordance with Federal Register Volume 49 No. 209, Method 602 - Purgeable Aromatics.

The total petroleum hydrocarbon determination was made in accordance with Environmental Protection Agency Method 418.1. The test results are as follows.

A < sign indicates less than the reported value was present in the sample.

Lab No.:	111341
Sample Description:	BH-6 Boring #6
Date Sampled:	1/10/91
Collected by:	Ken Lane

Volatile Organics (602), mg/l

Benzene	<1
Toluene	<1
Ethylbenzene	<1
Xylenes	<1
Date Analyzed:	1/17/91

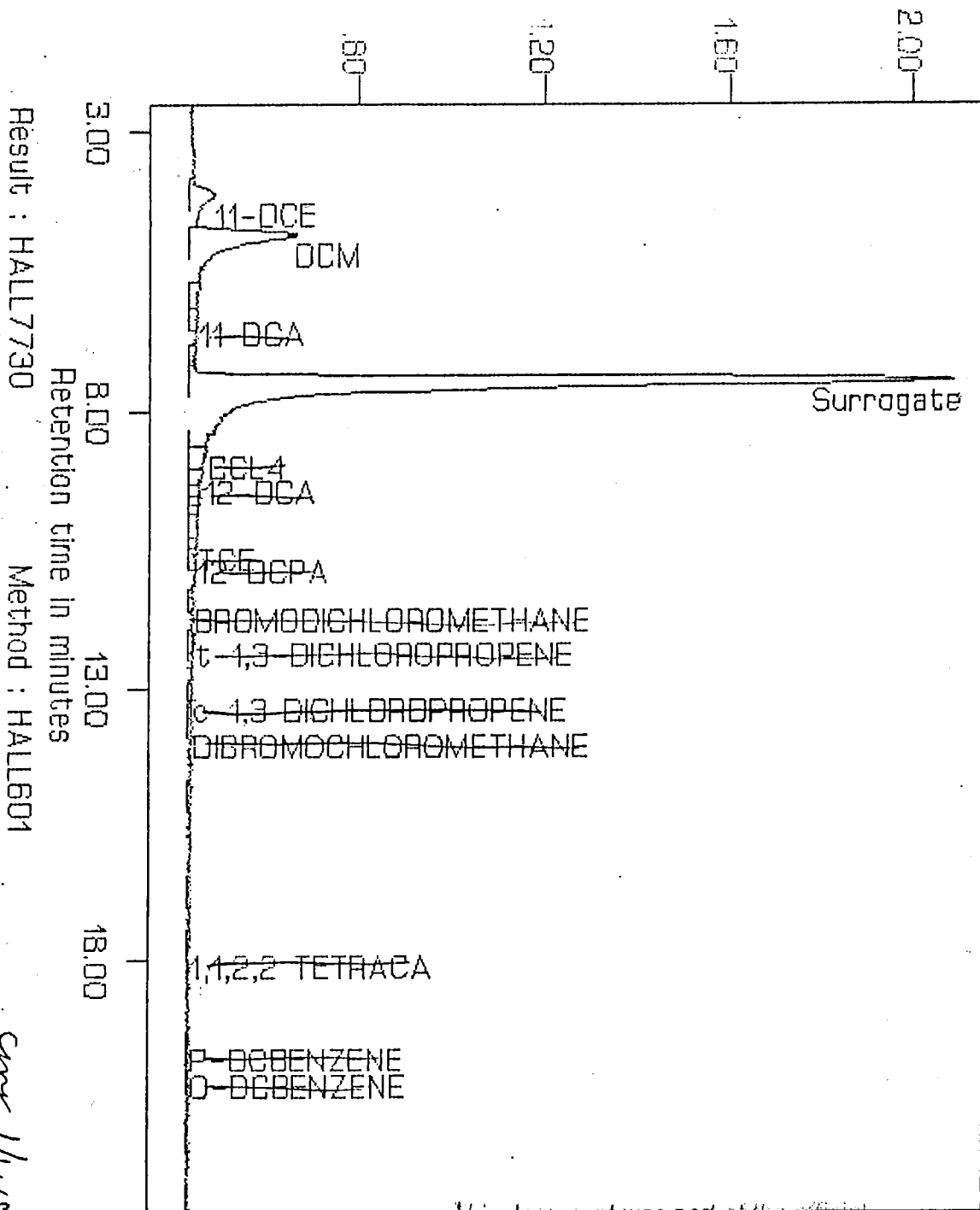
Total Recoverable Petroleum Hydrocarbons (418.1), mg/l	<0.01
Date Analyzed:	1/18/91

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Reviewed by Kathleen A. [Signature]

rmr

Amplitude / 10E9



Result : HALL7730

Method : HALL601

Sample : Method Blank Injected : SUN JAN 13, 1991 5:51:02 PM

Handwritten signature
1/14/91

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EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

Method 8010-Purgeable Halocarbons

Sample No. : BH-6 4'-10' Comp Client Project No. : 190-1961
 Lab Sample No. : x30615 Lab Project No. : 91-0147
 Date Received : 01/16/91 Dilution Factor : 1
 Date Analyzed : 01/17/91 Matrix : Soil

Compound	Concentration (ug/Kg)	PQL(ug/Kg)*
Benzyl chloride	U	-
Bis(2-chloroethoxy)methane	U	-
Bis(2-chloroisopropyl)ether	U	-
Bromobenzene	U	-
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	-
Carbon Tetrachloride	U	1.2
Chloroacetaldehyde	U	-
Chlorobenzene	U	2.5
Chloroethane	U	5.2
2-Chloroethylvinyl ether	U	1.3
Chloroform	U	0.5
1-Chlorohexane	U	-
Chloromethane	U	0.8
Chloromethylmethyl ether	U	-
Chlorotoluene	U	-
Dibromochloromethane	U	0.9
Dibromomethane	U	-
1,2-Dichlorobenzene	U	1.5
1,3-Dichlorobenzene	U	3.2
1,4-Dichlorobenzene	U	2.4
Dichlorodifluoromethane	U	-
1,1-Dichloroethane	U	0.7
1,2-Dichloroethane	U	0.3
1,1-Dichloroethene	U	1.3
t-1,2-Dichloroethene	U	1.0
Dichloromethane	4.7 B	-
1,2-Dichloropropane	U	0.4
t-1,3-Dichloropropene	U	3.4
1,1,2,2-Tetrachloroethane	U	0.3
1,1,1,2-Tetrachloroethane	U	-
Tetrachloroethene	1.0	0.3
1,1,1-Trichloroethane	U	0.3
1,1,2-Trichloroethane	U	0.2
Trichloroethene	U	1.2
Trichlorofluoromethane	U	-
Trichlororopropane	U	-
Vinyl Chloride	U	1.8

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Surrogate Recovery (c-1,2 Dichloroethene):101%
 J = Detected, but below PQL
 *PQL = Practical Quantitation Limit

U = None detected
 B = Also found in blank

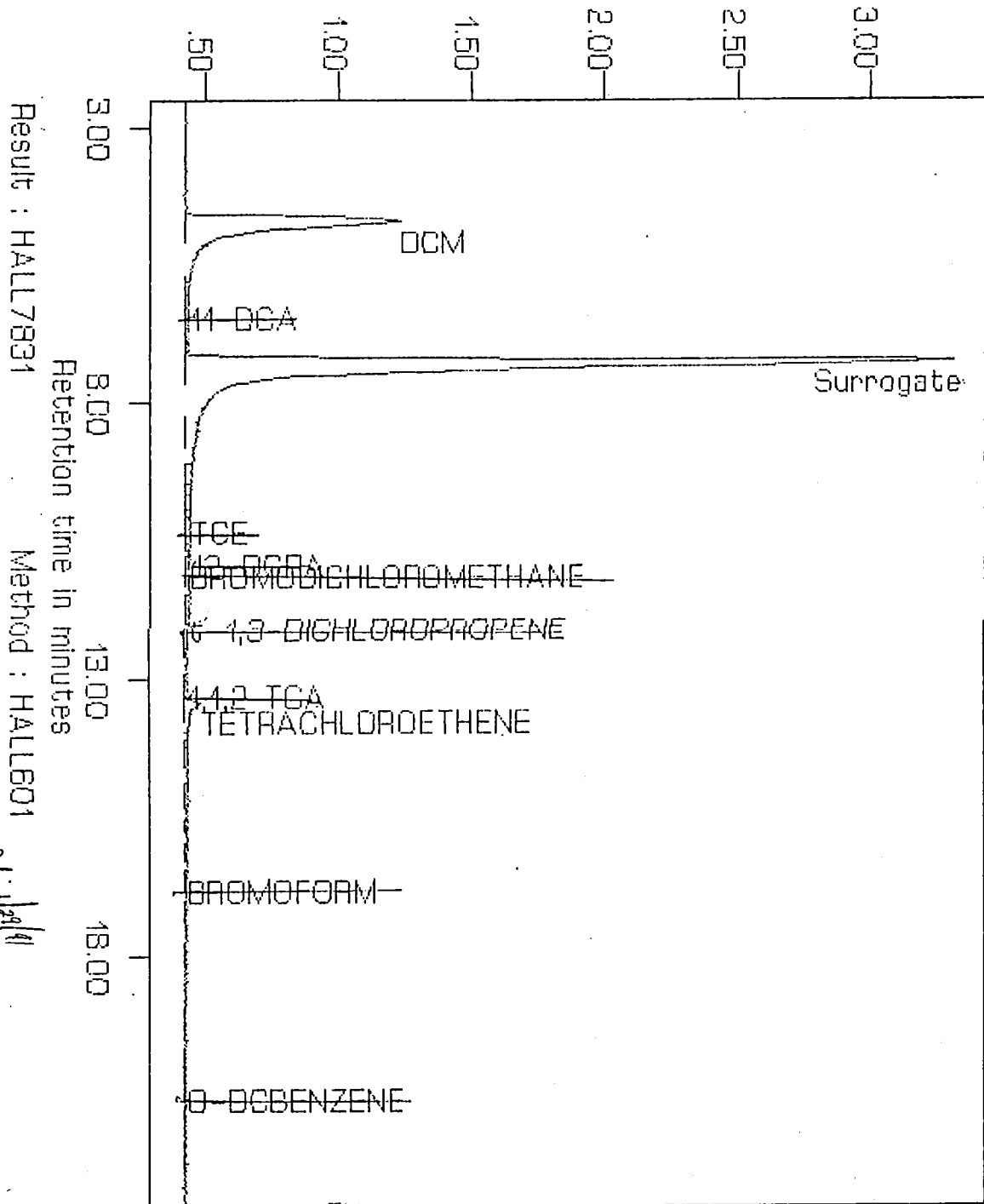
Approved

Ken V. Z...

