III
TXD083570051

FMC Corporation

Peroxygen Chemicals Division
12000 Bay Area Boulevard
Pasadena Texas 77507
713 474 4171

FMC

24-Jan-1990

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

1990 JAN 29 PM 12:36

United States Environmental
Protection Agency
Region VI
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Attention: Director, Hazardous Waste
Management Division (6H)

RE: Submittal of Workplan for RCRA
Facility Investigation.
EPA Hazardous Waste Permit
No. TXD083570051
TWC Permit for Industrial Solid
Waste Management Site
No. HW-50216

Dear Sir:

As provided by Provision VIII A of the above referenced permit, issued as a joint permit with the Texas Water Commission (TWC) by the United States Environmental Protection Agency, Region VI (EPA) on November 8, 1989, and effective November 8, 1989, under the Resource Conservation and Recovery Act (RCRA) as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA), with this letter FMC Corporation, Peroxygen Chemicals Division Plant, Pasadena (Bayport), Texas is submitting a workplan for implementation of a RCRA Facility Investigation (RFI) as required by Part VIII of the permit.

This workplan is forwarded for review and approval by EPA and TWC. Following receipt of such approval, FMC is prepared to commence the RFI program in accordance with the workplan and schedule set forth in Section 9.0 of the workplan.

If there are questions, or if further information is needed, please advise me at 713/474-8705 or Mr. H. H. Thakkar, Environmental Engineer, at FMC's Bayport Plant at 713/474-8774.

Yours very truly,

Roger C. Threde

Roger C. Threde
Resident Manager
FMC Corporation
Peroxygen Chemicals Division
Bayport, Texas Facility

cc: Executive Director - TWC (w/o enc.)

Mr. Tony Robledo - USEPA, Region VI (w/o enc.)

RCT/pw

FMC Corporation

Peroxygen Chemicals Division
12000 Bay Area Boulevard
Pasadena Texas 77507
713 474 4171

FMC

25-Jan-1990

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Texas Water Commission
Post Office Box 13087 Capitol Station
1700 North Congress Avenue
Austin, Texas 78711-3087

Attention: Executive Director

RE: Submittal of Workplan for RCRA Facility Investigation.
TWC Permit for Industrial Solid Waste Management Site No. HW-50216.
EPA Hazardous Waste Permit No. TXD083570051.

Dear Sir:

As provided by Provision VIII A of the above referenced permit, issued by the Texas Water Commission (TWC) on August 29, 1989, and effective November 8, 1989, and further issued as a joint permit under the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA), by the United States Environmental Protection Agency, Region VI (EPA), on November 8, 1989, with this letter FMC Corporation, Peroxygen Chemicals Division Plant, Pasadena (Bayport), Texas is submitting three copies of a workplan for implementation of a RCRA Facility Investigation (RFI) as required by Part VIII of the permit.

This workplan is forwarded for review and approval by TWC and EPA. Following receipt of such approval, FMC is prepared to commence the RFI program in accordance with the workplan and schedule set forth in Section 9.0 of the workplan.

If there are questions, or if further information is needed, please advise me at 713/474-8705 or Mr. H. H. Thakkar, Environmental Engineer, at FMC's Bayport Plant at 713/474-8774.

Yours very truly,

Roger C. Threde /DWC.

Roger C. Threde
Resident Manager
FMC Corporation
Peroxygen Chemicals Division
Bayport, Texas Facility

cc: Director, Hazardous Waste
Management Division
U. S. Environmental Protection
Agency, Region VI (w/o enc.)

TWC Southeast Region Office
Deer Park, Texas (w/o enc.)

RCT/pw

FMC Corporation Peroxygen Chemicals Division - Bayport Plant

Pasadena, Texas

ENSR

RCRA Facility Investigation Work Plan

ENSR Consulting and Engineering

(Formerly ERT)

January 1990

Document Number 2810-014-001

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1-1
1.1	Purpose and Scope	1-1
1.2	Investigation Approach	1-1
1.3	Scope of Document	1-2
2.0	FACILITY INFORMATION AND BACKGROUND	2-1
2.1	Site Location	2-1
2.2	RFI Unit Specifications and History	2-1
2.3	Spill History	2-7
2.4	Proposed Changes in Operational Status of RFI Units	2-7
3.0	PLANNED FIELD AND ANALYTICAL PROGRAM	3-1
3.1	Phase I	3-2
3.1.1	RFI Units 1 and 2 Soil Sampling and Analyses	3-2
3.1.1.1	Background Soil Sampling	3-3
3.1.1.2	RFI Units 1 and 2 Soil Sampling	3-4
3.1.1.3	Analyses	3-6
3.1.2	RFI Unit 3 through 8 Sampling and Analyses	3-6
3.2	Phase II	3-8
3.2.1	Soils Investigation	3-8
3.2.2	Groundwater Investigation	3-9
3.2.3	Analyses	3-9
4.0	EQUIPMENT AND SAMPLING SPECIFICATIONS	4-1
4.1	Phase I RFI Units 1 and 2 Soil Sampling	4-1
4.1.1	Sampling Equipment	4-1
4.1.2	Soil Boring Installation	4-4
4.1.3	Soil Sample Collection Procedures	4-6

TABLE OF CONTENTS (Continued)

			Page
	4.1.4	Soil Description and Field Screening Procedures	4-8
	4.1.5	Sample Bottles, Preservation, and Shipment	4-9
	4.1.6	Decontamination Procedures	4-11
4.2	Phase I RFI Units 3 through 8		4-13
	4.2.1	Sampling Equipment	4-14
	4.2.2	Sample Collection Procedures	4-15
	4.2.3	Sample Bottles, Preservation, and Shipment	4-19
	4.2.4	Decontamination Procedures	4-21
4.3	Phase II Monitor Well Installation and Sampling		4-21
	4.3.1	Well Design, Construction, and Installation	4-22
	4.3.2	Soil Description and Field Screening Procedures	4-24
	4.3.3	Development Procedures	4-26
	4.3.4	Monitor Well Sampling Procedures	4-26
		4.3.4.1 Equipment	4-26
		4.3.4.2 Monitor Well Evaluation	4-27
		4.3.4.3 Monitor Well Evacuation	4-28
		4.3.4.4 Sample Collection	4-31
	4.3.5	Decontamination Procedures	4-32
4.4	Phase II Soil Characterization		4-32
5.0	FIELD RECORDS AND DOCUMENTATION		5-1
5.1	Field Log Book		5-1
5.2	Monitor Well Development and Sampling Records		5-2
5.3	Sample Labels		5-2
5.4	Chain-of-Custody Forms		5-2

TABLE OF CONTENTS (Continued)

		Page
6.0	EVALUATION OF RESULTS	6-1
6.1	Statistical Evaluation of RFI Units 1 and 2 Soil Samples (Phase I)	6-1
6.2	RFI Units 3 through 8 Sampling Results (Phase I)	6-2
6.3	Statistical Evaluation of Groundwater Samples (Phase II)	6-2
6.4	Statistical Evaluation of Soil Samples (Phase II)	6-3
7.0	QUALITY ASSURANCE/QUALITY CONTROL	7-1
7.1	Field QA/QC	7-1
7.2	Laboratory QA/QC	7-4
8.0	RFI REPORT	8-1
9.0	RFI IMPLEMENTATION SCHEDULE	9-1

LIST OF FIGURES

Figure		Page
2-1	Site Location Map	2-2
2-2	Production Site Plot Plan	2-6
3-1	RFI Unit Soil Boring Location	3-5
4-1	Typical Hollow Stem Auger Assembly	4-2
4-2	Typical Well Construction Diagram	4-25
4-3	Well Volume Per Standing Water Height	4-30
5-1	Typical Well Development Form	5-3
5-2	Typical Well Sampling Form	5-4
5-3	Typical Sample Label	5-5
5-4	Typical Chain-of-Custody Form	5-6
9-1	RFI Implementation Schedule	9-2

TABLE OF CONTENTS (Continued)

LIST OF TABLES

Table		Page
2-1	RFI Solid Waste Management Units	2-3
2-2	RFI Solid Waste Management Unit Information Summary	2-4
3-1	Phase I Indicator Parameters and Laboratory Analytical Methods	3-7
4-1	Soil Sample Containers and Preservatives	4-10
4-2	Abbreviated Appendix VIII Waste Characterization Sample Containers and Preservatives	4-20

LIST OF APPENDICES

APPENDIX A HEALTH AND SAFETY PLAN

APPENDIX B EXISTING SOIL AND GROUNDWATER DATA

1.0 INTRODUCTION

1.1 Purpose and Scope

On August 28, 1989 the Texas Water Commission (TWC) issued a Hazardous Waste Permit to the FMC Corporation Peroxygen Chemicals Division Bayport Plant in Pasadena, Texas. On November 8, 1989, the U.S. Environmental Protection Agency, Region 6 (EPA) issued this same permit, effective November 8, 1989, under the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA), and provided that the permit is a joint TWC and EPA permit. As a requirement of the Permit (Provision VIII), FMC is required to perform a RCRA Facility Investigation (RFI) to determine if hazardous constituents, listed in 40 CFR 261 Appendix VIII, have been released into the environment from Solid Waste Management Units (SWMUs).

In November 1989, FMC Corporation retained ENSR Consulting and Engineering to prepare this RFI Work Plan. This plan presents the strategy and procedures that will be used to conduct the investigation.

1.2 Investigation Approach

The RFI will be conducted using a phased approach.

1. Phase I will consist of determining if a significant release has occurred from RFI Units 1 and 2, and a waste characterization of RFI Units 3 through 8 for Appendix VIII constituents.

2. Phase II will be implemented if the results indicate that a significant release has occurred from RFI Units 1 and 2. Phase II, if required, will consist of an expanded soils investigation to determine the aerial

extent of soil contamination and the installation of a groundwater monitoring system.

1.3 Scope of Document

This document sets forth the strategy and procedures that will be employed to perform the RFI. A brief outline of the scope of this document is presented below.

- Section 2.0 presents the results of a review of FMC Bayport Plant's environmental file pertinent to the RFI. This section contains information on the facility history and process; a listing of all RFI waste management units; and a summary of individual RFI unit specifications.

- Section 3.0 sets forth the strategy that will be used to perform the RFI. Soil boring locations, sample collection intervals, and analytical indicator parameters are presented.

- Section 4.0 presents the specific equipment and procedures that will be used during the RFI field investigation.

- Section 5.0 presents the documentation procedures that will be used during the field investigation. Examples of standardized sampling forms, sample labels, and chain-of-custody forms are presented.

- Section 6.0 describes how the analytical data will be statistically evaluated to determine if a significant release has occurred.

- Section 7.0 describes the quality assurance and quality control measures including field and laboratory data that will be undertaken during the RFI.

- Section 8.0 discusses the RFI report that will be prepared following completion of RFI field activities.

- Section 9.0 presents the time schedule for implementing the RFI.

- Appendix A is the Health and Safety Plan for the RFI field investigation.

- Appendix B contains existing geologic and hydrogeologic data collected at the FMC facility.

2.0 FACILITY INFORMATION AND BACKGROUND

The FMC Corporation Bayport Plant began operation in 1969. Initially the plant produced glycerine, acetic acid, epoxidized soybean oil, and allyl alcohol products. Peracetic acid was produced as an intermediate in the glycerine manufacturing process. In 1979, hydrogen peroxide manufacturing was added to the plant. Due to market conditions, in 1982 the plant ceased production of all products except hydrogen peroxide and allyl alcohol. Currently, only hydrogen peroxide is produced as the allyl alcohol unit was shut down in November 1989.

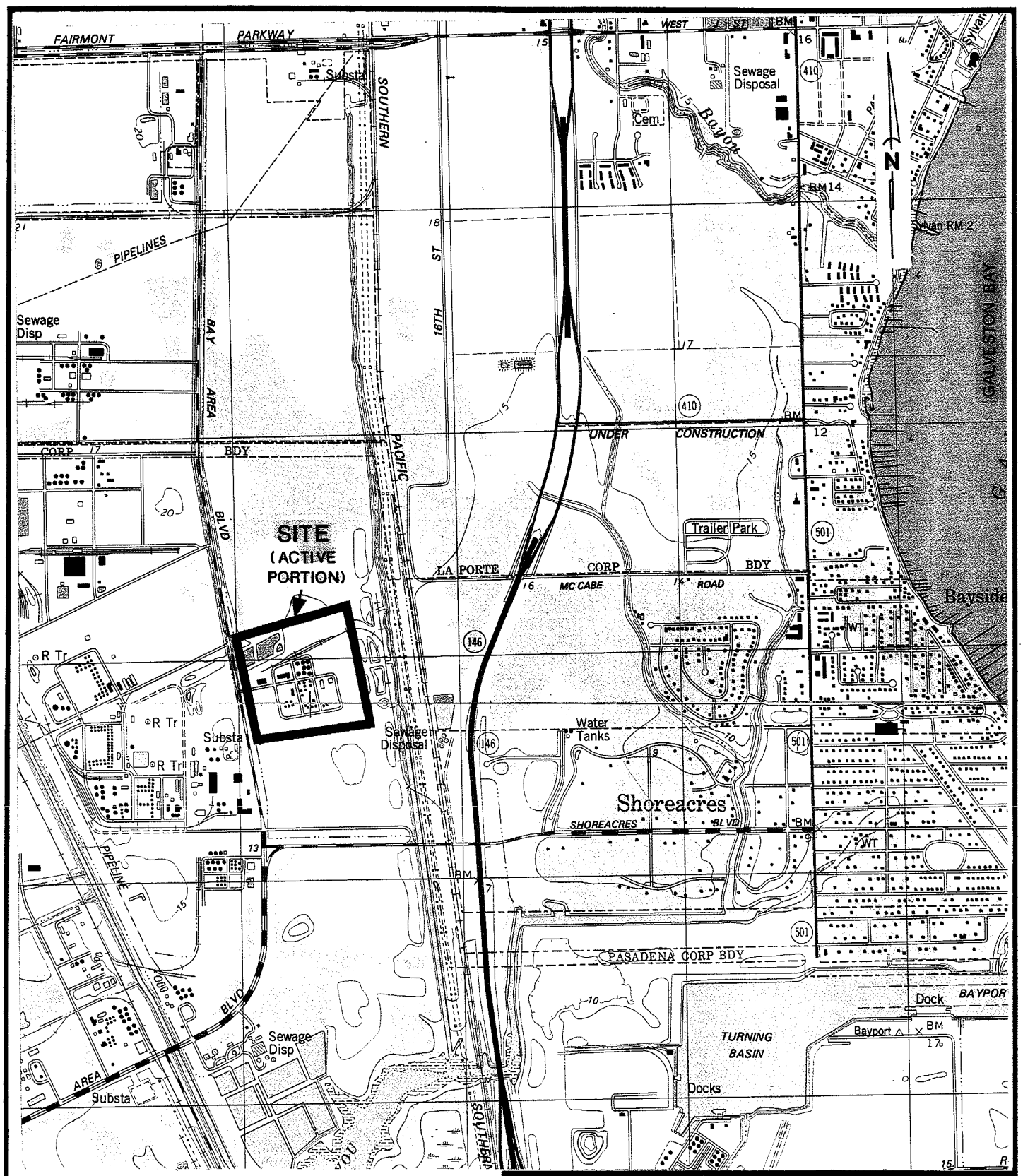
2.1 Site Location

The FMC Corporation, Peroxygen Chemicals Division, Bayport Plant, is located at 12000 Bay Area Blvd. in Pasadena, Texas, Harris County. Figure 2-1 is a site location map showing the active portion of the facility. Approximately 80 acres of the facility has been developed for industrial use.

2.2 RFI Unit Specifications and History

Based on the results of the RCRA Facility Assessment (RFA), the TWC and EPA have identified 8 solid waste management units for the RFI. These units are listed on Table 2-1. The location of these 8 units are identified on Figure 2-2.

Information obtained from site records and personnel interviews was reviewed. Data were obtained on potential facility contaminants, unit dimensions and capacities, construction materials, and operational history. Table 2-2 summarizes each RFI unit's specifications, history, and potential contaminants.



0 2000 4000

SCALE IN FEET

Ref.: USGS La Porte, Texas, 1982 & League City, Texas, 1982 Quadrangle Maps

ENSR™

ENSR CONSULTING AND ENGINEERING

FIGURE 2-1
SITE LOCATION MAP
FMC CORPORATION
PEROXYGEN CHEMICAL DIVISION
PASADENA, TEXAS

DRAWN BY: CS	DATE: 12-20-89	PROJECT NO.: 2810-014
CHK'D BY:	REVISED:	DWG.NO.:

TABLE 2-1

RFI SOLID WASTE MANAGEMENTS UNITS
RCRA FACILITY INVESTIGATION WORK PLAN
FMC CORPORATION
PEROXYGEN CHEMICALS DIVISION
BAYPORT PLANT
PASADENA, TEXAS

RFI Unit No.	Unit Name	Operational Status
1	Contaminated Sewer Lift Station	Inactive, Process Stormwater only
2	Process Sewer Lift Station	Inactive
3	Used Work Solution Tank	Inactive
4	Used Work Solution Tanks 716 A & B	Inactive
5	Check Tank T4889 C	Active
6	H_2O_2 Sewer Pits	Active
7	Oily Sewer Pits	Active
8	Wastewater Surge Tank	Active

TABLE 2-2

RFI SOLID WASTE MANAGEMENT UNIT INFORMATION SUMMARY
RCRA FACILITY INVESTIGATION WORK PLAN
FMC CORPORATION
PEROXYGEN CHEMICALS DIVISION
BAYPORT PLANT
PASADENA, TEXAS

RFI Unit/History	Potential Appendix VIII Constituents	Dimensions/Capacity/Construction
1. Contaminated Sewer Lift Station active since 1968.	Allyl Alcohol Acrolein Phenol Napthalene	23,000 gallons Below grade reinforced concrete open vault, 16.3 ft. in depth below grade.
2. Process Sewer Lift Lift Station active since 1968.	Allyl Alcohol Acrolein	1,000 gallons Open top, below grade metal tank which is inside a steel cylinder. 15.3 ft. in depth below grade
3. Used Work Solution Tank came on-line in 1986 to service Alkane Wash Unit; prior to 1986 used as allyl alcohol feed tank. Currently inactive.	Naphthalene Phenol	3,000 gallons above grade, closed vessel, situated on concrete pedestal.
4. Used Work Solution Tanks 716 A & B - came on-line in 1986; prior to 1986 used for product glycerin storage. Currently inactive.	Naphthalene Phenol	80,000 gallons each, above grade, closed vessels on concrete pedestals.
5. Check Tank T 4889C - active since 1979.	Naphthalene Phenol	36,000 gallons, above grade closed vessel, carbon steel on concrete slab with concrete dike.
6. H_2O_2 Sewer Pits - active since 1979.	Naphthalene Phenol	144,000 gallons, below grade concrete vaults covered by a concrete slab w/entry on top.

TABLE 2-2 (Continued)

RFI SOLID WASTE MANAGEMENT UNIT INFORMATION SUMMARY
RCRA FACILITY INVESTIGATION WORK PLAN
FMC CORPORATION
PEROXYGEN CHEMICALS DIVISION
BAYPORT PLANT
PASADENA, TEXAS

RFI Unit/History	Potential Appendix VIII Constituents	Dimensions/Capacity/Construction
7. Oily Sewer Pits - Active since 1979.	Naphthalene Phenol	309,000 gallons below grade concrete vaults covered by a concrete slab with entry on top
8. Wastewater Surge Tank - active since 1984, prior to 1984 used for Acetic Acid storage.	Acrolein Allyl Alcohol Naphthalene Phenol	100,000 gallons, above grade-closed vessel

MAP

2.3 Spill History

Based upon ENSR's review of all available data and on-site visit, there are no records of a spill having occurred from any of the RFI units.

2.4 Proposed Changes in Operational Status of RFI Units

FMC currently plans to decommission the following units during the first quarter of 1990:

RFI Unit 3	Used Work Solution Tank
RFI Unit 4	Used Work Solution Tanks 716 A & B

RFI Unit 3, Used Work Solution Tank, was part of the Alkane Wash Unit which was permitted by the Texas Air Control Board in 1986. Prior to 1986 RFI Unit 3 was used as the Allyl Alcohol feed tank. The Alkane Wash Unit came on-line in 1986 and continued operation until mid-1987 when it was shut down. The Used Work Solution Tank is no longer in service. RFI Unit 4, Used Work Solution Tanks 716 A & B, also came on line in 1986 and is no longer in service. Prior to 1986 RFI Unit 4 was used for product glycerin storage.

Prior to decommissioning, the contents of each of these units will be sampled in accordance with the procedures described in Section 4.2. These samples will be analyzed for Appendix VIII constituents.

FMC will notify the TWC and EPA at least 10 days in advance of any sampling of these units. The results of these sampling events will be reported in the RFI Report, and will also be available to the TWC and EPA upon request.

3.0 PLANNED FIELD AND ANALYTICAL PROGRAM

As stated in Section 1.0, Provision VIII of FMC's Hazardous Waste Permit requires that an RFI be performed for the following SWMUs:

RFI Unit No.	Description
1	Contaminated Sewer Lift Station
2	Process Sewer Lift Station
3	Used Work Solution Tank
4	Used Work Solution Tanks 716A & B
5	Check Tank T 4889C
6	H_2O_2 Sewer Pits
7	Oily Sewer Pits
8	Wastewater Surge Tank

The investigation requirements contained in Provision VIII segregate RFI Units No. 1 and 2 from RFI Units 3 through 8. Provision VIII.A.2 of the permit requires a subsurface investigation for RFI Units 1 and 2. Provision VIII.A.3 requires a waste characterization of the material contents of RFI Units 3 through 8.

To meet these requirements, the RFI will be performed using a phased approach.

1. Phase I will consist of a soils investigation for RFI Units 1 and 2, and a statistical comparison of analytical results from the investigation; and a waste characterization for RFI Units 3 through 8.

2. Phase II will be performed only if the results of the Phase I soils investigation indicate that a significant release of Appendix VIII hazardous constituents has occurred from RFI Units 1 and 2. The Phase II investigation, if required, may consist of an expanded

soils investigation and the possible installation of a groundwater monitoring system at RFI Units 1 and 2.

3.1 Phase I

Phase I will be performed to satisfy the requirements of Provisions VIII.A.2.b.(1) and VIII.A.3 of the Permit. The purpose of Phase I is:

1) to determine if a significant release of Appendix VIII hazardous constituents has occurred from RFI Units 1 and 2; and,

2) to perform a waste characterization of the material contents of RFI Units 3 through 8.

Due to the relatively small size of RFI Units 1 and 2, their physical proximity to each other, and their contents of similar waste material, RFI Units 1 and 2 will be treated as one area of investigation for purposes of the RFI.

3.1.1 RFI Units 1 and 2 Soil Sampling and Analyses

To determine if a significant release has occurred from RFI Units 1 and 2, a total of six soil borings will be made:

- two background soil borings, and
- four soil borings installed immediately adjacent to RFI Units 1 and 2.

Statistical comparisons between background soil data and waste management unit soil data will be used as the basis for determining if a significant release has occurred. The soil boring locations

and soil sample collection intervals are described below. Soil sample collection procedures, laboratory analytical procedures, and data evaluation procedures are discussed in Sections 4.1, 3.1.1.3, and 6.0, respectively.

If the statistical evaluation of soil sample analytical data collected during the Phase I investigation indicates that a significant release has occurred from RFI Units 1 and 2, then the Phase II investigation will be implemented.

3.1.1.1 Background Soil Sampling

Although not specifically required in the Permit, FMC has selected two locations for the collection of background soil samples. These locations are shown on Figure 2-2. The purpose of these background samples is to provide data from which statistical comparisons can be made to data from soil samples collected from RFI Units 1 and 2. These statistical comparisons, described in Section 6.0, will be used to determine if a significant release of Appendix VIII hazardous constituents from RFI Units 1 and 2 has occurred. These background data will also be used during the Phase II investigation.

For a valid statistical comparison between background data and waste management unit data, the background soil boring locations were selected according to the following general criteria:

- the background locations should be representative of the same general soil type characteristics and conditions existing at the waste management units;

- the location must not be or have been affected by contamination from industrial activities.

Background Sample No. 1 (BG-1) is located southwest of RFI Unit 1 and 2. Industrial activities have not occurred at or near this location. Also, it is located sufficiently close to the

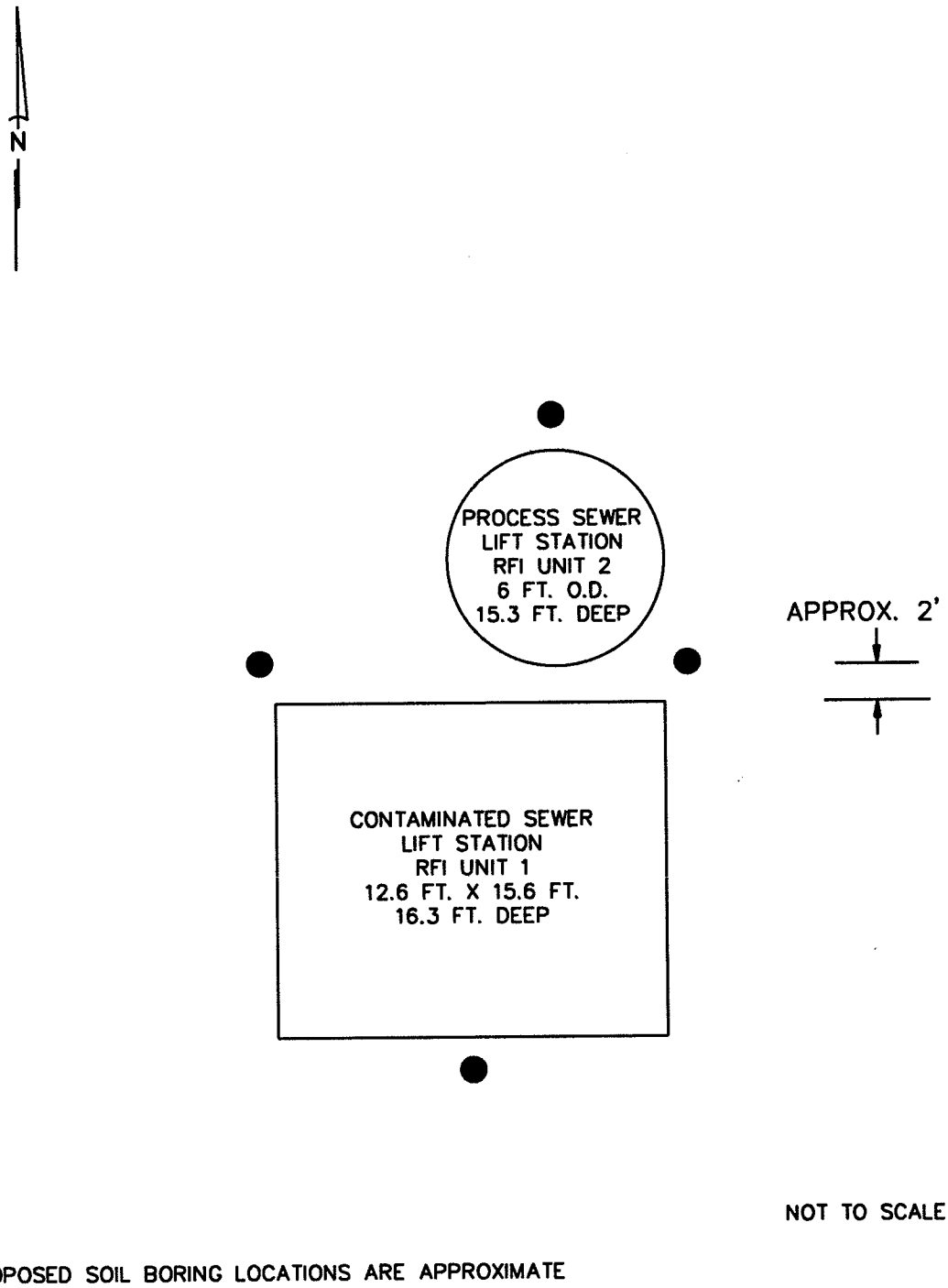
facility process area to be representative of the same general soil types there. Background Sample No. 2 (BG-2) is located in the northeast corner of the FMC facility property. It is also located in an area that has not been affected by industrial practices.

Background soil samples will be collected in accordance with the sampling requirements of Provision VIII.A.2.b.(1) of the Permit. Background soil borings will be completed at depths which correspond to the top of the water table. Soil samples will be collected continuously from ground surface to total depth (T.D.) for geologic description and field screening observations as described in Section 4.1.4. Background soils samples will be retained for chemical analysis at 6-inch, 5-foot, 10-foot, and thereafter at 5-foot intervals to T.D. All background soil samples will be collected and retained as discrete samples. Soil samples will not be composited.

3.1.1.2 RFI Units 1 and 2 Soil Sampling

Four soil borings will be advanced immediately adjacent to RFI Units 1 and 2. Their locations are shown on Figure 3-1. As stated above, the purpose of the Phase I investigation is to determine if a significant release of Appendix VIII constituents has occurred from RFI Units 1 and 2. If a significant release has occurred, it should be most readily detected in the soils closest to the unit. Therefore, the Phase I soil borings will be located as close as practically possible to these units.

