

155.57

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Prepared for:

*Floyd & Sons of
Thrifty Car Rental*

Site Location:

Anchorage, Alaska

FINAL REPORT

***Groundwater Sampling
and Analysis at
Thrifty Car Rental
3730 Spenard Road
Anchorage, Alaska***

April 3, 1995 E11931203.02

1.0 INTRODUCTION

Floyd and Sons of Thrifty Car Rental contracted Enviros, Inc. to conduct sampling of five groundwater monitoring wells at the Thrifty Car Rental site located at 3730 Spenard Road in Anchorage, Alaska. The following report addresses groundwater sampling performed on February 15 and 16, 1995. This work was conducted in accordance with the Exhibit to the General Services Agreement dated February 16, 1995.

2.0 SCOPE OF WORK

Enviros sampled groundwater monitoring wells MW-9, MW-11, T-1, T-2, and T-4 (Figure 1). The purpose of the sampling was to attempt to determine the origin of contamination in the subject wells. Thrifty Car Rental and Chevron gasoline station are in close vicinity to each other, and it was unclear which property was the source of contamination. Friedman & Bruya, Inc. (F&B) analyzed all samples and compared results to give a fingerprint of the petroleum in each well. F&B analyzed for lead in the samples, then determined an approximate age of the product released, and then compared the results from each well to determine whether they were from the same product release.

3.0 FIELD WORK AND METHODS

3.1 Field Methods

On February 15 and 16, 1995, MaryBeth Gilbrough of Enviros was present on-site for groundwater sampling of monitoring wells MW-9, MW-11, T-1, T-2, and T-4. The groundwater sampling was performed to assess the source of contamination in the subject wells. Where pertinent, samples were collected in accordance with the Enviros Quality Assurance Program Plan for USTs as approved by the State of Alaska Department of Environmental Conservation.

Prior to sampling, Enviros opened the wells and conducted water level measurements using an electronic well probe. The wells were also sounded to verify well construction data, and the probe was decontaminated between measurements to prevent the potential for cross-contamination. After water level measurement, Enviros carefully lowered a disposable bailer into each well to determine whether free product was present on the groundwater surface. If free product was present, the thickness was measured, and the product was sampled without purging the well.

If free product was not present on the groundwater surface, the well was purged by removing 3 to 5 well volumes of groundwater. The bailed water was monitored for temperature, pH, turbidity, and conductivity during bailing. Bailing continued until these parameters stabilized. After well purging, the groundwater samples were collected. Purged groundwater was placed in a labeled 55-gallon drum that was present on-site.

The groundwater and product samples were funneled into 40 ml VOA vials and 1 liter amber bottles. Samples were then shipped to F&B in Seattle, Washington.

3.2 Analytical Methods

The three product samples were analyzed for tetraethyl and tetramethyl lead using the Gas Chromatography/Electron Capture Detector (GC/ECD) Method. However, tetraethyl and tetramethyl are difficult to detect in samples without free product; therefore, the two groundwater samples were analyzed for the anti-knocking compounds Ethylene Dichloride (EDC) and Ethylene Dibromide (EDB).

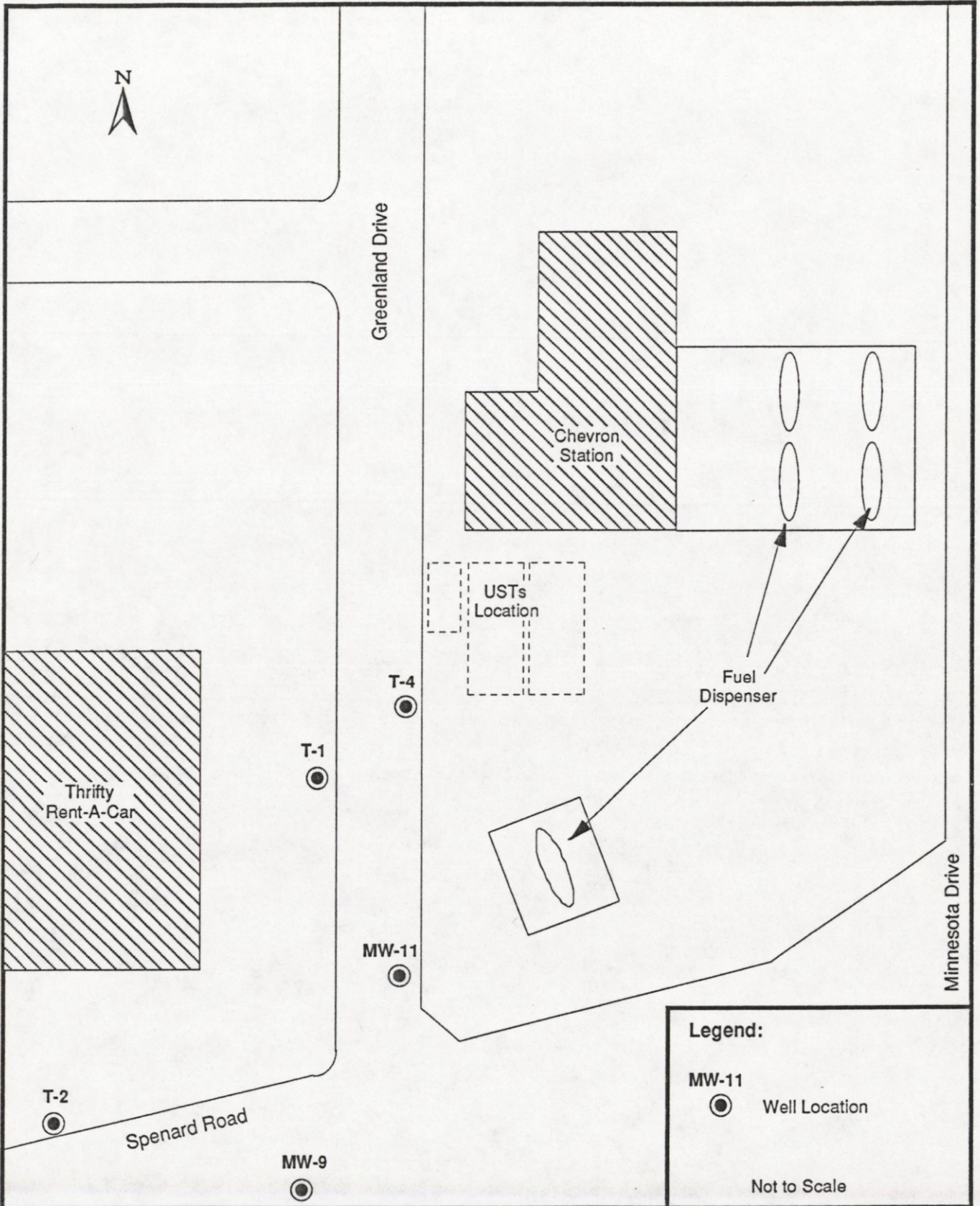


Figure 1. Vicinity Sketch of the Thrifty Property , Anchorage, Alaska.

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E1/931203.02

Drawn By: AIS Date: 4/3/94

Approved By: *Kaz* Date: 4/3/95

In addition to EDC and EDB, the groundwater samples were analyzed for methyl-tert-butyl ether (MTBE) and benzene, toluene, ethylbenzene and xylene (BTEX) using the Gas Chromatography/Mass Spectrometry (GC/MS) Method. In order to determine the age of the product in the wells, F&B fingerprinted the product using Capillary Gas Chromatography/Flame Ionization Detector (GC/FID) and GC/ECD.

3.3 Field Quality Control and Quality Assurance Procedures

Following collection, water samples were poured from the bailer into sampling bottles. The containers were sealed with a plastic, teflon-lined lids, and no air bubbles were noted in the VOA vials on inversion. All sample jars were labeled, placed in individual zip-lock bags, and stored on ice until delivered to the analytical laboratory with a chain-of-custody.

Disposable bailers were used for sampling of all monitoring wells; therefore it was not necessary to decontaminate bailers. Sampling personnel wore latex gloves that were changed after each sample was collected. The water level probe was decontaminated prior to, and between water level measurements. The decontamination procedure was as follows:

- Detergent/distilled water rinse;
- Distilled water rinse;
- 10 % Methanol Solution Rinse;
- Distilled water rinse; and
- Air Dry.

A chain-of-custody was maintained from the time the containers were obtained from the laboratory until they were returned and the analyses were performed. Recorded sample information included: time and date of collection, sample identification number, analysis to be performed, preservative used, and special instructions as appropriate. The laboratory used internal precision and accuracy checks that are reported with the analytical results in the Appendix.