QAO

[Signature]

Amplitude / 10E3



Result : HALL7831

Method : HALL601

[Handwritten signature]
1/21/91

Sample : X30615 Client # BH-6 14-18' Injected : THU JAN 17, 1991 6:31:17 A

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EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

Method 8010-Purgeable Halocarbons

Sample No. : BH-6 Client Project No. : 190-1961
 Lab Sample No. : x30614 Lab Project No. : 91-0147
 Date Received : 01/16/91 Dilution Factor : 1
 Date Analyzed : 01/17/91 Matrix : Water

Compound	Concentration (ug/L)	PQL(ug/L)*
Benzyl chloride	U	-
Bis(2-chloroethoxy)methane	U	-
Bis(2-chloroisopropyl)ether	U	-
Bromobenzene	U	-
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	-
Carbon Tetrachloride	U	1.2
Chloroacetaldehyde	U	-
Chlorobenzene	U	2.5
Chloroethane	U	5.2
2-Chloroethylvinyl ether	U	1.3
Chloroform	9.0	0.5
1-Chlorohexane	U	-
Chloromethane	U	0.8
Chloromethylmethyl ether	U	-
Chlorotoluene	U	-
Dibromochloromethane	U	0.9
Dibromomethane	U	-
1,2-Dichlorobenzene	U	1.5
1,3-Dichlorobenzene	U	3.2
1,4-Dichlorobenzene	U	2.4
Dichlorodifluoromethane	U	-
1,1-Dichloroethane	U	0.7
1,2-Dichloroethane	U	0.3
1,1-Dichloroethene	U	1.3
t-1,2-Dichloroethene	U	1.0
Dichloromethane	1.0 B	-
1,2-Dichloropropane	U	0.4
t-1,3-Dichloropropene	U	3.4
1,1,2,2-Tetrachloroethane	U	0.3
1,1,1,2-Tetrachloroethane	U	-
Tetrachloroethene	7.8	0.3
1,1,1-Trichloroethane	U	0.3
1,1,2-Trichloroethane	U	0.2
Trichloroethene	U	1.2
Trichlorofluoromethane	U	-
Trichlororopane	U	-
Vinyl Chloride	U	1.8

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Surrogate Recovery (c-1,2 Dichloroethene): 96%
 J = Detected, but below PQL
 *PQL = Practical Quantitation Limit

U = None detected
 B = Also found in blank

Approved

Sten h. Zys

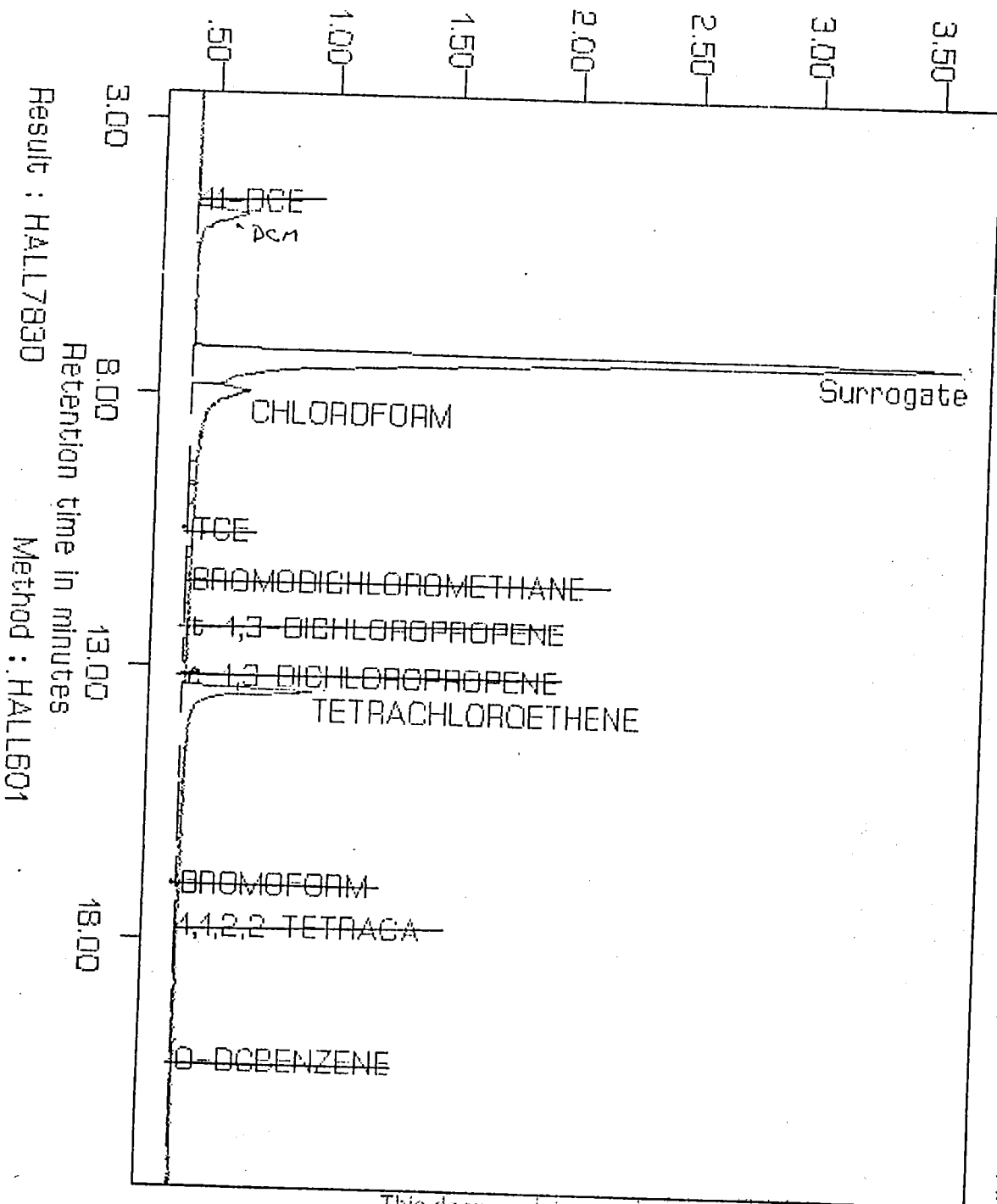
QAO

JK

M8010x30614.FMT::DATA

Amplitude / 10E3

Sample : X30614 Client # BH-6 Injected : THU JAN 17, 1991 5:48:24 AM



1/29/91
[Signature]

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EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033

Method 8010-Purgeable Halocarbons

Sample No. : Method Blank Client Project No. : 190-1961
 Lab Sample No. : MB011791 Lab Project No. : 91-0147
 Date Received : 01/16/91 Dilution Factor : 1
 Date Analyzed : 01/17/91 Matrix : Water

Compound	Concentration (ug/L)	PQL(ug/L)*
Benzyl chloride	U	-
Bis(2-chloroethoxy)methane	U	-
Bis(2-chloroisopropyl)ether	U	-
Bromobenzene	U	-
Bromodichloromethane	U	1.0
Bromoform	U	2.0
Bromomethane	U	-
Carbon Tetrachloride	U	1.2
Chloroacetaldehyde	U	-
Chlorobenzene	U	2.5
Chloroethane	U	5.2
2-Chloroethylvinyl ether	U	1.3
Chloroform	U	0.5
1-Chlorohexane	U	-
Chloromethane	U	0.8
Chloromethylmethyl ether	U	-
Chlorotoluene	U	-
Dibromochloromethane	U	0.9
Dibromomethane	U	-
1,2-Dichlorobenzene	U	1.5
1,3-Dichlorobenzene	U	3.2
1,4-Dichlorobenzene	U	2.4
Dichlorodifluoromethane	U	-
1,1-Dichloroethane	U	0.7
1,2-Dichloroethane	U	0.3
1,1-Dichloroethene	11.0	1.3
t-1,2-Dichloroethene	U	1.0
Dichloromethane	5.8	-
1,2-Dichloropropane	U	0.4
t-1,3-Dichloropropene	U	3.4
1,1,2,2-Tetrachloroethane	U	0.3
1,1,1,2-Tetrachloroethane	U	-
Tetrachloroethene	U	0.3
1,1,1-Trichloroethane	U	0.3
1,1,2-Trichloroethane	U	0.2
Trichloroethene	U	1.2
Trichlorofluoromethane	U	-
Trichlororopane	U	-
Vinyl Chloride	U	1.8

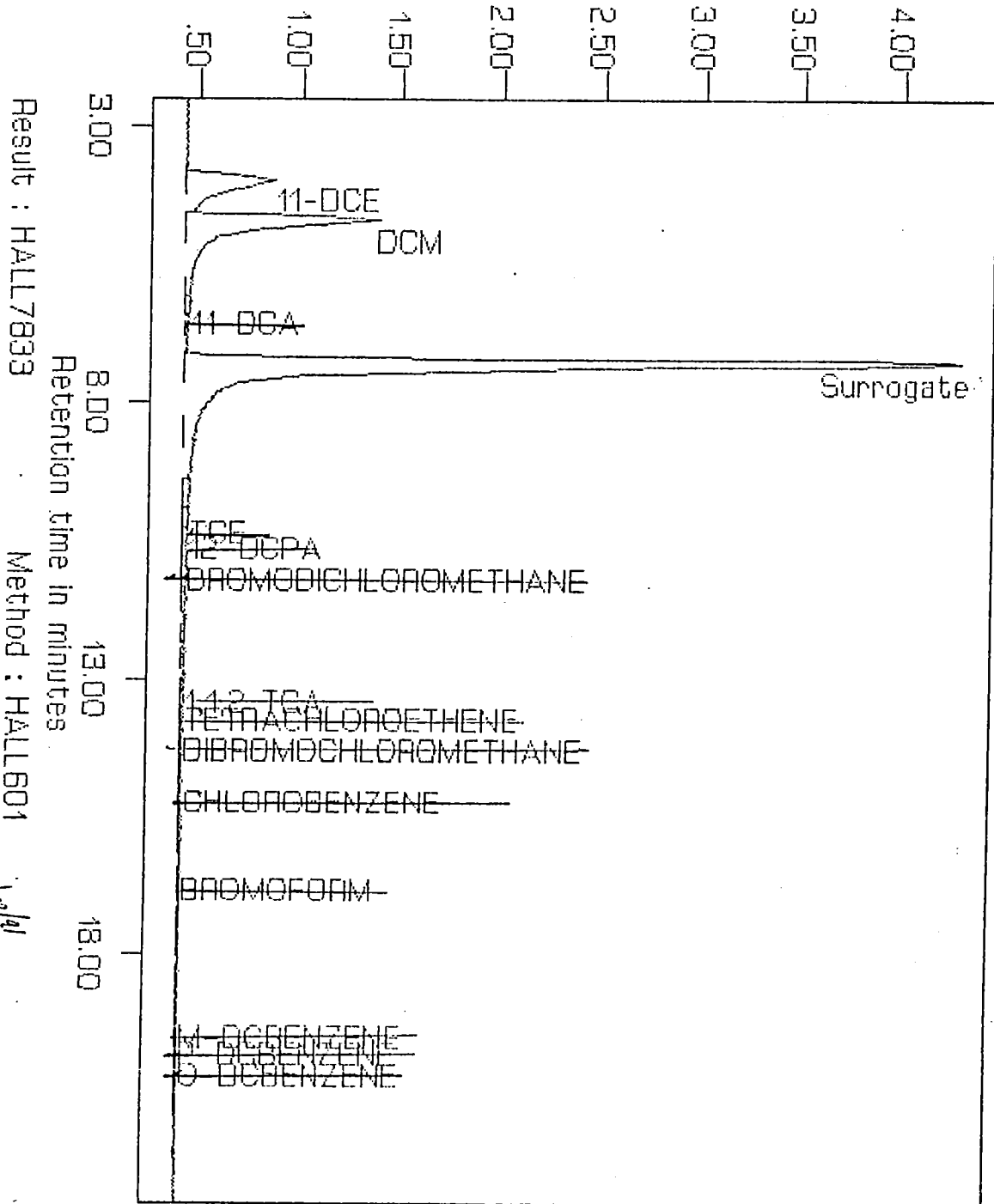
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Surrogate Recovery (c-1,2 Dichloroethene):141% U = None detected
 J = Detected, but below PQL B = Also found in blank
 *PQL = Practical Quantitation Limit