Soil sampling from each of the four borings will be in accordance with Provision VIII.A.2.b.(1) of the Permit, as described above for the background soil samples in Section 3.1.1.1. Soil samples will be collected continuously from ground surface to total depth for geologic description and field screening observation. Soil samples will be retained for chemical analysis from each soil boring at 6-inches, 5-foot, 10-foot and thereafter



● PROPOSED SOIL BORING LOCATIONS ARE APPROXIMATE

ENSR™

ENSR CONSULTING AND ENGINEERING

FIGURE 3-1
RFI UNIT 1 AND 2
SOIL BORING LOCATIONS
RFI WORK PLAN FMC CORPORATION
PASADENA, TEXAS

DRAWN BY: S.JACKSON	DATE: 12/19/89	PROJECT NUMBER: 2810-014-001
CHK'D.BY:	REVISED:	

CE281003

at 5-foot intervals to T.D. All soil samples will be collected and retained as discrete samples.

3.1.1.3 Analyses

Based on the data review, described in Section 2.0, specific indicator parameters have been selected for the soil investigation of RFI Units 1 and 2. These indicator parameters include all Appendix VIII hazardous waste constituents which have been managed at the FMC facility. All soil samples (both background and RFI Unit samples) collected during the Phase I investigation will be analyzed for these indicator parameters. Table 3-1 lists the indicator parameters and associated test methods and references.

3.1.2 RFI Unit 3 through 8 Sampling and Analyses

In accordance with Provision VIII.A.3. of the Permit, waste characterization of RFI Units 3 through 8 will be performed. This task will include collecting representative samples of the contents from each unit. These samples will be analyzed for those Appendix VIII constituents which potentially have been present sometime at the site during the plant's history. These include the following Appendix VIII constituent groupings:

- Volatiles
- Semi-volatiles
- HPLC-organics
- Metals
- Sulfides

Analyses will be performed in accordance with EPA-approved procedures.

TABLE 3-1

PHASE I INDICATOR PARAMETERS AND LABORATORY ANALYTICAL METHODS
RCRA FACILITY INVESTIGATION WORK PLAN
PEROXYGEN CHEMICALS DIVISION
PASADENA, TEXAS

Parameters	Test Method Reference	Detection Limit
Allyl Alcohol	[1]EPA SW-846: 8240, GC/MS	50 ppb
Acrolein	[1]EPA SW-846: 8240, GC/MS	50 ppb
Naphthalene	[1]EPA SW-846: 8270, GC/MS	330 ppb
Phenol	[1]EPA SW-846: 8270, GC/MS	330 ppb

1 EPA "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods," SW-846, 3rd Edition, 1986.

Procedures for collection of these samples are described in Section 4.2.

3.2 Phase II

A Phase II investigation will be conducted if it is determined, using the data evaluation procedures discussed in Section 6.0, that soil contamination resulting from a significant release of Appendix VIII hazardous constituents from RFI Units 1 and 2 has occurred. The Phase II investigation will be performed to determine the aerial extent of soil contamination (Provision VIII.A.2.a) and the possible installation of a groundwater monitoring system (Provision VIII.A.2.b.(2).). The Phase II investigation will be conducted as follows.

3.2.1 Soils Investigation

The purpose of the Phase II soils investigation will be to determine the horizontal and vertical extent of soil contamination. This will be accomplished by installing soil borings on appropriate grid basis, starting 10 feet from each Phase I soil boring, where analytical results indicate that a significant release has occurred, and extending radially outward from RFI Units 1 and 2 in such a manner that the boundary of soil contamination may be determined.

The vertical extent of soil contamination will be determined by terminating each Phase II soil boring at a depth which corresponds to the point at which there is no visual or olfactory evidence of contamination and HNU^R Photoionization Detector (PID) or Organic Vapor Analyzer (OVA) measurements of soil samples collected from this point are at or below the background measurements determined during the Phase I investigation.

Phase II soil samples will be collected for geologic description and chemical analysis in the same fashion as the Phase I soil samples. Sample equipment and collection procedures are

described in Section 4.1. The presence of contamination will be determined in accordance with the data evaluation procedures described in Section 6.0.

3.2.2 Groundwater Investigation

Provision VIII.A.2.b(2) of the Permit requires that a groundwater monitoring system be installed, based upon the results of the soil boring program. As stated above, if the results of the Phase I investigation indicate that a significant release to the groundwater has occurred from RFI Units 1 and 2, then a groundwater monitoring system for these units may be installed.

The groundwater monitoring system will be designed and installed in accordance with Provision VIII.A.2.b.(2). The system will consist of a minimum of one background well removed a sufficient distance from RFI Units 1 and 2 so it is not affected by RFI Units 1 and 2, and at least three wells located downgradient from RFI Units 1 and 2. The procedures that will be used in the design, construction, installation, development, and sampling of the groundwater monitoring system are described in Section 4.3.

At this time, it is uncertain as to whether or not a groundwater monitoring system will be required for RFI Units 1 and 2. This determination is dependent upon the results of the Phase I soil investigation. Therefore, should it be determined that a groundwater monitoring system will be required, then a proposal for monitor well placement, analytical parameters, and groundwater sampling frequency will be submitted to the TWC and EPA for approval prior to installation of the monitoring system. This proposal will be submitted in the interim RFI report; see Section 8.0.

3.2.3 Analyses

As stated above, at this time it is speculative as to whether or not a Phase II investigation will be required. Therefore, if

the results of the Phase I soils investigation indicate that Phase II is required, then at that time a proposed list of analytical test parameters (soil and groundwater) and associated test method references will be submitted to the TWC and EPA for approval prior to initiation of the Phase II investigation. This proposal will be submitted in the interim RFI report.

4.0 EQUIPMENT AND SAMPLING SPECIFICATIONS

This section describes in detail the specific procedures, equipment, and materials that will be used during the field investigation of the RFI.

4.1 Phase I RFI Units 1 and 2 Soil Sampling

Described below are the types of sampling equipment and procedures that will be employed to collect all soil samples during the Phase I and Phase II investigations for RFI Units 1 and 2.

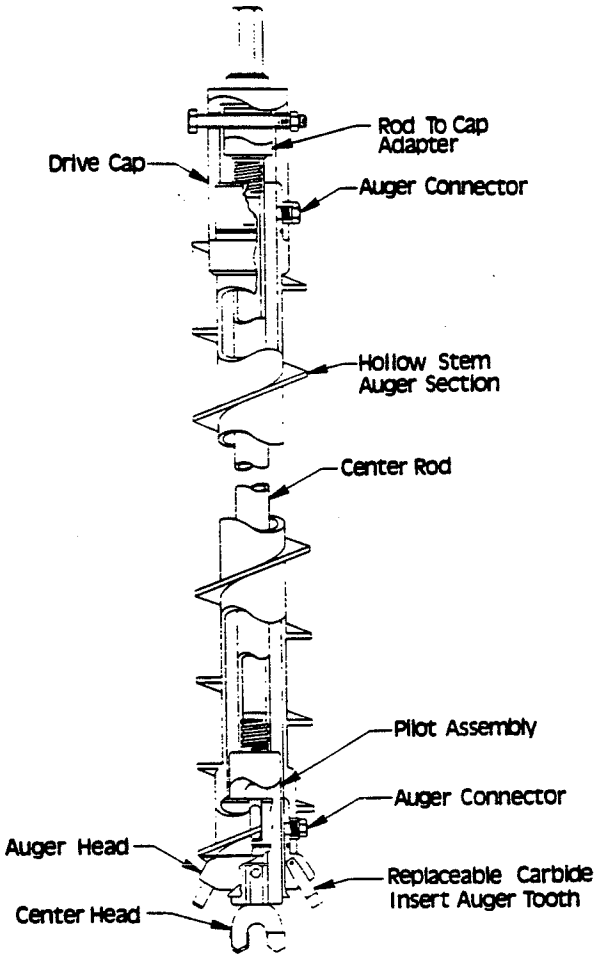
4.1.1 Sampling Equipment

The type of sampling equipment that will be used at any particular soil boring location will vary depending upon the accessibility of that location. Wherever possible, a truck-mounted, hollow stem auger drilling rig will be used to advance soil borings for sample collection. The tools that will be used for hollow stem auger drilling will consist of:

- 5-foot hollow stem auger sections,
- hollow stem auger head and drive cap,
- pilot assembly,
- center rod column, and
- rod-to-cap adapter.

A typical hollow stem auger assembly is shown on Figure 4-1. The outside diameter of the hollow stem auger sections will be 6.25 inches.

Soil samples will be collected with a 3-inch O.D., thin wall Shelby tube sampler, either 24 or 30 inches in length, or a split spoon sampler having a 2-inch O.D. and an 18- or 24-inch-long sample capacity. Shelby tubes will be used to collect samples of



ENSR™

ENSR CONSULTING AND ENGINEERING

FIGURE 4-1

TYPICAL HOLLOW STEM AUGER ASSEMBLY

RFI WORK PLAN

FMC CORPORATION

PASADENA, TEXAS

DRAWN BY: CS	DATE: 12-19-89	PROJECT NO.: 2810-014
CHK'D BY:	REVISED:	DWG.NO.:

cohesive material. Split spoon samplers will be used to collect samples of non-cohesive material.

Additional equipment and materials needed for advancing soil borings and collection of soil samples will consist of the following:

- health and safety equipment as specified by health and safety plan;
- PID or OVA meter with calibration gas;
- pH meter with calibration standards;
- sample bottles;
- ice chests with coolant for sample storage and transport;
- field log book;
- plot plan;
- supply of plastic trash bags;
- supply of heavy duty plastic sheeting;
- shovel, pick axe, post-hole auger or digger;
- stainless steel mixing bowls;
- stainless steel hand trowels and spatulas;
- 100-foot tape measure;
- 55-gallon drums;
- potable water supply;
- supply of deionized water with plastic squeeze bottle;
- powdered non-phosphate detergent;
- hexane with plastic squeeze bottle;
- supply of paper towels;
- scrub brushes;
- sample labels;
- chain-of-custody forms;
- wood stakes; and
- grouting materials (Portland Type I cement and powdered bentonite).

4.1.2 Soil Boring Installation

Soil borings will be advanced and soil samples will be collected using a truck-mounted hollow stem auger drilling rig with Shelby tube and split spoon samplers. Drilling fluids will not be used during soil boring installation. The procedures that will be used to advance soil borings with a hollow stem auger are described below.

1) Implement health and safety plan.

2) Prepare site: select exact soil boring location; obtain all necessary work and safety permits; check for underground obstructions (i.e., piping, foundations, etc.).

3) Itemize and assemble all necessary drilling and sampling equipment.

4) Set up work area (either pick-up truck tail gate or portable table). Cover work area with plastic sheeting.

5) Set up drilling rig over exact soil boring location; assemble hollow stem auger drilling components; connect assembly to the rotary drive of the drill rig.

6) Advance hollow stem auger assembly to desired sample depth interval.

7) Disconnect drive cap from the auger column assembly. Remove pilot assembly and center rod column with hoist line.

8) Attach sampling device (Shelby tube or split spoon) to sampling rod column and place inside the hollow axis of the auger column. Lower sampling apparatus to soil at bottom of the hole. Push sampling apparatus into soil sample interval with the hydraulic action of the drill rig.

9) Remove sampling device and retrieve soil sample in accordance with Section 4.1.3.

10) Decontaminate sampling device in accordance with Section 4.1.6.

11) Reinsert pilot assembly and center rod column; reconnect drive cap to auger column and the rotary drive of the drill rig.

12) Add additional 5 feet hollow auger sections and center rod sections, as necessary.

13) Continue the procedure to total depth. Remove auger assembly from hole.

14) Seal hole with grout mixture consisting of the following mixture ratio:

- one 98 lb sack of Portland Type I cement,
- approximately 2 to 5 lbs of powdered bentonite, and
- 10 gallons of water.

15) Containerize all soil cuttings and discarded soil cores in 55-gallon drums. Seal each drum with a drum lid. Label drums according to soil boring location, date of drilling, and general description of material. Final

disposition of soil cuttings will be dependent upon the chemical analysis of soil samples.

16) Decontaminate all drilling and sample collection equipment according to the decontamination procedures described in Section 4.1.6.

17) Place all trash (i.e., spent gloves, paper towels, plastic sheeting, etc.) in trash bags. Final disposal will be determined by the results of soil sample chemical analysis.

18) Stake location.

After all soil borings have been completed, they will be surveyed by a licensed surveyor registered in the State of Texas, for location coordinates and ground surface elevation.

4.1.3 Soil Sample Collection Procedures

After the Shelby tube or split spoon sampler has been removed from the bore hole, the soil sample will be collected in accordance with the procedures described below.

1) Remove Shelby tube or split spoon sampler from sample head on sampling rod column.

2) Remove any loose material ("sluff") on the top of the sample with a knife or spoon.

3) Extrude sample from sample tube onto a clean piece of plastic.

4) When handling samples, always wear clean PVC, Playtex^{R}, or neoprene gloves.

5) Immediately transfer sample to work area.

6) Using a stainless steel spatula or knife, trim the outer edges of the soil core. Discard these trimmings in 55-gallon drum.

7) Immediately describe sample for soil type characteristics and field screening observations as discussed in Section 4.3.4.

8) After the sample has been described, immediately place that portion of the sample intended for chemical analysis in stainless steel mixing bowl. Distribute the sample into the appropriate sample bottles, discussed below. Fill sample bottles in the order of the volatization sensitivity of the parameters; volatile organics first, followed by semivolatile organics followed by inorganics.

9) Perform steps (5), (6), (7), and (8) as quickly as practically possible to minimize losses of any volatile organic compounds and reduce possibility of sample contamination.

10) Label sample bottle and fill out chain-of-custody form in accordance with documentation procedures described in Section 5.0.

11) Place samples on coolant in ice chest for transportation to the laboratory.

12) Decontaminate sampling device, stainless steel mixing bowl, and any other reusable sample collection equipment which came in contact with the sample, in accordance with the decontamination procedures described in Section 4.1.6.

13) Discard remaining portion of sample in 55-gallon drums.

14) Prepare to collect next sample.

4.1.4 Soil Description and Field Screening Procedures

As stated above, soil will be continuously cored in each soil boring during Phase I and Phase II for geologic description and field screening observations (visual, olfactory, and organic vapor measurements).

Soil type descriptions will be performed by a qualified geologist, hydrogeologist, or geotechnical engineer. These descriptions will include the following information and will be recorded in the field log book:

- soil type according to the Unified Soil Classification System,
- color,
- structure,
- texture,
- moisture,
- mineral composition, and
- any other characteristic that may affect the environmental fate of any releases.

Field screening observations for possible contamination will include visual and olfactory descriptions of each sample relative to the presence of contamination. All descriptions will be recorded in the field log book. In addition, organic vapor measurements will be performed on each soil sample. The procedure for performing these measurements is as follows:

1) Immediately after the sample has been extruded from the sampling device and moved to the work area, place approximately 8 ounces of the sample in a clean 16-ounce, wide mouth, glass jar.

2) Immediately seal the jar with two layers of aluminum foil. Secure the aluminum foil to the jar with several rubber bands.

3) Leave the jar in an unshaded area for 30 minutes.

4) Break aluminum foil seal with the tip of organic vapor measurement probe; measure head space gas. Record highest reading and sample depth interval in field log book.

5) Discard sample in 55-gallon drum.

Organic vapor measurements will be performed with either a portable PID or a OVA. The performance characteristics and calibration procedures for each of these instruments are discussed in Section 7.4.

4.1.5 Sample Bottles, Preservation, and Shipment

Table 4-1 identifies the types of sampling containers and preservatives that will be used for the collection and transport of soil samples. A state or EPA-approved laboratory will provide all

TABLE 4-1

SOIL SAMPLE CONTAINERS AND PRESERVATIVES
RCRA FACILITY INVESTIGATION WORK PLAN
FMC CORPORATION
PEROXYGEN CHEMICALS DIVISION
PASADENA, TEXAS

Parameter	Sample Container	Preservative	Holding Time
1. Allyl Alcohol Acrolein	4 oz. glass	4°C	14 days
2. Naphthalene Phenol	8 oz. amber	4°C	14 days

sample bottles, shipping containers, chain-of-custody forms, labels, and preservatives. Sample bottle selection is based on sample matrix, analytical methods requested, and the laboratory's internal quality assurance requirements.

All sample bottles will have Teflon^{R}-lined caps. Sample bottles will be transported to and from the site in sample shuttle coolers. Each sample bottle will remain in the sample shuttles at all times during the sampling event, except during actual sample collection. Labels and chain-of-custody will accompany the sample bottles at all times. Documentation procedures are discussed in Section 5.0. The sample shuttles will remain in the presence of the ENSR field team at all times.

After the sample has been collected, any appropriate preservatives added, and the sample bottle labeled, each sample bottle will be wrapped with plastic, bubble-packing material and placed in an ice chest for transport to contract laboratories in Houston, Texas. Each ice chest will contain ice, blue ice, or similar coolant.

All samples will be transported to the laboratory at the end of the sampling day on which they were collected. A chain-of-custody form will accompany the samples at all times after the sample has been collected and until it reaches the laboratory. Samples will be transported to the laboratory by the ENSR field sampling crew.

4.1.6 Decontamination Procedures

All reusable drilling and sample collection equipment will be decontaminated according to the procedures described below. A designated decontamination area will be established. All equipment (with the exception of some of the smaller items, such as stainless steel mixing bowls, hand trowels, etc.) will be decontaminated only in the designated area.

Hollow Stem Auger Drilling Equipment

1) After the soil boring has been completed to total depth, remove the auger assembly from the boring. Clean augers of any soil cuttings adhering to the auger assembly; place soil cuttings in 55-gallon drums.

2) Disassemble auger assembly, and transport to designated decontamination area.

3) Decontaminate auger assembly and any other drilling components which were introduced into the soil boring or came in contact with the soil by washing with a steam cleaner followed by a pressure wash rinse. It may be necessary to use a brush to remove any soil remaining on the auger flights.

Sample Collection Equipment

Sample collection equipment (i.e., Shelby tubes, split spoon, mixing bowl, bailers, etc.) will be decontaminated as follows:

1) Cover the decontamination area with plastic sheeting.

2) In a 5 gallon plastic bucket, prepare a mixture of potable water and powdered non-phosphate detergent.

3) Fill another 5 gallon plastic bucket with deionized water.

4) Place the equipment to be cleaned in the potable water/non-phosphate detergent mixture and, using a scrub brush, thoroughly clean the equipment.

5) Then, thoroughly rinse the equipment in the 5 gallon bucket containing the deionized water.

6) Dry equipment with paper towel.

7) Using a plastic squeeze bottle, apply a light hexane rinse to equipment surface and allow to air dry. Collect all rinsate and containers and dispose as appropriate.

8) Using a plastic squeeze bottle, rinse equipment with deionized water and dry with paper towel.

9) Wrap equipment in plastic or aluminum foil until ready to use again.

10) Dispose of decontamination fluids in FMC wastewater collection system.

11) Place all trash (i.e., paper towels, plastic sheeting, aluminum foil, etc.) in plastic trash bag for general trash disposal.

4.2 Phase I RFI Units 3 through 8 Sampling

Described below are the procedures that are to be used to sample the contents of RFI Units 3 through 8. Prior to the initiation of the sampling event, each unit will be inventoried. All available information concerning each container will be recorded in the field log book, including:

- Type of Unit
- Total Capacity
- Estimate of Volume Currently in Tank
- Contents of the Unit

- Visual Condition of Unit and any Surrounding Structures (i.e., piping, concrete pads, etc.)

4.2.1 Sampling Equipment

Listed below are the types of sampling equipment that will be used to collect the waste characterization samples.

- Scrub Brush
- Hexane
- Deionized Water
- Non-phosphate Detergent
- Paper Towels
- PID or OVA
- Health & Safety Equipment as required by Health and Safety Plan
- Polypropylene rope
- Stainless steel spatulas
- Stainless steel mixing bowls
- Plastic sheeting
- 5-gallon plastic buckets
- Camera
- Field book
- Sample bottle labels
- Chain-of-custody forms
- Trash bags
- Appropriate glassware
- Ponar[R] Sampler
- Kemmerer[R] Sampler
- Teflon[R] bailer
- Peristaltic Pump and Silicon tubing.

4.2.2 Sample Collection Procedures

The specific procedures which will be used to sample RFI Units 3 through 8 are presented below. Since these procedures will vary depending upon the type of vessel and the amount of material existing in each unit, the sampling procedures for each unit will be addressed separately.

RFI Unit 3 - Used Work Solution Tank

Current records indicate that RFI Unit 3 is no longer in service and empty. However, the tank will be opened and inspected for the presence of any remaining residue. If present, this residue will be sampled to the extent practical in accordance with the following procedures:

1) Implement Health and Safety Plan.

2) Assemble and itemize sampling equipment.

3) Access tank through manway.

4) Determine and record amount of material remaining in tank with either a weighted stainless steel tape or photo-optic oil/water interface probe.

5) Depending upon the consistency of the material, samples will be collected with either a Ponar[R] or Kemmerer[R] sampler, or Teflon[R] bailer.

6) Place collected samples in appropriate glassware for Appendix VIII analyses. See Section 4.2.3.

7) Pack and label samples.

8) Decontaminate sampling equipment in accordance with Section 4.2.4.

If the residue does not exist in sufficient volume to practically collect a representative sample, a sample will not be collected.

RFI Unit 4 - Used Work Solution Tanks 716A&B

Current records indicate that this unit is no longer in service and presently contains less than 1-foot of material in the bottom of each tank. These tanks will be sampled in accordance with the following procedures:

1) Implement Health and Safety Plan.

2) Assemble and itemize sampling equipment.

3) Access tank through manway.

4) Determine and record amount of material remaining in tank with either a weighted stainless steel tape or photo-optic oil/water interface probe.

5) Depending upon the consistency of the material, samples will be collected with either a Ponar[R] sampler or Kemmerer[R] sampler or Teflon[R] bailer.

6) Collect a separate sample from each tank for Appendix VIII analysis.

7) Place collected samples in appropriate glassware. See Section 4.2.3.

8) Pack and label samples.

9) Decontaminate sampling equipment in accordance with the procedures described in Section 4.2.4.

If the contents of the tank do not exist in sufficient volume to collect a representative sample, a sample will not be collected.

RFI Unit 5 - Check Tank T4889C

This unit is currently in service. Records indicate that the level in this tank is maintained at approximately 50 to 90% capacity. This tank receives work solution collected from the oily water sewer.

This tank will be sampled for Appendix VIII analysis in accordance with the following procedures.

1) Implement Health and Safety Plan.

2) Assemble and itemize sampling equipment.

3) Access tank through manway.

4) Determine amount of material, both liquid and solid in the tank, and the presence and thickness of any separate liquid phases using a photo-optic oil/water interface probe and/or weighted stainless steel tape with indicator paste.

5) Depending upon the amount and types of solids and liquids encountered, sampling equipment will be chosen which best fits the conditions present. The types of samplers which will be considered are:

- Peristaltic pump with dedicated silicon tubing
- Teflon[R] bailer
- Ponar[R] grab sampler

- Kemmerer[R] sampler
- PVC pipe sampler

6) If solid material is present in the bottom of the tank, collect a discrete sample of this material for Appendix VIII analysis.

7) If the contents of the tank consist entirely of one single phase, or if a separate liquid phase is present but doesn't exist in sufficient quantity to practically collect a representative sample, collect three samples: one from the top, one from the middle, and one from the bottom. Composite these three samples together for Appendix VIII analysis.

8) If a separate liquid phase is present in sufficient quantity to practically collect a representative sample, collect a discrete sample from each phase for Appendix VIII analysis.

9) Decontaminate sampling equipment in accordance with the procedures described in Section 4.2.4.

10) Pack and label samples.

RFI Unit 6 - H_2O_2 Sewer Pits

This unit is currently in service and consists of separate pits which receive wastewater from the hydrogen peroxide distillation and product storage area. This unit will be sampled in accordance with the procedures described above for RFI Unit 5.

RFI Unit 7 - Oily Sewer Pits

This unit will be sampled in accordance with the same procedures as those used in sampling RFI Unit 5.

RFI Unit 8 - Wastewater Surge Tank

This unit is currently in service. It receives process wastewater, surface run-off water from the Allyl Alcohol and Hydrogen Peroxide Plant, and domestic wastes. The discharge from this tank is pumped using a 150 gpm pump to the Gulf Coast Waste Disposal Authority. This discharge pump is equipped with a sampling port. The waste characterization sample for this unit will be collected directly from this pump.

The sample will be collected by filling a 1 to 2 gallon glass container. This sample will then be distributed to the appropriate glassware.

4.2.3 Sample Bottles, Preservatives, and Shipment

Table 4-2 lists the sample container, preservatives and holding times for the Abbreviated Appendix VIII waste characterization samples. Sample bottle packaging and shipment will be performed in accordance with the procedures described in Section 4.1.5. Sample bottle selection is based on sample matrix, analytical methods requested, and the laboratory's internal quality assurance requirements.

All sample bottles will have Teflon^{R}-lined caps. Sample bottles will be transported to and from the site in sample shuttle coolers. Each sample bottle will remain in the sample shuttle cooler at all times during the sampling event, except during actual sample collection. Labels and chain-of-custody will accompany the sample bottles at all times. Documentation procedures are discussed in Section 5.0. The sample shuttle cooler will remain in the presence of the ENSR field team at all times.

TABLE 4-2

ABBREVIATED APPENDIX VIII WASTE CHARACTERIZATION SAMPLE CONTAINERS AND PRESERVATIVES
RCRA FACILITY INVESTIGATION WORK PLAN
FMC CORPORATION
PEROXYGEN CHEMICALS DIVISION
BAYPORT PLANT
PASADENA, TEXAS

Parameter	Containers	Preservative	Holding Time
1. Volatiles			
Liquid	(2) 40 ml	4°C	14 days
Sludge	(1) 4 oz, tall	4°C	14 days
2. Semi-Volatiles			
Liquid	(2) 32 oz. amber	4°C	7 days
Sludge	(1) 16 oz. amber	4°C	14 days
3. HPLC - Organic			
Liquid	(2) 32 oz. amber	4°C	7 days
Sludge	(1) 8 oz. amber	4°C	14 days
4. Metals			
Liquid	(1) 32 oz. plastic	HNO_3 pH<2	180 days
Sludge	(1) 8 oz. glass	N/A	180 days
5. Sulfide			
Liquid	(1) 16 oz. plastic	Zn Acetate, 4°C	28 days
Sludge	(1) 8 oz. glass	4°C	28 days

4.2.4 Decontamination Procedures

Decontamination procedures for waste characterization sampling will be performed in accordance with the procedures described in Section 4.1.6.

Decontamination of the peristaltic pump, however, will be accomplished according to the following procedures:

1) Dispose of silicon tubing used to collect sample and attach clean silicon tubing.

2) Pump mixture of potable water and nonphosphate detergent through machine and containerize fluid in 5 gallon bucket.

3) Next, pump hexane through peristaltic pump and containerize in 5 gallon bucket.

4) Finally, pump deionized water through machine.

5) Remove silicon tubing, attach clean silicon tubing immediately prior to sample collection.

4.3 Phase II Monitor Well Installation and Sampling

All groundwater monitor wells will be designed, installed, developed, and sampled in accordance with the procedures described below. For the purposes of this work plan, it has been assumed that PVC well casing and screen material, and Teflon[R] well sampling material, will be compatible with any contaminants which may be found to exist in the soil and groundwater at the FMC facility. However, if the results of the Phase I investigation indicate that these materials will be incompatible, then different materials will be selected at that time. FMC will notify TWC and EPA in advance of any change in the design, installation, or materials that will

be used during the RFI. Any change will be subject to TWC and EPA approval.

4.3.1 Well Design, Construction, and Installation

All groundwater monitor wells will be installed using hollow stem auger drilling techniques. Drilling fluids will not be added to the well bore. The equipment and procedures for advancing each well bore will be the same as described above in Sections 4.1.1 and 4.1.2.1. Likewise, soil samples will be collected continuously, as described above in Section 4.1.3, for geologic description and field screening observations described in Section 4.1.4.

However, if, during drilling of a well bore, field screening observations indicate that contamination exists in the soil above the transmissive zone to be monitored, or if the well bore intersects more than one transmissive zone, then surface casing will be installed to isolate the transmissive zone to be monitored from the contamination or other transmissive zone. The procedures, equipment, and materials for installing surface casing are as follows:

1) Determine depth of contamination or depth of transmissive zone to be sealed off using the hollow stem augers and Shelby tube or split spoon samplers as described in Section 4.1. Drill well bore to a point which corresponds to a depth of approximately 1 to 2 feet below the point of which contamination was last observed in the soil samples or 1 to 2 feet below the transmissive zone to be sealed off.

2) Remove the hollow stem auger assembly from the well bore.

3) Ream well bore using a minimum 14-inch-O.D. auger or drill bit to the depth described in Step 1.

4) Remove drill assembly from well bore.

5) Install a minimum 10-inch-diameter PVC surface casing that extends from bottom of reamed well bore to ground surface.

6) Grout annulus of surface casing using the following grout mixture.

- (1) 98 lb sack of Portland Type I cement,
- approximately 2 to 5 lbs of powdered bentonite, and
- 10 gallons of water.

7) Allow grout to cure for a minimum of 24 hours before resuming drilling well bore.

Regardless if surface casing is or is not installed, each well bore will be drilled or reamed to a minimum diameter of 8 inches. Each well bore will be terminated at a point which corresponds to a depth of 2 to 3 feet in the top of the clay unit immediately underlying the first transmissive zone to be monitored. Immediately upon completion of drilling the well bore, the auger assembly will be removed from the well bore and the monitor well will be installed.