4.0 FIELD OBSERVATIONS

Monitoring wells MW-9, MW-11, and T-2 had a considerable amount of product present on the groundwater surface. Monitoring well T-1 had a strong odor with a slight sheen. Well T-4 had a slight odor with no free product or sheen. The following table summarizes the monitoring well data and product thickness determined during groundwater level measurements.

Table 1. Well Parameters.

Well Designation	Diameter (inches)	Depth to Water (feet)	Depth to Bottom (feet)	Thickness of Product (inches)
MW-9	2	15.34	19.93	6
MW-11	2	14.52	17.04	8
T-1	4	12.82	22.70	0
T-2	4	15.43	19.25	12
T-4	4	12.91	18.55	0

5.0 ANALYTICAL RESULTS

Tetraethyl and tetramethyl lead were not detected in the three wells (MW-9, MW-11, and T-2) where product was present on the groundwater surface. EDC and EDB were not detected in the groundwater samples from wells T-1 and T-4.

Using the product fingerprinting Method by GC/FID and GC/ECD, F&B determined that the samples from the five wells contain a product identified as an automobile gasoline, and that the product in the five wells is probably from the same release. The two water samples contained MTBE which has been used mainly in the last four years. In addition, the product samples were relatively unweathered. Based on these results, the estimated age of the product present in the five wells is less than 4 years old.

For a more detailed discussion of the analytical results, see the Appendix of this report for the F&B discussion.

6.0 SUMMARY AND CONCLUSIONS

Based on the analytical results provided by F&B, the product and dissolved gasoline in each of the five wells appears to have occurred from the same release. In addition, it appears that the product is younger than 4 years.

There is additional pertinent information from the past environmental studies. The release at the Thrifty site occurred before September 1989 which is when a faulty valve was detected and replaced. The underground tank at the Thrifty site was removed on August 21, 1992 and the tank and piping were reportedly in good condition (Western Environmental Consultants, 1992). Previous reports by Chevron's consultant (Quality Environmental Sampling, Sept. 16, 1994) and Thrifty's consultant (Western Environmental Consultants, 1993) indicate that the groundwater flow direction is toward the southwest which means that the Thrifty site and the wells sampled in this investigation, are located predominantly downgradient of the underground storage tanks and dispensing islands at the Chevron site. Based on the previous studies and the information developed in this investigation, the release of product that is affecting groundwater in the five subject wells sampled appears to have originated from the Chevron site.

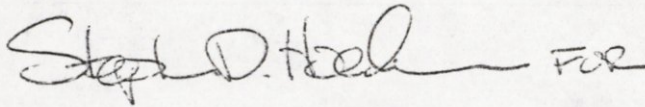
7.0 LIMITATIONS

No warranty is expressly stated or implied in this report with regard to the condition of the substrate and groundwater below the surface of the property with the exception of the sampling and analysis of groundwater assessed in this report. The findings and conclusions documented in this report have been prepared in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the Exhibit and General Services Agreement executed between Enviro and Floyd and Sons. This report reflects our observations of the condition of the property on the days of field activities, and does not cover any other conditions found on the property that were not discernible during these field activities.

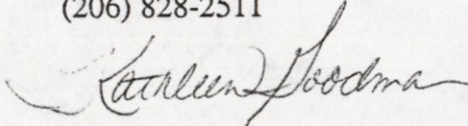
It has been a pleasure to provide our environmental services to you. If you have any questions regarding this submittal, please contact our offices at your convenience.

Sincerely,

Enviro, Incorporated

Handwritten signature of Stephen D. Hood in black ink, followed by the initials "FOR" in a smaller, less distinct script.

MaryBeth Gilbrough
Project Civil Engineer
(206) 828-2511

Handwritten signature of Kathleen Goodman in black ink, written in a cursive style.

Kathleen Goodman, R.G.
Principal Geoscientist
(206) 828-2503

APPENDIX: FRIEDMAN & BRUYA REPORT

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3012 16th Avenue West
Seattle, WA 98119-2029
FAX: (206) 283-5044

March 13, 1995

Mary Beth Gilbrough, Project Manager
ENVIROS
25 Central Way, Suite 210
Kirkland, WA 98033

Dear Ms. Gilbrough:

Enclosed are the results from the testing of material submitted on February 20, 1995 from your project #E1/931203.01, Thrifty.

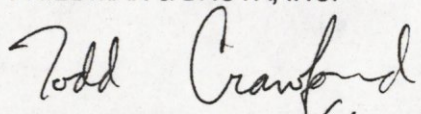
Samples MW-11, T-2 and MW-9 contain a product identified as an automobile gasoline. Monitoring Wells T-4 and T-1 were water samples which contained the BTEX constituents which would be consistent with a gasoline release. These water samples also contained MTBE which has been used mainly in the last four years or so. Since these products are relatively unweathered and the presence of MTBE is confirmed, we estimate the age of this product to be less than four years old. The absence of Tetraethyl lead and Tetramethyl lead, EDB and EDC is evidence of an unleaded product.

In comparing the gasolines to each other, it appears that they are very similar, perhaps the same product or release. First, the relative ratios and abundances for each component peak are similar. Second, these products appear to contain aromatic constituents in larger proportions than normal. This may indicate a "premium grade" unleaded gasoline and tends to be unique among most products of recent manufacture which tend to contain more alkylated hydrocarbons than seen in these samples.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.


Bradley T. Benson (for BTB)
Chemist

jdp
Enclosures

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: March 13, 1995
Date Received: February 20, 1995
Project: #E1/931203.01, Thrifty
Date Samples Extracted: March 1, 1995
Date Extracts Analyzed: March 1, 1995

**RESULTS FROM THE ANALYSIS OF PRODUCT SAMPLES
FOR TETRAETHYL LEAD AND TETRAMETHYL LEAD**

Results Reported as $\mu\text{g/g}$ (ppm)

<u>Sample ID</u>	<u>Tetraethyl Lead</u>	<u>Tetramethyl Lead</u>
MW-11	<10	<10
T-2	<10	<10
MW-9	<10	<10
 <u>Quality Assurance</u>		
Blank	<10	<10
MW-9 (Duplicate)	<10	<10
MW-9 (Matrix Spike) % Recovery	88%	138%
MW-9 (Matrix Spike Duplicate) % Recovery	88%	138%
Spike Blank % Recovery	120%	100%
Spike Level	50	50

Date of Report: March 13, 1995
Date Received: February 20, 1995
Project: #E1/931203.01, Thrifty
Date Samples Extracted: March 3, 1995
Date Extracts Analyzed: March 3, 1995

RESULTS FROM THE ANALYSIS OF PRODUCT SAMPLES
FOR FINGERPRINT CHARACTERIZATION
BY CAPILLARY GAS CHROMATOGRAPHY
USING A FLAME IONIZATION DETECTOR (FID)
AND ELECTRON CAPTURE DETECTOR (ECD)

Sample ID

GC Characterization

MW-11

The GC trace using the flame ionization detector (FID) showed the presence of low boiling compounds. The patterns displayed by these peaks are indicative of gasoline.

The low boiling compounds appeared as a regular pattern of peaks eluting from n -C₄ to n -C₁₀ showing a maximum near n -C₇. The GC/FID trace showed the presence of peaks that appeared to be indicative of augmented levels of benzene, toluene, ethylbenzene, the xylenes and C₃-benzenes. These compounds are characteristic of the constituents commonly found in gasoline. The low boiling product appears to have undergone degradation by evaporative processes due to the loss of the low boiling constituents.

The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis. There is a second internal standard peak seen on the GC/ECD trace at about 26 minutes which is dibutyl chlorendate.

Date of Report: March 13, 1995
Date Received: February 20, 1995
Project: #E1/931203.01, Thrifty
Date Samples Extracted: March 3, 1995
Date Extracts Analyzed: March 3, 1995

**RESULTS FROM THE ANALYSIS OF PRODUCT SAMPLES
FOR FINGERPRINT CHARACTERIZATION
BY CAPILLARY GAS CHROMATOGRAPHY
USING A FLAME IONIZATION DETECTOR (FID)
AND ELECTRON CAPTURE DETECTOR (ECD)**

Sample ID

GC Characterization

T-2

The material present is similar to what was found in sample MW-11 except that this sample has lost fewer of the most volatile front end components. There are also two small peaks on the ECD trace that are not present in this sample. The levels are too low for us to identify these compounds.