Approved Alan L. Zym QAO [Signature]

Amplitude / 10E3

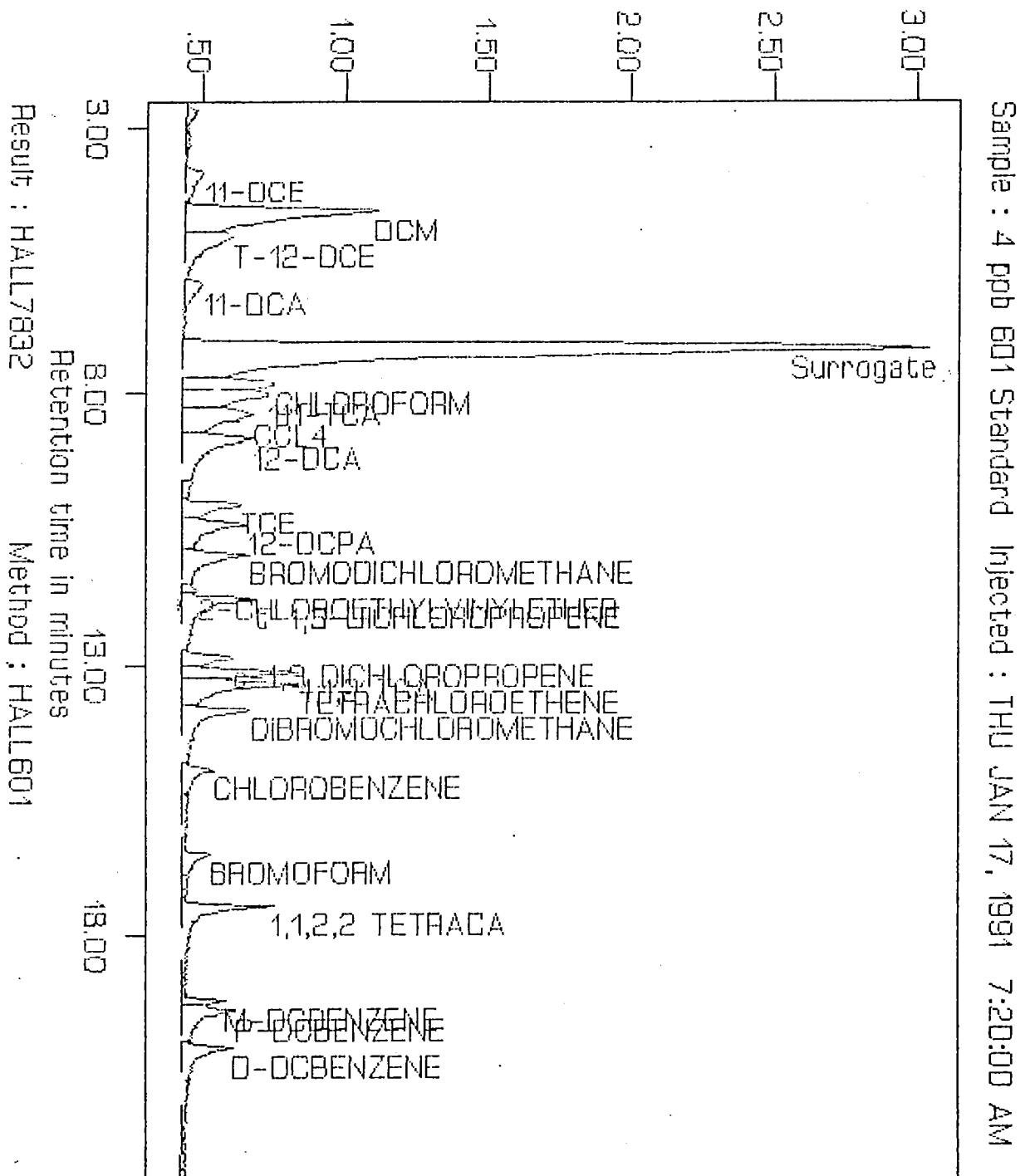
Sample : Method Blank Injected : THU JAN 17, 1991 8:00:56 AM



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Handwritten signature
1/21/91

Amplitude / 10E3



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EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033
(303)425-6021

CHLORINATED HERBICIDES REPORT SHEET

Lab Project # 91-0147
Matrix: Water
Sample wt/vol: 1000 ml
Level: Low
%Moisture: Not Applicable
Extraction: Sep. Funnel
GPC Cleanup: No pH: 5.5

Client Sample# BH-6
Lab Sample ID: x30614
Lab File ID: ECD(3,4)314
Date Received: 01/16/91
Date Extracted: 01/16/91
Date Analyzed: 01/21/91
Dilution Factor: 1

CAS NO.	Compound	Concentration ug/L	MDL* ug/L
94-75-7	2,4-D	U	0.84
75-99-0	Dalapon	U	4.1
94-82-6	2,4-DB	U	0.64
1918-00-9	Dicamba	U	0.19
120-36-5	Dichlorprop	U	0.46
88-85-7	Dinoseb	U	0.05
94-74-6	MCPA	U	174
93-65-2	MCPP	U	134
93-76-5	2,4,5-T	U	0.14
93-72-1	2,4,5-TP (Silvex)	U	0.12

Surrogate Recovery = 98%

QUALIFIERS

U=Compound analyzed for but not detected.

B=Compound found in blank as well as sample (blank data should be compared).

J=Indicates an estimated value, when the substance is detected, but is below the practical quantitation limit, or when it is a tentatively identified compound.

*MDL=Method Detection Limit

This document was part of the official
Administrative Record for the Yakima
Railroad Area of Concern, 81, 4095.

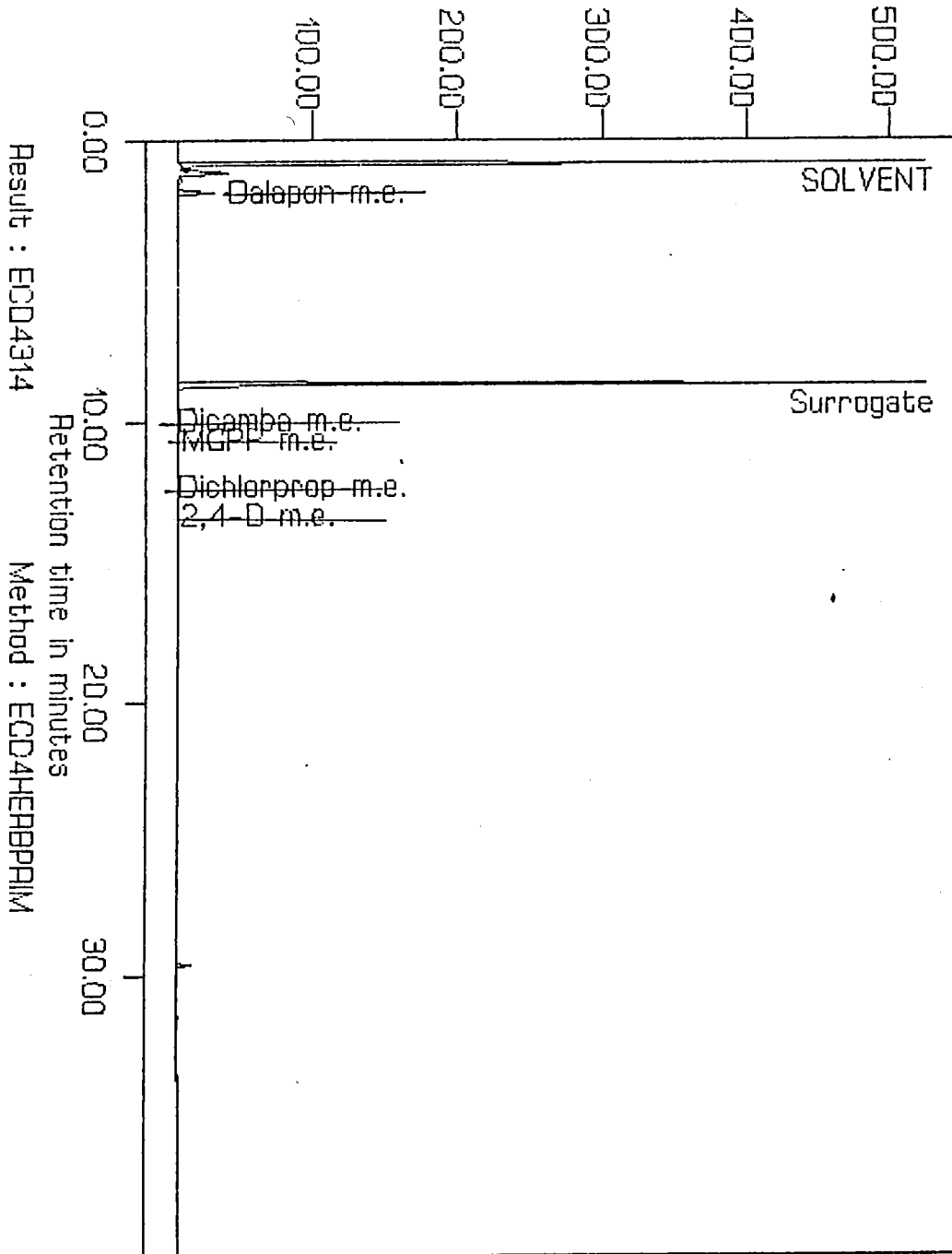
Wheat Ridge, CO
Evergreen Analytical, Inc.