Each monitor well will be constructed of 4-inch-I.D. threaded, flush joint, PVC material. Screen sections will be machine slotted with 0.010-inch openings. The entire saturated thickness will be screened. However, in no event will the screened interval exceed 20 feet in length. If the transmissive zone exceeds 20 feet, the upper 20 feet of the zone will be monitored. A 2-1/2-foot sediment trap will be attached to the bottom of the screen interval.

After the well has been placed in the well bore, a sand pack will be placed around the screen interval. The sand pack will extend across the entire length of the screen interval to a point

approximately 6-inch to 1-foot above top of the screen. Colorado Silica Sand, size #16-30, will be used as the sand pack.

A 2- to 3-foot bentonite pellet seal will then be placed on top of the sand pack. The bentonite pellet seal will then be allowed to hydrate for a minimum of 3 hours before the grout seal is placed. The remaining well annulus will then be sealed with a cement/bentonite grout mixture using the same ratio as described above for sealing of surface casing. A typical well construction is shown on Figure 4-2.

All fluids/solids generated during monitor well installation will be collected in 55-gallon drums for proper disposal. Each drum will be labeled for location, description of contents, and date that drum was filled.

In order to prevent vandalism of the monitor wells, and secure confidence in the groundwater level measurements and samples obtained from these wells, a steel protective cover with a locking cap will be installed over each well. In addition, a concrete pad will be placed around the well. The pad will be 4 inches thick and 4 feet square.

Each well casing will be vented, and marked for surveying and groundwater elevation measurements, and properly labeled. Following installation, all wells will be surveyed by a Texas registered surveyor. Two elevations will be obtained from each well: one elevation at the reference point on the top of the PVC well casing, and one elevation at ground surface. The well coordinates will also be determined.

4.3.2 Soil Description and Field Screening Procedures

During drilling of the well bore, soil samples will be collected continuously for geologic description and field screening observations. The procedures that will be used will be the same as described in Section 4.1.4.

PROJECT NAME: _____

PROJECT NUMBER: _____

IDENTIFICATION NUMBER: _____

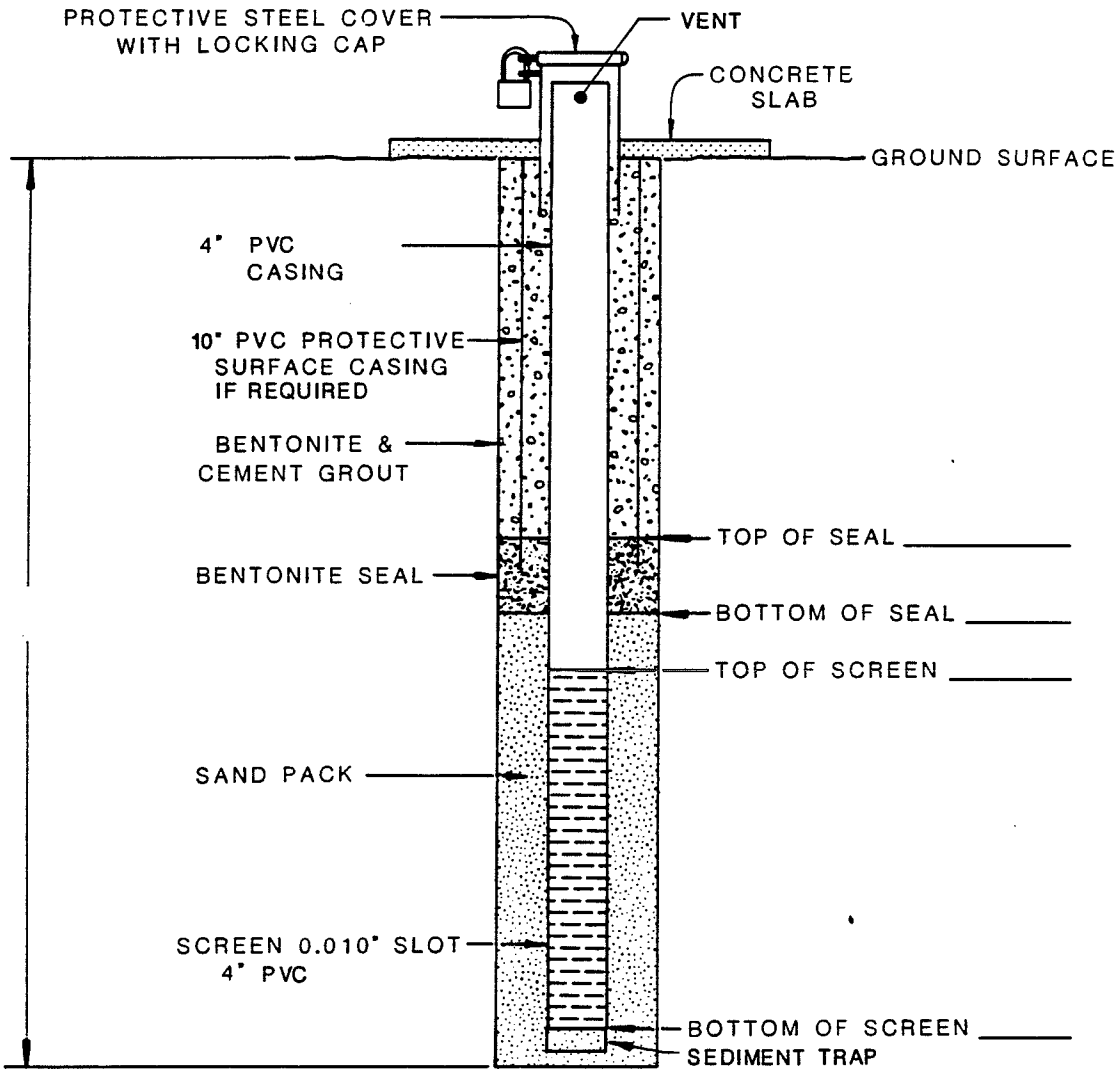
DATE INSTALLED: _____

LOCATION: N _____ E _____

GROUND SURFACE ELEVATION: _____

TOP OF WELL CASING ELEVATION (AT NOTCH): _____

GROUNDWATER SURFACE ELEVATION _____ ON: _____



ENSR™

ENSR CONSULTING AND ENGINEERING

FIGURE 4-2

TYPICAL WELL COMPLETION DETAIL

FMC CORPORATION

PASADENA, TEXAS

DRAWN BY: CS	DATE: 12-19-89	PROJECT NO.: 2810-014
CHK'D BY:	REVISED:	DWG.NO.:

4.3.3 Development Procedures

All wells will be developed to maximize well yields and provide groundwater containing minimal suspended solids for sampling.

The development procedure most likely to be used will be either hand bailing or hand pumping. Hand bailing will be accomplished with a 4-inch Teflon[R] or PVC bailer. Hand pumping will be accomplished using a 2-inch PVC, hand pump. The choice between these two methods will be a field decision, dependent primarily upon well yield.

Multiple well volumes will be removed as pH; specific conductance temperature, and levels of turbidity are monitored. All observations will be recorded on well development records. Refer to Section 5.2. All developed water will be containerized in 55-gallon drums or pumped to Gulf Coast Waste Disposal for proper treatment and disposal. Proper disposal will be dictated by the analytical results from groundwater samples collected from the well and by the acceptability criteria of Gulf Coast Waste Disposal Authority. The criteria for satisfactory well development will be stabilization of pH, specific conductance, temperature, and when no, or a minimal amount of suspended solids, are observed.

All development equipment will be decontaminated after use at each well in accordance with the procedures described in Section 4.1.6.

4.3.4 Monitor Well Sampling Procedures

The following sections describes the equipment and procedures to be used in sampling groundwater monitor wells installed at the FMC Plant as part of the RFI.

4.3.4.1 Equipment

- Health and Safety Equipment

- OVA or PID
- Teflon[R] bailer
- 5-gallon buckets
- Water level sounder
- Tape measure
- PVC or Playtex[R] gloves
- Appropriate glassware
- pH meter with standard solutions
- Specific conductance meter with standard solutions
- Deionized water
- Potable water supply
- Chemical-free paper towels
- Non-phosphate detergent
- Hexane with squirt bottle
- Sample labels
- Chain-of-custody forms
- Cooler and ice
- Polypropylene rope
- Aluminum foil
- Scrub brush
- Appropriate preservatives
- Plastic sheeting
- Paper towels

4.3.4.2 Monitor Well Evaluation

Monitor wells must be evaluated to determine the ability of the well to yield representative samples. This evaluation should be performed at each monitor well prior to commencement of any purging or sampling activities. Use the following procedure to evaluate each well before purging and sampling the well. Record all information in the field sampling logbook.

1) Put on PVC or Playtex[R] gloves.

2) Inspect integrity of lock and protective casing. Note if repairs are needed.

3) Remove protective cover cap and well casing cap. Note condition of PVC well casing.

4) Measure organic vapor level at well head and breathing zone with PID or OVA meter.

5) Measure depth to static fluid level to nearest hundredth of a foot from top of well casing at the survey reference mark with measuring device. Repeat this measurement three times and check for repeatability. Depth measurements must be repeatable to 0.02 feet.

6) Use a tape measure to measure total depth of well. Compare this value with the well construction log and note any discrepancies. Measure total depth from the survey reference mark.

7) While removing the tape measure from the well, observe and record the appearance of any immiscible layer(s) light and/or dense which may have clung to the measuring device.

8) Measure thickness of any immiscible layer with interface probe.

9) Decontaminate measuring device and tape measure.

4.3.4.3 Monitor Well Evacuation

Water standing in the well casing may be of a different chemical quality than that in the aquifer. The presence of stagnant water in the well may have an adverse effect on the

representativeness of the samples. To ensure that groundwater samples are representative of aquifer water, the following well purging procedures will be performed.

1) Put on PVC or Playtex[R] gloves.

2) Calculate the well volume and record this value in the logbook. One well volume is equivalent to the amount of static fluid in the well. To determine this volume, subtract the depth to static water from the total depth of the well (refer to Section 4.3.4.2). Then refer to Figure 4-3, height of standing water in well versus gallons of water in well. The corresponding number read from the graph equals the volume of fluid standing in the well.

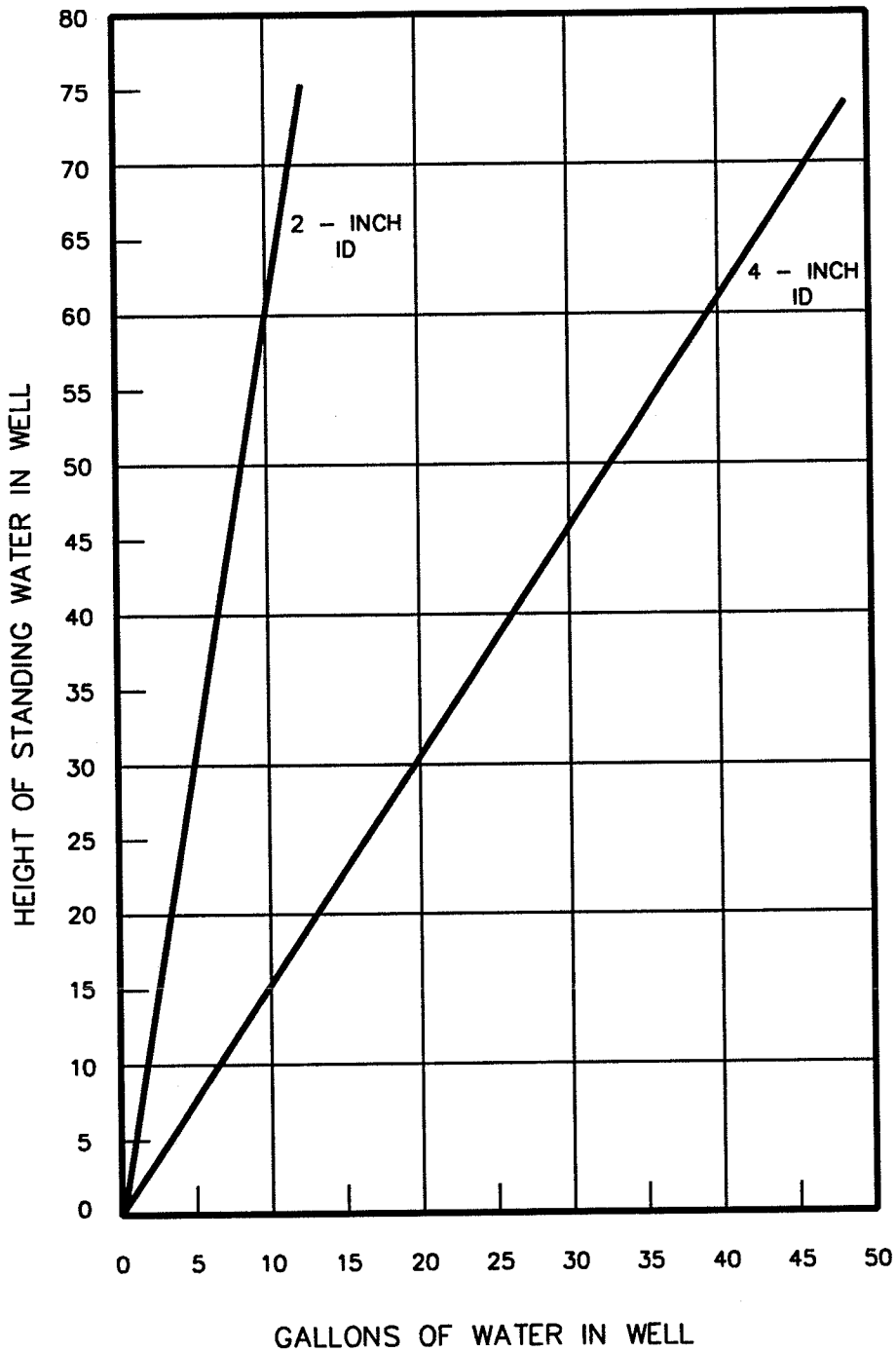
3) Lay a plastic sheet on the ground near the well to be sampled. Use this plastic sheet to help keep purging and sampling equipment from coming in contact with the ground surface.

4) Be sure not to let the polypropylene rope come in contact with the ground surface while raising and lowering the bailer.

5) Remove at least 3 well volumes from each well.

6) Containerize purged water in 55-gallon drums. Disposal will be determined by results of chemical analysis of water samples.

7) Measure pH and specific conductance after each well volume removed. Record values in logbook and field data sheet.



ENSR™

ENSR CONSULTING AND ENGINEERING

FIGURE 4-3
WELL VOLUME PER
STANDING WATER HEIGHT
FMC CORPORATION
PASADENA, TEXAS

DRAWN BY: S.SAWYERS	DATE: 12-19-89	PROJECT NUMBER: 2810-014
CHK'D.BY:	REVISED:	

CE281002

8) Record number of well volumes removed.

9) Prepare to sample well.

4.3.4.4 Sample Collection

Water samples are to be collected according to the following procedures.

1) Put on PVC or Playtex[R] gloves.

2) Samples will be collected in the order of the volatization sensitivity of the analytical parameters.

3) All samples will be collected with a Teflon[R] bailer.

4) Use dedicated polypropylene rope to lower and raise bailer.

5) While raising and lowering the bailer, be sure not to let the rope come into contact with the ground surface.

6) Empty water from the bailer slowly into the appropriate sample container.

7) Add appropriate preservatives.

8) Label the sample container.

9) Place sample container in ice chest.

10) Collect samples for pH and specific conductance measurements. After field measurements have been performed, the water samples can be discarded.

11) Secure the PVC well cap and steel protective casing cover.

12) Decontaminate all non-dedicated well evacuation and sampling equipment.

13) Record sampling information in field logbook and field data sheet.

4.3.5 Decontamination Procedures

Decontamination procedures for monitor well installation and sampling will be performed in accordance with the procedures described in Section 4.1.6.

4.4 Phase II Soil Characterization

Section 3.2.1 describes the criteria for, and scope of, the Phase II soil characterization. Should Phase II be required, the soil boring installation and soil sample collection procedures will be performed in accordance with the procedures set forth in Section 4.1.

5.0 FIELD RECORDS AND DOCUMENTATION

5.1 Field Log Book

Sampling notes will be recorded in a hard cover, bound, field log book with numbered pages. Each page will be signed and dated by the sampler(s).

The log book will contain the following information for each soil boring location:

- A sketch of the waste management unit under investigation.
- Soil boring monitor well location and number; measured distances from waste management unit to soil boring location.
- Date, time of day, weather conditions, and sampler(s) name(s).
- Procedures and equipment used in installing soil boring/ monitor well and collecting soil/groundwater samples.
- Soil type descriptions and field screening observations.
- Types of sample containers and sample identification.
- Parameters requested for analysis.
- Decontamination procedure.
- Amount of grouting material used to seal the boring or monitor well.

- A description of how the soil boring or monitor well was marked for identification (i.e., stakes, etc.).

5.2 Monitor Well Development and Sampling Records

In addition to field log book entries, field personnel will record pertinent sampling information on standardized field forms. Figures 5-1 and 5-2 are the development and sampling forms which will be used.

5.3 Sample Labels

All sample bottles will be identified with labels containing the following information:

- Site location.
- Sample location (soil boring number).
- Sample number.
- Date and time of sample collection.
- Sample method (grab or composite).
- Parameters for analysis.
- Preservatives.
- Samplers signature.

Figure 5-3 is a typical sample label.

5.4 Chain-of-Custody Forms and Chain-of-Custody Tape

A chain-of-custody form (Figure 5-4) will accompany all samples and include the following information:

- Site location.
- Sample numbers.

FIGURE 5-1

MONITOR WELL DEVELOPEMENT RECORD

Client: _____ Job # : _____

Location: _____ Date : _____

Well # : _____ Depth to water : _____

Well Diameter : _____ Total Depth : _____

gallons/feet : _____ Well Volume : _____

Volume #	PH	Cond.	Temp.	Color	Remarks

ENSR™

FIGURE 5-2

ENSR

Well No. _____

GROUND WATER SAMPLE COLLECTION RECORD

Job No. _____ Date: _____

Location: _____ Time: S _____

Weather Conds.: _____ F _____

1. WATER LEVEL DATA: (from ToC) ToC Elevation (from LS) _____

   a. Total Well Length (+ TC) _____ (known, meas.) Tape Corr. (TC) _____

   b. Water Table Elev. (+ TC) _____ Well Dia. _____

   c. Length of Water Column _____ (a-b)

2. WELL PURGING DATA:

   a. Purge Method _____

   b. Required Purge Volume (@ ____ well volumes) _____

   c. Field Testing: Equipment Used _____

Volume Removed	T°	PH	Spec. Cond.	Color

3. Sample Collection: Method _____

Container Type	Preservation	Analysis Req.

Comments: _____

FIGURE 5-3

ENSR CONSULTING AND ENGINEERING LABORATORIES ©

PROJECT NO.		PROJECT NAME			
LOCATION					
DATE	TIME	GRAB		COMPOSITE	
PRESERVATIVE		DEPTH			
LAB NO.		FIELD ID NO.			
ANALYSES REQUESTED/COMMENTS					
SAMPLER SIGNATURE					

FIGURE 5-4

Page _____ of _____

ENSR LABORATORIES ©

CONSULTING AND ENGINEERING

2925 RICHMOND AVENUE HOUSTON, TX 77098 (713) 520-1495

Analysis Request and Chain of Custody Record

Project no.	Client/Project Name	Project Location

Lab ID No	Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preser-vative	ANALYSIS REQUESTED	LABORATORY REMARKS

Samplers: *(Signature)*	Relinquished by: *(Signature)*	Date: Time:	Received by: *(Signature)*	Date: Time:	COC Seal No.
	Relinquished by: *(Signature)*	Date: Time:	Received by: *(Signature)*	Date: Time:	
Affiliation	Relinquished by: *(Signature)*	Date: Time:	Received by Laboratory: *(Signature)*	Date: Time:	Intact:

REMARKS:	Data Results To: 1. 2.	Laboratory No.

- Date and time of sample collection.
- Sample method (grab or composite).
- Sample container size and material.
- Sample type (soil, water, sludge, etc.).
- Preservatives.
- Sampler(s) signature.
- Chain-of-possession signatures, dates, and times will be recorded for all persons receiving and relinquishing samples.

6.0 EVALUATION OF RESULTS

6.1 Statistical Evaluation of RFI Units 1 and 2 Soil Samples (Phase I)

Statistical comparisons between background data and waste management unit data will be used as the basis to determine if a significant release of hazardous constituents has occurred. These comparisons will be performed on both soil and, if Phase II is required, groundwater data.

The specific statistical methods that will be used will depend on the analytical results of the investigation. These methods will be chosen consistent with the guidelines presented in: "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance, February 1989. In general, the criteria for test method selection will be as follows:

Percentage of Non-Detects within Each Data Set	Statistical Test Method
≥50%	Test of Proportions
≥15% and <50%	Kruskall-Wallis
<15% and data not normally distributed	Kruskall-Wallis
<15% and data normally distributed	Parametric One-Way ANOVA

One data set corresponds to all analytical results of a particular indicator parameter. Each test method will compare background data to waste management unit data at the 95% confidence level to determine if a significant release has occurred. The

criteria that will be used to determine whether or not a significant release has occurred will be as follows:

- If the calculated test statistic or, in the case of the test of proportions, the absolute value of the calculated test statistic exceeds the appropriate tabulated test statistic at the 95% confidence level, then it will be determined that contamination exists and a significant release has occurred.

- If the calculated test statistics or, in the case of the test of proportions, the absolute value of the calculated test statistic is less than the appropriate tabulated test statistic at the 95% confidence level, then it will be determined that contamination does not exist and a significant release has not occurred.

The criteria used in selecting a statistical approach will be presented along with the actual statistical comparisons in the final RFI Report and, if Phase II is required, the interim RFI Report.

6.2 RFI Units 3 through 8 Sampling Results (Phase I)

Waste characterization samples collected from RFI Units 3 through 8 will be analyzed for Appendix VIII constituents. If any sample, collected from any particular unit, contains Appendix VIII constituents, then it will be determined that particular unit contains listed hazardous constituents as defined by 40 CFR 261. These results will be presented in tabular form in the RFI Report.

6.3 Statistical Evaluation of Groundwater Samples (Phase II)

If Phase II is required, groundwater samples from background and waste management unit locations will be collected. These

groundwater samples will be statistically compared in accordance with the procedures described in Section 6.1. to determine whether or not groundwater contamination has occurred.

6.4 Statistical Evaluation of Soil Samples (Phase II)

If Phase II is required, additional soil samples will be collected to determine the horizontal and vertical extent of soil contamination. These determinations will be made in accordance with the statistical evaluation procedures described in Section 6.1.

7.0 QUALITY ASSURANCE/QUALITY CONTROL

The overall objectives of the RFI, which are defined (and ultimately approved) in this plan, will be achieved through adherence to written procedures; the use of skilled qualified personnel; and through informal review and regular audits. Specific measures and controls are implemented, however, that ensure all field and laboratory activities undertaken to accomplish the objectives of the RFI result in uncompromised, valid data sets from which correct conclusions and decisions can be made. The specific measures taken to ensure this is achieved involve special field and laboratory protocols. These measures check sample collection procedures, sample shipment and handling, and laboratory analytical protocols to ensure that all results are indeed valid and significant variances can be easily recognized and explained.

Valid data sets will be assured through the submittal of quality assurance/quality control samples. QA/QC samples are intended to provide control over the collection of environmental measurements and subsequent review, interpretation, and validation of generated analytical data. Two general types of QA/QC samples will be evaluated during the RFI: Field QA/QC samples and laboratory QA/QC samples.

7.1 Field QA/QC

Field QA/QC samples will consist of the following:

- Trip Blanks
- Field Blanks
- Duplicates

Trip Blanks: The primary purpose of the trip blank is to assess the effect of cleaning procedures, storage, and transport on the actual collected samples. The trip blank will be prepared by the analytical laboratory and will consist of deionized water. The

trip blanks will remain sealed in the sample shuttle throughout the sampling event and will be returned to the laboratory with the actual collected samples. The trip blanks will be handled, transported, and analyzed in the same manner as the samples collected on that particular day. Trip blanks will be labeled as trip blanks and will accompany the samples at a rate of one set of trip blanks for each sample shipment. Trip blanks will be prepared for the same organic analysis as those required for the actual samples. Inorganic trip blanks will not be required.

Field Blanks: Field blank samples will be collected to assess the effect of sample collection and decontamination procedures. One set of field blanks will be collected at the end of each day of sampling. The procedures to be used are as follows:

1) Set up to collect field blank in the same area from which the actual samples were collected that day.

2) Put on PVC, Playtex[R], or neoprene gloves.

3) Hold decontaminated sampling device over sample container.

4) Pour deionized water over the sampling device, allowing the rinse water to accumulate in the sample container.

5) Label the sample bottles as field blanks and fill out chain-of-custody form.

6) Prepare one set of field blanks for the same analysis as samples that were collected that particular day.

7) Store and transport the field blank samples in the same manner as the actual samples..

Duplicates: A duplicate sample will be collected at the rate of one per sampling event or one per every 20 samples collected during a single sampling event, whichever is greater. However, duplicates will not be collected for the waste characterization samples.

The purpose of the duplicate sample is to provide a comparison of analytical results obtained from the laboratory. The procedures to be used for collecting the duplicates are as follows:

- Collect the duplicate samples, simultaneously with the actual sample using the same sample collection and preparation techniques as described above.

- Do not identify the duplicate sample as a duplicate. Identify the duplicate sample container, such that only the sampler(s) knows the true identity of the sample. Record this information in field log book.

- Request the same set of laboratory analyses as the actual sample.

The field instruments that will be used during the Phase I investigation will be a portable PID and/or a portable OVA. These instruments will be calibrated at the beginning of each work day and then immediately prior to advancing each soil boring. Isobutylene gas of known concentration (between 5 to 10 ppm) will be used to calibrate these instruments.

The field instruments that will be used during the Phase II investigation will be a portable PID and/or OVA, a pH meter, and a specific conductance meter. The PID and OVA will be calibrated, as described above. The pH meter will be calibrated to standard solutions of pH 7 and pH 10. The specific conductance meter will be calibrated to a standard which is of the same magnitude of the

specific conductance of the groundwater in the area. The pH and specific conductance meter will be calibrated immediately prior to collection of each groundwater sample.

A record will be kept in the field log book of when the instruments are calibrated, type and concentration of calibration gas and solution, and instrument response.

7.2 Laboratory QA/QC

Laboratory quality control measures include the use of internally generated spike samples, and other instrument or calibration checks. These are as follows:

- Check Standards
- Spiked Samples
- Duplicates
- Method Blanks

Check Standards - Check standards, at concentrations representing the midpoint of the calibration curve, will be analyzed at a frequency of once every 10 to 15 samples. Results will be used to verify the standard calibration curve used. Check standard recoveries will be compared to the control limits which are maintained and periodically updated by the laboratory; they will be rerun whenever they exceed those limits. If the recovery of the rerun exceeds the control limits, the analytical instruments will be recalibrated.

Spiked Samples - One out of every 10 samples will be spiked with a known quantity of standard. For these spikes, two aliquots of a sample will be taken; one will be spiked and both will be extracted and analyzed. Results will be used to detect sample matrix interferences. If no standard is readily available, the samples will be compared at least weekly with a reference standard which may be purchased commercially. Analytical results must be within the performance specifications provided by the supplier. If

the standard analysis does not fall within these specifications, then all analytical data for this set of samples shall be considered out-of-control. If all other quality control data are met, based on the data quality objectives defined in this plan, the laboratory shall make a determination of whether or not the analytical results are useful and should be reported. If it is determined that the results are unacceptable, the sample batch shall be repeated. If the repeat analysis is within specification, then all samples within the batch shall be considered in control.

Duplicates - One duplicate analysis will be performed for every 10 samples. Precision between duplicates will be <20%. If the precision is greater than 20%, the sample will be reanalyzed (if sufficient quantity remains).

Method Blanks - One blank will be analyzed for every 10 samples. If contaminants are found in the method blank, the sample will be reanalyzed, and efforts must be made to eliminate the source of the other contaminants.

8.0 RFI REPORT

A final RFI report will be prepared for submittal to the TWC and EPA Region 6 at the completion of the RFI field investigation. At a minimum, this report will include:

- A plan view map showing boring and groundwater monitor well locations.
- A narrative discussion of the drilling, sampling, and decontamination procedures that were used.
- A narrative discussion of the soil type characteristics with accompanying soil boring lithologic logs.
- If Phase II is required, a narrative discussion of well design, construction, and installation procedures.
- Field screening observatives and procedures.
- If Phase II is required, contours of the groundwater surface based on measurements of piezometers and monitor wells, and direction of groundwater movement.
- Geologic cross sections depicting the near surface stratigraphy.
- Laboratory analytical data summarized in tabular form, as well as the actual laboratory report with all quality assurance quality control data.
- Narrative discussion of the statistical methods used for comparisons, including work sheets and results.

- Copies of all field notes.

- Conclusions.

If the Phase II investigation is not required, the final RFI report will be submitted within 60 days of receipt of all laboratory analytical results from the Phase I investigation. If the Phase II investigation is required, the final RFI report will be submitted within 60 days of receipt of all groundwater sampling analytical and QA/QC results.

In addition, if Phase II is required, an Interim RFI report will be submitted following completion of Phase I. This interim RFI report will be submitted to the TWC and EPA Region 6 within 60 days following receipt of all laboratory analytical and QA/QC results from Phase I. This report will include the same elements as described above for the final RFI report, plus the following:

- Proposed locations for additional soil borings and groundwater monitor wells, and;

- Proposed indicator parameter for the Phase II investigation.