The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis. There is a second internal standard peak seen on the GC/ECD trace at about 26 minutes which is dibutyl chlorendate.

MW-9

The material present is similar to what was found in sample MW-11 except that this sample has lost more of the most volatile front end components. The same two peaks appear on the ECD trace of this sample as were found in that from sample T-2 and at similar levels.

The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis. There is a second internal standard peak seen on the GC/ECD trace at about 26 minutes which is dibutyl chlorendate.

Date of Report: March 13, 1995
Date Received: February 20, 1995
Project: #E1/931203.01, Thrifty
Date Samples Extracted: March 3, 1995
Date Extracts Analyzed: March 3, 1995

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR FINGERPRINT CHARACTERIZATION
BY CAPILLARY GAS CHROMATOGRAPHY
USING A FLAME IONIZATION DETECTOR (FID)
AND ELECTRON CAPTURE DETECTOR (ECD)

Sample ID

GC Characterization

T-4

The GC trace using the flame ionization detector (FID) showed the presence of low boiling compounds. The patterns displayed by these peaks are indicative of the water soluble fraction of a petroleum product.

The low boiling compounds appeared as a regular pattern of peaks eluting from *n*-C₆ to *n*-C₁₀ showing a maximum near *n*-C₇. The GC/FID trace showed the presence of peaks that appeared to be indicative of augmented levels of benzene, toluene, ethylbenzene and the xylenes.

The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis. There is a second internal standard peak seen on the GC/ECD trace at about 26 minutes which is dibutyl chlorendate.

T-1

The material present is similar to what was found in sample T-4 but the relative abundances of the *m,p*-xylenes are higher in this sample.

The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis. There is a second internal standard peak seen on the GC/ECD trace at about 26 minutes which is dibutyl chlorendate.

COMPANY ENVIRO
 PROJECT # E1/931203.01
 PROJECT NAME Thriftly
 MANAGER Ma. Beth
 PM _____



14924 NE 31st CIRCLE, REDMOND, WA 98052
 PHONE (206) 883-3081 FAX (206) 885-4603

WEBCID STRONG
 WTPH-418.1
 WTPH-418.1
 WTPH-D
 WTPH-418.1
 DRY WEIGHT

02:20.95
 10:25

REQUES. TURNAROUN.
 TRAVELER #

Dash	Sample Number	Date Sampled	Time Sampled	Type	# Jars	Analysis Required										Comments	
	MW-11	2/15/95	15:20	Product H ₂ O	4	X											57239-44
	T-4	2/15/95	17:20	H ₂ O	2		X	X									57245-46
	T-1	2/16/95	11:25	H ₂ O	8(LA)		X	X									57244-54
	T-2	2/16/95	11:45	Product	3	X											57255-54
	MW-1	2/16/95	13:50	Product H ₂ O	3	X											57258-60

Samples consumed
 with 3/13/95

Submitted MB Hilwonglo
 Firm Enviros, Inc.
 Submitted _____
 Firm _____

Date 2/16/95 Received by Cathy Riggs Date 2-20-95
 Time 14:30 Firm FABY 100 Time 10:20
 Date _____ Received by _____ Date _____
 Time _____ Firm _____ Time _____

Friedman & Bruya, Inc.

(206) 285-8282

Analysis For BTEX, Ethylene Dichloride, Ethylene Dibromide and MTBE By EPA Method 8240

Client Sample Name:	T-1	Matrix:	Water
FBI Sample Name:	57251 1:10	Run Date:	03/02/95
Client:	Enviros	Instrument:	GCMS1
Extraction Date:	3/1/95, dilutions 3/2/95	Operator:	BA
Data File:	030206.D	Units:	ug/L(ppb)
Project:	Thrifty		

Surrogates	% Recovery	Lower Limit	Upper Limit
1,2-Dichloroethane-d4	109	88	110
Toluene-d8	112	76	114
4-Bromofluorobenzene	114	86	115

Compounds	Concentration ug/L(ppb)
Benzene	680
Toluene	1200
Ethylbenzene	5
m,p-Xylene	310
o-Xylene	320
Ethylene Dibromide (EDB)	<1
Ethylene Dichloride (EDC)	<1
MTBE	25

Friedman & Bruya, Inc.

(206) 285-8282

Analysis For BTEX, Ethylene Dichloride, Ethylene Dibromide and MTBE By EPA Method 8240

Client Sample Name:	T-1 Duplicate	Matrix:	Water
FBI Sample Name:	57251 dup 1:10	Run Date:	03/02/95
Client:	Enviros	Instrument:	GCMS1
Extraction Date:	3/1/95, dilutions 3/2/95	Operator:	BA
Data File:	030207.D	Units:	ug/L(ppb)
Project:	Thrifty		

Surrogates	% Recovery	Lower Limit	Upper Limit
1,2-Dichloroethane-d4	109	88	110
Toluene-d8	114	76	114
4-Bromofluorobenzene	115	86	115

Compounds	Concentration ug/L(ppb)
Benzene	670
Toluene	1100
Ethylbenzene	1
m,p-Xylene	300
o-Xylene	320
Ethylene Dibromide (EDB)	<1
Ethylene Dichloride (EDC)	<1
MTBE	17

Friedman & Bruya, Inc.

(206) 285-8282

Analysis For BTEX, Ethylene Dichloride, Ethylene Dibromide and MTBE By EPA Method 8240

Client Sample Name:	T-4	Matrix:	Water
FBI Sample Name:	57246 1:10	Run Date:	03/02/95
Client:	Enviros	Instrument:	GCMS1
Extraction Date:	3/1/95, dilutions 3/2/95	Operator:	BA
Data File:	030205.D	Units:	ug/L(ppb)
Project:	Thrifty		

Surrogates	% Recovery	Lower Limit	Upper Limit
1,2-Dichloroethane-d4	109	88	110
Toluene-d8	113	76	114
4-Bromofluorobenzene	113	86	115

Compounds	Concentration ug/L(ppb)
Benzene	2600 ve.
Toluene	750
Ethylbenzene	9
m,p-Xylene	150
o-Xylene	260
Ethylene Dibromide (EDB)	< 1
Ethylene Dichloride (EDC)	< 1
MTBE	5600 ve.

ve. The value reported exceeded the highest calibration standard.

Friedman & Bruya, Inc.