Approved *[Signature]*

QAO *[Signature]*

Herbx30614.FMT

Amplitude / 10E3



Result : ECD4314

Method : ECD4HERBPRIM

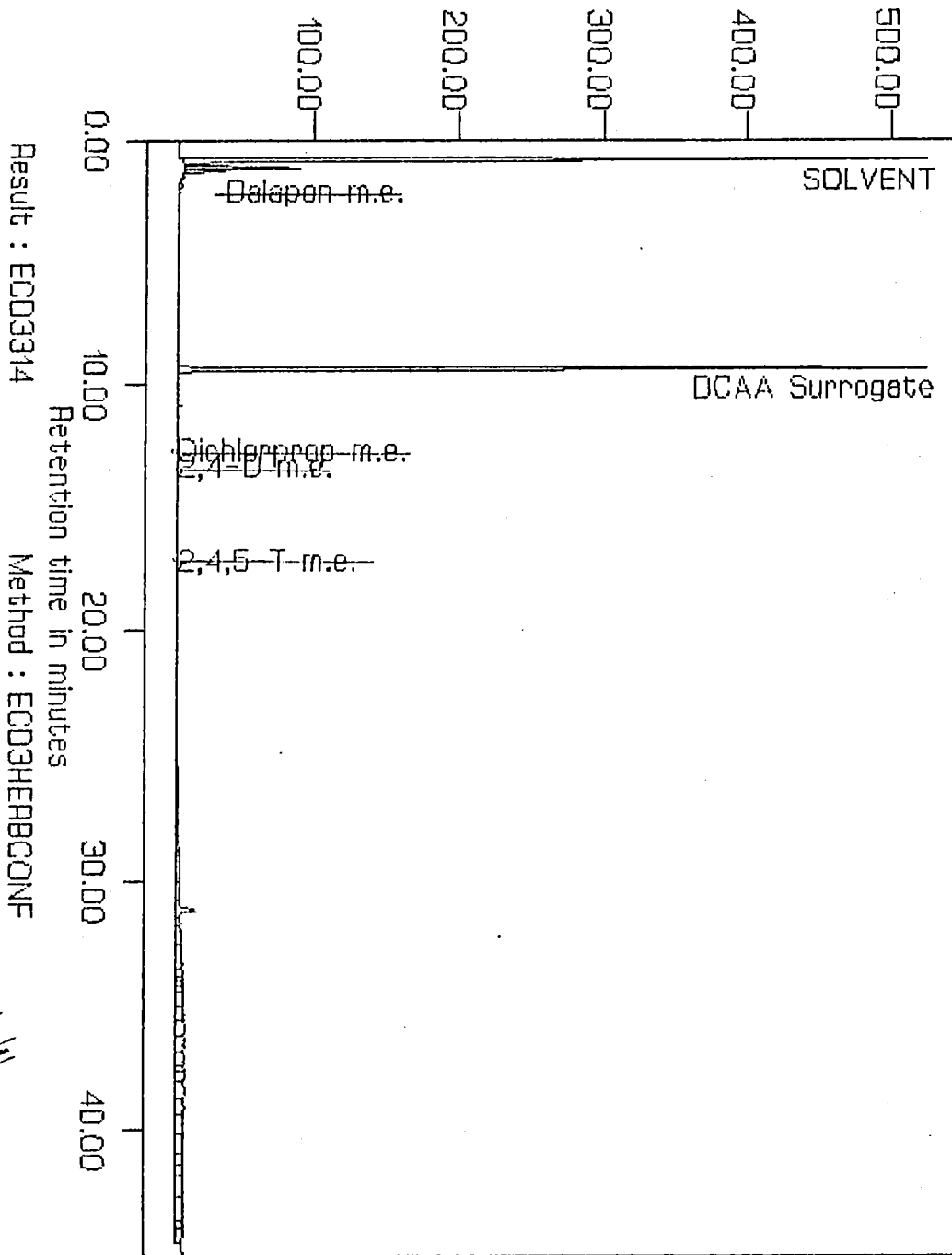
Retention time in minutes

Sample : X30614 Client # BH-8 Injected : MON JAN 21, 1991 2:55:59 PM

This document was part of the official Administrative Record for the Yakima Railroad Area on October 31, 1996.
Washington State Department of Ecology

Handwritten signature
1/24/91

Amplitude / 10E3



Sample : X30814 Client # BH-8 Injected : MON JAN 21, 1991 2:55:59 PM

Result : ECD3314

Method : ECD3HERBGNF

Handwritten signature

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Administration record for the Yakima
Railroad until on October 31, 1993.

Washington State
Department of Ecology

EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033
(303)425-6021

CHLORINATED HERBICIDES REPORT SHEET

Lab Project # 91-0147
Matrix: Water
Sample wt/vol: 1000 ml
Level: Low
%Moisture: Not Applicable
Extraction: Sep. Funnel
GPC Cleanup: No pH: 5

Client Sample# Method Blank
Lab Sample ID: WB011691
Lab File ID: ECD(3,4)309
Date Received: 01/16/91
Date Extracted: 01/16/91
Date Analyzed: 01/21/91
Dilution Factor: 1

CAS NO.	Compound	Concentration ug/L	MDL* ug/L
94-75-7	2,4-D	U	0.84
75-99-0	Dalapon	U	4.1
94-82-6	2,4-DB	U	0.64
1918-00-9	Dicamba	U	0.19
120-36-5	Dichlorprop	U	0.46
88-85-7	Dinoseb	U	0.05
94-74-6	MCPA	U	174
93-65-2	MCPP	U	134
93-76-5	2,4,5-T	U	0.14
93-72-1	2,4,5-TP (Silvex)	U	0.12

Surrogate Recovery = 100%

QUALIFIERS

U=Compound analyzed for but not detected.

B=Compound found in blank as well as sample (blank data should be compared).

J=Indicates an estimated value, when the substance is detected, but is below the practical quantitation limit, or when it is a tentatively identified compound.

*MDL=Method Detection Limit

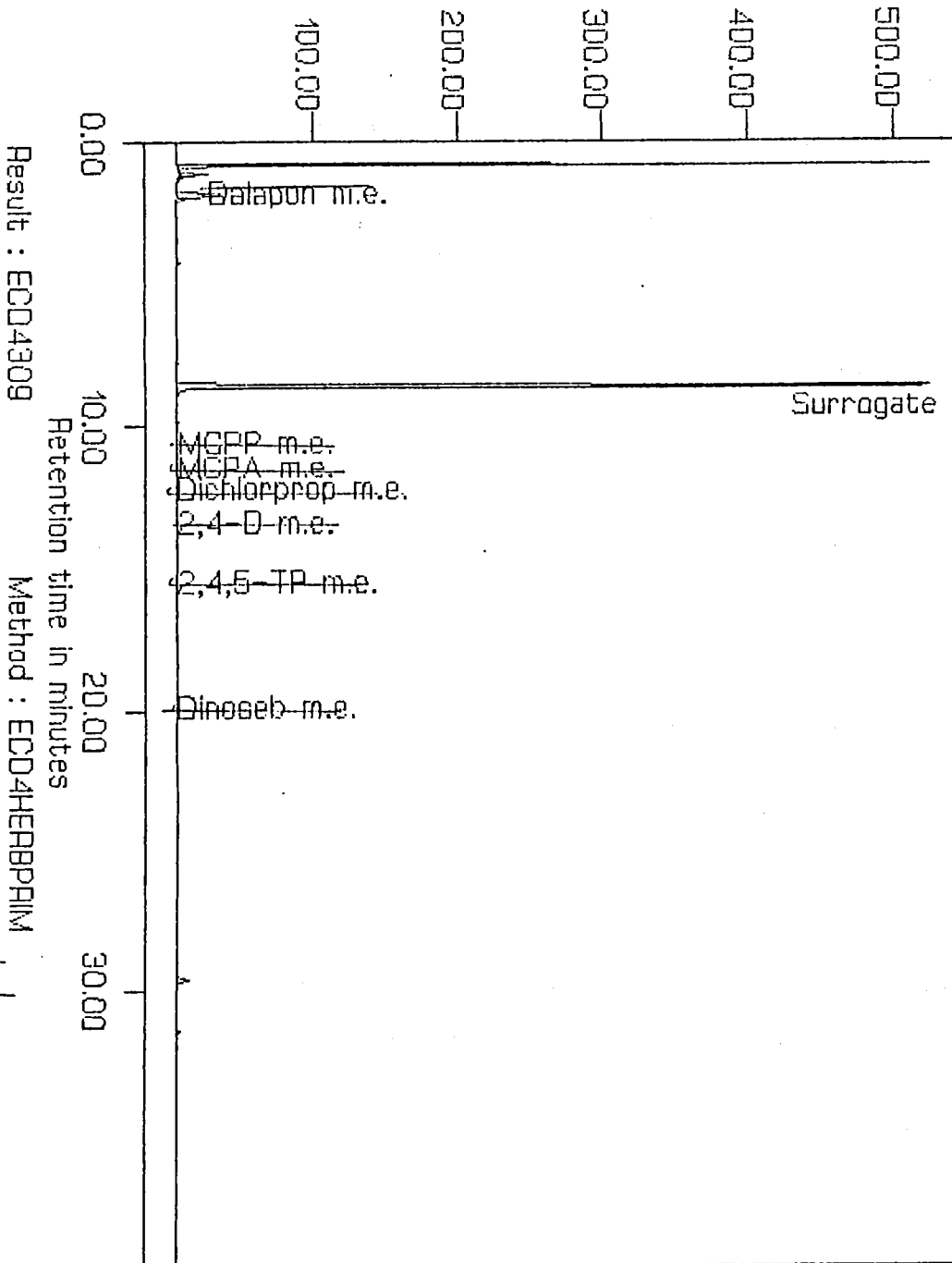
Approved John V. Ryan

QAO JB

Herbp0147a.FMT

This document was part of the official
Administrative Record for the Yakima
Railroad Area on October 23, 1986
Washington State
Department of Ecology

Amplitude / 10E3



Sample : WB011591 Method Blank Injected : MON JAN 21, 1991 9:50:41 AM

Result : ECD4309

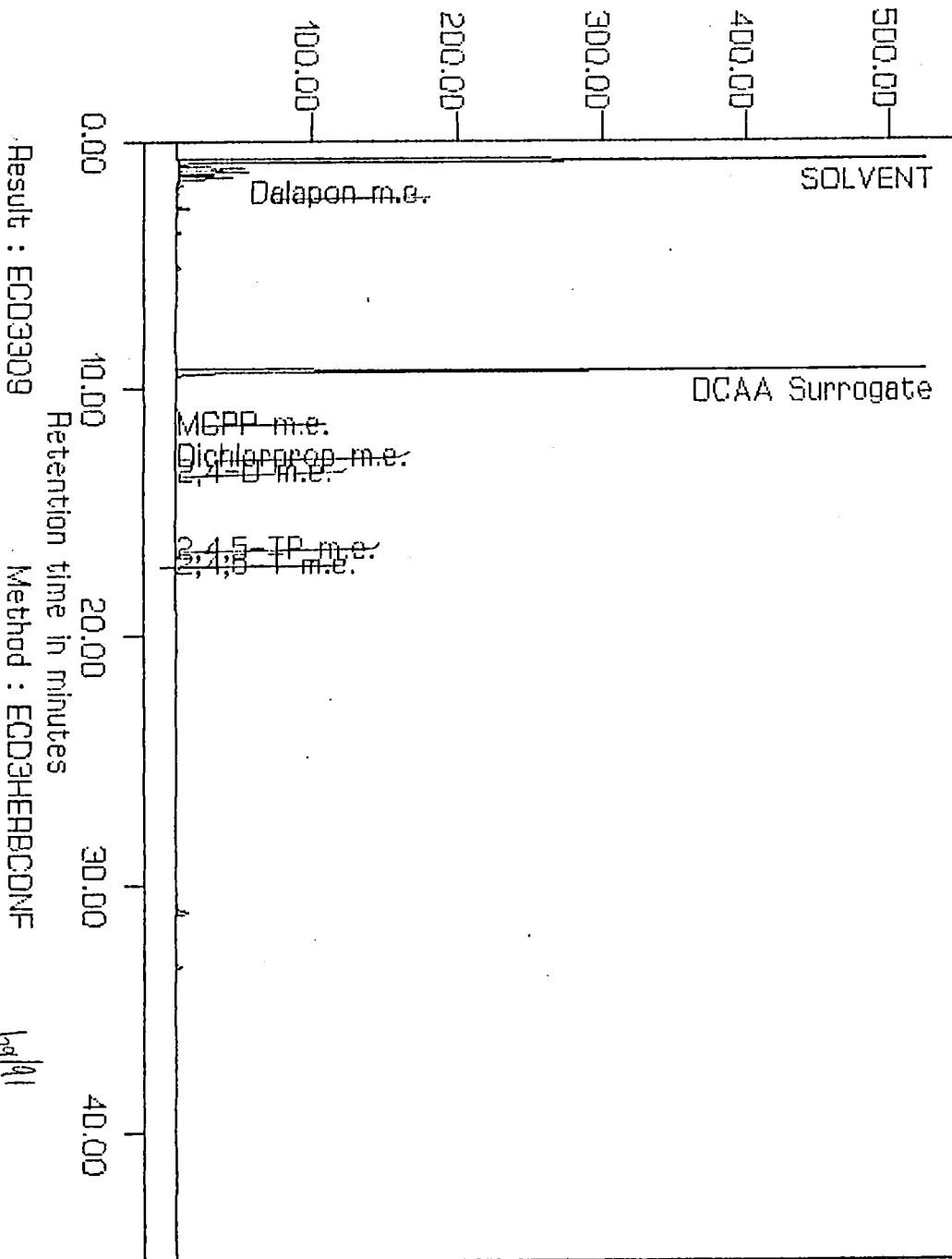
Method : ECD4HERBPHIM

Retention time in minutes

Handwritten signature
1/21/91

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Amplitude / 10E3



Result : ECD33909

Method : ECD3HERB.DNF

Retention time in minutes

Sample : WBD01691 Method Blank Injected : MON JAN 21, 1991 9:50:41 AM

Handwritten signature and date: 1/21/91

EVERGREEN ANALYTICAL, INC.
4036 Youngfield, Wheat Ridge, CO 80033
(303)425-6021

CHLORINATED HERBICIDES REPORT SHEET

Lab Project # 91-0147
Matrix: Soil
Sample wt/vol: 50.37 g
Level: Low
%Moisture: 15.26%
Extraction: Sonication
GPC Cleanup: No pH: 7.5