9.0 RFI IMPLEMENTATION SCHEDULE

Figure 9-1 depicts the general time schedule for conducting the RCRA Facility Investigation. Phase I will be initiated within 30 days of receipt of TWC and EPA approval of this Work Plan. If the results of the Phase I investigation indicate that soil contamination, resulting from a significant release of hazardous waste constituents from RFI Units 1 and 2 has occurred, then the Phase II investigation will be proposed in the RFI Interim Report.

As stated above, the Phase II investigation will consist of installing additional soil borings and installing a minimum of four groundwater monitor wells. Following completion of the soil borings and monitor wells, groundwater samples will be collected from the newly installed monitor wells at a frequency of once every two months in accordance with Provision VIII.A.2.b.4 of the Permit. A total of three sets of groundwater samples will be collected. The first set will be collected within 30 days following development of all groundwater monitor wells.

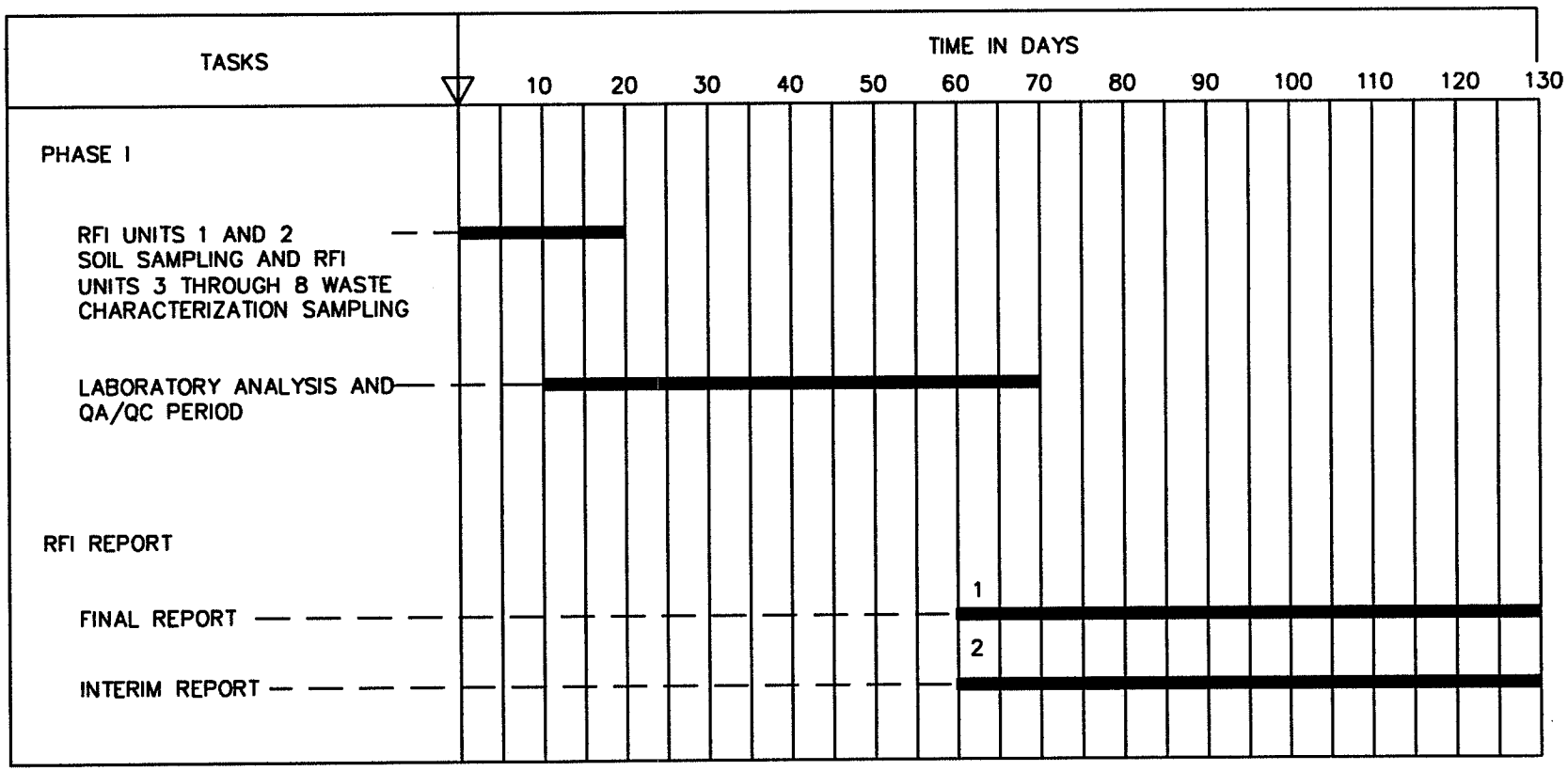
A final RFI Report will be prepared following completion of all RFI field investigation activities. Three copies of the RFI Report will be submitted to the Executive Director of the TWC and one copy to the Director, Hazardous Waste Management Division, EPA Region 6, within 60 days of receipt of all analytical results obtained from the RFI.

If Phase II is required, an interim RFI Report will be submitted following completion of Phase I, as described in Section 8.0.

FMC will notify the TWC Southeast Region Office in Deer Park, Texas and EPA Region 6 Permits Branch at least 10 days prior to any sampling activity in order to afford agency personnel the opportunity to observe sampling procedures and split samples.

CE281001 12/29/89 S.JACKSON

FIGURE 9-1
TIME SCHEDULE
RCRA FACILITY INVESTIGATION
FMC CORPORATION
PEROXYGEN CHEMICALS DIVISION
PASADENA, TEXAS



▽ TIMELINE BEGINS WITHIN 30 DAYS OF RECEIPT OF TWC AND EPA APPROVAL OF THE RFI WORKPLAN

1 IF PHASE II NOT REQUIRED

2 IF PHASE II REQUIRED

APPENDIX A

HEALTH AND SAFETY PLAN

Final 1/24/90

SITE/TASK

SAFETY PLAN

for the

FMC Corporation Peroxygen Chemical Division Facility

in

Pasadena, Texas

Project Number: 2810-014

Division Number: 42

Prepared By: Charles C. Clarke

Date: 12/18/89

Approved
By:_____
Project Manager

Date:

_____

_____
Regional Health and
Safety Manager

Date:

_____

HEALTH AND SAFETY PLAN (HASP)
SIGNOFF SHEET
FOR THE

FMC Corporation Peroxygen Division Facility

Pasadena, Texas

2810-014

I have received a copy of the Health and Safety Plan prepared for the above-referenced site, I have read and understand its content, and I agree that I will abide by its requirements.

_____
Name

_____
Signature

_____
Company

_____
Date

NOTE: Each employee and subcontractor is to receive a copy of this plan, read and understand the plan, and sign a copy of this page.

1.0 BACKGROUND

The FMC Corporation Peroxygen Chemical Division Facility in Pasadena, Texas was issued a waste permit in August, 1989. The State identified eight units requiring work as part of the RFI. Six units require waste characterization and two units require soil investigations.

2.0 SCOPE OF WORK

This Health and Safety Plan is designed to:

- collect and analyze waste samples from six units; and
- accomplish a total of six borings (including two background borings) at two units;

Borings will be advanced to the water table, which is estimated to be 15 to 20 feet. If indications that release has occurred are noted, additional borings will be completed to define the extent of contamination, and a minimum of four groundwater monitoring wells will be installed.

3.0 HAZARDS

The chemicals that may be encountered during the performance of this project include:

- acetone,
- acrolein,
- allyl alcohol,
- methanol
- naphthalene, and
- phenol,

Contaminants may be contacted as a component of waste materials, or as a component of contaminated soil or groundwater. Concentrations of contaminants are expected to be low. Exposure to vapors is expected to be minimal. However, the possibility of significant vapors exists during the opening of a tank for sample collection, if this becomes necessary. Skin contact with sampled materials or contaminated soil or water may present a potential hazard, particularly where phenol or acrolein are involved.

The inhalation of dust from contaminated soil may present a possible exposure to contaminants and should be avoided.

Physical hazards that may be encountered include those normally associated with drilling operations, such as pinch points, overhead objects, release of tension, noise, and handling heavy gear. In addition, the difficulties encountered in collecting and handling samples must be considered.

4.0 PROTECTIVE MEASURES

All contractor personnel will adhere to FMC Health and Safety requirements throughout the RFI. A photo-ionization detector will be used periodically during drilling operations to determine the presence of any volatile contaminants. It will also be used when opening a tank for sample collection prior to getting in position to collect a sample. A sustained 10-unit deflection or any indication of irritating vapors will require the use of a respirator.

A full-facepiece respirator must be available equipped with combination HEPA/organic vapor cartridges. The use of the respirator is required as noted above, or whenever visible dust is encountered. Rubber steel-toed boots and neoprene gloves may be required as applicable. Normal work clothing may be worn when contact with contaminated surfaces or soil will not occur. Tyvek[R] coveralls are required when contact with contaminated surfaces or soils is likely to occur.

Hard hats are required when working in an area where overhead activity may take place. Ear protection should be carried and used if high noise situations are encountered.

When sampling from tanks requires opening the tank, the photo-ionization detector should be used to evaluate the emanating gases. Tank entry will be permitted only when properly authorized by FMC. Care must be exercised when working in the vicinity of a drilling rig to stay out of the way of moving equipment.

Hand and face washing is required prior to taking breaks or leaving the area, and a shower is recommended at the end of the day.

5.0 DECONTAMINATION

Soap and water are adequate for personnel decontamination. A shower should be taken at the end of the day.

A solvent may be used, if necessary, for equipment decontamination.

6.0 TRAINING REQUIREMENTS

All contractor employees must complete 40 hours of Hazardous Waste Site Health and Safety Training as required by OSHA.

7.0 MEDICAL MONITORING

All workers on site will have the required OSHA medical monitoring program.

NOTE: This information is to be completed upon arrival in the field. Contact with agencies or facilities is necessary to verify that service will be provided.

EMERGENCY REFERENCE

AMBULANCE: _____

POLICE: _____

FIRE: _____

HOSPITAL: _____

Location: _____

_____

_____

DIRECTIONS TO HOSPITAL: MAP INCLUDED? _____

_____

_____

_____

_____

POISON CONTROL CENTER: _____

NATIONAL RESPONSE CENTER: _____

- AGENCY REPRESENTATIVE: _____ _____
- CLIENT REPRESENTATIVE: _____ _____

NEAREST PHONE: _____

ACETONE
CAS: 67-64-1
$(CH_3)_2CO$ **1987 TLV = 750 ppm**

SYNONYMS: Dimethyl ketone; 2-propanone; pyroacetic ether

PHYSICAL FORM. Liquid (highly flammable)

USES. Solvent; in the production of lubricating oils; in the dyeing and celluloid industries; as an intermediate in the production of chloroform

EXPOSURE. Inhalation

TOXICOLOGY. Acetone is an irritant of the eyes and mucous membranes; at very high concentration, it causes narcosis in animals, and severe exposure is expected to produce the same effect in humans.

Acetone is considered to be of low risk to health, because few adverse effects have been reported despite wide-spread use for many years. One early study, often quoted, reports eye, nose, and throat irritation in volunteers exposed to 500 ppm.

In more recent studies, subjects exposed to 500 ppm were aware of odor but exhibited no effects. Mild eye irritation occurred around 1000 ppm. Higher concentrations produced headache, light-headedness, and nose and throat irritation. Concentrations above 12,000 ppm depress the central nervous system, causing dizziness, weakness, and loss of consciousness. Topical application of 1 ml of acetone for 90 minutes produced reversible skin damage in humans.

Acetone may be recognized by a sweet, pungent odor.

[Information taken from Nick H. Proctor, Ph.D., James P. Hughes, M.D., F.A.C.P., and Michael L. Fischman, M.D., M.P.H., Chemical Hazards of the Workplace, 2nd ed. (Philadelphia: J. B. Lippincott Company, 1988), 49.]

Final 1/24/90

ACROLEIN
CAS: 107-02-8
CH_2==CHCHO **1987 TLV = 0.1 ppm**

SYNONYMS: Acrylaldehyde; propanol; allyl aldehyde; ethylene aldehyde; aqualin

PHYSICAL FORM. Liquid boils at 52.7°C

USES. In manufacture of pharmaceuticals, perfumes, food supplements, and resins; warning agent in methyl chloride refrigerating systems
Exposure. Inhalation

TOXICOLOGY. Acrolein is an intense irritant of the eyes and upper respiratory tract.

Exposure to high concentrations may cause tracheobronchitis and pulmonary edema. The irritation threshold in humans is 0.25 ppm to all mucous membranes within 5 minutes. Fatalities have been reported at levels as low as 10 ppm, and 150 ppm is lethal after 10 minutes. The violent irritant effect usually prevents chronic toxicity in humans. Prolonged or repeated contact produces skin irritation, burns, and sometimes sensitization. Eye splashes cause corneal damage, palpebral edema, blepharoconjunctivitis, and fibrinous or purulent discharge.

Of 57 male rats, 32 died following exposure to 4 ppm for 6 hours/day for up to 62 days. Bronchiolar necrosis and focal pulmonary edema were noted. Sublethal acrolein exposure in mice at 3 and 6 ppm suppressed pulmonary antibacterial defense mechanisms.

Intra-amniotic administration of acrolein in rats induced a significant number of fetal malformations, whereas intravenous administration was embryolethal.

The carcinogenic potential of acrolein has not been adequately determined, but one of its potential metabolites, glycidaldehyde, is considered to be carcinogenic.

[Information taken from Nick H. Proctor, Ph.D., James P. Hughes, M.D., F.A.C.P., and Michael L. Fischman, M.D., M.P.H., Chemical Hazards of the Workplace, 2nd ed. (Philadelphia: J. B. Lippincott Company, 1988), 54-5.]

Final 1/24/90

ALLYL ALCOHOL
CAS: 107-18-6
CH_2==$CHCH_2OH$ **1987 TLV = 2 ppm; skin**

SYNONYMS: 2-Propen-1-ol; 1-propenol-3; vinyl carbinol

PHYSICAL FORM. Colorless liquid

USES. In manufacture of allyl compounds, resins, plasticizers; fungicide and herbicide

EXPOSURE. Inhalation; skin absorption

TOXICOLOGY. Allyl alcohol is a potent lacrimator and is an irritant of the mucous membranes and skin.

In humans, severe aye irritation occurs at 25 ppm, and irritation of the nose is moderate at 12.5 ppm. In workers exposed to a "moderate" vapor level, there was a syndrome of lacrimation, retrobulbar pain, photophobia, and blurring of vision. The symptoms persisted for up to 48 hours. Skin contact with the liquid has a delayed effect, causing aching, which begins several hours after contact, followed by the formation of vesicles. Splashes of the liquid in human eyes have caused moderately severe reactions.

In rats, the 1-, 4-, and 8-hour LC_{50}s are 1060, 165, and 76 ppm, respectively. Signs of toxicity included apathy, excitability, tremors, convulsions, diarrhea, coma, pulmonary and visceral congestion, and varying degrees of liver injury. Repeated 7 hour/day exposure at 60 ppm caused gasping during the first few exposures, persistent eye irritation, and death of 1 of 10 rats. In several species of animals exposed to 7 ppm for 7 hours/day for 6 months, observed effects were minimal, but, at autopsy, findings were focal necrosis of the liver and necrosis of the convoluted tubules of the kidneys.

The warning properties are thought to be adequate to prevent voluntary exposure to acutely dangerous concentrations but inadequate for chronic exposure.

[Information taken from Nick H. Proctor, Ph.D., James P. Hughes, M.D., F.A.C.P., and Michael L. Fischman, M.D., M.P.H., Chemical Hazards of the Workplace, 2nd ed. (Philadelphia: J. B. Lippincott Company, 1988), 62.]

Final 1/24/90

NAPHTHALENE
CAS: 91-20-3
$C_{10}H_8$ **1987 TLV = 10 ppm**

SYNONYMS: Napthalin; tar camphor; white tar

PHYSICAL FORM. White crystalline solid with a characteristic "moth ball" odor

USES. Moth repellant; chemical and dye manufacturing

EXPOSURE. Inhalation; ingestion

TOXICOLOGY. Naphthalene is a hemolytic agent and an irritant of the eyes; it may cause cataracts.

Severe intoxication from ingestion results in characteristic manifestations of marked intravascular hemolysis and its consequences, including potentially fatal hyperkalemia. Initial symptoms include eye irritation, headache, confusion, excitement, malaise, profuse sweating, nausea, vomiting, abdominal pain, and irritation of the bladder; there may be progression to jaundice, hematuria, hemoglobinuria, renal tubular blockade, and acute renal shutdown. Hematologic features include red cell fragmentation, icterus, severe anemia with nucleated red cells, leukocytosis, and dramatic decreases in hemoglobin, hematocrit, and red cell count; sometimes there is formation of Heinz bodies and methemoglobin. Naphthalene itself is nonhemolytic; several metabolites, including α-naphthol, are hemolytic. Persons with a hereditary deficiency of the enzyme, glucose-6-phosphate dehydrogenase, in red blood cells (and consequently decreased concentrations of reduced glutathione) are particularly susceptible to the hemolytic properties of naphthalene.

The vapor causes eye irritation at 15 ppm; eye contact with the solid may result in conjunctivitis, superficial injury to the cornea, chorioretinitis, scotoma, and diminished visual acuity. Cataracts and ocular irritation have been produced experimentally in animals and have been described in humans. Of 21 workers exposed to high concentrations of fume or vapor for 5 years, eight had peripheral lens opacities. In other studies, no abnormalities of the eyes have been detected in workers exposed to naphthalene for several years.

Reportedly, headache, nausea, and confusion may occur after inhalation of vapor. Occupational poisoning from vapor exposure is rare. Naphthalene on the skin may cause hypersensitivity dermatitis; chronic dermatitis is rare.

[Information taken from Nick H. Proctor, Ph.D., James P. Hughes, M.D., F.A.C.P., and Michael L. Fischman, M.D., M.P.H., Chemical Hazards of the Workplace, 2nd ed. (Philadelphia: J. B. Lippincott Company, 1988), 357-58.]

METHYL ALCOHOL
CAS: 67-56-1
CH_3OH **1987 TLV = 200 ppm: skin**

Synonyms: Methanol; wood spirit; carbinol; wood alcohol; wood naphtha; methylol; Columbian spirit; colonial spirit

PHYSICAL FORM. Colorless liquid

USES. Production of formaldehyde; paints, varnishes, cements, inks, and dyes

EXPOSURE. Inhalation; skin absorption

TOXICOLOGY. Methyl alcohol causes optic neuropathy, metabolic acidosis, and respiratory depression.

Although methyl alcohol poisoning has occurred primarily from the ingestion of adulterated alcoholic beverages, symptoms can also occur from inhalation or absorption through the skin. Impairment of vision and death from absorption by the latter routes have been reported in the older literature. Typically, within 18 to 48 hours after ingestion, patients develop nausea, abdominal pain, headache, and abnormally slow deep breathing. This is accompanied by visual symptoms ranging from blurred or double vision and changes in color perception to constricted visual fields and complete blindness. The most severely poisoned patients become comatose and may die; those who recover from coma may be found blind. One of the most striking features of methyl alcohol poisoning is acidosis; the degree of acidosis has been found to closely parallel the severity of poisoning. Accumulated evidence suggest that chronic exposure to 1200 to 8300 ppm can lead to impaired vision. Exposure to vapor concentrations ranging from 365 to 3080 ppm resulted in blurred vision, headache, dizziness, and nausea.

The liquid in the eyes has caused superficial lesions of the cornea that were of a nonserious nature. Prolonged or repeated skin contact will cause dermatitis, erythema, and scaling.

The presence of an asymptomatic latent period following ingestion suggests that methyl alcohol needs to be metabolized before toxicity is fully manifest. This concept also explains the discrepancy between plasma concentrations of methyl alcohol and clinical signs of toxicity. Furthermore, methyl alcohol poisoning is ameliorated by ethanol, a substance with greater affinity than methyl alcohol for alcohol dehydrogenase, which is responsible for the initial step in metabolism. The metabolite formate appears to be the mediator of ocular injury and acidosis. The individual

variations in activity of the alcohol dehydrogenase systems, which are responsible for the oxidative metabolism of methyl (and ethyl) alcohol, may account for the wide variation in the individual responses observed with methyl alcohol poisoning.

DIAGNOSIS. Signs and symptoms include headache; blurred vision, constricted visual fields; shortness of breath; dizziness and vertigo.

DIFFERENTIAL DIAGNOSIS: The combination of visual disturbances and metabolic acidosis together with a history of exposure and the presence of formic acid in the urine is confirmation of methyl alcohol intoxication.

SPECIAL TESTS: Assay of formic acid in the urine and measurement of blood pH and plasma bicarbonate should be done.

TREATMENT. Treatment includes (1) emesis or gastric lavage, rehydration, correction of acidosis, and folate to enhance formate oxidation; (2) intravenous ethanol when plasma methanol concentrations are higher than 20 mg/dl, when ingested doses are greater than 30 ml, or when there is evidence of acidosis or visual abnormalities; and (3) hemodialysis when plasma methanol concentrations are greater than 50 mg/dl or when metabolic acidosis is unresponsive to bicarbonate given intravenously. Serum formate concentration may be a more direct indicator of toxicity; levels exceeding 20 mg/dl may be expected to produce acidosis or ocular injury.

[Information taken from Nick H. Proctor, Ph.D., James P. Hughes, M.D., F.A.C.P., and Michael L. Fischman, M.D., M.P.H., Chemical Hazards of the Workplace, 2nd ed. (Philadelphia: J. B. Lippincott Company, 1988), 320-21.]

Final 1/24/90

PHENOL
CAS: 108-95-2
C_6H_5OH **1987 TLV = 5 ppm; skin**

SYNONYMS: Carbolic acid; phenic acid; phenylic acid; phenyl hydroxide; hydroxybenzene; oxybenzene

PHYSICAL FORM. Colorless crystals or white, crystalline mass

USES. Disinfectant; reagent in chemical analysis; manufacture of aromatic compounds

EXPOSURE. Skin absorption; inhalation; ingestion

TOXICOLOGY. Phenol is an irritant of the eyes, mucous membranes, and skin; systemic absorption causes convulsions as well as liver and kidney damage.

Phenol does not frequently constitute a serious respiratory hazard in industry, due in large part to its low volatility. The skin is a primary route of entry for the vapor, liquid, and solid. The vapor readily penetrates the skin with an absorption efficiency equal to that for inhalation. Skin absorption can occur at low vapor concentrations, apparently without discomfort. Signs and symptoms can develop rapidly with serious consequences, including shock, collapse, coma, convulsions, cyanosis, and death

A laboratory technician repeatedly exposed to the vapor (unknown concentration) and to liquid spilled on the skin developed anorexia, weight loss, weakness, muscle pain, and dark urine. During several months of non-exposure, there was gradual improvement in his condition, but, after brief re-exposure, he suffered an immediate worsening of symptoms, with prompt darkening of the urine and tender enlargement of the liver.

Brief intermittent industrial exposures to vapor concentrations of 48 ppm of phenol (accompanied by 8 ppm of formaldehyde) caused marked irritation of eyes, nose, and throat. Workers at the same plant who were continuously exposed to an average concentration of 4 ppm experienced no respiratory irritation.

Ingestion of lethal amounts (as little as 10 g) causes severe burns of the mouth and throat, marked abdominal pain, cyanosis, muscular weakness, collapse, coma, and death. Tremor, convulsions, and muscle twitching have also occurred.

Concentrated phenol solutions are severely irritating to the human eye and cause conjunctival swelling; the cornea becomes white and hypesthetic. Loss of vision has occurred in some cases.

In addition to systemic effects, contact with the solid or liquid can produce chemical burns. Erythema, edema, tissue necrosis, and gangrene have been reported, and prolonged contact with dilute solutions may result in deposition of dark pigment in the skin (ochronosis).

Rats and mice given doses of up to 120 mg/kg and 280 mg/kg, respectively, by gavage on days 6 to 15 of gestation showed dose-related signs of fetotoxicity with no evidence of teratogenic effects. A Russian study demonstrated increased preimplantation loss and early postnatal death in the offspring of rats exposed to 0.13 and 1.3 ppm throughout pregnancy.

Phenol was not considered carcinogenic to rats or mice receiving 2,500 or 5,000 ppm in drinking water for 103 weeks, although an increased incidence of leukemia and lymphomas was detected in the low-dose male rats.

Mice were treated twice weekly for 42 weeks by application of one drop of a 10% solution of phenol in benzene to the shaved dorsal skin; after 52 weeks, there were papillomas in 5 of 14 mice, and a single fibrosarcoma appeared at 72 weeks. Phenol as a nonspecific irritant may promote development of tumors when applied in large amounts repeatedly to the skin.

In bakelite factory workers, the urinary level of total phenol, free plus conjugated, was proportional to the air concentration of phenol up to 12.5 mg/m^3 of workroom air.

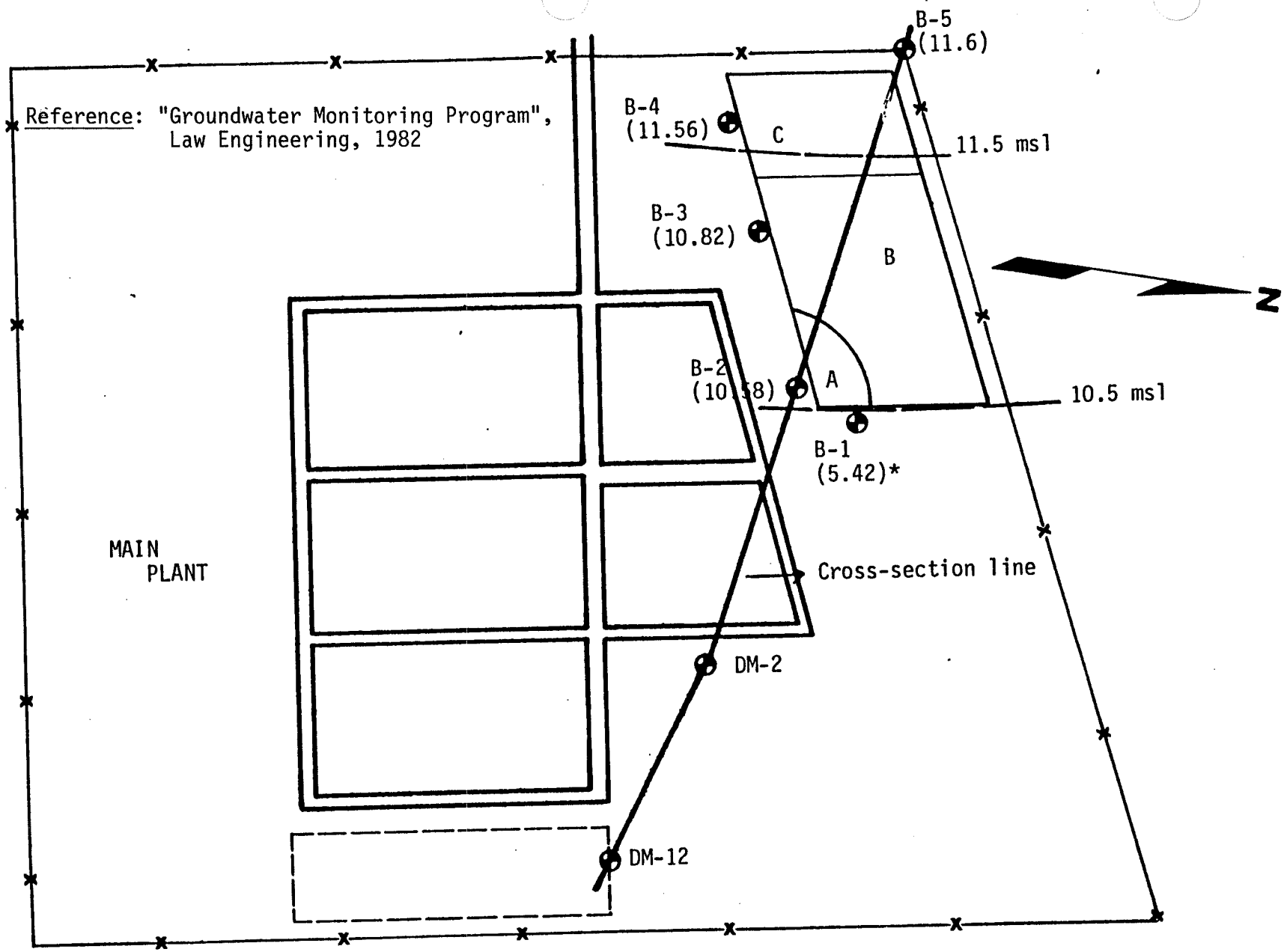
Although phenol is a major metabolite of the leukemogen benzene, it does not exhibit any potential for myeloclastogenicity in animal tests.

Phenol is detectable by odor at a threshold of 0.05 ppm.

[Information taken from Nick H. Proctor, Ph.D., James P. Hughes, M.D., F.A.C.P., and Michael L. Fischman, M.D., M.P.H., Chemical Hazards of the Workplace, 2nd ed. (Philadelphia: J. B. Lippincott Company, 1988), 403-404.]