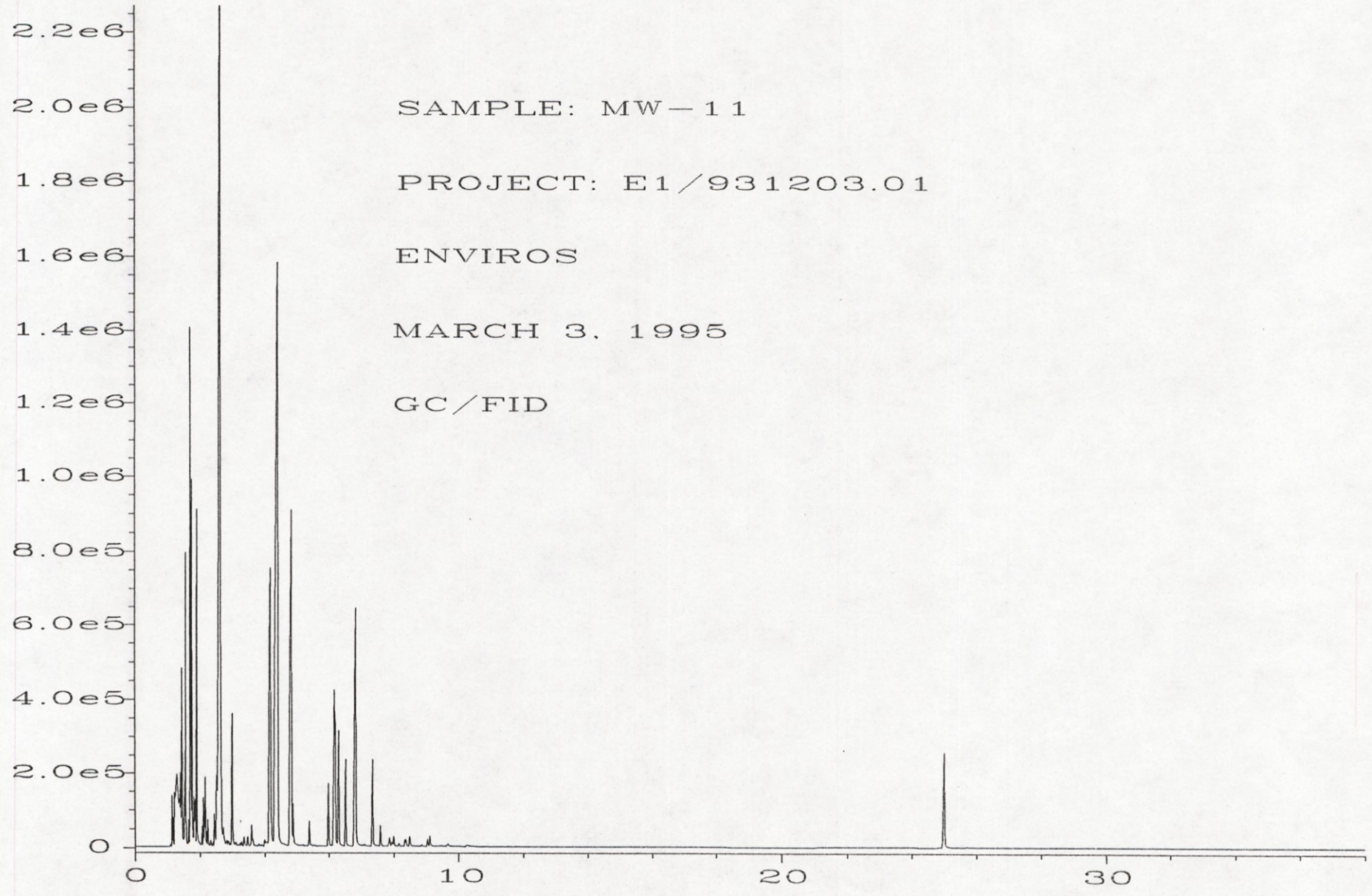
(206) 285-8282

Analysis For BTEX, Ethylene Dichloride, Ethylene Dibromide and MTBE By EPA Method 8240

Client Sample Name:	Method Blank	Matrix:	Water
FBI Sample Name:	method blank	Run Date:	03/01/95
Client:	Enviros	Instrument:	GCMS1
Extraction Date:	2/28/95	Operator:	BA
Data File:	022725.D	Units:	ug/L(ppb)
Project:	Thrifty		

Surrogates	% Recovery	Lower Limit	Upper Limit
1,2-Dichloroethane-d4	108	88	110
Toluene-d8	111	76	114
4-Bromofluorobenzene	111	86	115

Compounds	Concentration ug/L(ppb)
Benzene	<1
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<1
o-Xylene	<1
Ethylene Dibromide (EDB)	<1
Ethylene Dichloride (EDC)	<1
MTBE	<1