Client Sample# BH-6 4'-10' Comp.
Lab Sample ID: x30616
Lab File ID: ECD(3,4)316
Date Received: 01/16/91
Date Extracted: 01/18/91
Date Analyzed: 01/21/91
Dilution Factor: 1.17

CAS NO.	Compound	Concentration ug/L	MDL* ug/L
94-75-7	2,4-D	U	19.7
75-99-0	Dalapon	U	96.1
94-82-6	2,4-DB	U	15.0
1918-00-9	Dicamba	U	4.5
120-36-5	Dichlorprop	U	10.8
88-85-7	Dinoseb	U	1.2
94-74-6	MCPA	U	4077
93-65-2	MCPP	U	3139
93-76-5	2,4,5-T	U	3.3
93-72-1	2,4,5-TP (Silvex)	U	2.8

Surrogate Recovery = 99%

QUALIFIERS

U=Compound analyzed for but not detected.

B=Compound found in blank as well as sample (blank data should be compared).

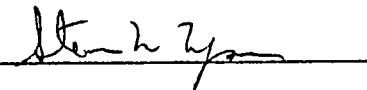
J=Indicates an estimated value, when the substance is detected, but is below the practical quantitation limit, or when it is a tentatively identified compound.

*MDL=Method Detection Limit

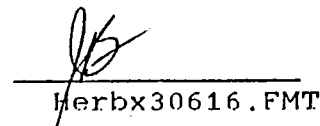
This document was part of the official
Administrative Record for the Yakima
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Washington State
Department of Ecology.

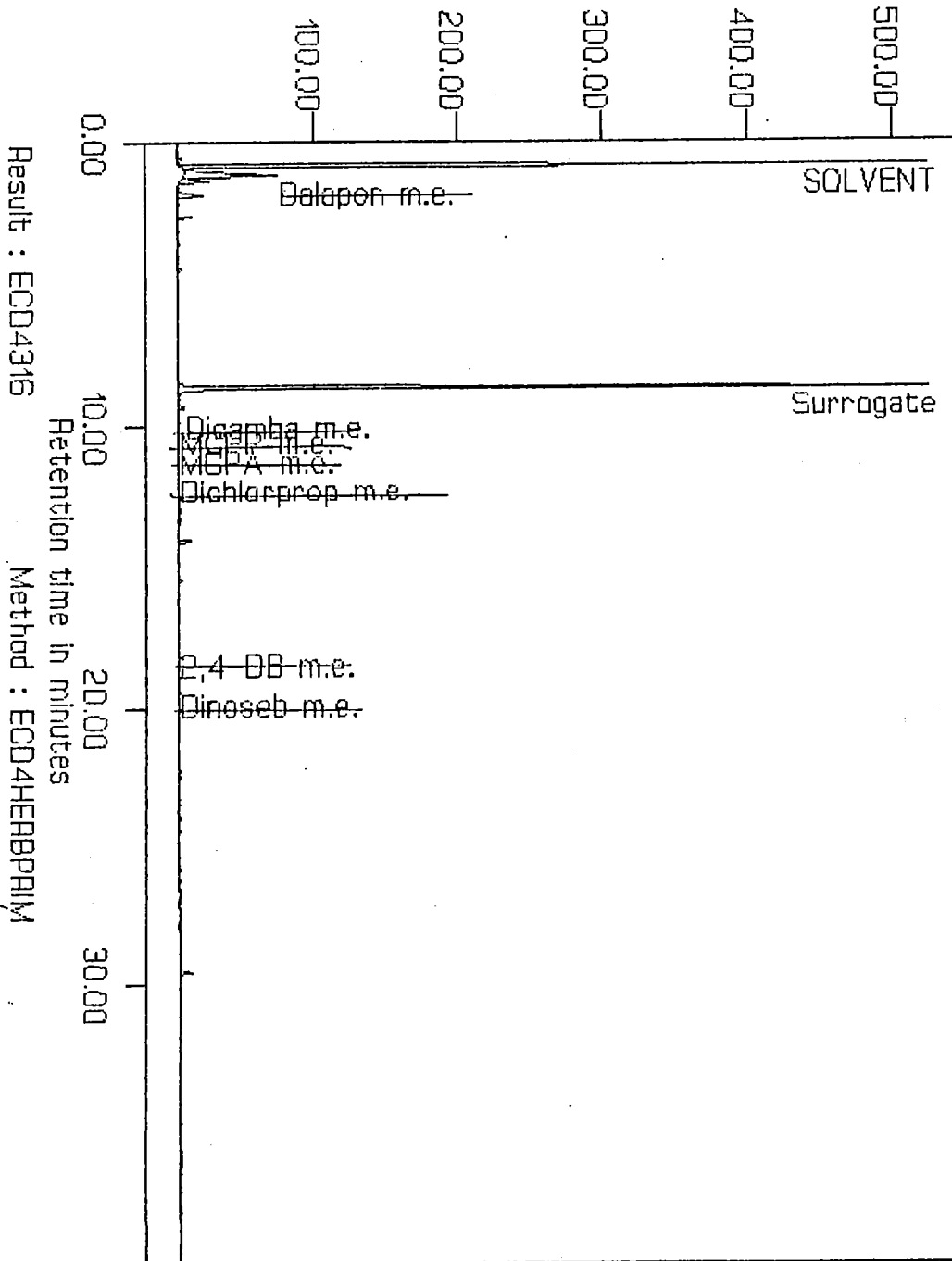
Approved



QAO


Herbx30616.FMT

Amplitude / 10E3



Result : ECD4315

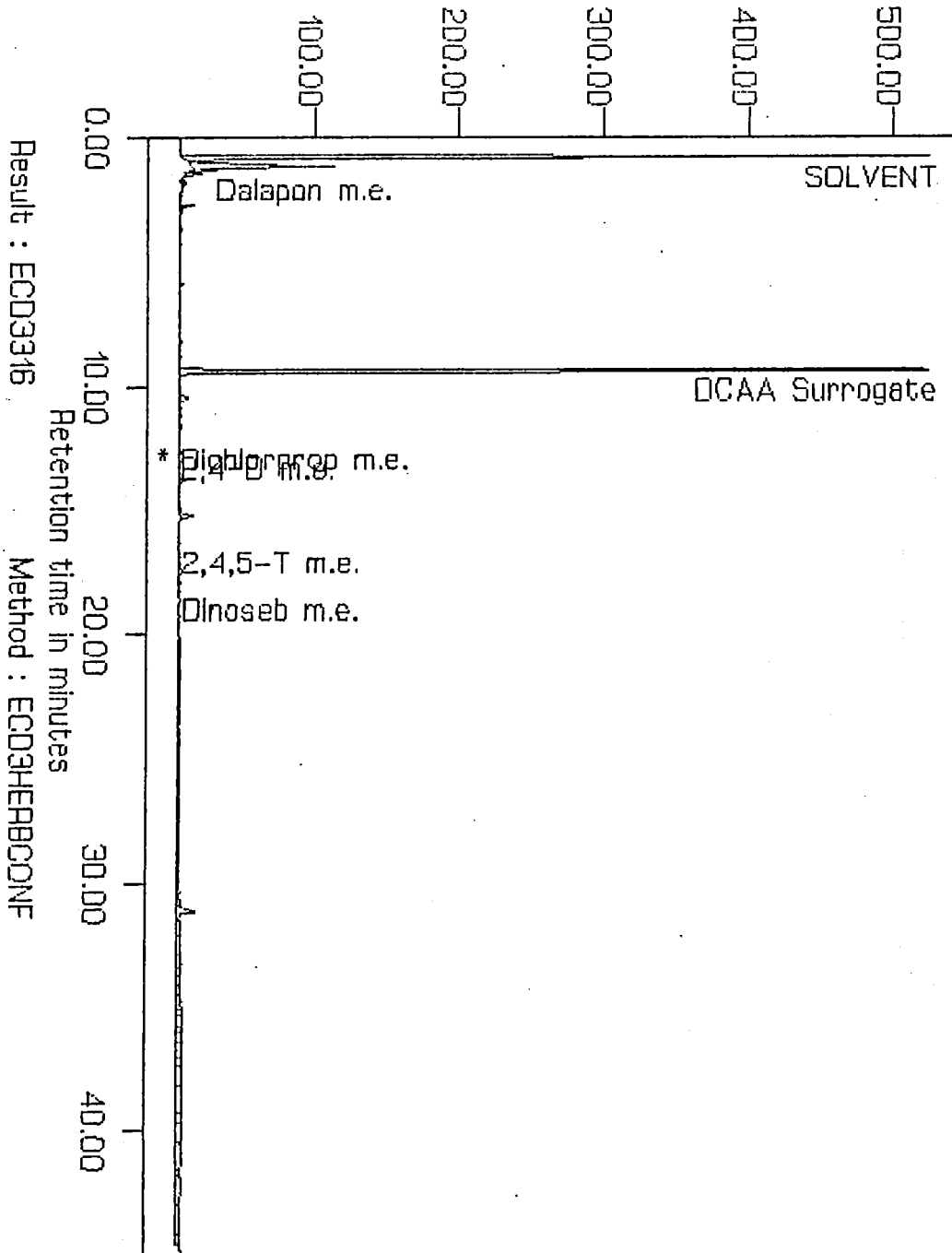
Method : ECD4HERBPRM

Sample : X30616 Client # BH-6 Comp. 4'-10' Injected : MON JAN 21, 1991 4:58:2

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Railroad Area on October 31, 1996.
Washington State
Department of Ecology.