APPENDIX B

EXISTING SOIL AND GROUNDWATER DATA



Legend

B = Law Engineering Borings
DM = Dames and Moore Borings

Figure 1.1-1

Boring Location Plan
FMC-Speciality Chemicals
Bayport Plant
Pasadena, Texas
HT-770-81G

--- Estimated Ground-water Contour
(11.6) Measured Ground-water Elevation
(5.42) Measured Ground-water Elevation in Lower Aquifer

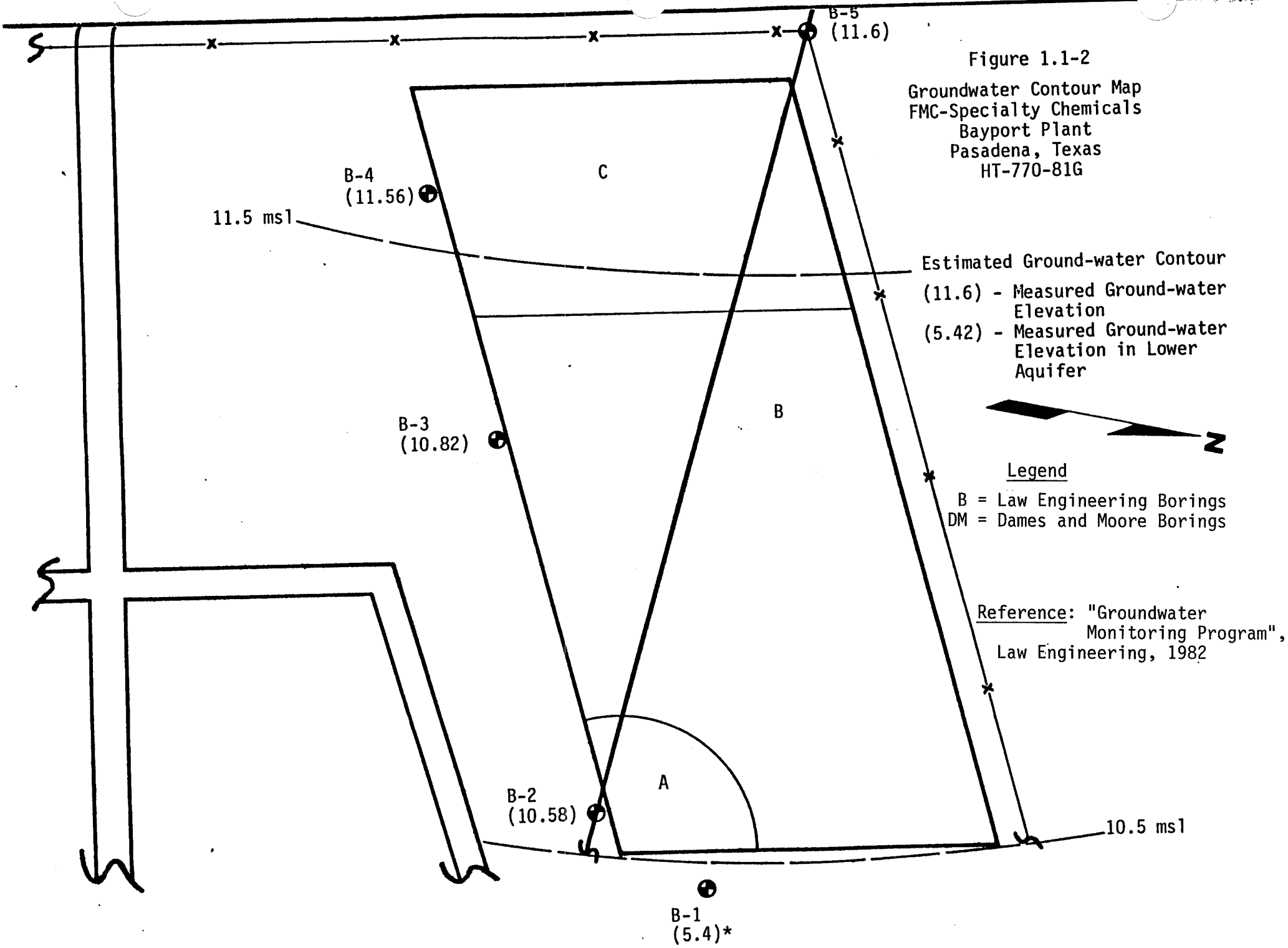


Figure 1.1-2

Groundwater Contour Map
FMC-Specialty Chemicals
Bayport Plant
Pasadena, Texas
HT-770-81G

TEST BORING RECORD

⊗ COHESION - 100 psf
● PENETRATION-BLOWS PER FOOT

ELEV.	DEPTH FEET	DESCRIPTION	s	dd	pf	mc	0 5 10 15 20 30 40 60 80 100
16.3		Very Stiff Dark Gray CLAY with ferric oxide stains.					
11.3							
6.3							
	11.0	Stiff Orange Very Fine Sandy SILT with sand lenses.					
1.3							
-3.7							
	21.0	Dense Tan Very Fine Silty SAND with clay and silt lenses.					
-8.7							
	26.0	Firm Reddish Brown Sandy Clayey SILT with clay lenses.					
-13.7							
	32.0	Very Stiff Reddish-Brown Silty CLAY.					
-18.7							
-23.7	40.0						

REMARKS:
Water elevation
5.89 feet msl

DRILLED BY VSCS
LOGGED BY MGB
CHECKED BY SEO

BORING NUMBER B-1
DATE STARTED 9/1/81
DATE COMPLETED 9/2/81
JOB NUMBER HT-770

LAW ENGINEERING
HOUSTON, TEXAS

TEST BORING RECORD

⊗ COHESION - 100 psf
● PENETRATION-BLOWS PER FOOT

ELEV.	DEPTH FEET	DESCRIPTION
		Very Stiff Reddish-Brown CLAY.
-28.7		
-33.7		
	52.0	Very Stiff Blue-Gray Sandy Silty CLAY.
-38.7		
	56.0	Blueish-Gray Sandy Clayey SILT.
	58.5	Very Dense Medium Gray Silty Fine SAND.
-43.7		
	62.0	Very Dense Medium Gray SAND.
-48.7		
-53.7		
-58.7		
	76.0	Very Dense Fine to Medium Silty SAND.
-63.7		

s dd pf mc 0 5 10 15 20 30 40 60 80 10

REMARKS:

DRILLED BY VSCS
LOGGED BY MGB
CHECKED BY SEO

BORING NUMBER B-1
DATE STARTED 9/1/81
DATE COMPLETED 9/2/81
JOB NUMBER HT-770

LAW ENGINEERING
HOUSTON, TEXAS

FIGURE 1.1.2

TEST BORING RECORD

⊗ COHESION - 100 psf
● PENETRATION-BLOWS PER FOOT

ELEV.	DEPTH FEET	DESCRIPTION	s	dd	pf	mc	0 5 10 15 20 30 40 60 80 100
		Very Dense Fine to Medium Silty SAND.					
	82.0	Very Dense Medium Gray Fine Silty SAND.					●
-68.7							
	86.0	Hard Blue-Gray and Reddish-Brown Silty CLAY with Slickensides and calcareous nodules.					⊗
-73.7	90.0						
		Boring terminated at 90 feet.					

REMARKS:

DRILLED BY VSCS
LOGGED BY MGB
CHECKED BY SEO

BORING NUMBER B-1
DATE STARTED 9/1/81
DATE COMPLETED 9/2/81
JOB NUMBER HT-770

LAW ENGINEERING
HOUSTON, TEXAS

FIGURE 1.1-2

TEST BORING RECORD

ELEV.	DEPTH FEET	DESCRIPTION
15.6		Stiff Dark Gray CLAY with slickensides.
10.6	8.0	Stiff Medium Gray to Tan Clayey Sandy SILT.
5.6	11.0	Very Stiff Reddish-Brown CLAY with silt lenses and slickensides.
0.6		
-4.4	22.5	Stiff Reddish-Brown Clayey Sandy SILT with clay lenses and ferric oxide stains.
-9.4		
-14.4	32.0	Very Stiff Reddish-Brown CLAY with sand and silt lenses and slickensides.
-19.4	35.0	Boring terminated at 35.0 feet.
-24.4		

s dd pf mc

⊗ COHESION - 100 psf

PENETRATION-BLOWS PER FOOT

0 5 10 15 20 30 40 60 80 100

REMARKS:

Water elevation 10.58 feet msl

DRILLED BY VSCS

LOGGED BY MGB

CHECKED BY SEO

BORING NUMBER B-2

DATE STARTED 9/2/81

DATE COMPLETED 9/2/81

JOB NUMBER HT-770

LAW ENGINEERING
HOUSTON, TEXAS

FIGURE 1.1-3

TEST BORING RECORD

⊗ COHESION - 100 psf

PENETRATION-BLOWS PER FOOT

ELEV.	DEPTH FEET	DESCRIPTION
16.9		Stiff Dark Gray CLAY with roots and ferric oxide stains.
11.9	7.5	Very Stiff Gray to Reddish-Brown Sandy Silty CLAY.
6.9	13.5	Very Stiff Reddish-Brown Silty CLAY with silt lenses.
1.9	17.0	Very Stiff Reddish-Brown CLAY with slickensides.
-3.1	20.0	Stiff Reddish-Brown Very Fine Sandy SILT with clay lenses.
-8.1		
-13.1		
-18.1	34.5	
	35.0	Very Stiff Reddish Brown CLAY
		Boring terminated at 35.0 feet.

s dd pf mc 0 5 10 15 20 30 40 60 80 100

REMARKS:
Water elevation 10.82 feet msl

DRILLED BY VSCS
LOGGED BY MGB
CHECKED BY SEO

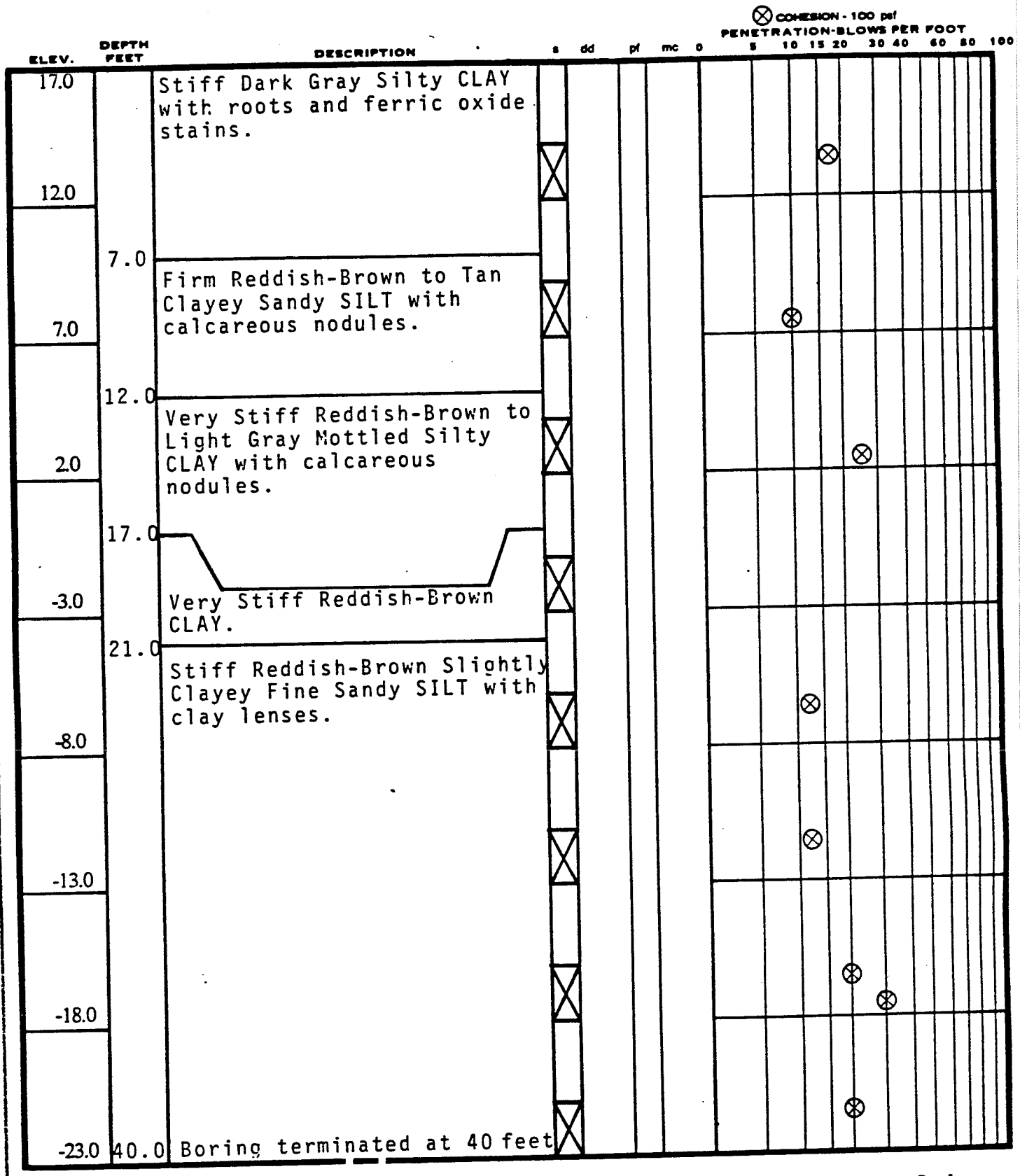
BORING NUMBER B-3
DATE STARTED 9/2/81
DATE COMPLETED 9/2/81
JOB NUMBER HT-770

LAW ENGINEERING
HOUSTON, TEXAS

FIGURE 1.1-4

TEST BORING RECORD

ELEV.	DEPTH FEET	DESCRIPTION
17.0		Stiff Dark Gray Silty CLAY with roots and ferric oxide stains.
12.0	7.0	Firm Reddish-Brown to Tan Clayey Sandy SILT with calcareous nodules.
7.0	12.0	Very Stiff Reddish-Brown to Light Gray Mottled Silty CLAY with calcareous nodules.
2.0	17.0	Very Stiff Reddish-Brown CLAY.
-3.0	21.0	Stiff Reddish-Brown Slightly Clayey Fine Sandy SILT with clay lenses.
-8.0		
-13.0		
-18.0		
-23.0	40.0	Boring terminated at 40 feet



REMARKS:
Water elevation 11.56 feet msl

DRILLED BY VSCS
LOGGED BY MGB
CHECKED BY SEO

BORING NUMBER B-4
DATE STARTED 9/3/81
DATE COMPLETED 9/3/81
JOB NUMBER HT-770

LAW ENGINEERING
HOUSTON, TEXAS
FIGURE 1.1-5

TEST BORING RECORD

⊗ COHESION - 100 psf

PENETRATION-BLOWS PER FOOT

ELEV.	DEPTH FEET	DESCRIPTION	s	dd	pf	mc	0	5	10	15	20	30	40	60	80	100
17.9		Very Stiff Dark Gray CLAY with scattered roots and ferric nodules.	X									⊗				
12.9																
	7.5	Very Stiff Reddish Brown CLAY with calcareous nodules and slickensides.	X								⊗					
7.9																
	11.0	Very Stiff Blue-Gray Sandy Silty CLAY.	X										⊗			
2.9										⊗						
	18.5	Firm Tan Very Fine Sandy SILT with scattered clay lenses.	X													
-2.1																
-7.1	24.5	Dense Tan Silty Very Fine SAND slightly micaceous.	X													
-12.1																
	32.5	Stiff Reddish-Brown Clayey SILT w/ferric oxide stains.	X									⊗				
-17.1	35.0	Boring terminated at 35 feet.														
-22.1																

REMARKS:

Water elevation 11.6 feet msl

DRILLED BY VSCS

LOGGED BY MGB

CHECKED BY SEO

BORING NUMBER B-5

DATE STARTED 9/3/81

DATE COMPLETED 9/3/81

JOB NUMBER HT-770

LAW ENGINEERING
HOUSTON, TEXAS

FIGURE 1.1-6

TYPE II MONITORING WELL INSTALLATION RECORD

JOB NAME FMC Bayport Plant

JOB NUMBER HT-770

WELL NUMBER B-1

INSTALLATION DATE 9/1/81 - 9/2/81

LOCATION

GROUND SURFACE ELEVATION 16.32 msl

REFERENCE POINT ELEVATION 18.22 msl

GRANULAR BACKFILL MATERIAL sand

SLOT SIZE 0.015

SCREEN MATERIAL schedule 80 PVC

SCREEN DIAMETER 2 inches

RISER MATERIAL schedule to PVC

RISER DIAMETER 2 inches

DRILLING TECHNIQUE rotary wash

DRILLING CONTRACTOR Law

BOREHOLE DIAMETER 5 inches

LAW ENGINEERING FIELD REPRESENTATIVE Bagel

LOCK BRAND

SIZE/MODEL

KEY CODE/COMBINATION

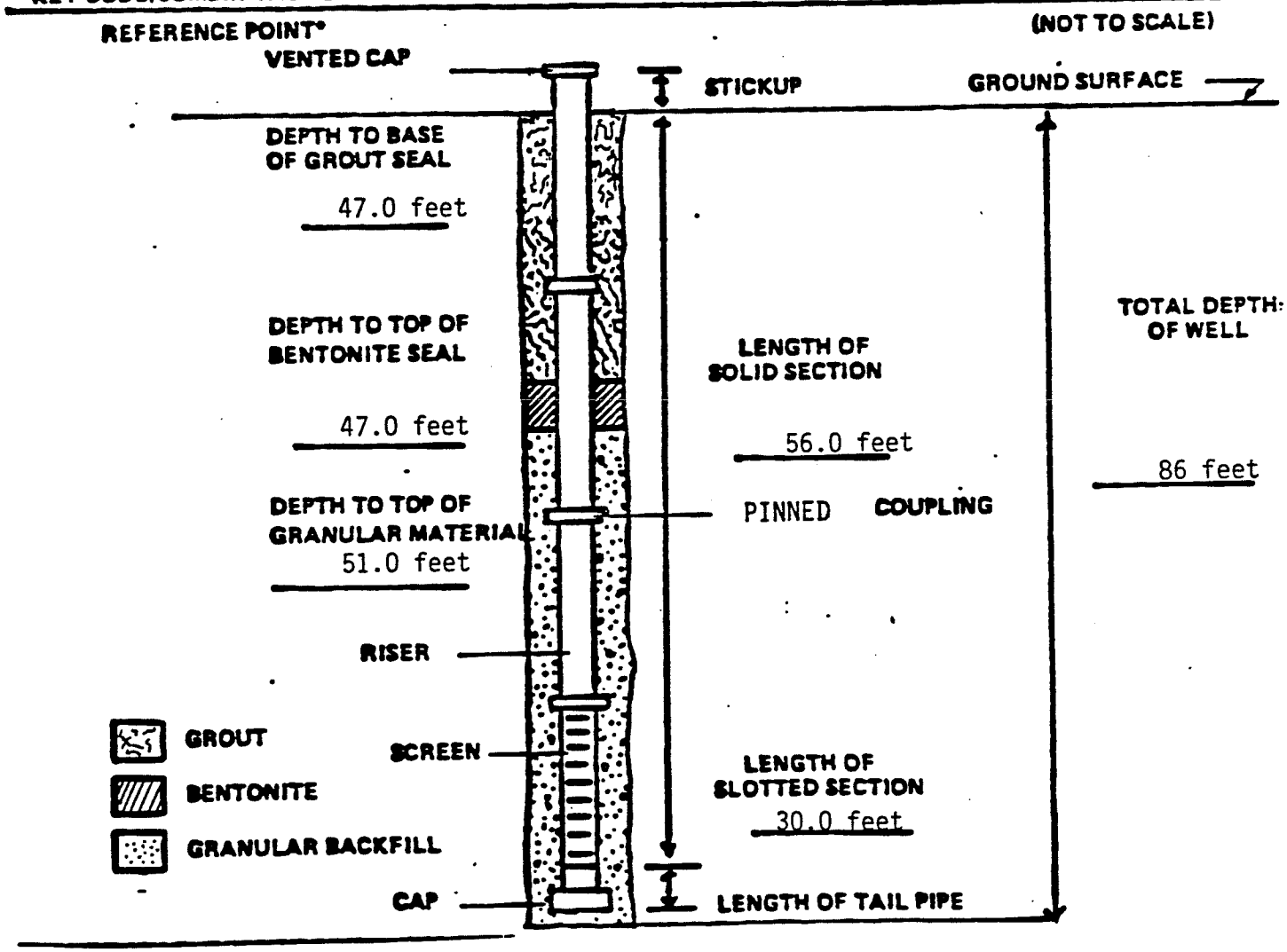


FIGURE 2.2-2

TYPE II MONITORING WELL INSTALLATION RECORD

JOB NAME: FMC Bayport Plant
JOB NUMBER: HT-770
WELL NUMBER: B-2
INSTALLATION DATE: 9/2/81
LOCATION:
GROUND SURFACE ELEVATION: 15.58 msl
REFERENCE POINT ELEVATION: 16.38 msl
GRANULAR BACKFILL MATERIAL: sand
SLOT SIZE: 0.015
SCREEN MATERIAL: schedule 80 PVC
SCREEN DIAMETER: 2 inches
RISER MATERIAL: schedule 40 PVC
RISER DIAMETER: 2 inches
DRILLING TECHNIQUE: rotary wash
DRILLING CONTRACTOR: Law
BOREHOLE DIAMETER: 5 inches
LAW ENGINEERING FIELD REPRESENTATIVE: Bagel
LOCK BRAND:
SIZE/MODEL:
KEY CODE/COMBINATION:

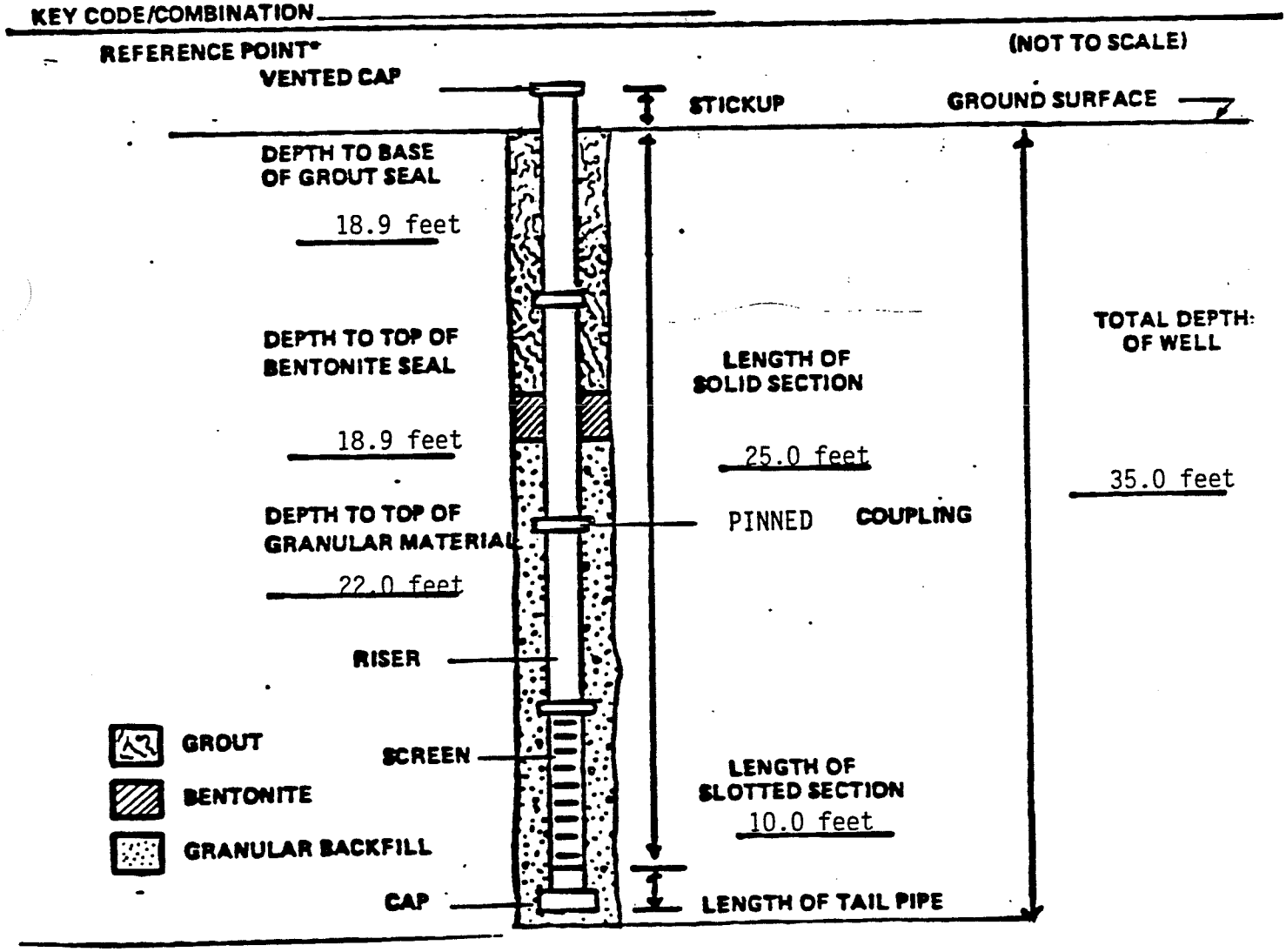


FIGURE 2.2-3

TYPE II MONITORING WELL INSTALLATION RECORD

JOB NAME FMC Bayport Plant

JOB NUMBER HT-770

WELL NUMBER B-3

INSTALLATION DATE 9/2/81

LOCATION

GROUND SURFACE ELEVATION 16.9 msl

REFERENCE POINT ELEVATION 18.8 msl

GRANULAR BACKFILL MATERIAL sand

SLOT SIZE 0.015

SCREEN MATERIAL schedule 80 PVC

SCREEN DIAMETER 2 inches

RISER MATERIAL schedule 40 PVC

RISER DIAMETER 2 inches

DRILLING TECHNIQUE rotary wash

DRILLING CONTRACTOR Law

BOREHOLE DIAMETER 5 inches

LAW ENGINEERING FIELD REPRESENTATIVE Bagel

LOCK BRAND

SIZE/MODEL

KEY CODE/COMBINATION

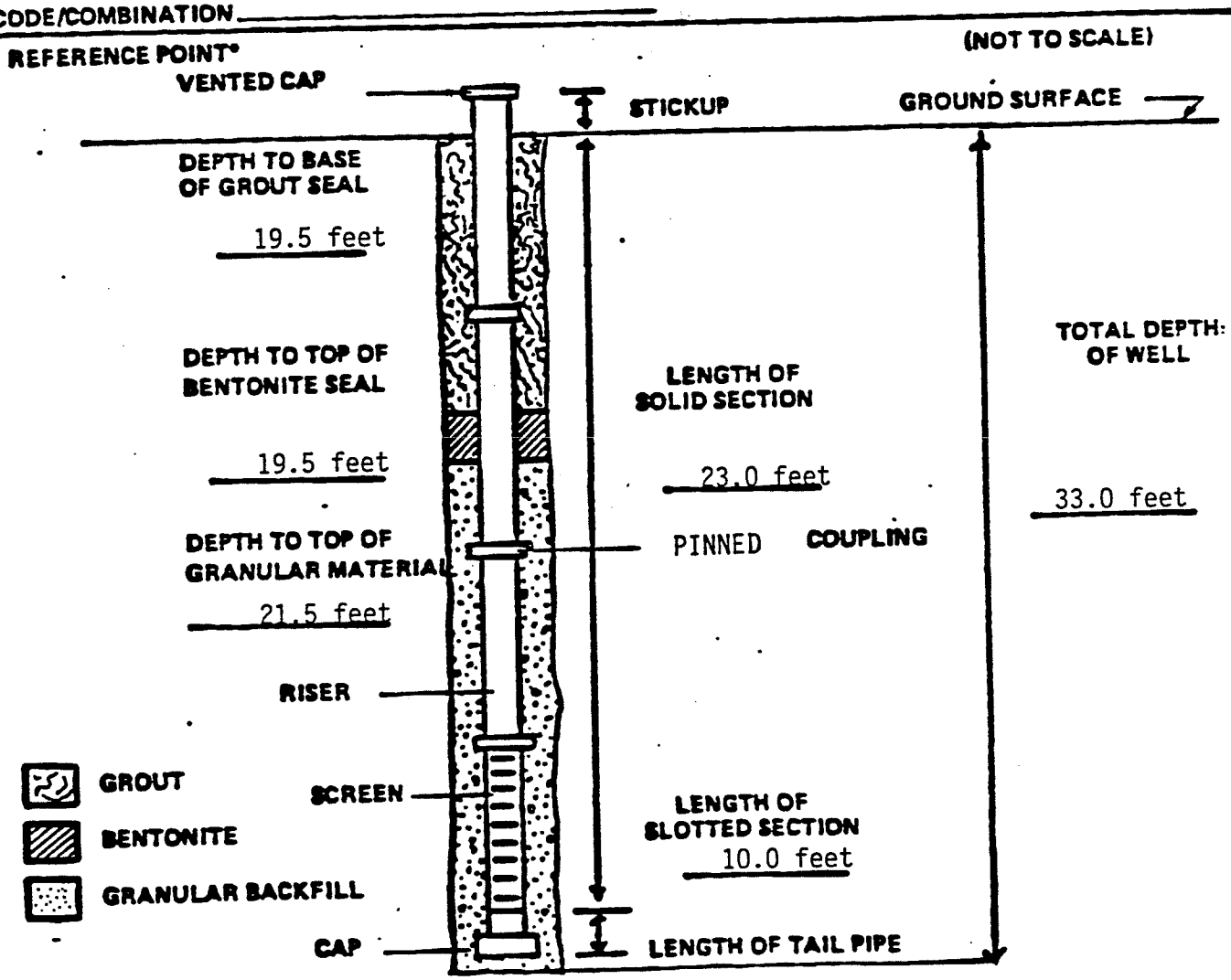


FIGURE 2.2-4

TYPE II MONITORING WELL INSTALLATION RECORD

JOB NAME: FMC Bayport Plant
JOB NUMBER: HT-770
WELL NUMBER: B-4
INSTALLATION DATE: 9/3/81
LOCATION:
GROUND SURFACE ELEVATION: 15.96 msl
REFERENCE POINT ELEVATION: 18.56 msl
GRANULAR BACKFILL MATERIAL: sand
SLOT SIZE: 0.015
SCREEN MATERIAL: schedule 80 PVC
SCREEN DIAMETER: 2 inches
RISER MATERIAL: schedule 40 PVC
RISER DIAMETER: 2 inches
DRILLING TECHNIQUE: rotary wash
DRILLING CONTRACTOR: Law
BOREHOLE DIAMETER: 5 inches
LAW ENGINEERING FIELD REPRESENTATIVE: Bagel
LOCK BRAND:
SIZE/MODEL:
KEY CODE/COMBINATION:

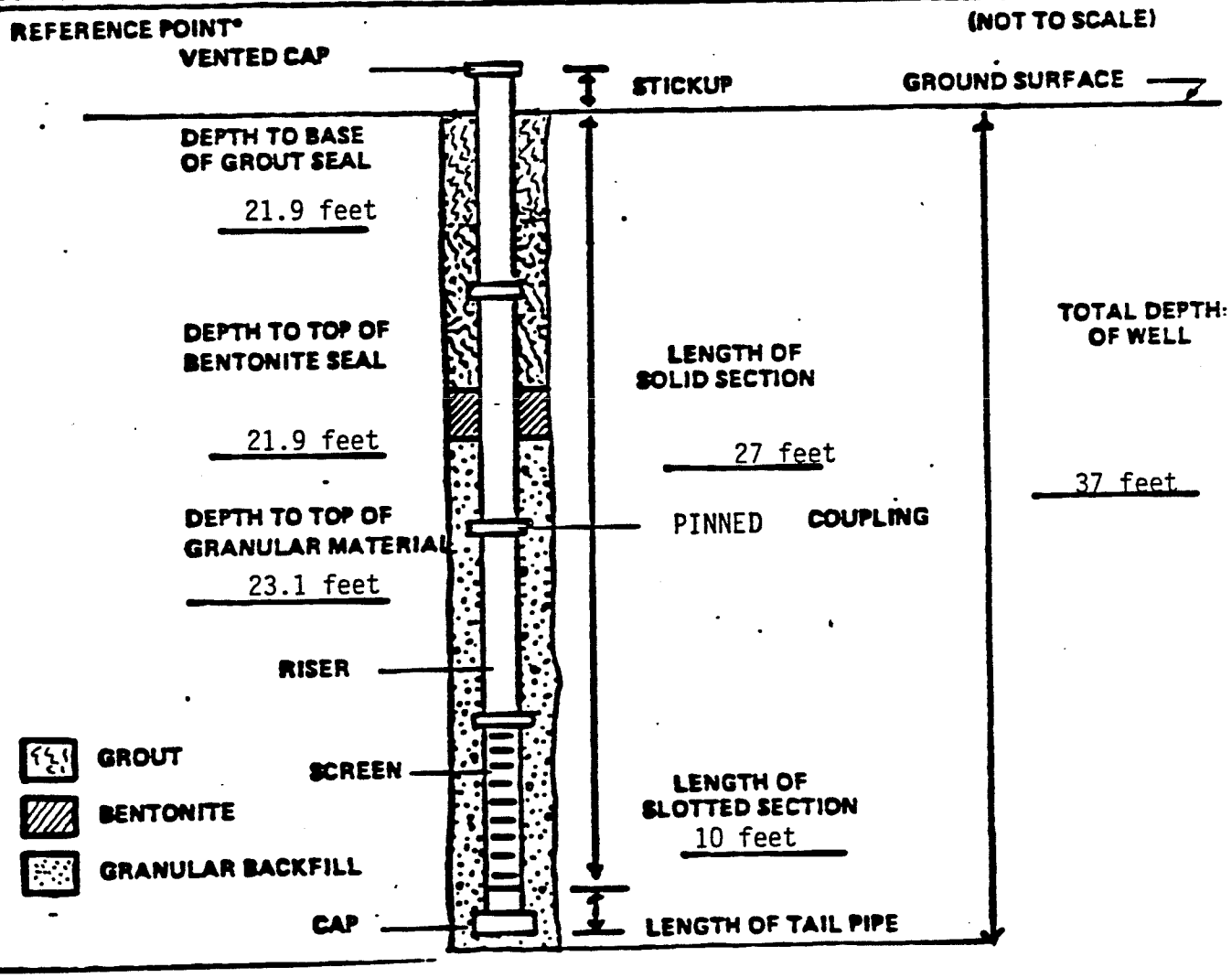


FIGURE 2.2-5

JOB NAME FMC Bayport Plant

JOB NUMBER HT-770

WELL NUMBER B-5

INSTALLATION DATE 9/3/81

LOCATION

GROUND SURFACE ELEVATION 17.9 msl

REFERENCE POINT ELEVATION 20.20 msl

GRANULAR BACKFILL MATERIAL sand

SLOT SIZE 0.015

SCREEN MATERIAL schedule 80 PVC

SCREEN DIAMETER 2 inches

RISER MATERIAL schedule 40 PVC

RISER DIAMETER 2 inches

DRILLING TECHNIQUE rotary wash

DRILLING CONTRACTOR Law

BOREHOLE DIAMETER 5 inches

LAW ENGINEERING FIELD REPRESENTATIVE Bagel

LOCK BRAND

SIZE/MODEL

KEY CODE/COMBINATION

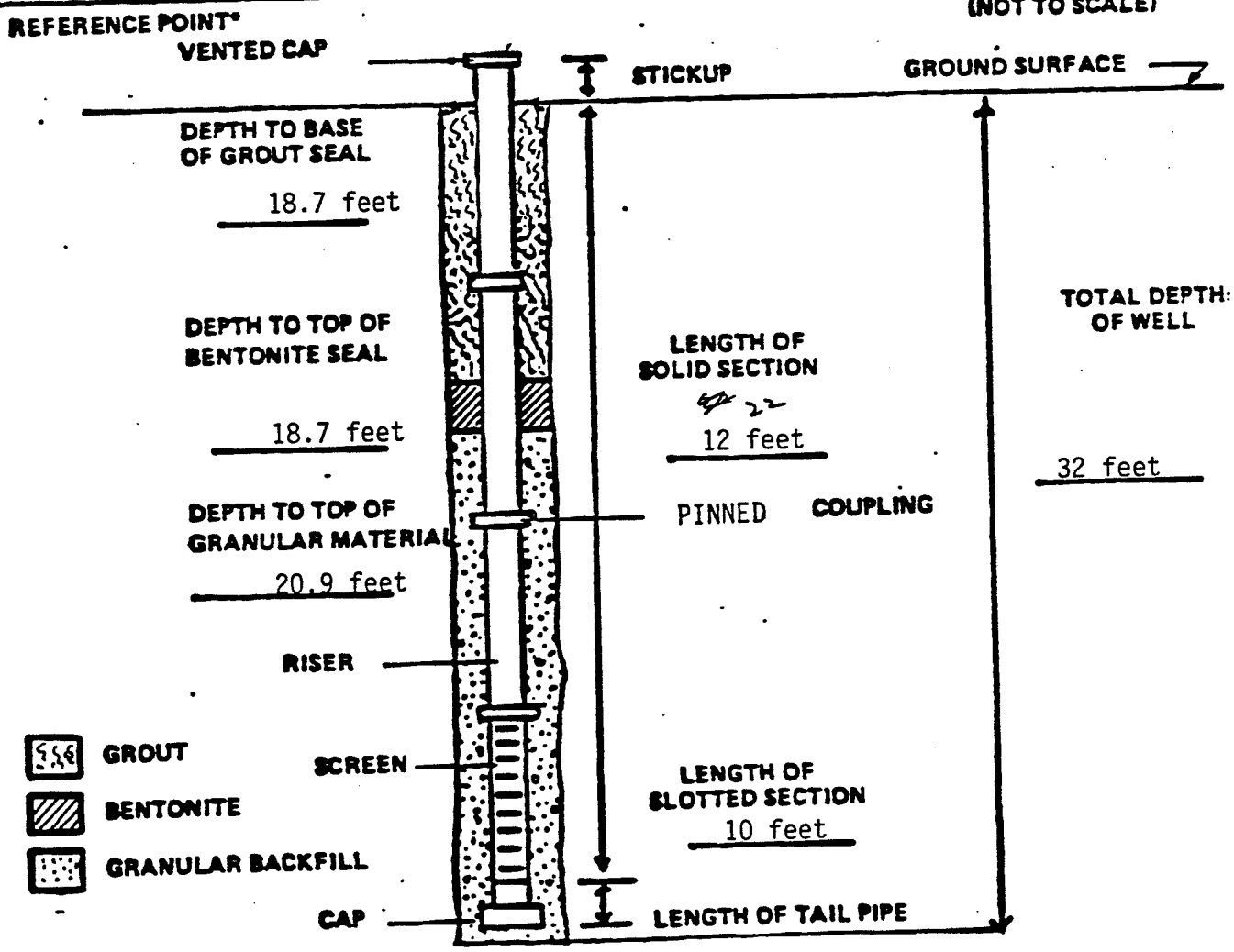


FIGURE 2.2-6

TEXAS WATER COMMISSIO.

111

B. J. Wynne, III, Chairman
John E. Birdwell, Commissioner
Cliff Johnson, Commissioner

John J. Vay, General Counsel
Michael E. Field, Chief Hearings Examiner
Brenda W. Foster, Chief Clerk

Allen Beinke, Executive Director

July 27, 1990

CERTIFIED MAIL

RECEIVED
1990 JUL 31 AM 7:46

Mr. Roger C. Threde, Resident Manager
FMC Corporation
Peroxygen Chemicals Division
12000 Bay Area Boulevard
Pasadena, TX 77507

Re: RCRA Facility Investigation (RFI) Workplan
Hazardous Waste Permit No. HW-50216
Industrial Solid Waste Registration No 30614
EPA Identification No TXD 083570051

Dear Mr. Threde:

The Texas Water Commission has reviewed the RFI Workplan submitted which discusses the investigative work to be performed at the industrial solid waste management units located at the FMC facility in Pasadena, Texas.

Our evaluation of the RFI Workplan indicates that the proposed activities do not completely fulfill the requirements of Provision VIII. (the RCRA Facility Investigation of hazardous waste permit No. HW-50216). This provision requires submitting a workplan which will determine if a release to the environment of hazardous waste or hazardous constituents has occurred at the subject units. Therefore we request that within sixty days of the date of this letter you resubmit an amended original RFI Workplan and three identical copies, and incorporate the following items which were insufficiently addressed in the original submittal:

1. VIII. A. 2. b.

   Table 3-1 appearing on page 3-7 of the workplan must be amended to include the following seven hazardous constituents and two indicator parameters: arsenic, cadmium, chromium, lead, mercury, endrin, lindane, pH, and conductivity.

2. VIII. A. 2. b. (4)

Please amend paragraph 2 of §3.2.1. to include laboratory analyses of samples which do not exhibit OVA or PID-detectable evidence of contamination.

3. VIII. A. 7.

a) On page 4-4, item 2 under §4.1.2 must address overhead obstructions.

b) On page 4-15, item 3), it is imperative that you require safety harness apparatus be used on all personnel entering tanks.

4) VIII. A. 6.

a) On page 4-9, first paragraph, we require that you provide for insertion of the OVA probe into boreholes as a screening technique.

b) On page 4-10, we require that Table 4-1 be made consonant with Table 3-7.

5) VIII. A. 3.

On page 4-17 "RFI Unit 5" paragraph 2, we request that you specify to which Appendix VIII analysis you make reference. Should this be 40CFR 264 Appendix IX?

6) VIII. A. 2. B. (2)

a) On page 4-23, paragraph 2, PVC pipe is specified for monitor well constrution. Because we are exploring the unknown, PVC pipe which has the propensity to react with organics may not be the best choice. Therefore we require that you install monitor wells which will not be adversely affected by organics which may be present in the soils and groundwater.

b) On Figure 4-2, We require that you identify the correct material of which the well casing is made.

c) On page 4-26, we discourage the use of dedicated PVC bailers and recommend that you do the same.

d) Same as comment 6 C above except applicable to polypropylene rope (Page 4-31).

7) VIII. A. 2. b. (4).

Material presented in §6 of the workplan must reflect the following performance requirements:

- Raw data will accompany all evaluation submittals.

- Interpretive statements of analytical and statistical results must be qualified. For example, "If no contamination is located in or around the borehole, no contamination is present in or around the borehole."

8) VIII.C.

In §7.0, we require that you provide a performance specification for the following two obligations:

1) Identify the name and location of laboratory to be used for testing of samples.

2) Notify the TWC District 7/ Houston Office as well as the TWC Austin Headquarters of your laboratory testing dates at least 10 days in advance of the planned testing events.

9) VIII A. 7.

a) On the cover sheet A-1 of Appendix A, we require the you provide a sign off line for the FMC Plant Safety Engineer.

b) On page A-5 in Appendix A, we require that you specify the use of personal safety harness use for all personnel entering 1) any enclosed tank, and 2) both lift stations.

Please note that you will not receive a separate notice of deficiency letter covering your RFI workplan submittal from the U.S.E.P.A. Rather, this and subsequent reviews of your RFI workplan will be provided exclusively by the TWC.

Further evaluation of your RFI Workplan will continue upon receipt of your response to this request. If you have questions or comments, please contact Alan P. Church, P.E. at AC512/463-8020.

Sincerely,

Ray Henry Austin, P.E.

Minor Brooks Hibbs, Chief
Permits Section
Hazardous and Solid Waste Division

APC:kh

cc: Henry Onsgard, EPA - Dallas
Lydia M. Boada - Clista, EPA - Dallas
TWC Southeast Region Office - Deer Park

JUN 28 1990

Mr. Minor Hibbs, Chief
Permits Section
Solid and Hazardous Waste Division
Texas Water Commission
P.O. Box 13087, Capitol Station
Austin, Texas 78711-3087

Re: RCRA Facility Investigation Workplan
FMC Corporation
TXD083570051

Dear Mr. Hibbs:

We have received a copy of the RCRA Facility Investigation (RFI) Workplan for FMC Corporation in Pasadena, Texas. This facility ranks low in our prioritization strategy based on our Environmental Priority Initiative (EPI) ranking scheme. Therefore, we will not provide you comments on the RFI Workplan, but will rely on your review of the Workplan. Please proceed with your review and provide us with a copy of your response of the facility.

If you have any further questions or comments, please contact me, or your staff may call Lydia M. Boada-Clista at (214) 655-6785.

Sincerely yours,

William K. Honker, Chief
RCRA Permits Branch

6H-PT:BOADA:lp:5-6785:6-13-90:LYDIA #2:ITEM 45:FILE CODE:

6H-PT
ROBERTO

TEXAS WATER COMMISSION

TU
India

B. J. Wynne, III, Chairman
John E. Birdwell, Commissioner
Cliff Johnson, Commissioner

John J. Vay, General Counsel
Michael E. Field, Chief Hearings Examiner
Brenda W. Foster, Chief Clerk

Allen Beinke, Executive Director

October 8, 1990

Mr. Quentin G. Hopkins, Resident Manager
FMC Corporation
Peroxygen Chemicals Division
12000 Bay Area Boulevard
Pasadena, Texas 77507

CERTIFIED DELIVERY

Re: RFI Workplan Associated with Permit No. HW-50216
Industrial Solid Waste Registration No. 30614
EPA I.D. No. TXD 083570051

NOTICE TO PROCEED

Dear Mr. Hopkins:

We have reviewed the RCRA Facility Investigation Workplan originally dated January, 1990, and subsequently revised by submittals which were transmitted by your letter dated September 21, 1990. The plan appears to be consistent with the requirements of Section VIII of Permit No. HW-50216.

This letter constitutes approval by the Texas Water Commission of the revised workplan and authorizes you to begin the RCRA Facility Investigation. A separate approval from the U.S. Environmental Protection Agency is not required.

Further questions or comments may be addressed to Alan P. Church, P.E. of the TWC staff at AC512/463-8020.

Sincerely,

Daniel J. Eden

Daniel J. Eden, Director
Hazardous and Solid Waste Division

APC:jb

cc: TWC District 7 Office - Houston
Paul S. Lewis, TWC Enforcement Section
William Honker - USEPA Region VI - Dallas

TEXAS WATER COMMISSION
P.O. BOX 13087
CAPITOL STATION
AUSTIN, TEXAS 78711-3087

VOTE
Every One Matters.

Register and Vote
Official State of
Texas Mail, Penalty
For Private Use

DALLAS, TX 72
PM
OCT 8 '90
1990
AUSTIN
TEX.

U.S. POSTAGE
Intercontinental
Collect Stamps
METER
F 8C20865

Mr. William K. Honker, Chief
RCRA Permits Branch
U. S. Environmental Protection Agency
Region VI - 6H-PT
1445 Ross Avenue
Dallas, Texas 75202-2733

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman
John E. Birdwell, Commissioner
Cliff Johnson, Commissioner

John J. Vay, General Counsel
Michael E. Field, Chief Hearings Examiner
Brenda W. Foster, Chief Clerk

Allen Beinke, Executive Director

October 8, 1990

Anthony Robledo, Chief
Texas Section
Hazardous Waste Management Division
U. S. Environmental Protection Agency
Region VI - 6H-PT
1445 Ross Avenue
Dallas, Texas 75202

Re: FMC Corporation - Pasadena
Solid Waste Registration Number 30614
Permit Application Number 50216
EPA I. D. Number TXD083570051

Dear Mr. Robledo:

Enclosed are RFI Workplan revisions received on October 1, 1990 for the subject facility.

Please address any comments to the attention of Alan P. Church, P. E., at (512) 463-8020.

Sincerely,

Cheryl A. Wilson

Cheryl A. Wilson, Head
Reports and Information Management Unit
Hazardous and Solid Waste Division

BB:am

Enclosure

cc: Gerald Hord, District Manager, Texas Water Commission
District 7 Office - Houston

FMC Corporation

Peroxygen Chemicals Division
12000 Bay Area Boulevard
Pasadena, Texas 77507
713 474 4171

ISW 30614
EPA Region VI

FMC

RECEIVED
OCT 1 1990
HAZARDOUS AND SOLID WASTE DIVISION

21-Sep-1990

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 913-564-930

Texas Water Commission
Hazardous and Solid Waste Division
1700 North Congress Avenue
Austin, Texas 78711-3087
Attention: Mr. Minor Brooks Hibbs, Chief
Permit Section

RE: RCRA Facility Investigation (RFI) Work Plan; Hazardous Waste Permit No. HW-50216; Industrial Solid Waste Registration No. 30614; EPA Registration No. TXD 083570051

Dear Mr. Hibbs:

FMC Corporation (FMC) Peroxygen Chemicals Division Bayport Plant in Pasadena, Texas has received the Texas Water Commission (TWC) letter of July 27, 1990 which listed comments and questions regarding RCRA Facility Investigation Work Plan.

Enclosed please find FMC's response (prepared by ENSR Corporation) to TWC comments in the above referred letter. The enclosed package consists of two parts:

1.) Itemized response to each TWC comment or question.
2.) Affected Work Plan pages showing applicable revisions (in triplicate).

If this is acceptable to you, please replace the affected pages with the enclosed revised pages.

If there are questions or if further information is needed at the present time, please advise me at (713) 474-8705 or, in my absence, Mr. H. H. Thakkar at FMC's Pasadena Facility at (713) 474-8774.

Very truly yours,

Quentin G. Hopkins

Quentin G. Hopkins
Resident Manager
FMC Corporation
Peroxygen Chemicals Division
Pasadena (Bayport), Texas Facility

cc: Texas Water Commission
Hazardous and Solid Waste Permits Section
Stephen F. Austin Building
1700 North Congress Avenue
Austin, Texas 78711-3087
Attention: Mr. Alan Church, P.E.
Permit Section

U. S. Environmental Protection Agency, Region VI
First International Building
1445 Ross Avenue, 12th Floor, Suite #1200
Dallas, Texas 75202-2733
Attention: Mr. Henry Onsgard

U. S. Environmental Protection Agency, Region VI
First International Building
1445 Ross Avenue, 12th Floor, Suite #1200
Dallas, Texas 75202-2733
Attention: Ms. Lydia M. Boado-Clista

Texas Water Commission
Southeast Regional Office
4301 Center Street
Deer Park, Texas 77536-6299
Attention: Regional Director

QGH/mr
DN: 16164

Attachments: Summary of Responses to TWC Comments
Revised Cover Pages
Revised Page 3 - 7
Revised Page 3 - 8
Revised Page 4 - 4
Revised Page 4 - 9
Revised Page 4 - 10
Revised Page 4 - 17
Revised Page 4 - 26
Revised Page 4 - 31
Revised Page 6 - 2
Revised Health & Safety Plan Cover Sheet

FMC Corporation

Peroxygen Chemicals Division
12000 Bay Area Boulevard
Pasadena Texas 77507
713 474 4171

hydic III

1990 OCT 31 PM 5:40

FMC

21-Sep-1990

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 913-564-930

Texas Water Commission
Hazardous and Solid Waste Division
1700 North Congress Avenue
Austin, Texas 78711-3087
Attention: Mr. Minor Brooks Hibbs, Chief
Permit Section

RE: RCRA Facility Investigation (RFI) Work Plan; Hazardous Waste Permit No. HW-50216; Industrial Solid Waste Registration No. 30614; EPA Registration No. TXD 083570051

Dear Mr. Hibbs:

FMC Corporation (FMC) Peroxygen Chemicals Division Bayport Plant in Pasadena, Texas has received the Texas Water Commission (TWC) letter of July 27, 1990 which listed comments and questions regarding RCRA Facility Investigation Work Plan.

Enclosed please find FMC's response (prepared by ENSR Corporation) to TWC comments in the above referred letter. The enclosed package consists of two parts:

1.) Itemized response to each TWC comment or question.
2.) Affected Work Plan pages showing applicable revisions (in triplicate).

If this is acceptable to you, please replace the affected pages with the enclosed revised pages.

If there are questions or if further information is needed at the present time, please advise me at (713) 474-8705 or, in my absence, Mr. H. H. Thakkar at FMC's Pasadena Facility at (713) 474-8774.

Very truly yours,

Quentin G. Hopkins

Quentin G. Hopkins
Resident Manager
FMC Corporation
Peroxygen Chemicals Division
Pasadena (Bayport), Texas Facility

cc: Texas Water Commission
Hazardous and Solid Waste Permits Section
Stephen F. Austin Building
1700 North Congress Avenue
Austin, Texas 78711-3087
Attention: Mr. Alan Church, P.E.
Permit Section

U. S. Environmental Protection Agency, Region VI
First International Building
1445 Ross Avenue, 12th Floor, Suite #1200
Dallas, Texas 75202-2733
Attention: Mr. Henry Onsgard

U. S. Environmental Protection Agency, Region VI
First International Building
1445 Ross Avenue, 12th Floor, Suite #1200
Dallas, Texas 75202-2733
Attention: Ms. Lydia M. Boado-Clista

Texas Water Commission
Southeast Regional Office
4301 Center Street
Deer Park, Texas 77536-6299
Attention: Regional Director

QGH/mr
DN: 16164

Attachments: Summary of Responses to TWC Comments
Revised Cover Pages
Revised Page 3 - 7
Revised Page 3 - 8
Revised Page 4 - 4
Revised Page 4 - 9
Revised Page 4 - 10
Revised Page 4 - 17
Revised Page 4 - 26
Revised Page 4 - 31
Revised Page 6 - 2
Revised Health & Safety Plan Cover Sheet

FMC Corporation Peroxygen Chemicals Division - Bayport Plant

Pasadena, Texas

ENSR

RCRA Facility Investigation Work Plan

ENSR Consulting and Engineering

(Formerly ERT)

January 1990
(Revised September 1990)

Document Number 2810-014-001

FMC Corporation Peroxygen Chemicals Division - Bayport Plant

Pasadena, Texas

ENSR

RCRA Facility Investigation Work Plan

ENSR Consulting and Engineering

(Formerly ERT)

January 1990
(Revised September 1990)

Document Number 2810-014-001

SUMMARY OF RESPONSES TO TWC COMMENTS

OF JULY 27, 1990

RCRA FACILITY INVESTIGATION WORK PLAN

FMC CORPORATION, BAYPORT PLANT

TWC Comment No. 1:

Table 3-1 appearing on page 3-7 of the workplan must be amended to include the following seven hazardous constituents and two indicator parameters: arsenic, cadmium, chromium, lead, mercury, endrin, lindane, pH, and conductivity.

ENSR Response:

Table 3-1 has been revised to include:

Arsenic
Cadmium
Chromium
Lead
Mercury
Endrin
Lindane
pH

We question the value of soil conductivity measurements in an investigation of this type. Natural soil conductivity may vary greatly from one location to another. This type of response, even if due solely to natural fluctuations in soil conductivity, could result in a false positive determination of a release. Furthermore, we believe that the revised analytical test provides a comprehensive representation of the types of constituents handled at the subject RFI Units. Therefore, soil conductivity has not been included in the revised list of analytical parameters for the Phase I investigation.

TWC Comment No. 2:

Please amend paragraph 2 of §3.2.1 to include laboratory analyses of samples which do not exhibit OVA or PID-detectable evidence of contamination.

ENSR Response:

Paragraph 2 of Section 3.2.1 of the RFI has been revised to include laboratory analyses of samples which do not exhibit OVA or PID-detectable evidence of contamination.

TWC Comment No. 3:

a) On page 4-4, item 2 under §4.1.2 must address overhead obstructions.

b) On page 4-15, item 3), it is imperative that you require safety harness apparatus be used on all personnel entering tanks.

ENSR Response:

a) Item 2 on page 4-4 of the RFI has been revised to address overhead obstructions.

b) Item 3 on page 4-15 addresses access of tanks for sampling. This refers to the point at which sample collection equipment, not sampling personnel, will be introduced into the tank. The RFI Work Plan does not contemplate sampling personnel physically entering the inside of the tank to collect samples.

TWC Comment No. 4:

a) **On page 4-9, first paragraph, we require that you provide for insertion of the OVA probe into boreholes as a screening technique.**

b) **On page 4-10, we require that Table 4-1 be made consonant with Table 3-7.**

ENSR Response:

a) The first paragraph on page 4-9 has been revised to provide for insertion of the OVA probe into boreholes as a screening technique.

b) We assume that the reference to Table 3-7 is a typographical error and that Table 3-1 is the intended reference. Table 4-1 has been revised to be made consonant with the revised version of Table 3-1.

TWC Comment No. 5:

On page 4-17 "RFI Unit 5" paragraph 2, we request that you specify to which Appendix VIII analysis you make reference. Should this be 40 CFR 264 Appendix IX?

ENSR Response:

The correct reference is 40 CFR 264 Appendix IX analysis. Paragraph 2 on page 4-17 has been revised to reflect the correct reference.

TWC Comment No. 6:

a) **On page 4-23, paragraph 2, PVC pipe is specified for monitor well construction. Because we are exploring the unknown, PVC pipe which has the propensity to react with organics may not be the best choice. Therefore, we require that you install monitor wells which will not be adversely affected by organics which may be present in the soils and groundwater.**

b) **On Figure 4-2, we require that you identify the correct material of which the well casing is made.**

c) **On page 4-26, we discourage the use of dedicated PVC bailers and recommend that you do the same.**

d) **Same as comment 6 C above except applicable to polypropylene rope (page 4-31).**

ENSR Response:

a,b) We believe that it is premature to positively select monitor well materials at this time. The first paragraph of Section 4.3, page 4-21, of the RFI Work Plan provides that it is assumed that PVC will be appropriate; however, the final determination of well construction material will be based upon the results of the Phase I investigation. The pertinent portion of the RFI Work Plan is reprinted below:

> "For the purposes of this work plan, it has been assumed that PVC well casing and screen material, and Teflon® well sampling material, will be compatible with any contaminants which may be found to exist in the soil and groundwater at the FMC facility. However, if the results of the Phase I investigation indicate that these materials will be incompatible, then different materials will be selected at that time. FMC will notify TWC and EPA in advance of any change in the design, installation, or materials that will be used during the RFI. Any change will be subject to TWC and EPA approval."

c) The TWC comment refers to well-development procedures. These procedures do not provide for the use of dedicated bailers; rather, the procedures specify the use of a bailer (PVC or Teflon®) or a hand pump. As specified in the RFI Work Plan, these instruments will be decontaminated after each use, and therefore, would not be considered dedicated equipment. Furthermore, we feel that the use of PVC equipment for well development would be appropriate. However, Section 4.3.3 of the RFI Work Plan has been revised to provide that well development will be accomplished using a Teflon® bailer.

d) Step 4 on page 4-31 has been revised to provide for the use of Teflon®-coated stainless steel wire to raise and lower the bailer during sample collection.