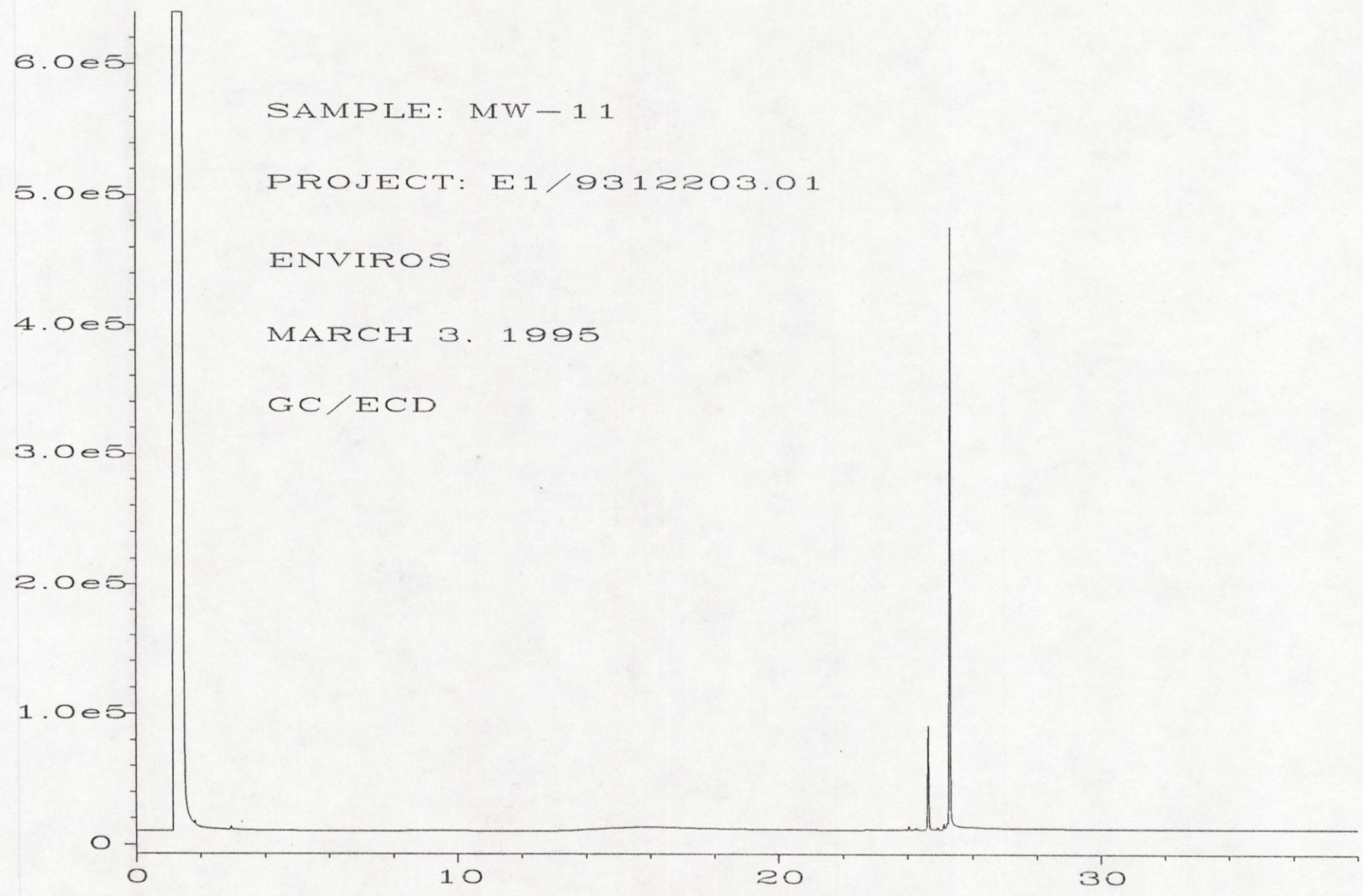
SAMPLE: MW-11

PROJECT: E1/931203.01

ENVIROS

MARCH 3, 1995

GC/FID



SAMPLE: MW-11

PROJECT: E1/9312203.01

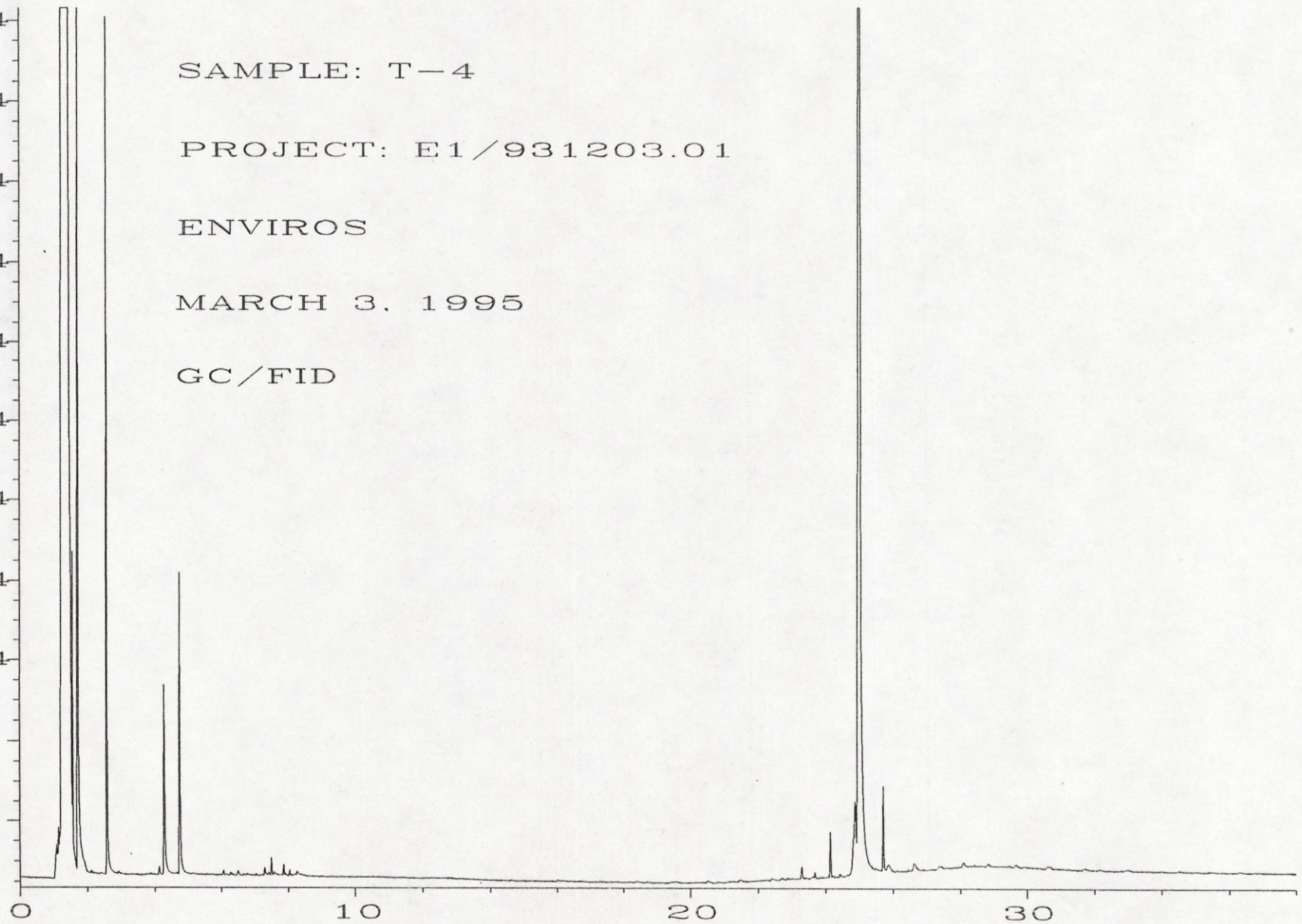
ENVIROS

MARCH 3, 1995

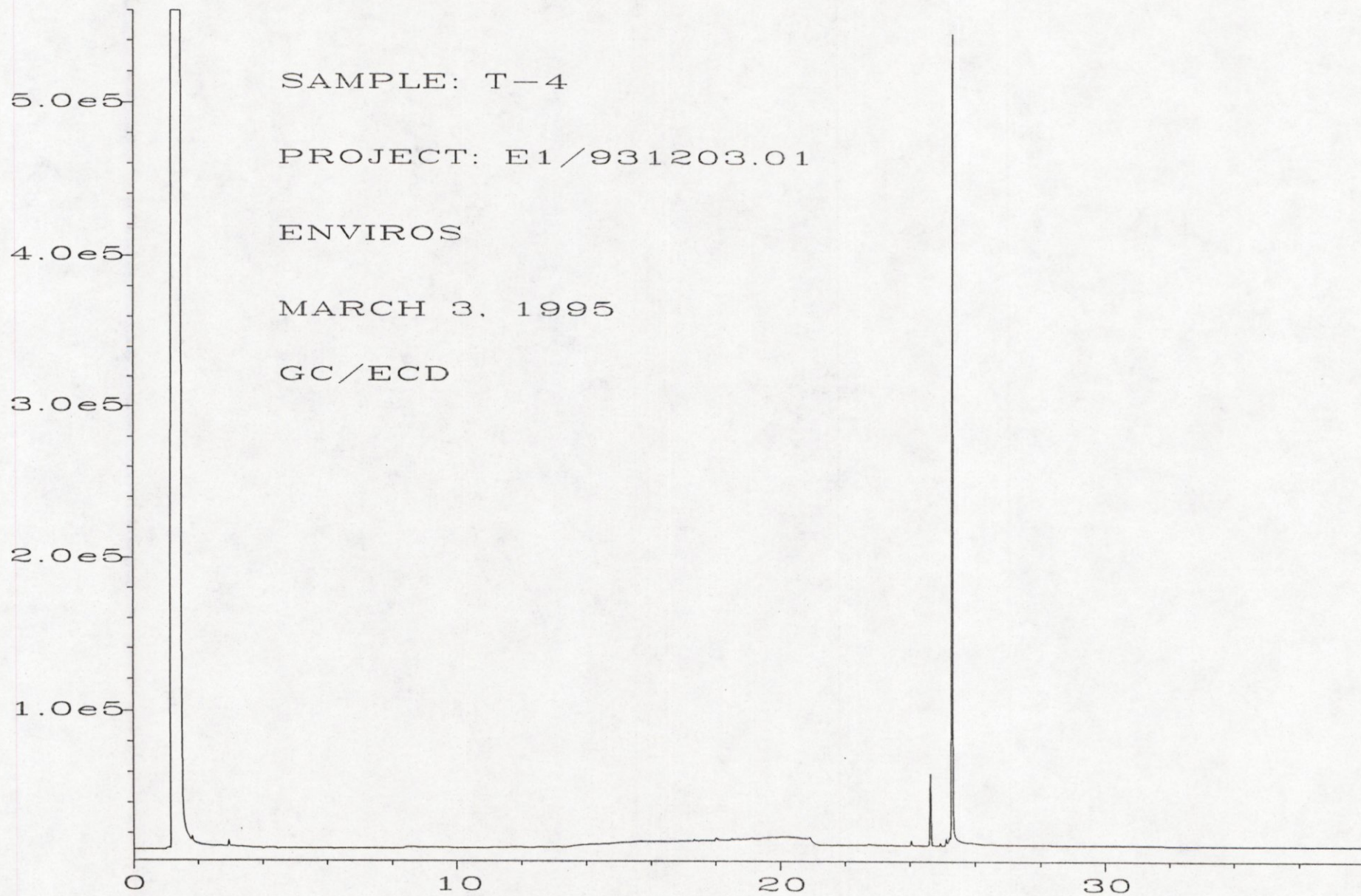
GC/ECD

2.6e4
2.4e4
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2.0e4
1.8e4
1.6e4
1.4e4
1.2e4
1.0e4
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6000
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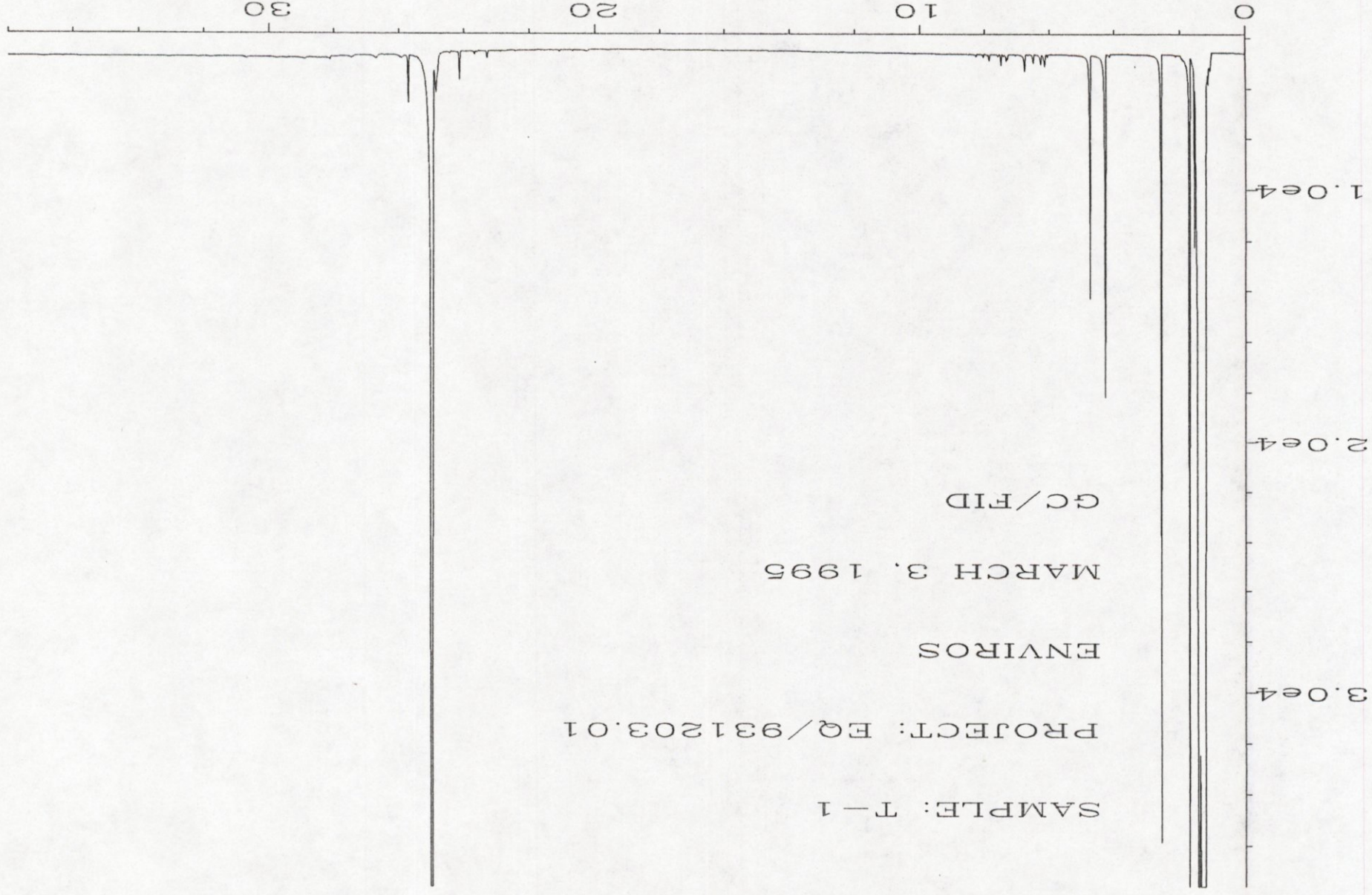
SAMPLE: T-4
PROJECT: E1/931203.01
ENVIROS
MARCH 3, 1995
GC/FID