qb
1/29/91

Amplitude / 10E3



Result : ECD33316

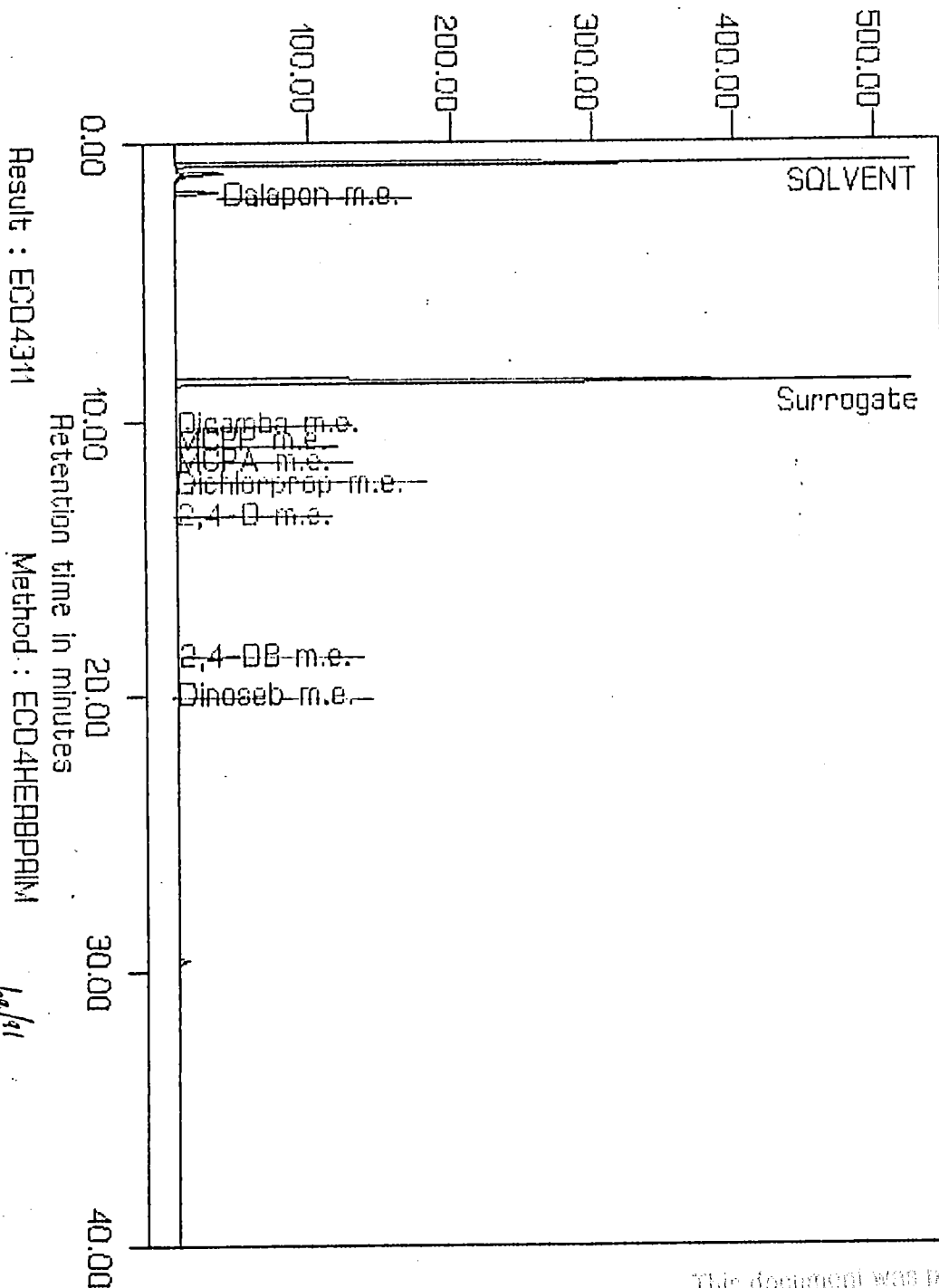
Method : ECD3HEHBCDNF

Sample : x30616 Client # BH-6 Comp. 4'-10' Injected : MON JAN 21, 1991 4:58:2

This document was part of the official
Administrative Record for the Yakima
Railroad Area on October 31, 1998.
Washington State
Department of Ecology

1/21/91

Amplitude / 10E3

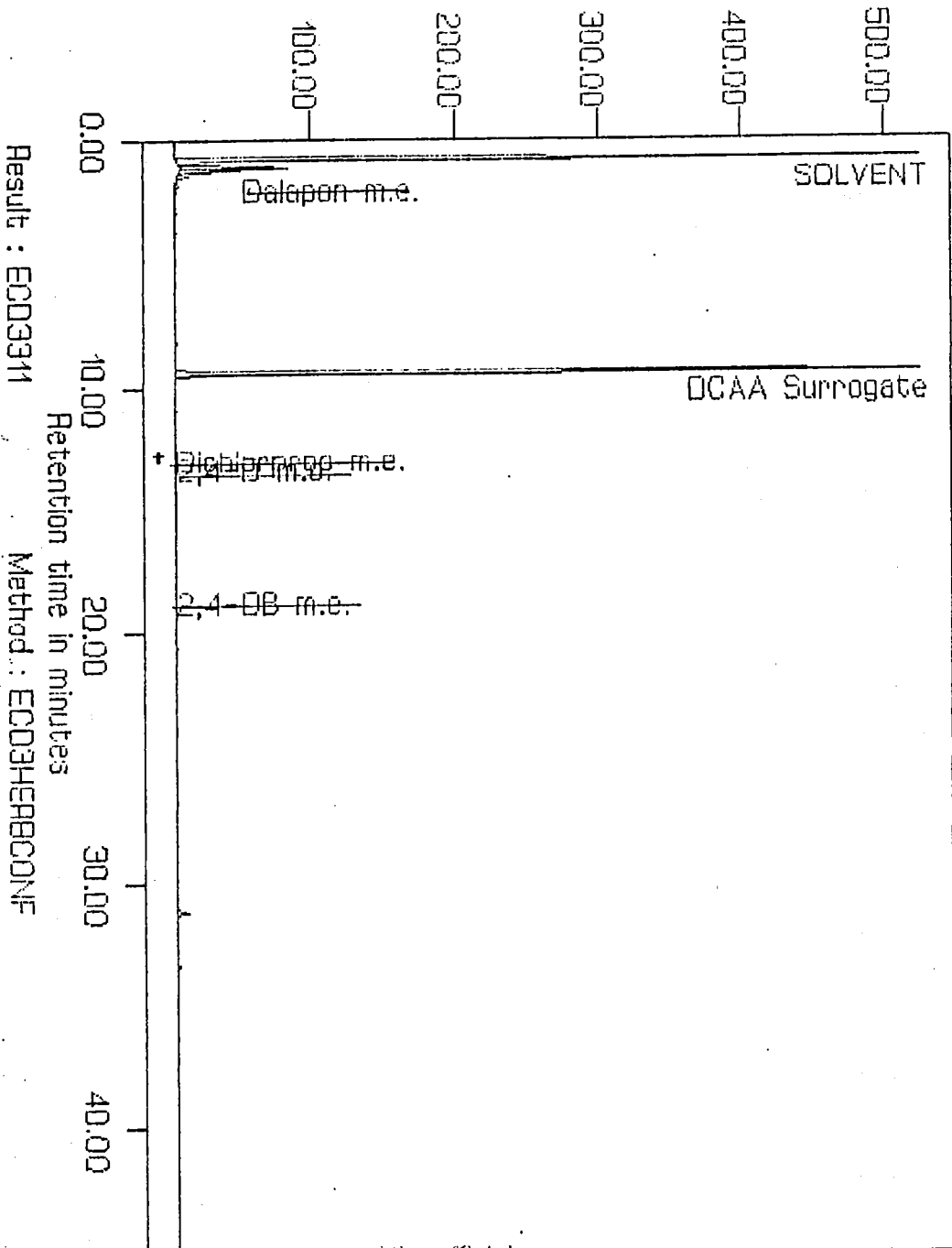


Sample : S8011891 Method Blank Injected : MON JAN 21, 1991 11:52:32 AM

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Washington State Department of Ecology.

Handwritten signature and date
1/21/91

Amplitude / 10E3



Sample : SBD01691 Method Blank Injected : MON JAN 21, 1991 11:52:32 AM

Handwritten signature
1/21/91

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Washington State Department of Ecology.

EVERGREEN ANALYTICAL, INC.
 4036 Youngfied Wheat Ridge CO 80033
 (303)425-6021

Pesticide Data Report

Client Sample #	: BH #6 COMP.	Client Project #	: 190-1961
Lab Sample #	: X30616 COMP.	Lab Project #	: 91-0147
Date Sampled	: 01/10/91	Dilution Factor	: 1.175
Date Received	: 01/16/91	Method	: BOBO
Date Extracted/Prepared	: 01/20/91	Matrix	: Soil
Date Analyzed	: 01/21/91	Lab File No.	: ECD1707/2707
Percent Loss on Drying	: 15.26	Method Blank No.	: SB01/20/91
Level	: LOW		
pH	: 7.5		

Compound Name	Cas Number	Concentration ug/Kg	PQL* ug/Kg
alpha-BHC	319-84-6	U	9.4
beta-BHC	319-85-7	U	9.4
delta-BHC	319-86-8	U	9.4
gamma-BHC	58-89-9	U	9.4
Heptachlor	76-44-8	U	9.4
Aldrin	309-00-2	U	9.4
Heptachlor epoxide	1024-57-3	U	9.4
Endosulfan I	959-98-8	U	9.4
Dieldrin	60-57-1	U	19
4,4'DDE	72-55-9	U	19
Endrin	72-20-8	U	19
Endosulfan II	33213-65-9	U	19
4,4'-DDD	72-54-8	U	19
Endosulfan sulfate	1031-07-8	U	19
4,4'-DDT	50-29-3	U	19
Methoxychlor	72-43-5	U	94
Endrin ketone	53494-70-5	U	19
alpha-Chlordane	5103-71-9	U	94
gamma-Chlordane	5103-74-2	U	94
Toxaphene	8001-35-2	U	190

Surrogate Recovery;
 TCMX 94%

This document was part of the official
 Administrative Record for the Yakima
 Railroad Area on October 31, 1990,
 Washington State
 Department of Ecology.

QUALIFIERS:

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- B = Compound found in blank and sample. Compare blank and sample data.
- * = Indicates the Practical Quantitation Limit (PQL).
- NA = Not applicable or not available.

Approved: William R. Snyder

[Signature]
 Quality Assurance Officer

X 30616 (Comp.)

ECD 1707

BH #6 Comp.

01/21/91

~~3:062~~
3:458

3.993

5.036

~~5:469~~
5:727

TCMX SURROGATE

6.914

~~ALPHA BHC~~

7.987

~~GAMMA BHC~~

~~DELTA BHC~~

10.467

~~10.915~~

~~HEPTACHLOR~~

11.700

~~ALDRIN~~

12.885

~~HEPTACHLOR EPOXIDE~~

14.544

15.421

15.896

16.372

~~18.613~~

~~ALDRIN ALDEHYDE~~

19.391

~~20.049~~

20.333

21.502

~~22.233~~

22.941

23.803

26.026

27.250

28.083

28.802

~~29:191~~

~~29:414~~

~~29:637~~

~~30:110~~

30.437

30.849

32.331

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Administrative Record for the Yakima
Railroad Area on October 31, 1996.
Washington State
Department of Ecology.