TWC Comment No. 7:

Material presented in § 6 of the workplan must reflect the following performance requirements:

- **Raw data will accompany all evaluation submittals.**
- **Interpretive statements of analytical and statistical results must be qualified. For example, "If no contamination is located in or around the borehole, no contamination is present in or around the borehole."**

ENSR Response:

Section 8.0 of the RFI Work Plan addresses report submittals. This section provides that the individual work sheets and results from the statistical evaluations will be submitted to TWC and EPA in the RFI report. In other words, raw data will accompany evaluation submittals. The interpretive statements presented in Section 6.0 of the RFI Work Plan have been revised to provide the requested qualifications.

TWC Comment No. 8:

In §7.0, we require that you provide a performance specification for the following two obligations:

1) Identify the name and location of laboratory to be used for testing of samples.

2) Notify the TWC District 7/ Houston Office as well as the TWC Austin Headquarters of your laboratory testing dates at least 10 days in advance of the planned testing events.

ENSR Response:

1. As of this writing, FMC has not selected a laboratory to perform testing of samples collected during the RFI. FMC will notify TWC in writing of its selection of a contract laboratory after a selection has been made.

2. The last paragraph of Section 9.0 of the RFI Work Plan stated that FMC will provide the specified notification.

TWC Comment No. 9:

a) On the cover sheet A-1 of Appendix A, we require that you provide a sign off line for the FMC Plant Safety Engineer.

b) On page A-5 in Appendix A, we require that you specify the use of personal safety harness use for all personnel entering 1) any enclosed tank, and 2) both lift stations.

ENSR Response:

a) The cover sheet of the Health and Safety Plan has been revised to include a signoff line for the FMC Plant Safety Engineer.

b) Please refer to ENSR Response to TWC Comment 3(b).

FMC Corporation
Peroxygen Chemicals Division
Bayport Plant

Pasadena, Texas

RCRA Facility Investigation Work Plan

ENSR Consulting and Engineering
(Formerly ERT)

January 1990
(Revised September 1990)

Document Number 2810-014-001

ENSR

TABLE 3-1

PHASE I INDICATOR PARAMETERS AND LABORATORY ANALYTICAL METHODS
RCRA FACILITY INVESTIGATION WORK PLAN
PEROXYGEN CHEMICALS DIVISION
PASADENA, TEXAS

Parameters	Test Method Reference	Detection Limit
Allyl Alcohol	[1]EPA SW-846: 8240, GC/MS	50 ppb
Acrolein	[1]EPA SW-846: 8240, GC/MS	50 ppb
Naphthalene	[1]EPA SW-846: 8270, GC/MS	330 ppb
Phenol	[1]EPA SW-846: 8270, GC/MS	330 ppb
Arsenic	[1]EPA SW-846: 7060, Gr. Fur.	1 ppm
Cadmium	[1]EPA SW-846: 6010, ICP	1 ppm
Chromium	[1]EPA SW-846: 6010, ICP	2 ppm
Lead	[1]EPA SW-846: 6010, ICP	2 ppm
Mercury	[2]SM: 303(F), Cold Vapor	0.05 ppm
Endrin	[1]EPA SW-846: 8080 GC/ECD	20 ppb
Lindane	[1]EPA SW-846: 8080 GC/ECD	20 ppb
pH	[1]EPA SW-846: 9040	N/A

---

1 EPA "Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods," SW-846, 3rd Edition, 1986.

2 "Standard Methods for the Examination of Water and Wastewater," 15th and 16th editions, 1980, 1985, APHA-AWWA-WPCF.

Procedures for collection of these samples are described in Section 4.2.

3.2 Phase II

A Phase II investigation will be conducted if it is determined, using the data evaluation procedures discussed in Section 6.0, that soil contamination resulting from a significant release of Appendix VIII hazardous constituents from RFI Units 1 and 2 has occurred. The Phase II investigation will be performed to determine the aerial extent of soil contamination (Provision VIII.A.2.a) and the possible installation of a groundwater monitoring system (Provision VIII.A.2.b.(2).). The Phase II investigation will be conducted as follows.

3.2.1 Soils Investigation

The purpose of the Phase II soils investigation will be to determine the horizontal and vertical extent of soil contamination. This will be accomplished by installing soil borings on appropriate grid basis, starting 10 feet from each Phase I soil boring, where analytical results indicate that a significant release has occurred, and extending radially outward from RFI Units 1 and 2 in such a manner that the boundary of soil contamination may be determined.

The vertical extent of soil contamination will be determined by: 1) terminating each Phase II soil boring at a depth which corresponds to the point at which there is no visual or olfactory evidence of contamination; and 2) when and HNU^R Photoionization Detector (PID) or Organic Vapor Analyzer (OVA) measurements of soil samples collected from this point are at or below the background measurements determined during the Phase I investigation. A soil sample will be collected from this depth for laboratory analysis.

Phase II soil samples will be collected for geologic description and chemical analysis in the same fashion as the Phase I soil samples. Sample equipment and collection procedures are

4.1.2 Soil Boring Installation

Soil borings will be advanced and soil samples will be collected using a truck-mounted hollow stem auger drilling rig with Shelby tube and split spoon samplers. Drilling fluids will not be used during soil boring installation. The procedures that will be used to advance soil borings with a hollow stem auger are described below.

1) Implement health and safety plan.

2) Prepare site: select exact soil boring location; obtain all necessary work and safety permits; check for overhead and underground obstructions (i.e., piping, foundations, etc.).

3) Itemize and assemble all necessary drilling and sampling equipment.

4) Set up work area (either pick-up truck tail gate or portable table). Cover work area with plastic sheeting.

5) Set up drilling rig over exact soil boring location; assemble hollow stem auger drilling components; connect assembly to the rotary drive of the drill rig.

6) Advance hollow stem auger assembly to desired sample depth interval.

7) Disconnect drive cap from the auger column assembly. Remove pilot assembly and center rod column with hoist line.

Field screening observations for possible contamination will include visual and olfactory descriptions of each sample relative to the presence of contamination. All descriptions will be recorded in the field log book. Periodic measurements of each open borehole will be made by inserting the OVA probe into the borehole. In addition, organic vapor measurements will be performed on each soil sample. The procedure for performing these measurements is as follows:

1) Immediately after the sample has been extruded from the sampling device and moved to the work area, place approximately 8 ounces of the sample in a clean 16-ounce, wide mouth, glass jar.

2) Immediately seal the jar with two layers of aluminum foil. Secure the aluminum foil to the jar with several rubber bands.

3) Leave the jar in an unshaded area for 30 minutes.

4) Break aluminum foil seal with the tip of organic vapor measurement probe; measure head space gas. Record highest reading and sample depth interval in field log book.

5) Discard sample in 55-gallon drum.

Organic vapor measurements will be performed with either a portable PID or a OVA. The performance characteristics and calibration procedures for each of these instruments are discussed in Section 7.4.

4.1.5 Sample Bottles, Preservation, and Shipment

Table 4-1 identifies the types of sampling containers and preservatives that will be used for the collection and transport of soil samples. A state or EPA-approved laboratory will provide all

TABLE 4-1

SOIL SAMPLE CONTAINERS AND PRESERVATIVES
RCRA FACILITY INVESTIGATION WORK PLAN
FMC CORPORATION
PEROXYGEN CHEMICALS DIVISION
PASADENA, TEXAS

Parameter	Sample Container	Preservative	Holding Time
1. Allyl Alcohol Acrolein	4 oz. glass	4°C	14 days
2. Naphthalene Phenol	8 oz. amber	4°C	14 days
3. Arsenic Cadmium Chromium Lead Mercury	16 oz. glass	N/A	Indefinite
4. Endrin Lindane	16 oz. glass	4°C	14 days
5. pH	8 oz. glass	N/A	Indefinite

9) Decontaminate sampling equipment in accordance with the procedures described in Section 4.2.4.

If the contents of the tank do not exist in sufficient volume to collect a representative sample, a sample will not be collected.

RFI Unit 5 - Check Tank T4889C

This unit is currently in service. Records indicate that the level in this tank is maintained at approximately 50 to 90% capacity. This tank receives work solution collected from the oily water sewer.

This tank will be sampled for 40 CFR 264 Appendix IX analysis in accordance with the following procedures.

1) Implement Health and Safety Plan.

2) Assemble and itemize sampling equipment.

3) Access tank through manway.

4) Determine amount of material, both liquid and solid in the tank, and the presence and thickness of any separate liquid phases using a photo-optic oil/water interface probe and/or weighted stainless steel tape with indicator paste.

5) Depending upon the amount and types of solids and liquids encountered, sampling equipment will be chosen which best fits the conditions present. The types of samplers which will be considered are:

- Peristaltic pump with dedicated silicon tubing
- Teflon[R] bailer
- Ponar[R] grab sampler

4.3.3 Development Procedures

All wells will be developed to maximize well yields and provide groundwater containing minimal suspended solids for sampling.

The development procedure that will be used will be hand bailing. Hand bailing will be accomplished with a 4-inch Teflon[R] bailer.

Multiple well volumes will be removed as pH; specific conductance temperature, and levels of turbidity are monitored. All observations will be recorded on well development records. Refer to Section 5.2. All developed water will be containerized in 55-gallon drums or pumped to Gulf Coast Waste Disposal for proper treatment and disposal. Proper disposal will be dictated by the analytical results from groundwater samples collected from the well and by the acceptability criteria of Gulf Coast Waste Disposal Authority. The criteria for satisfactory well development will be stabilization of pH, specific conductance, temperature, and when no, or a minimal amount of suspended solids, are observed.

All development equipment will be decontaminated after use at each well in accordance with the procedures described in Section 4.1.6.

4.3.4 Monitor Well Sampling Procedures

The following sections describes the equipment and procedures to be used in sampling groundwater monitor wells installed at the FMC Plant as part of the RFI.

4.3.4.1 Equipment

- Health and Safety Equipment

8) Record number of well volumes removed.

9) Prepare to sample well.

4.3.4.4 Sample Collection

Water samples are to be collected according to the following procedures.

1) Put on PVC or Playtex[R] gloves.

2) Samples will be collected in the order of the volatization sensitivity of the analytical parameters.

3) All samples will be collected with a Teflon[R] bailer.

4) Use Teflon[R]-coated stainless steel wire to lower and raise bailer.

5) While raising and lowering the bailer, be sure not to let the wire come into contact with the ground surface.

6) Empty water from the bailer slowly into the appropriate sample container.

7) Add appropriate preservatives.

8) Label the sample container.

9) Place sample container in ice chest.

10) Collect samples for pH and specific conductance measurements. After field measurements have been performed, the water samples can be discarded.

criteria that will be used to determine whether or not a significant release has occurred will be as follows:

- If the calculated test statistic or, in the case of the test of proportions, the absolute value of the calculated test statistic exceeds the appropriate tabulated test statistic at the 95% confidence level, then it will be determined that contamination exists and a significant release has occurred.

- If the calculated test statistics or, in the case of the test of proportions, the absolute value of the calculated test statistic is less than the appropriate tabulated test statistic at the 95% confidence level, then it will be determined that contamination does not exist at that particular soil boring location.

The criteria used in selecting a statistical approach will be presented along with the actual statistical comparisons in the final RFI Report and, if Phase II is required, the interim RFI Report.

6.2 RFI Units 3 through 8 Sampling Results (Phase I)

Waste characterization samples collected from RFI Units 3 through 8 will be analyzed for Appendix VIII constituents. If any sample, collected from any particular unit, contains Appendix VIII constituents, then it will be determined that particular unit contains listed hazardous constituents as defined by 40 CFR 261. These results will be presented in tabular form in the RFI Report.

6.3 Statistical Evaluation of Groundwater Samples (Phase II)

If Phase II is required, groundwater samples from background and waste management unit locations will be collected. These

SITE/TASK

SAFETY PLAN

for the

FMC Corporation Peroxygen Chemical Division Facility

in

Pasadena, Texas

Project Number: 2810-014

Division Number: 42

Prepared By: Charles C. Clarke

Date: 12/18/89

Approved
By:_____
ENSR Project Manager

Date:

_____

_____
ENSR Regional Health and
Safety Manager

Date:

_____

_____
FMC Safety Engineer

Date:

_____

Final 1/24/90
Revised 9/20/90

F.2 FEBRUARY 1991 SAMPLING RESULTS

AnalytiKEM *An American NuKEM Company*

AnalytiKEM Inc.
2925 Richmond Avenue
Houston, TX 77098
713/520-1495
713/520-9900
Fax: 713/523-7107

DATE: 02/19/91

TO: Derrick Vallance

FROM: Bo Blankfield, Lab Director

PROJ. NO.: 9505-005 LAB NO.: A5438

Attached are reports of chemical analyses of samples received February 6, 1991. These analyses are:

Count	Test Code		Test Name	Test Method	Sampled	Matrix
7	As	-S-GFA-HOU	ARSENIC ON SOLID	EPA SW-846: 7060, GRAPHITE FURNACE	02/06/91	SOIL
7	BN	-S- -HOU	BASE NEUTRALS ON SOLID	EPA SW-846: 3550,8270, SON.,GC/MS	02/06/91	SOIL
7	Cd	-S-ICP-HOU	CADMIUM ON SOLID	EPA SW-846: 3050,6010, ICP	02/06/91	SOIL
7	Cr	-S-ICP-HOU	CHROMIUM ON SOLID	EPA SW-846: 3050,6010, ICP	02/06/91	SOIL
7	Hg	-S- -HOU	MERCURY ON SOLID	EPA SW-846: 7471, COLD VAPOR	02/06/91	SOIL
7	PEST	-S- -HOU	PESTICIDES ON SOLID	EPA SW-846: 3550,8080, SONICATN.,GC	02/06/91	SOIL
7	Pb	-S-ICP-HOU	LEAD ON SOLID	EPA SW-846: 3050,6010, ICP	02/06/91	SOIL
2	VOA	- - -HOU	VOLATILE ORGANIC ANALYSES	EPA SW-846: 8240, GC/MS	02/06/91	WATER
20	VOA	-S- -HOU	VOLATILE ORGANICS ON SOLID	EPA SW-846: 8240, GC/MS	02/06/91	SOIL
7	pH	-S- -HOU	pH ON SOLID	EPA SW-846: 9045	02/06/91	SOIL

Data contained in this report reflect a full quality control review and have met all applicable standards established by AnalytiKEM. AnalytiKEM quality assurance protocols are in accordance with EPA guidelines.

Should you have any questions, do not hesitate to contact me at (713) 520-9900.

BB/lis

Enclosures: Analytical Summary, Analytical Report, Chain of Custody, Sample Receipt Checklist, Quality Control Logs, ENSR ID #A5438-1, ENSR ID #A5438-10, ENSR ID #A5438-11, ENSR ID #A5438-12, ENSR ID #A5438-13, ENSR ID #A5438-14, ENSR ID #A5438-15, ENSR ID #A5438-16, ENSR ID #A5438-17, ENSR ID #A5438-18, ENSR ID #A5438-19, ENSR ID #A5438-2, ENSR ID #A5438-20, ENSR ID #A5438-21, ENSR ID #A5438-22, ENSR ID #A5438-3, ENSR ID #A5438-4, ENSR ID #A5438-5, ENSR ID #A5438-6, ENSR ID #A5438-7, ENSR ID #A5438-8, ENSR ID #A5438-9, Billing Summary

LAB NO. A5438
PROJECT 9505-005 FMC

AnalytiKEM
An American NuKEM Company
2925 RICHMOND AVENUE HOUSTON, TX 77098 (713) 520-1495 FAX: (713) 523-7107

Analysis Request and Chain of Custody Record

Project no. 9505-005

Client/Project Name: FMC

Project Location: PASADENA, TX

Lab ID No	Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
1	B-3B-A 1'-3'	2-6-91 830	X		4 oz TRAIL	soil	4°C	ACROLIEN, Allyl Alcohol	
2	B-3B-B 5'-7'	840							
3	B-3B-C 10'-12'	850							
4	B-3B-D 15'-17'	855							
5	B-3B-E 20'-25'	0904							
6	B-4B-A 1'-3'	1000							
7	B-4B-B 5'-7'	1010							
8	B-4B-C 10'-12'	1035							
9	B-4B-D 15'-17'	1040							
10	B-4B-E 20'-25'	1050							

Samplers: (Signature)	Relinquished by: (Signature)	Date: 2-6-91 Time: 1715	Received by: (Signature)	Date: Time:	COC Seal No.
[signature]	[signature]				
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
	Relinquished by: (Signature)	Date: Time:	Received by Laboratory: (Signature) [signature]	Date: 2-6-91 Time: 1800	Intact:

REMARKS: RUSH

Data Results To:
1.
2.

Laboratory No. A5438

AnalytiKEM
An American NuKEM Company
2925 RICHMOND AVENUE HOUSTON, TX 77098 (713) 520-1495 FAX: (713) 523-7107

Analysis Request and Chain of Custody Record

Project no.	Client/Project Name	Project Location
9505-005	FMC	PASADENA, TX

Lab ID No	Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preser-vative	ANALYSIS REQUESTED	LABORATORY REMARKS
11	BKG-1B-A 1'-3'	2-6-91 1130	X		4oz TAN	SOIL	4°C	Acrolein Allyl Alcohol	
12	BKG-1B-B 5'-7'	~~1150~~ SE 1135							
13	BKG-1B-C 10'-12'	1145							
14	BKG-1B-1D 15'-17'	1150							
15	BKG-1B-E 20'-22'	1200							
16	BKG-2B-A 1'-3'	1325							
17	BKG-2B-B 5'-7'	1330							
18	BKG-2B-C 10'-12'	1335							
19	BKG-2B-D 15'-17'	1348							
20	BKG-2B-E 20'-22'	1400							

Samplers: (Signature)	Relinquished by: (Signature)	Date: 2-6-91 Time: 1715	Received by: (Signature)	Date: Time:	COC Seal No.
[signature]	[signature]				
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
	Relinquished by: (Signature)	Date: Time:	Received by Laboratory: (Signature) [signature]	Date: 2-6-91 Time: 1800	Intact:

REMARKS: RUSH

Data Results To:
1.
2.

Laboratory No. A5438

AnalytiKEM
An American NuKEM Company
2925 RICHMOND AVENUE HOUSTON, TX 77098 (713) 520-1495 FAX: (713) 523-7107

Analysis Request and Chain of Custody Record

Project no.: 9505-005
Client/Project Name: FMC
Project Location: PASADENA, TX

Lab ID No	Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
1	B-3B-A 1-3'	2-6-91 1830	X		8 oz Amber	soil	4°C	TOTAL As, Cd, Cr, Pb, Hg	PH
2	B-3B-B 5-7'	840	↓		↓	↓	↓	↓	
6	B-4B-A 1-3'	1000	↓		↓	↓	↓	↓	
7	B-4B-B	1010	↓		↓	↓	↓	↓	
18	BKG-2B-C 10-12'	1335	↓		↓	↓	↓	↓	
19	BKG-2B-D 15-17'	1348	↓		↓	↓	↓	↓	
20	BKG-2B-E 20-22'	1400	↓		↓	↓	↓	↓	

Samplers: (Signature)	Relinquished by: (Signature)	Date: 2-6-91 Time: 1715	Received by: (Signature)	Date: Time:	COC Seal No.
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
	Relinquished by: (Signature)	Date: Time:	Received by Laboratory: (Signature)	Date: 2-6-91 Time: 1800	Intact:

REMARKS: RUSH

Data Results To:
1.
2.

Laboratory No.: A5438

AnalytiKEM
An American NuKEM Company
2925 RICHMOND AVENUE HOUSTON, TX 77098 (713) 520-1495 FAX: (713) 523-7107

Analysis Request and Chain of Custody Record

Project no.: 9505-005
Client/Project Name: FMC
Project Location: PASADENA, TX.

Lab ID No	Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
1	B-3B-A 1'-3'	2-6-91 830	X		8oz AMBER	Soil	4°C	ENDRINE, LINDANE	
2	B-3B-B 5'-7'	840							
6	B-4B-A 1'-3'	1000							
7	B-4B-B 5'-7'	1010							
18	BKG-2B-C 10'-12'	1335							
19	BKG-2B-D 15'-17'	1348							
20	BKG-2B-E 20'-22'	1400							

Samplers: (Signature)	Relinquished by: (Signature)	Date: 2-6-91 Time: 1515	Received by: (Signature)	Date: Time:	COC Seal No.
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
	Relinquished by: (Signature)	Date: Time:	Received by Laboratory: (Signature)	Date: 2-6-91 Time: 1800	Intact:

REMARKS: RUSH

Data Results To:
1.
2.

Laboratory No. A5438

AnalytiKEM
An American NuKEM Company
2925 RICHMOND AVENUE HOUSTON, TX 77098 (713) 520-1495 FAX: (713) 523-7107

Analysis Request and Chain of Custody Record

Project no.: 9505-005
Client/Project Name: FMC
Project Location: PASADENA, TX

Lab ID No	Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
1	B-3B-A 1-3	2-6-91 1830	X		8 oz AMBER	Soil	4°C	NAPHTHELENE, PHENOL	
2	B-3B-B 5-7'	840							
6	B-4B-A 1-3'	1000							
7	B-4B-B 5-7'	1010							
18	BKG-2B-C 10-12'	1335							
19	BKG-2B-D 15-17'	1348							
20	BKG-2B-E 20-22'	1400							
21	EQ-blank	1420	X		40 ml VOA	WATER		ACROLIEN, Ally Alcohol	
22	TRIP-blk					"		"	

Samplers: (Signature)	Relinquished by: (Signature)	Date: 2-6-91 Time: 1715	Received by: (Signature)	Date: Time:	COC Seal No.
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
	Relinquished by: (Signature)	Date: Time:	Received by Laboratory: (Signature) Thelma Howe	Date: 2-6-91 Time: 1800	Intact:

REMARKS: RUSH

Data Results To:
1.
2.

Laboratory No.: A5438

AnalytiKEM Laboratories
SAMPLE RECEIPT CHECKLIST

ent FMC Project Number 9505-005 Laboratory Number A5438

1 ____ Shipped
X Hand Delivered
Notes: ____

2 X COC Present on Receipt
____ No COC
Notes: ____

3 ____ COC Tape on Shipping Container
X No COC Tape on Shipping Container
Notes: ____

4 ____ Samples Broken/Leaking
X Sample Intact on Receipt
____ Other (See Notes)
Notes: Intact

5 ____ Ambient on Receipt
X Chilled on Receipt
Notes: ____

6 ____ Samples Preserved Correctly
____ Improper Preservatives
X N/A (None Recommended)
____ Other (See Notes)
Notes: ____

7 X Received Within Holding Time
____ Not Received Within Holding Time
____ N/A (None Recommended)
____ Other (See Notes)
Notes: ____

8 ____ COC Tapes on Samples
X No COC Tapes on Samples
Notes: ____

9 X Discrepancies Between COC and Sample Labels
____ No Discrepancies Noted
____ N/A (No COC Received)
Notes: ____

Additional Comments: ____

Inspected and Logged in by: Thelma Lowe Date/Time 2-6-91/1800

AnalytiKEM-Houston

Analytical Summary
02/19/91 15:21

Lab Number: A5438
Project: 9505-005
FMC

Lab ID / *Field ID* / *Test /Matrix*	1 B-3B-A, 1-3' SOIL	2 B-3B-B, 5-7' SOIL	3 B-3B-C, 10-12' SOIL	4 B-3B-D, 15-17' SOIL	5 B-3B-E, 20-25' SOIL	6 B-4B-A, 1-3' SOIL	7 B-4B-B, 5-7' SOIL	8 B-4B-C, 10-12' SOIL
As -S-GFA-HOU (MDL)	2.7 MG/KG (0.25)	3.7 MG/KG (2.5)	--	--	--	1.3 MG/KG (0.5)	1 MG/KG (0.5)	--
BN -S- -HOU (MDL)	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	--	--	--	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	--
Cd -S-ICP-HOU (MDL)	<2.0 MG/KG (2.0)	<2.0 MG/KG (2.0)	--	--	--	<2.0 MG/KG (2.0)	<2.0 MG/KG (2.0)	--
Cr -S-ICP-HOU (MDL)	3.5 MG/KG (2)	28 MG/KG (2)	--	--	--	5.9 MG/KG (2)	3 MG/KG (2)	--
Hg -S- -HOU (MDL)	<0.05 MG/KG (0.05)	<0.05 MG/KG (0.05)	--	--	--	<0.05 MG/KG (0.05)	<0.05 MG/KG (0.05)	--
PEST -S- -HOU (MDL)	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	--	--	--	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	--
Pb -S-ICP-HOU (MDL)	<5 MG/KG (5)	11 MG/KG (5)	--	--	--	<5 MG/KG (5)	<5 MG/KG (5)	--
VOA -S- -HOU (MDL)	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*	ATTACHED UG/KG ()*
pH -S- -HOU (MDL)	7.78 UNITS (0.01)	7.87 UNITS (0.01)	--	--	--	10.67 UNITS (0.01)	10.32 UNITS (0.01)	--

* Please see attached Analytical Report for remarks.

Signatures of approval indicate quality assurance-quality control verification of analytical results, billing and enclosed documentation.

Approvals: Joann M. Hood Date: 2/21/91 Brenda P. Basile Date: 2/25/91

***** CONTINUED *****

AnalytiKEM-Houston

Analytical Summary
02/19/91 15:22

Lab Number: A5438
Project: 9505-005
FMC

Lab ID	9	10	11	12	13	14	15	16
Field ID	B-4B-D, 15-17'	B-4B-E, 20-22'	BKG-1B-A, 1-3'	BKG-1B-B, 5-7'	BKG-1B-C, 10-12'	BKG-1B-D, 15-17'	BKG-1B-E, 20-22'	BKG-2B-A, 1-3'
Test /Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
VOA -S- -HOU	ATTACHED UG/KG	ATTACHED UG/KG	ATTACHED UG/KG	ATTACHED UG/KG	ATTACHED UG/KG	ATTACHED UG/KG	ATTACHED UG/KG	ATTACHED UG/KG
(MDL)	()*	()*	()*	()*	()*	()*	()*	()*

* Please see attached Analytical Report for remarks.

Signatures of approval indicate quality assurance-quality control verification of analytical results, billing and enclosed documentation.

Approvals: Joann M. Hoese Date: 2/21/91 Brenda P. Basile Date: 2/25/91

***** CONTINUED *****

AnalytiKEM-Houston

Analytical Summary
02/19/91 15:22

Lab Number: A5438
Project: 9505-005
FMC

Lab ID / *Field ID* / *Test /Matrix*	17 BKG-2B-B, 5-7' SOIL	18 BKG-2B-C, 10-12' SOIL	19 BKG-2B-D, 15-17' SOIL	20 BKG-2B-E, 20-22' SOIL	21 EQ. BLANK WATER	22 TRIP BLANK WATER
As -S-GFA-HOU *(MDL)*	--	2.6 MG/KG *(0.5)*	2.3 MG/KG *(0.25)*	0.6 MG/KG *(0.25)*	--	--
BN -S- -HOU *(MDL)*	--	ATTACHED UG/KG *()**	ATTACHED UG/KG *()**	ATTACHED UG/KG *()**	--	--
Cd -S-ICP-HOU *(MDL)*	--	<2.0 MG/KG *(2.0)*	<2.0 MG/KG *(2.0)*	<2.0 MG/KG *(2.0)*	--	--
Cr -S-ICP-HOU *(MDL)*	--	6.1 MG/KG *(2)*	4.2 MG/KG *(2)*	<2 MG/KG *(2)*	--	--
Hg -S- -HOU *(MDL)*	--	<0.05 MG/KG *(0.05)*	<0.05 MG/KG *(0.05)*	<0.05 MG/KG *(0.05)*	--	--
PEST -S- -HOU *(MDL)*	--	ATTACHED UG/KG *()**	ATTACHED UG/KG *()**	ATTACHED UG/KG *()**	--	--
Pb -S-ICP-HOU *(MDL)*	--	<5 MG/KG *(5)*	<5 MG/KG *(5)*	<5 MG/KG *(5)*	--	--
VOA - - -HOU *(MDL)*	--	--	--	--	ATTACHED UG/L *()**	ATTACHED UG/L *()**

* Please see attached Analytical Report for remarks.

Signatures of approval indicate quality assurance-quality control verification of analytical results, billing and enclosed documentation.

Approvals: Joann Hoesl Date: 2/21/91 Ronda P Basile Date: 2/25/91

***** CONTINUED *****

AnalytiKEM-Houston

Analytical Summary
02/19/91 15:22

Lab Number: A5438
Project: 9505-005
FMC

Lab ID / *Field ID* / *Test /Matrix*	17 BKG-2B-B, 5-7' SOIL	18 BKG-2B-C, 10-12' SOIL	19 BKG-2B-D, 15-17' SOIL	20 BKG-2B-E, 20-22' SOIL	21 EQ. BLANK WATER	22 TRIP BLANK WATER
VOA -S- -HOU *(MDL)*	ATTACHED UG/KG *()**	ATTACHED UG/KG *()**	ATTACHED UG/KG *()**	ATTACHED UG/KG *()**	--	--
pH -S- -HOU *(MDL)*	--	8.67 UNITS *(0.01)*	8.65 UNITS *(0.01)*	8.52 UNITS *(0.01)*	--	--

* Please see attached Analytical Report for remarks.

Signatures of approval indicate quality assurance-quality control verification of analytical results, billing and enclosed documentation.