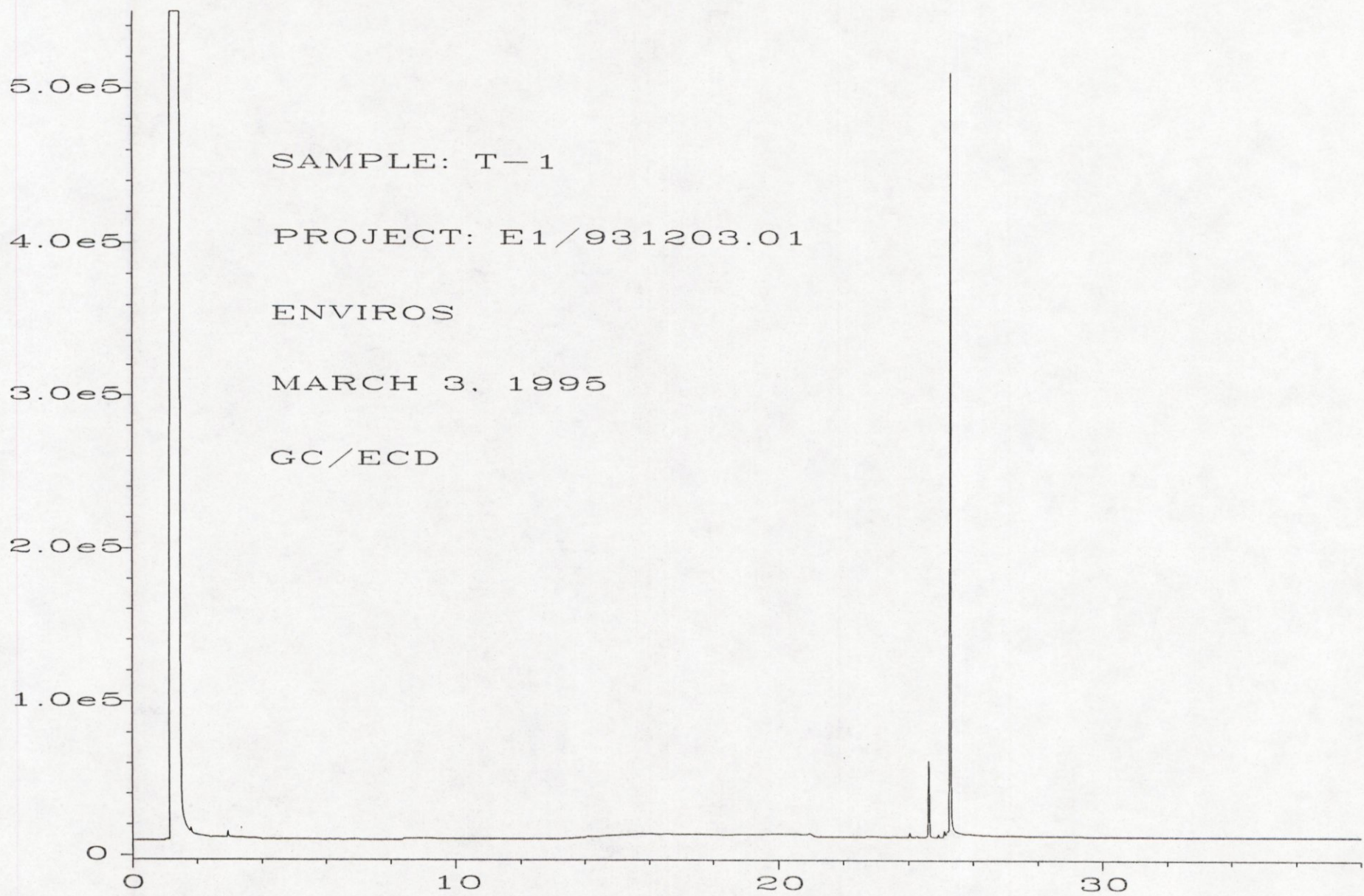


10 20 30



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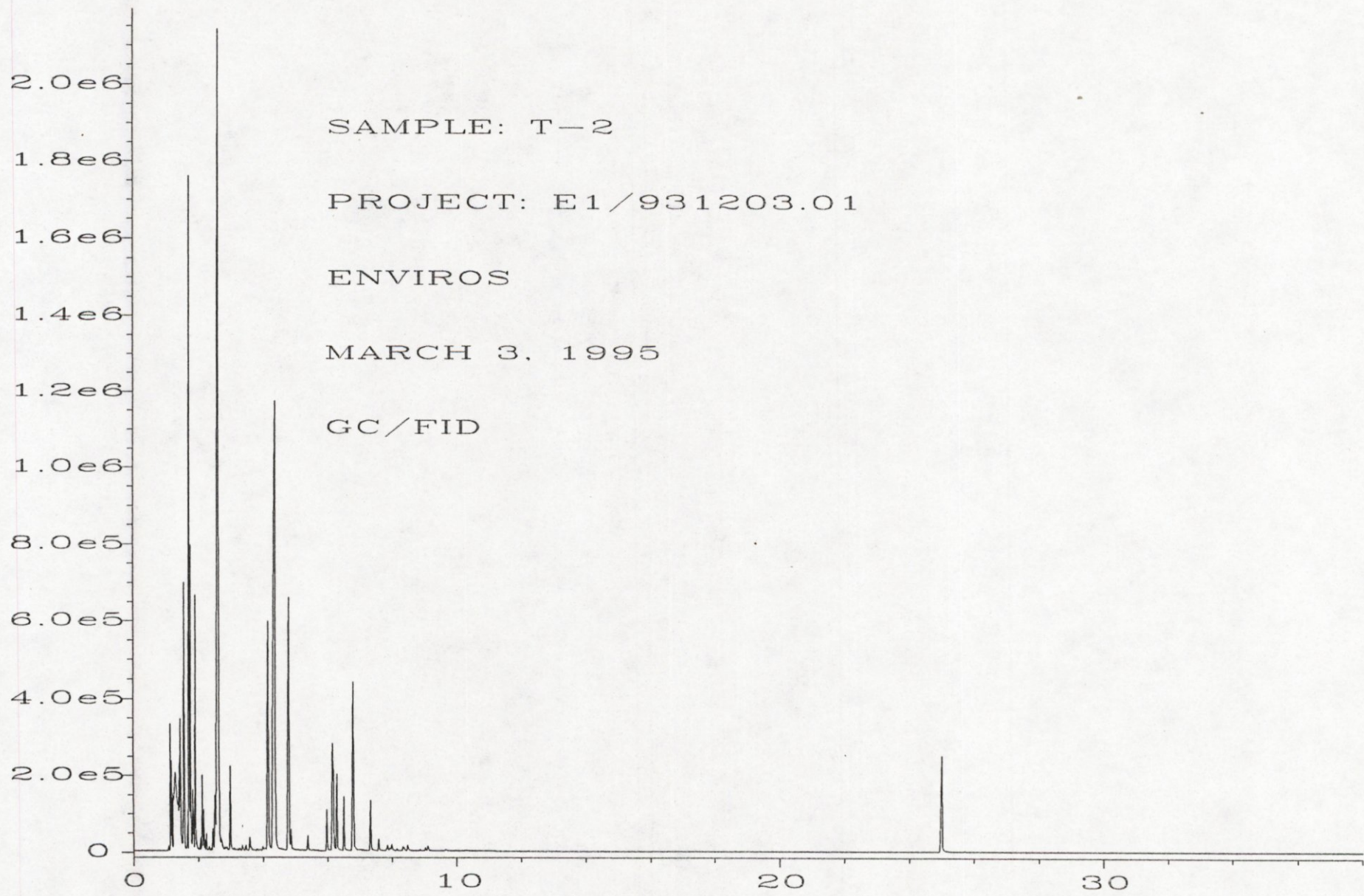
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PROJECT: E1/931203.01