Confirmation

2.878 X30616 (Comp.)

ECD2707

BH #6 Comp. 01/21/7

3.815

5.015

TCMX SURROGATE

7.418

8.388

8.930

~~ALPHA-BHC~~

9.991

10.601

11.291

12.182

13.100

~~13.992~~
~~BETA-BHC~~

~~HEPTACHLOR EPOXIDE~~

16.660

17.568

~~ENDRIN~~

19.712

20.330

20.882

~~ENDOSULFAN II~~

22.595

23.933

24.782

~~ENDRIN KETONE~~

26.853

27.528

27.823

28.198

28.476

29.347

30.127

30.639

31.335

31.912

32.611

33.003

33.610

34.333

This document was part of the official
Administrative Record for the New York
Railroad Area on October 31, 1966,
Washington State
Department of Ecology

EVERGREEN ANALYTICAL, INC.
4036 Youngfield Wheat Ridge CO 80033
(303)425-6021

Pesticide Data Report

Client Sample # : BH-6
Lab Sample # : X30614
Date Sampled : 01/10/91
Date Received : 01/16/91
Date Extracted/Prepared : 01/28/91
Date Analyzed : 01/30/91
Percent Loss on Drying : NA
Level : LOW
pH : 6

Client Project # : 190-1961
Lab Project # : 91-0147
Dilution Factor : 1.667
Method : 8080
Matrix : Water
Lab File No. : ECD1755/2755
Method Blank No. : WBO1/28/91

Compound Name	Cas Number	Concentration ug/L	PQL* ug/L
alpha-BHC	319-84-6	U	0.083
beta-BHC	319-85-7	U	0.083
delta-BHC	319-86-8	U	0.083
gamma-BHC	58-89-9	U	0.083
Heptachlor	76-44-8	U	0.083
Aldrin	309-00-2	U	0.083
Heptachlor epoxide	1024-57-3	U	0.083
Endosulfan I	959-98-8	U	0.083
Dieldrin	60-57-1	U	0.17
4,4'-DDE	72-55-9	U	0.17
Endrin	72-20-8	U	0.17
Endosulfan II	33213-65-9	U	0.17
4,4'-DDD	72-54-8	U	0.17
Endosulfan sulfate	1031-07-8	U	0.17
4,4'-DDT	50-29-3	U	0.17
Methoxychlor	72-43-5	U	0.83
Endrin ketone	53494-70-5	U	0.17
alpha-Chlordane	5103-71-9	U	0.83
gamma-Chlordane	5103-74-2	U	0.83
Toxaphene	8001-35-2	U	1.7

This document was part of the official
Administrative Record for the Yakima
Railroad Area on October 31, 1996.
Washington State
Department of Ecology

Surrogate Recovery;
TCMX 79%

QUALIFIERS:

- U = Compound analyzed for, but not detected.
- J = Indicates an estimated value when the compound is detected, but is below the CLP Practical Quantitation Limit (PQL).
- B = Compound found in blank and sample. Compare blank and sample data.
- * = Indicates the Practical Quantitation Limit (PQL).
- NA = Not applicable or not available.

Approved: William R. Snyder

C. M. Hunt
Quality Assurance Officer

EVERGREEN ANALYTICAL, INC.
 4036 Youngfield Wheat Ridge CO 80033
 (303)425-6021

Pesticide Data Report

Client Sample #	: BH-6	Client Project #	: 190-1961
Lab Sample #	: X30614	Lab Project #	: 91-0147
Date Sampled	: 01/10/91	Dilution Factor	: 1.000
Date Received	: 01/16/91	Method	: 8080
Date Extracted/Prepared	: 01/17/91	Matrix	: Water
Date Analyzed	: 01/19/91	Lab File No.	: ECD1676/2676
Percent Loss on Drying	: NA	Method Blank No.	: WBO1/17/91
Level	: LDW		
pH	: 7		

Compound Name	Cas Number	Concentration ug/L	PQL* ug/L
alpha-BHC	319-84-6	U	0.05
beta-BHC	319-85-7	U	0.05
delta-BHC	319-86-8	U	0.05
gamma-BHC	58-89-9	U	0.05
Heptachlor	76-44-8	U	0.05
Aldrin	309-00-2	U	0.05
heptachlor epoxide	1024-57-3	U	0.05
Endosulfan I	959-98-8	U	0.05
Dieldrin	60-57-1	U	0.1
4,4'DDE	72-55-9	U	0.1
Endrin	72-20-8	U	0.1
Endosulfan II	33213-65-9	U	0.1
4,4'-DDD	72-54-8	U	0.1
Endosulfan sulfate	1031-07-8	U	0.1
4,4'-DDT	50-29-3	U	0.1
Methoxychlor	72-43-5	U	0.5
Endrin ketone	53494-70-5	U	0.1
alpha-Chlordane	5103-71-9	U	0.5
gamma-Chlordane	5103-74-2	U	0.5
Toxaphene	8001-35-2	U	1

Surrogate Recovery;
 TCMX 15% **

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 Administrative Record for the Yakima
 Railroad Area on October 31, 1996.
 Washington State
 Department of Ecology.

QUALIFIERS:

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- B = Compound found in blank and sample. Compare blank and sample data.
- * = Indicates the Practical Quantitation Limit (PQL).
- NA = Not applicable or not available.
- ** = Sample will be reprepared to confirm low surrogate recovery.

Approved: William R. Snyder

[Signature]
 Quality Assurance Officer

X30614

BH-6

ECD1676

01/19/91

3.426

3.980

5.021

TCMX SURROGATE

10.296

~~HEPTACHLOR~~

12.892

14.550

~~DIELDRIN~~

22.095

~~METHOXYCHLOR~~

DIBUTYLCHLORENDATE

26.827

27.575

28.477

29.503

30.386

32.017

32.961

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National Area on October 31, 1996.
Washington State
Department of Ecology.

2.687 X30614 (Confidential) BH-C ECD 2676 01/19/91

5.003

TCMX SURROGATE

22.875

26.939
27.482

34.573

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Administrative Record for the Yakima
Basin Area on October 31, 1996.
Washington State
Department of Ecology

EVERGREEN ANALYTICAL, INC.
 4036 Youngfield Wheat Ridge CO 80033
 (303)425-6021
 Pesticide Data
 Method Blank Report

Method Blank Number : SB01/20/91
 Date Extracted/Prepared : 01/20/91
 Date Analyzed : 01/21/91

Client Project No. : 190-1961
 Lab Project No. : 91-0147
 Dilution Factor : 1.000
 Method : 8080
 Matrix : Soil
 Lab File No. : ECD1706/2706


Compound Name	Cas Number	Concentration ug/Kg	PQL* ug/Kg
alpha-BHC	319-84-6	U	8
beta-BHC	319-85-7	U	8
delta-BHC	319-86-8	U	8
gamma-BHC	58-89-9	U	8
Heptachlor	76-44-8	U	8
Aldrin	309-00-2	U	8
Heptachlor epoxide	1024-57-3	U	8
Endosulfan I	959-98-8	U	8
Dieldrin	60-57-1	U	16
4,4'-DDE	72-55-9	U	16
Endrin	72-20-8	U	16
Endosulfan II	33213-65-9	U	16
4,4'-DDD	72-54-8	U	16
Endosulfan sulfate	1031-07-8	U	16
4,4'-DDT	50-29-3	U	16
Methoxychlor	72-43-5	U	80
Endrin ketone	53494-70-5	U	16
alpha-Chlordane	5103-71-9	U	80
gamma-Chlordane	5103-74-2	U	80
Toxaphene	8001-35-2	U	160

Surrogate Recovery;
TCMX 81%

QUALIFIERS:

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- B = Compound found in blank and sample. Compare blank and sample data.
- * = Indicates the Practical Quantitation Limit (PQL).
- NA = Not applicable or not available.

Approved: William R. Snyder



 Quality Assurance Officer

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 Agency and shall not be released to the public
 without the approval of the official
 Washington State
 Department of Ecology

SB 01/20/91

Method Blank

ECD 1706 01/21/91

3.862

3.442

4.000

5.044

TCMX SURROGATE

9.083

10.027

10.477

10.929

~~HEPTACHLOR~~

12.901

13.607

~~HEPTACHLOR EPOXIDE~~

15.451

15.815

~~DIELDREN~~

~~1,1 DDE~~

17.895

18.251

~~ENDRIN ALDEHYDE~~

19.414

~~4,4' DDT~~

20.432

21.514

22.233

22.954

23.816

25.637

26.348

26.659

27.266

28.210

28.813

29.193

29.662

30.126

30.455

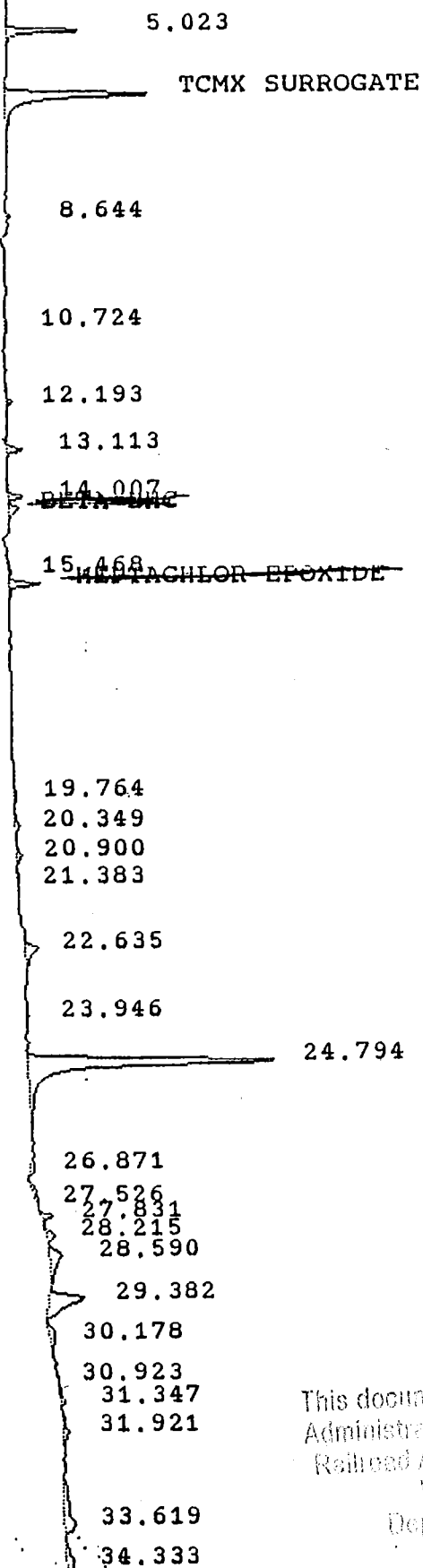
30.859

31.769

32.369

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SB01/20/91 (confirm.) Method Blank ECD2706 01/21/



This document was part of the official
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Railroad Area on October 31, 1990.
Washington State
Department of Ecology

EVERGREEN ANALYTICAL, INC.
 4036 Youngfield Wheat Ridge CO 80033
 (303)425-6021
 Pesticide Data
 Method Blank Report

Method Blank Number	: WB01/17/91	Client Project No.	: 190-1961
Date Extracted/Prepared	: 01/17/91	Lab Project No.	: 91-0147
Date Analyzed	: 01/19/91	Dilution Factor	: 1.000
		Method	: 8080
		Matrix	: Water
		Lab File No.	: ECD1657/2657

Compound Name	Cas Number	Concentration ug/L	PQL* ug/L
alpha-BHC	319-84-6	U	0.05
beta-BHC	319-85-7	U	0.05
delta-BHC	319-86-8	U	0.05
gamma-BHC	58-89-9	U	0.05
Heptachlor	76-44-8	U	0.05
Aldrin	309-00-2	U	0.05
leptachlor epoxide	1024-57-3	U	0.05
Endosulfan I	959-98-8	U	0.05
Dieldrin	60-57-1	U	0.1
4,4'DDE	72-55-9	U	0.1
Endrin	72-20-8	U	0.1
Endosulfan II	33213-65-9	U	0.1
4,4'-DDD	72-54-8	U	0.1
Endosulfan sulfate	1031-07-8	U	0.1
4,4'-DDT	50-29-3	U	0.1
Methoxychlor	72-43-5	U	0.5
Endrin ketone	53494-70-5	U	0.1
alpha-Chlordane	5103-71-9	U	0.5
gamma-Chlordane	5103-74-2	U	0.5
Toxaphene	8001-35-2	U	1

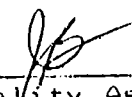
Surrogate Recovery; TCMX 78%

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 Railroad Area on October 31, 1996.
 Washington State
 Department of Ecology.