ENVIROS

MARCH 3, 1995

GC/ECD



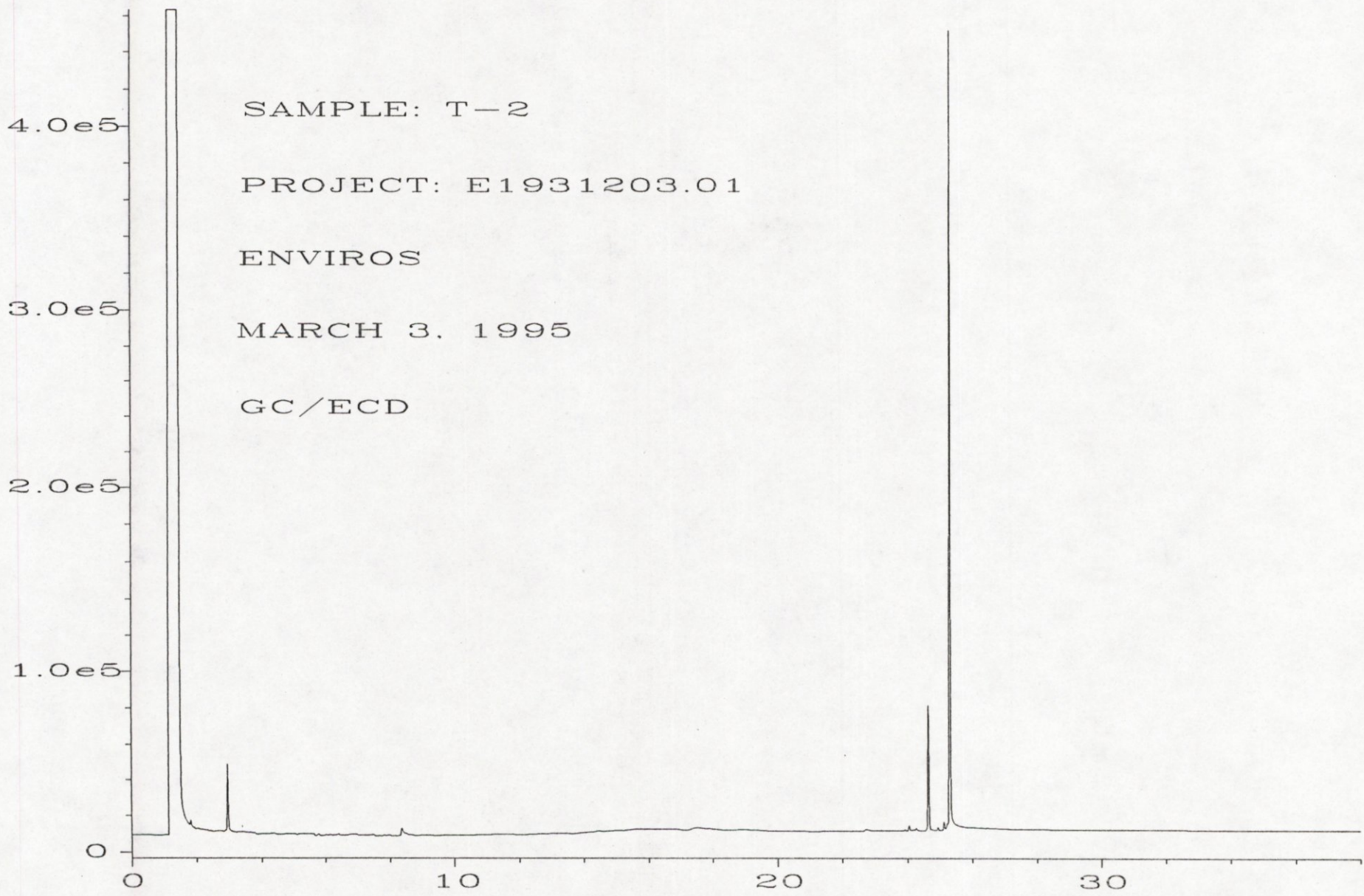
SAMPLE: T-2

PROJECT: E1/931203.01

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MARCH 3, 1995

GC/FID



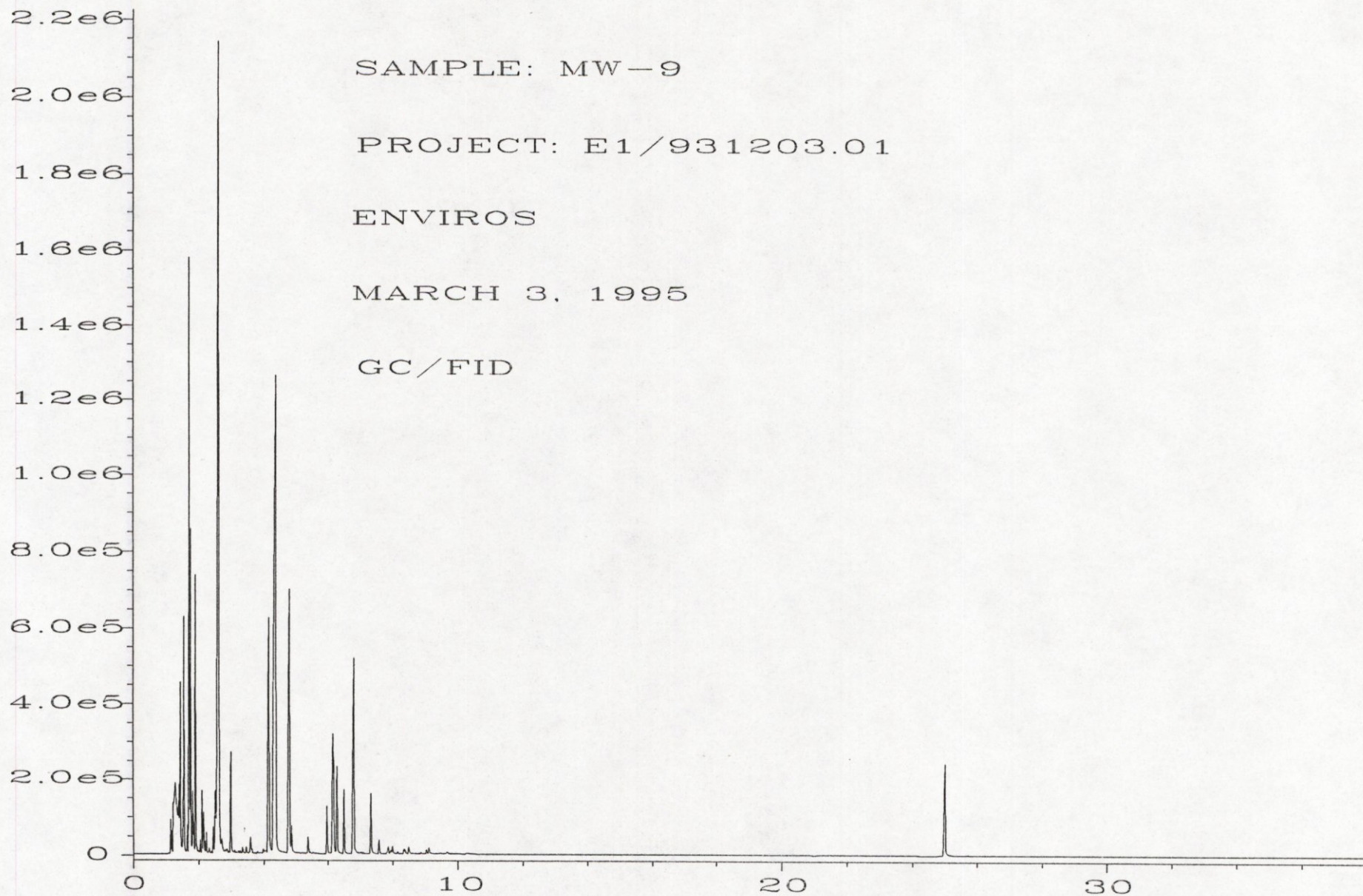
SAMPLE: T-2

PROJECT: E1931203.01

ENVIROS

MARCH 3, 1995

GC/ECD



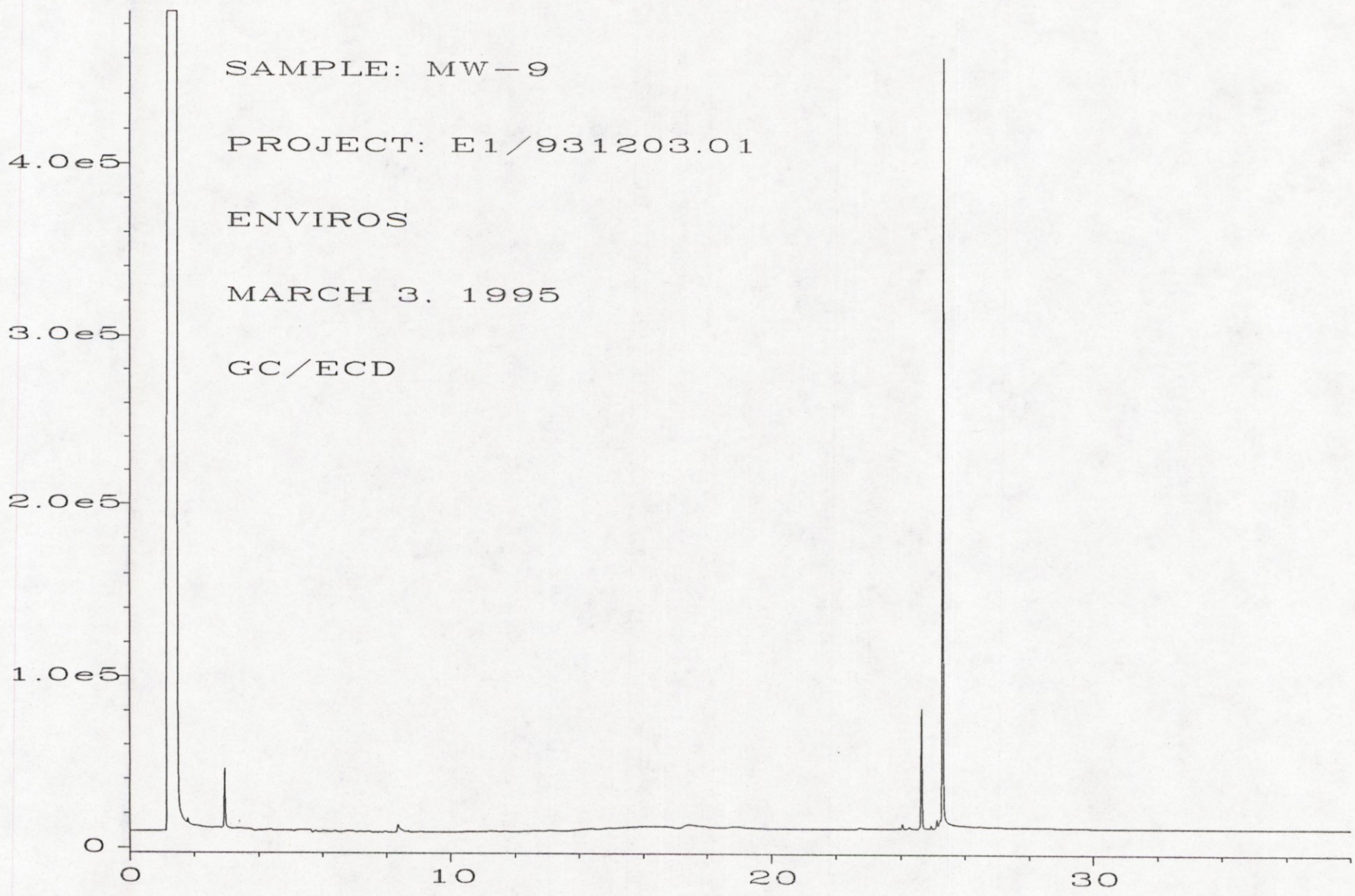
SAMPLE: MW-9

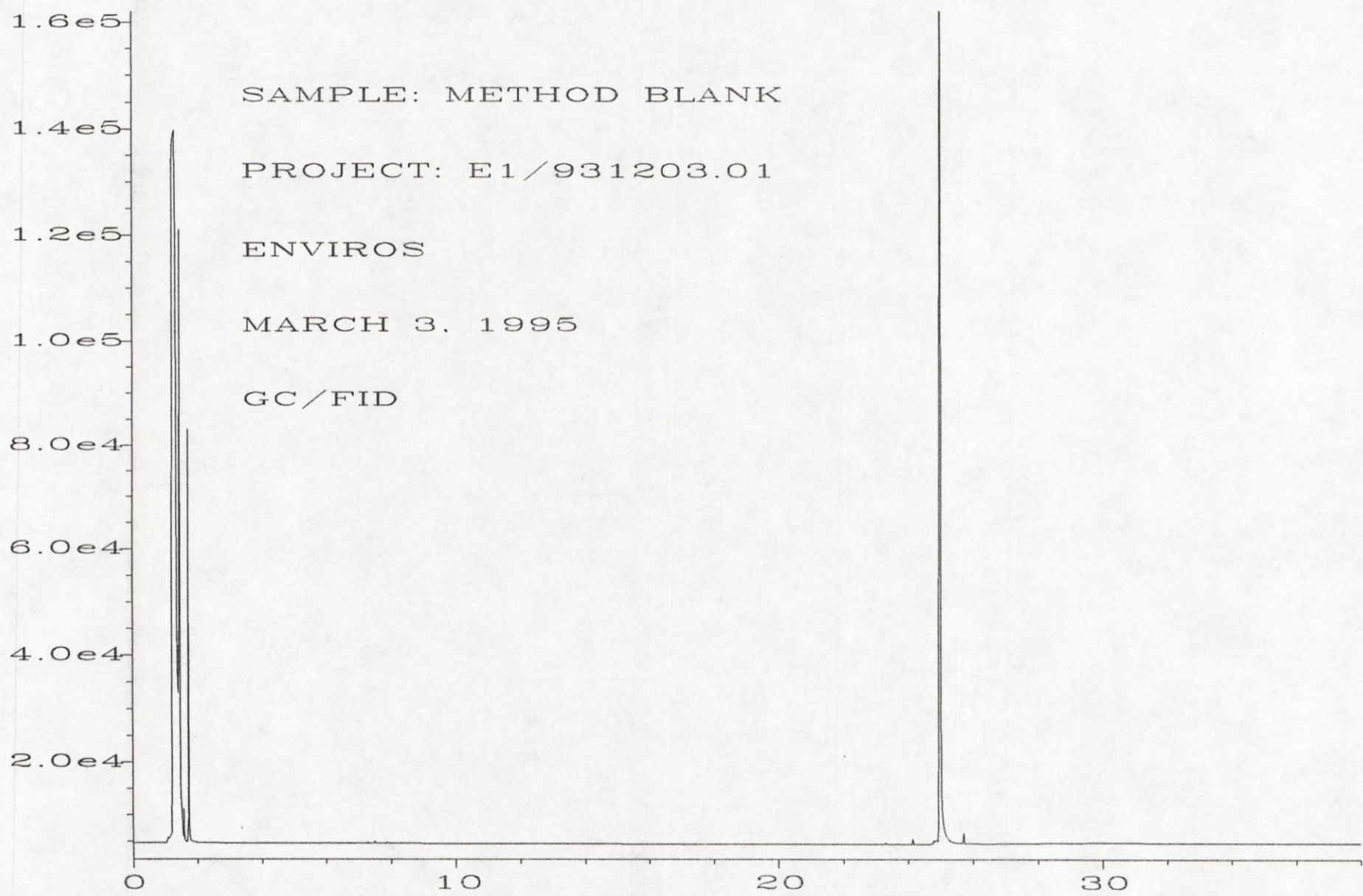
PROJECT: E1/931203.01

ENVIROS

MARCH 3, 1995

GC/FID





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SAMPLE: METHOD BLANK

PROJECT: E1/931203.01

ENVIRO

MARCH 3, 1995

GC/ECD