QUALIFIERS:

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- NA = Not applicable or not available.

Approved: William R. Snyder


 Quality Assurance Officer

WB 01/17/91

Method Blank

ECD 1657

01/19/91

3.948

4.987

TCMX SURROGATE

~~XXXXXXXXXX~~
22.425

~~DISSOLVED SURROGATE~~

27.981
28.404

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Washington State
Department of Ecology.

32.697

WB 01/17/91 (confirm)

Method Blank

ECD 2657 01/19/91

3.356

4.973

TCMX SURROGATE

26.937

34.583

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Washington State
Department of Ecology.

EVERGREEN ANALYTICAL, INC.
 4036 Youngfield Wheat Ridge CO 80033
 (303)425-6021
 Pesticide Data
 Method Blank Report

Method Blank Number	: WB01/28/91	Client Project No.	: 190-1961
Date Extracted/Prepared	: 01/28/91	Lab Project No.	: 91-0147
Date Analyzed	: 01/30/91	Dilution Factor	: 1.000
		Method	: 8080
		Matrix	: Water
		Lab File No.	: ECD1753/2753

Compound Name	Cas Number	Concentration ug/L	PQL* ug/L
alpha-BHC	319-84-6	U	0.05
beta-BHC	319-85-7	U	0.05
delta-BHC	319-86-8	U	0.05
gamma-BHC	58-89-9	U	0.05
Heptachlor	76-44-8	U	0.05
Aldrin	309-00-2	U	0.05
Heptachlor epoxide	1024-57-3	U	0.05
Endosulfan I	959-98-8	U	0.05
Dieldrin	60-57-1	U	0.1
4,4'DDE	72-55-9	U	0.1
Endrin	72-20-8	U	0.1
Endosulfan II	33213-65-9	U	0.1
4,4'-DDD	72-54-8	U	0.1
Endosulfan sulfate	1031-07-8	U	0.1
4,4'-DDT	50-29-3	U	0.1
Methoxychlor	72-43-5	U	0.5
Endrin ketone	53494-70-5	U	0.1
alpha-Chlordane	5103-71-9	U	0.5
gamma-Chlordane	5103-74-2	U	0.5
Toxaphene	8001-35-2	U	1

Surrogate Recovery;
 TCMX 69%

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QUALIFIERS:

- U = Compound analyzed for, but not detected.
- J = Indicates an estimated value when the compound is detected, but is below the CLP Practical Quantitation Limit (PQL).
- B = Compound found in blank and sample. Compare blank and sample data.
- * = Indicates the Practical Quantitation Limit (PQL).
- NA = Not applicable or not available.

Approved: William R. Snyder

C. M. Smith
 Quality Assurance Officer

2.912 WB 01/28/91

Method Blank

ECD 1753 01/30/91

3.585

4.054

5.105

TCMX SURROGATE

7.045

~~DELTA BHC~~

~~DELTA BHC~~

10.573

11.024

21.034

21.639

22.436

23.380

23.960

28.503

30.531

31.466

32.110

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copy 2/1/91

2.739 WB 01/28/91 (confirm.) Method Blank ECD 27.53 01/30/91

3.407
3.853
4.136

5.079

TCMX SURROGATE

7.537

9.471

10.845

12.293

13.202

~~14.116~~
~~DATA BNC~~

16.348

21.747

22.998

24.911

27.034

27.992

32.768
33.215

34.801

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Washington State
Department of Ecology.

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ChenNorthchem, Inc. CHAIN OF CUSTODY RECORD

BILLINGS 600 SOUTH 25TH STREET P.O. BOX 30615 BILLINGS, MT 59107 (406) 248-9161 FAX (406) 248-9282
 BOISE 370 BENJAMIN LANE P.O. BOX 7177 BOISE, ID 83707 (208) 377-2100 FAX (208) 376-5349
 CASPER 605 N. WAREHOUSE ROAD P.O. BOX 2599 CASPER, WY 82602 (307) 284-2126 FAX (307) 266-5143
 GREAT FALLS 528 SMELTER AVENUE P.O. BOX 951 GREAT FALLS, MT 59403 (406) 453-1641 FAX (406) 727-2070
 HELENA 1610 B STREET P.O. BOX 1493 HELENA, MT 59604 (406) 443-5274 FAX (406) 449-3788
 TRI-CITIES 2214 NORTH 4TH AVENUE P.O. BOX 2691 TRI-CITIES, WA 99302 (509) 547-9671 FAX (509) 547-1673

Project Name		Station Location		No. of Containers	Remarks
Proj. No.	Date	Date	Time		
190-1961	Yakima Public Works				
Samplers: (Signature) <i>Ken Lane</i>					
Sta. No.	Date	Date	Time	No. of Containers	Remarks
DH#BB	1/9/91	3:00 PM		1	lit. bottle
DH#3B	"	"	"	2	Vials
DH#7	"	"	"	1	Soil samples
DH#7	"	"	"	1	Soil sample
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Relinquished by: (Signature) <i>John Jones</i>		Date / Time	1/16/91 3:00 PM	Relinquished by: (Signature) <i>[Signature]</i>	Date / Time
Relinquished by: (Signature) <i>[Signature]</i>		Date / Time		Relinquished by: (Signature) <i>[Signature]</i>	Date / Time
Relinquished by: (Signature) <i>[Signature]</i>		Date / Time		Relinquished by: (Signature) <i>[Signature]</i>	Date / Time

BILLINGS
460 SOUTH 25TH STREET
P. O. BOX 30515
BILLINGS, MT 59107
(406) 248-9161
FAX (406) 248-9282

BOISE
370 BENJAMIN LANE
P. O. BOX 7777
BOISE, ID 83707
(208) 377-2100
FAX (208) 376-5349

CASPER
605 N. WAREHOUSE ROAD
P. O. BOX 2599
CASPER, WY 82602
(406) 234-2128
FAX (307) 266-5143

GREAT FALLS
528 SHELTER AVENUE
P. O. BOX 951
GREAT FALLS, MT 59403
(406) 453-1641
FAX (406) 727-2070

HELENA
1610 B STREET
P. O. BOX 4693
HELENA, MT 59604
(406) 443-5210
FAX (406) 449-3783

TRI-CITIES
224 NORTH 4TH AVENUE
P. O. BOX 2601
TRI-CITIES, WA 99302
(509) 547-1571
FAX (509) 547-1573

OTHER

Proj. No.	Project Name		Station Location	No. of Containers	Remarks
	Date	Time			
190-1961	Yakima Public Works - Coast Line				
Samplers: (Signature) <i>Paul Daniclov</i>					
DH-2	12/17	12/17	17° - 14'	1	
DH-2	12/17	12/17	14° - 15'	1	
DH-2	12/17	12/17	15° - 16'	1	
DH-2	12/17	12/17	15° - 17'	1	
DH-1	12/12	12/12	12° - 13'	1	
DH-1	12/13	12/13	15° - 17'	1	
DH-1	12/14	12/14	water	2	water vial
DH-1	12/14	12/14	"	2	water - Bottle
DH-1	12/14	12/14	"	1	
Relinquished by: (Signature) <i>Paul Daniclov</i> Date / Time 12/19 4:00 Rec'd by: (Signature) <i>Carlynn UPS</i>					
Relinquished by: (Signature) Date / Time Rec'd by: (Signature)					
Relinquished by: (Signature) Date / Time Rec'd for laboratory by: (Signature)					

Salmon
TPE K22
TPE K21
BTEX 603

12/28/90
12/28/90

12/17/90
12/17/90

Chen & North, Inc. CHAIN OF CUSTODY RECORD

BILLINGS 800 SOUTH 25TH STREET P. O. BOX 30615 BILLINGS, MT 59107 (406) 248-9161 FAX (406) 248-9282
 BOISE 370 BENJAMIN LANE P. O. BOX 7777 BOISE, ID 83707 (208) 372-2100 FAX (208) 376-5349
 CASPER 605 N. WAREHOUSE ROAD P. O. BOX 2599 CASPER, WY 82602 (307) 234-2126 FAX (307) 286-5143
 GREAT FALLS 528 SWEETER AVENUE P. O. BOX 951 GREAT FALLS, MT 59403 (406) 453-1641 FAX (406) 727-2070
 HELENA 1610 B STREET P. O. BOX 4899 HELENA, MT 59604 (406) 443-5210 FAX (406) 449-3728
 TRI-CITIES 2214 NORTH 4TH AVENUE P. O. BOX 2601 TRI-CITIES, WA 99302 (509) 547-1671 FAX (509) 547-1673

Proj. No.		Project Name		Station Location	No. of Containers	Remarks	Date / Time	Relinquished by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time		
190-1961		Yakima County													
Samplers: (Signature)		Ken Lane													
Sta. No.	Date	Time													
BH-6	1/10		Boring # 6	5	X X X	Water									
BH-6	1/10		Boring # 6 14-18'	2	X X	Soil									
BH-6	1/10		Boring # 6 4-6' 2-5-10'	3	X X										
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Relinquished by: (Signature)								Date / Time		Relinquished by: (Signature)		Date / Time		Relinquished by: (Signature)	
Dorinda Hays								1/13/91 4:00							
Relinquished by: (Signature)								Date / Time		Relinquished by: (Signature)		Date / Time		Relinquished by: (Signature)	
Relinquished by: (Signature)								Date / Time		Relinquished by: (Signature)		Date / Time		Relinquished by: (Signature)	

OTHER Evergreen Analytical

- BILLINGS 600 SOUTH 25TH STREET P. O. BOX 30615 BILLINGS, MT 59107 (406) 248-8282 FAX (406) 248-8161
- BOISE 370 BENJAMIN LANE P. O. BOX 7777 BOISE, ID 83707 (208) 377-2100 FAX (208) 376-5349
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- TRI-CITIES 2214 NORTH 4TH AVENUE P. O. BOX 2601 TRI-CITIES, WA 99302 (509) 547-1671 FAX (509) 547-1673

Proj. No. 190-1961		Project Name Yakima Public Works		Station Location	No. of Containers	Remarks
Samplers: (Signature) <u>Ken Lane</u>		Date	Time			
DH#S	12/19	3:00 PM	9.5' - 11.0'	1	X	Soil jars
DH#S	12/19	"	13.0' - 16.0'	1	X	↓
DH#S	12/19	"	11.0' - 12.0'	1	X	↓
DH#S	12/19	"	12.0 - 13.0'	1	X	↓
DH#2	12/18	"	Surface H ₂ O Level	2	X	Liquid small vial
DH#2	12/18	"	" " "	2	X	" " "
DH#S	12/20	"	" " "	2	X	" " "
DH#S	12/20	"	" " "	1	X	Large Bottle (Liter)
DH#S	12/20	"	" " "	1	X	(No HCL) " "
DH#2	12/18	"	" " "	1	X	(with HCL) " "
DH#2	12/18	"	" " "	1	X	" " "
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Relinquished by: (Signature) <u>[Signature]</u>		Date / Time	12/21 4:00	Relinquished by: (Signature)	Date / Time	Rec'd by: (Signature)
Relinquished by: (Signature)		Date / Time		Relinquished by: (Signature)	Date / Time	Rec'd by: (Signature)
Relinquished by: (Signature)		Date / Time		Relinquished by: (Signature)	Date / Time	Rec'd by: (Signature)