Approvals: Joann M. Hood Date: 2/21/91 Brenda L. Basile Date: 2/25/91

AnalytiKEM-Houston

Analytical Report
02/19/91 15:19

C Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-3B-A, 1-3' Lab ID: 1 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 830 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
As -S-GFA-HOU ARSENIC ON SOLID EPA SW-846: 7060, GRAPHITE FURNACE	2.7	MG/KG	0.25	02/11/91 658
BN -S- -HOU BASE NEUTRALS ON SOLID EPA SW-846: 3550,8270, SON.,GC/MS	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.: 02/08/91
Cd -S-ICP-HOU CADMIUM ON SOLID EPA SW-846: 3050,6010, ICP	<2.0	MG/KG	2.0	02/11/91 835
Cr -S-ICP-HOU CHROMIUM ON SOLID EPA SW-846: 3050,6010, ICP	3.5	MG/KG	2	02/11/91 835
Hg -S- -HOU ERCURY ON SOLID PA SW-846: 7471, COLD VAPOR	<0.05	MG/KG	0.05	02/13/91 700
PEST -S- -HOU PESTICIDES ON SOLID EPA SW-846: 3550,8080, SONICATN.,GC	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.: 02/12/91
Pb -S-ICP-HOU LEAD ON SOLID EPA SW-846: 3050,6010, ICP	<5	MG/KG	5	02/11/91 835
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91
pH -S- -HOU pH ON SOLID EPA SW-846: 9045	7.78	UNITS	0.01	02/13/91 900

*1 SEE ENSR ID #A5438-1

AnalytiKEM-Houston

Analytical Report
02/19/91 15:19

rMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-3B-B, 5-7' Lab ID: 2 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 840 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
As -S-GFA-HOU ARSENIC ON SOLID EPA SW-846: 7060, GRAPHITE FURNACE	3.7	MG/KG	2.5	02/11/91 658
BN -S- -HOU BASE NEUTRALS ON SOLID EPA SW-846: 3550,8270, SON.,GC/MS	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.: 02/08/91
Cd -S-ICP-HOU CADMIUM ON SOLID EPA SW-846: 3050,6010, ICP	<2.0	MG/KG	2.0	02/11/91 835
Cr -S-ICP-HOU CHROMIUM ON SOLID EPA SW-846: 3050,6010, ICP	28	MG/KG	2	02/11/91 835
'g -S- -HOU .ERCURY ON SOLID EPA SW-846: 7471, COLD VAPOR	<0.05	MG/KG	0.05	02/13/91 700
PEST -S- -HOU PESTICIDES ON SOLID EPA SW-846: 3550,8080, SONICATN.,GC	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.: 02/12/91
Pb -S-ICP-HOU LEAD ON SOLID EPA SW-846: 3050,6010, ICP	11	MG/KG	5	02/11/91 835
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91
pH -S- -HOU pH ON SOLID EPA SW-846: 9045	7.87	UNITS	0.01	02/13/91 900

*1 SEE ENSR ID #A5438-2

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-3B-C, 10-12' Lab ID: 3 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 850 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91

*1 SEE ENSR ID #A5438-3

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-3B-D, 15-17' Lab ID: 4 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 855 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91

*1 SEE ENSR ID #A5438-4

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

..MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-3B-E, 20-25' Lab ID: 5 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 904 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91

*1 SEE ENSR ID #A5438-5

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-4B-A, 1-3' Lab ID: 6 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1000 Date Received:02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
As -S-GFA-HOU ARSENIC ON SOLID EPA SW-846: 7060, GRAPHITE FURNACE	1.3	MG/KG	0.5	02/11/91 658
BN -S- -HOU BASE NEUTRALS ON SOLID EPA SW-846: 3550,8270, SON.,GC/MS	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.:02/08/91
Cd -S-ICP-HOU CADMIUM ON SOLID EPA SW-846: 3050,6010, ICP	<2.0	MG/KG	2.0	02/11/91 835
Cr -S-ICP-HOU CHROMIUM ON SOLID EPA SW-846: 3050,6010, ICP	5.9	MG/KG	2	02/11/91 835
Hg -S- -HOU MERCURY ON SOLID EPA SW-846: 7471, COLD VAPOR	<0.05	MG/KG	0.05	02/13/91 700
PEST -S- -HOU PESTICIDES ON SOLID EPA SW-846: 3550,8080, SONICATN.,GC	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.:02/12/91
Pb -S-ICP-HOU LEAD ON SOLID EPA SW-846: 3050,6010, ICP	<5	MG/KG	5	02/11/91 835
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91
pH -S- -HOU pH ON SOLID EPA SW-846: 9045	10.67	UNITS	0.01	02/13/91 900

*1 SEE ENSR ID #A5438-6

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

rMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-4B-B, 5-7' Lab ID: 7 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1010 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
As -S-GFA-HOU ARSENIC ON SOLID EPA SW-846: 7060, GRAPHITE FURNACE	1	MG/KG	0.5	02/11/91 658
BN -S- -HOU BASE NEUTRALS ON SOLID EPA SW-846: 3550,8270, SON.,GC/MS	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.: 02/08/91
Cd -S-ICP-HOU CADMIUM ON SOLID EPA SW-846: 3050,6010, ICP	<2.0	MG/KG	2.0	02/11/91 835
Cr -S-ICP-HOU CHROMIUM ON SOLID EPA SW-846: 3050,6010, ICP	3	MG/KG	2	02/11/91 835
g -S- -HOU ERCURY ON SOLID EPA SW-846: 7471, COLD VAPOR	<0.05	MG/KG	0.05	02/13/91 700
PEST -S- -HOU PESTICIDES ON SOLID EPA SW-846: 3550,8080, SONICATN.,GC	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.: 02/12/91
Pb -S-ICP-HOU LEAD ON SOLID EPA SW-846: 3050,6010, ICP	<5	MG/KG	5	02/11/91 835
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91
pH -S- -HOU pH ON SOLID EPA SW-846: 9045	10.32	UNITS	0.01	02/13/91 900

*1 SEE ENSR ID #A5438-7

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-4B-C, 10-12' Lab ID: 8 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1035 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91

*1 SEE ENSR ID #A5438-8

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

.MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-4B-D, 15-17' Lab ID: 9 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1040 Date Received:02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91

*1 SEE ENSR ID #A5438-9

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: B-4B-E, 20-22' Lab ID: 10 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1050 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/07/91

*1 SEE ENSR ID #A5438-10

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-1B-A, 1-3' Lab ID: 11 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1130 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91

*1 SEE ENSR ID #A5438-11

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-1B-B, 5-7' Lab ID: 12 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1135 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91

*1 SEE ENSR ID #A5438-12

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-1B-C, 10-12' Lab ID: 13 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1145 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91

*1 SEE ENSR ID #A5438-13

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-1B-D, 15-17' Lab ID: 14 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1150 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91

*1 SEE ENSR ID #A5438-14

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-1B-E, 20-22' Lab ID: 15 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1200 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91

*1 SEE ENSR ID #A5438-15

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

rMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-2B-A, 1-3' Lab ID: 16 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1325 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91

*1 SEE ENSR ID #A5438-16

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-2B-B, 5-7' Lab ID: 17 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1330 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91

*1 SEE ENSR ID #A5438-17

AnalytiKEM-Houston

Analytical Report
02/19/91 15:20

MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-2B-C, 10-12' Lab ID: 18 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1335 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
As -S-GFA-HOU ARSENIC ON SOLID EPA SW-846: 7060, GRAPHITE FURNACE	2.6	MG/KG	0.5	02/11/91 658
BN -S- -HOU BASE NEUTRALS ON SOLID EPA SW-846: 3550,8270, SON.,GC/MS	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.: 02/08/91
Cd -S-ICP-HOU CADMIUM ON SOLID EPA SW-846: 3050,6010, ICP	<2.0	MG/KG	2.0	02/11/91 835
Cr -S-ICP-HOU CHROMIUM ON SOLID EPA SW-846: 3050,6010, ICP	6.1	MG/KG	2	02/11/91 835
Hg -S- -HOU ERCURY ON SOLID EPA SW-846: 7471, COLD VAPOR	<0.05	MG/KG	0.05	02/13/91 700
PEST -S- -HOU PESTICIDES ON SOLID EPA SW-846: 3550,8080, SONICATN.,GC	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.: 02/13/91
Pb -S-ICP-HOU LEAD ON SOLID EPA SW-846: 3050,6010, ICP	<5	MG/KG	5	02/11/91 835
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91
pH -S- -HOU pH ON SOLID EPA SW-846: 9045	8.67	UNITS	0.01	02/13/91 900

*1 SEE ENSR ID #A5438-18

AnalytiKEM-Houston

Analytical Report
02/19/91 15:21

MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-2B-D, 15-17' Lab ID: 19 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1348 Date Received:02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
As -S-GFA-HOU ARSENIC ON SOLID EPA SW-846: 7060, GRAPHITE FURNACE	2.3	MG/KG	0.25	02/11/91 658
BN -S- -HOU BASE NEUTRALS ON SOLID EPA SW-846: 3550,8270, SON.,GC/MS	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.:02/08/91
Cd -S-ICP-HOU CADMIUM ON SOLID EPA SW-846: 3050,6010, ICP	<2.0	MG/KG	2.0	02/11/91 835
Cr -S-ICP-HOU CHROMIUM ON SOLID EPA SW-846: 3050,6010, ICP	4.2	MG/KG	2	02/11/91 835
g -S- -HOU ERCURY ON SOLID EPA SW-846: 7471, COLD VAPOR	<0.05	MG/KG	0.05	02/13/91 700
PEST -S- -HOU PESTICIDES ON SOLID EPA SW-846: 3550,8080, SONICATN.,GC	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.:02/19/91
Pb -S-ICP-HOU LEAD ON SOLID EPA SW-846: 3050,6010, ICP	<5	MG/KG	5	02/11/91 835
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/11/91
pH -S- -HOU pH ON SOLID EPA SW-846: 9045	8.65	UNITS	0.01	02/13/91 900

*1 SEE ENSR ID #A5438-19

AnalytiKEM-Houston

Analytical Report
02/19/91 15:21

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: BKG-2B-E, 20-22' Lab ID: 20 Matrix: SOIL (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1400 Date Received:02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
As -S-GFA-HOU ARSENIC ON SOLID EPA SW-846: 7060, GRAPHITE FURNACE	0.6	MG/KG	0.25	02/11/91 658
BN -S- -HOU BASE NEUTRALS ON SOLID EPA SW-846: 3550,8270, SON.,GC/MS	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.:02/08/91
Cd -S-ICP-HOU CADMIUM ON SOLID EPA SW-846: 3050,6010, ICP	<2.0	MG/KG	2.0	02/11/91 835
Cr -S-ICP-HOU CHROMIUM ON SOLID EPA SW-846: 3050,6010, ICP	<2	MG/KG	2	02/11/91 835
Hg -S- -HOU MERCURY ON SOLID EPA SW-846: 7471, COLD VAPOR	<0.05	MG/KG	0.05	02/13/91 700
PEST -S- -HOU PESTICIDES ON SOLID EPA SW-846: 3550,8080, SONICATN.,GC	ATTACHED *1	UG/KG		Ext.: 02/08/91 Anal.:02/13/91
Pb -S-ICP-HOU LEAD ON SOLID EPA SW-846: 3050,6010, ICP	<5	MG/KG	5	02/11/91 835
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/08/91
pH -S- -HOU pH ON SOLID EPA SW-846: 9045	8.52	UNITS	0.01	02/13/91 900

*1 SEE ENSR ID #A5438-20

AnalytiKEM-Houston

Analytical Report
02/19/91 15:21

FMC Proj. No.: 9505-005 Lab No.: A5438	Field ID: EQ. BLANK Lab ID: 21 Matrix: WATER (GRAB)	Date Sampled: 02/06/91 Time Sampled: 1420 Date Received: 02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA - - -HOU VOLATILE ORGANIC ANALYSES EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/L		02/07/91

*1 SEE ENSR ID #A5438-21

AnalytiKEM-Houston

Analytical Report
02/19/91 15:21

MC Proj. No.: 9505-005 Lab No.: A5438	Field ID: TRIP BLANK Lab ID: 22 Matrix: WATER	Date Sampled: 02/06/91 Time Sampled: Date Received:02/06/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA - - -HOU VOLATILE ORGANIC ANALYSES EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/L		02/08/91

*1 SEE ENSR ID #A5438-22

AnalytiKEM-Houston

QUALITY CONTROL LOG

Page: 1 of 1

Parameter: ARSENIC As

Matrix: SOILS (TCLP EXT.) WATER

Method of Analysis: EPA SW846: 7060 GFAA

Date/Time: 11/26/91 / 0658

Lab Numbers	Detection Limits
A5438 - 1, 19, 20	0.25 mg/Kg
A5438-2	2.5 mg/Kg
A5438-6, 7, 18	0.5 mg/Kg
A5428-1T, 2T, 3T	0.005 mg/L

Calibration Stds./Blk	Absorbance/Conc.
BLANK	0.002 Abs. / 0.0003 PPM
0.0200 PPM	0.097 Abs. / 0.0219 PPM
0.0500 PPM	0.246 Abs. / 0.0515 PPM
0.1000 PPM	0.474 Abs. / 0.1002 PPM
Correlation Coefficient:	

Check Standards	Concentration Found/True
~~Sample Blank~~	PPM
~~Method Blank~~	PPM
~~P.E. Std.~~ EPA #3 (2) 1/40	0.0271 / 0.0250 PPM
~~Internal Std.~~ CENS	0.0463 / 0.0750 PPM
MDL = 0.005 ppm	0.0048 / 0.0050 PPM

Comments:

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
A5438-Blk	<0.25	—	—	—	0.0333	*	0.04	83
A5438-20	0.6	0.6	0	0	0.0408	0.0113	0.04	74
TCLP A5428-Blk	<0.005	—	—	—	0.0320	*	0.04	80
A5428-2T	<0.005	<0.005	*	*	0.0410	*	50% of 0.1	82

Analyst: Michael A. Avila

QA/QC Approval: DeAnna M. Senegal

Analytikem-Houston

QUALITY CONTROL LOG

Page: 1 of 1

Parameter: MERCURY Hg

Matrix: SOILS, TCLP EXTR.

Method of Analysis: EPA SW-846 : 7470 AA - (COLD VAPOR/CONTINUOUS FLOW)

Date/Time: 13 FEB 91 / 0700

Lab Numbers	Detection Limits
A5438-1,2,6,7, 18, 19, 20	0.05 mg/kg
A5428-1T, 2T, 3T	0.001 mg/L

Calibration Stds./Blk	Absorbance/Conc.
BLANK	0.000 Abs / 0.0000 PPM
0.0020 PPM	0.015 Abs / 0.0018 PPM
0.0050 PPM	0.039 Abs / 0.0046 PPM
0.0100 PPM	0.073 Abs / 0.0100 PPM

Correlation Coefficient:

Comments:

Check Standards	Concentration Found/True
~~Sample Blank~~	PPM
~~Method Blank~~	PPM
~~P.E. Std.~~ EPA WP1085-1	0.0137 / 0.0100 PPM
~~Internal Std.~~ CCVS	0.0069 / 0.0075 PPM
MDL = 0.0010 PPM	0.0010 / 0.0010 PPM

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
BLANK-Spk	<0.001	—	—	—	0.0051	0.0000	0.005	102
A5428-3T	<0.001	<0.001	*	*	0.0046	*	0.005	92
A5438-6	<0.05	<0.05	*	*	0.0060	*	0.005	120

Analyst: Michael A. Avila

QA/QC Approval: DeAnna M. Senegal

ate: 11 Feb 11

ime: 0835

AnalytiKEM-Hous...

ICAP Quality Control Logs
Method EPA SW-846:6010, 3rd Ed.
Calibration, Standard and Blank Information

	Parameter / 100→25 MDL	Pb / 0.025	Cd / 0.010	Fe / 0.02	Cr / 0.02						
CALIBRATION STD/BLK	Blank	0.017	0.002	-0.001	0.001						
	5.00 ppm	5.15	4.79	-1.80	5.04						
	1.00 ppm	1.08	1.01	0.999	1.01						
	0.10 ppm	0.108	—	—	—						
	0.08 ppm	—	—	0.082	0.074						
	0.04 ppm	—	0.042	0.041	0.043						

CHECK STD	ICAP 19	1.00/1.00	0.996/1.00	1.02/1.00	0.998/1.00	Found/True					

SAMPLE BLANKS											

Analyst: James Mattis

QA/QC Approval: DeAnna M. Senegal

AnalytiKEM—Houston

ICAP Quality Control Logs
Method SW-846-3rd Ed., #6010
Duplicate and Spike Information

ate: 11 Feb 91

ime: 0835

* Below MDL

Paramcter / 100-525 MDL	Pb 0.025	Cd 0.010	Fe 0.02	Cr 0.02						
A5438-Blk	—	-0.001	—	0.003						
Duplicate		—	—	—						
% RPD		—		—						
Spike		0.092		0.195						
% Recovery	—	92		98						
A5438-6	0.012	-0.005		0.113						
Duplicate	0.010	-0.011		0.119						
% RPD	*	*		0.84						
Spike	2.28	0.084		0.285						
% Recovery	91	84		84						
A5422-Blk	-0.011	0.000	—	-0.001						
Duplicate	—	—		—						
% RPD	—	—		—						
Spike	0.854	0.083		0.202						
% Recovery	85	83		101						
A5422-7	-0.019	-0.002	0.010	0.029						
Duplicate	-0.005	-0.001	0.010	0.031						
% RPD	*	*	*	6.66						
Spike	0.771	0.086	0.912	0.234						
% Recovery	77	86	91	84						
A5422-14	-0.012	-0.001	0.009	0.010						
Duplicate	-0.002	-0.001	0.010	0.009						
% RPD	*	*	*	*						
Spike	0.935	0.099	2.61	0.230						
% Recovery	94	99	104	95						

nalyst: James Matthews

QAQC Approval: DeAnna M. Senegal

ate: 11 Feb 91

ime: 0835

AnalytiKEM—Houston

ICAP Quality Control Logs
Method SW-846-3rd Ed., #6010
Duplicate and Spike Information

* Below MDL

Parameter / 100→25 MDL	Pb / 0.025	Cd / 0.010	Fe / 0.02	Cr / 0.02						
A5422-21	-0.007	-0.001	0.003	0.013						
Duplicate	-0.009	-0.001	0.003	0.014						
% RPD	*	*	*	*						
Spike	0.213	0.091	1.00	0.233						
% Recovery	81	91	100	93						
A5430-3	—	0.040	—	—						
Duplicate		0.038								
% RPD		5.13								
Spike		2.47	—							
% Recovery	—	96	—	—						
Duplicate										
% RPD										
Spike										
% Recovery										
Duplicate										
% RPD										
Spike										
% Recovery										
Duplicate										
% RPD										
Sp										
Recovery										

alyst: James Matthews

QAQC Approval: DeAnna M. Senegal

QUALITY CONTROL LOG

Page: 1 of 1

Parameter: pH on Soil

Matrix: Soil

Method of Analysis: EPA SW-846:9045

Date/Time: 2-13-91/0900

Lab Numbers	Detection Limits
A5438 (1,2,6,7,18-20)	0.01 units

Calibration Stds./Blk	Absorbance/Conc.
Buffer 10.0 } calib	
4.0 }	
7.0	7.04
Correlation Coefficient:	

Comments:

Check Standards	Concentration Found/True
Sample Blank	ppm
Method Blank	ppm
P.E. Std.	ppm
Internal Std.	ppm
Buffer 7.0 CCVS	7.10/7.0
Buffer 12.0	11.80/12.0

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
A5438-20	8.52	8.52	0	0				

Analyst: Erica M. Edwards

QA/QC Approval: DeAnna M. Senegal

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-1
Client Sample ID: B-3B-A-1-3

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 16.8

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 0.99

SEMIVOLATILE COMPOUNDS

CAS Number		ug/Kg	
108-95-2	Phenol	390	<
62-53-3	Aniline	390	<
111-44-4	bis(2-Chloroethyl)Ether	390	<
95-57-8	2-Chlorophenol	390	<
541-73-1	1,3-Dichlorobenzene	390	<
106-46-7	1,4-Dichlorobenzene	390	<
100-51-6	Benzyl Alcohol	390	<
95-50-1	1,2-Dichlorobenzene	390	<
95-48-7	2-Methylphenol	390	<
39638-32-9	bis(2-Chloroisopropyl)Ether	390	<
106-44-5	4-Methylphenol	390	<
621-64-7	N-Nitroso-Di-n-Propylamine	390	<
67-72-1	Hexachloroethane	390	<
98-95-3	Nitrobenzene	390	<
78-59-1	Isophorone	390	<
88-75-5	2-Nitrophenol	390	<
105-67-9	2,4-Dimethylphenol	390	<
65-85-0	Benzoic Acid	1900	<
111-91-1	bis(2-Chloroethoxy)Methane	390	<
120-83-2	2,4-Dichlorophenol	390	<
[illegible]-82-1	1,2,4-Trichlorobenzene	390	<
[illegible]-20-3	Naphthalene	390	<
106-47-8	4-Chloroaniline	390	<
87-68-3	Hexachlorobutadiene	390	<
59-50-7	4-Chloro-3-Methylphenol	390	<
91-57-6	2-Methylnaphthalene	390	<
77-47-4	Hexachlorocyclopentadiene	390	<
88-06-2	2,4,6-Trichlorophenol	390	<
95-95-4	2,4,5-Trichlorophenol	1900	<
91-58-7	2-Chloronaphthalene	390	<
88-74-4	2-Nitroaniline	1900	<
131-11-3	Dimethyl Phthalate	390	<
208-96-8	Acenaphthylene	390	<

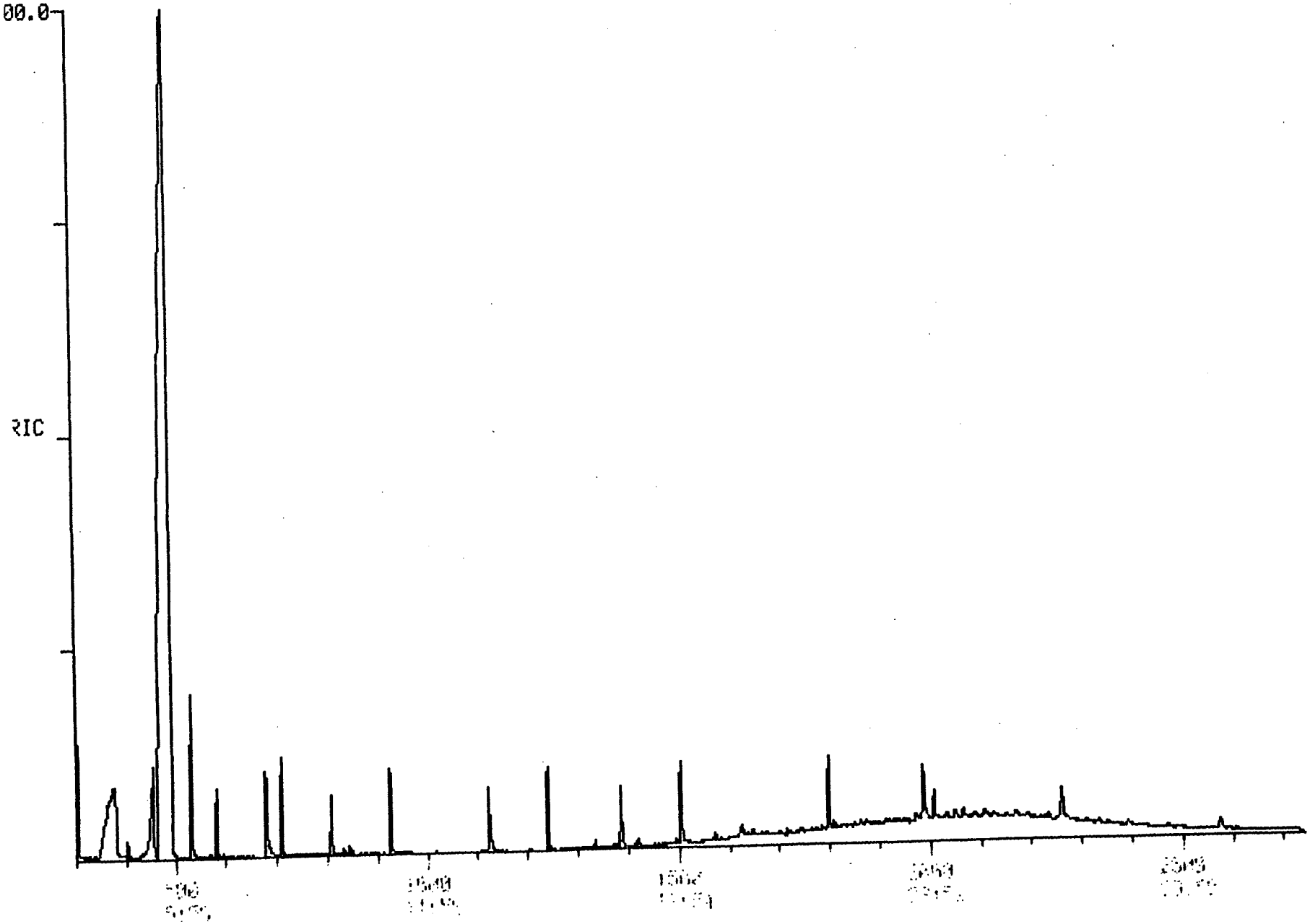
CAS Number		ug/Kg	
606-20-2	2,6-Dinitrotoluene	390	<
99-09-2	3-Nitroaniline	1900	<
83-32-9	Acenaphthene	390	<
51-28-5	2,4-Dinitrophenol	1900	<
100-02-7	4-Nitrophenol	1900	<
132-64-9	Dibenzofuran	390	<
121-14-2	2,4-Dinitrotoluene	390	<
84-66-2	Diethylphthalate	390	<
7005-72-3	4-Chlorophenyl phenyl ether	390	<
86-73-7	Fluorene	390	<
100-01-6	4-Nitroaniline	1900	<
534-52-1	4,6-Dinitro-2-Methylphenol	1900	<
86-30-6	N-Nitrosodiphenylamine (1)	390	<
101-55-3	4-Bromophenyl phenyl ether	390	<
118-74-1	Hexachlorobenzene	390	<
87-86-5	Pentachlorophenol	1900	<
85-01-8	Phenanthrene	390	<
120-12-7	Anthracene	390	<
84-74-2	Di-n-Butylphthalate	160	W
206-44-0	Fluoranthene	390	<
129-00-0	Pyrene	390	<
85-68-7	Butylbenzylphthalate	390	<
91-94-1	3,3'-Dichlorobenzidine	790	<
56-55-3	Benzo(a)Anthracene	390	<
117-81-7	bis(2-Ethylhexyl)Phthalate	270	W
218-01-9	Chrysene	390	<
117-84-0	Di-n-Octyl Phthalate	390	<
205-99-2	Benzo(b)Fluoranthene	390	<
207-08-9	Benzo(k)Fluoranthene	390	<
50-32-8	Benzo(a)Pyrene	390	<
193-39-5	Indeno(1,2,3-cd)Pyrene	390	<
53-70-3	Dibenz(a,h)Anthracene	390	<
191-24-2	Benzo(g,h,i)Perylene	390	<

The Lab ID for data on this page is A54381.
(1) - Cannot be separated from diphenylamine

W - Reported value is less than the quantitation limit.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC DATA: A54381 #1 SCANS 300 TO 2741
02/08/91 16:41:00 CALI: A54381 #3
SAMPLE: CLP,A5438,A5438,B-3B-A-1-3,LOW,SOIL,A5438-1,BNA,EPA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

1433600.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-2
Client Sample ID: B-3B-B-5-7

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 25.4

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 1.0

SEMIVOLATILE COMPOUNDS

CAS Number		ug/Kg	
108-95-2	Phenol	440	<
62-53-3	Aniline	440	<
111-44-4	bis(2-Chloroethyl)Ether	440	<
95-57-8	2-Chlorophenol	440	<
541-73-1	1,3-Dichlorobenzene	440	<
106-46-7	1,4-Dichlorobenzene	440	<
100-51-6	Benzyl Alcohol	440	<
95-50-1	1,2-Dichlorobenzene	440	<
95-48-7	2-Methylphenol	440	<
39638-32-9	bis(2-Chloroisopropyl)Ether	440	<
106-44-5	4-Methylphenol	440	<
621-64-7	N-Nitroso-Di-n-Propylamine	440	<
67-72-1	Hexachloroethane	440	<
98-95-3	Nitrobenzene	440	<
78-59-1	Isophorone	440	<
88-75-5	2-Nitrophenol	440	<
105-67-9	2,4-Dimethylphenol	440	<
65-85-0	Benzoic Acid	2100	<
111-91-1	bis(2-Chloroethoxy)Methane	440	<
120-83-2	2,4-Dichlorophenol	440	<
[illegible]0-82-1	1,2,4-Trichlorobenzene	440	<
[illegible]20-3	Naphthalene	440	<
106-47-8	4-Chloroaniline	440	<
87-68-3	Hexachlorobutadiene	440	<
59-50-7	4-Chloro-3-Methylphenol	440	<
91-57-6	2-Methylnaphthalene	440	<
77-47-4	Hexachlorocyclopentadiene	440	<
88-06-2	2,4,6-Trichlorophenol	440	<
95-95-4	2,4,5-Trichlorophenol	2100	<
91-58-7	2-Chloronaphthalene	440	<
88-74-4	2-Nitroaniline	2100	<
131-11-3	Dimethyl Phthalate	440	<
208-96-8	Acenaphthylene	440	<

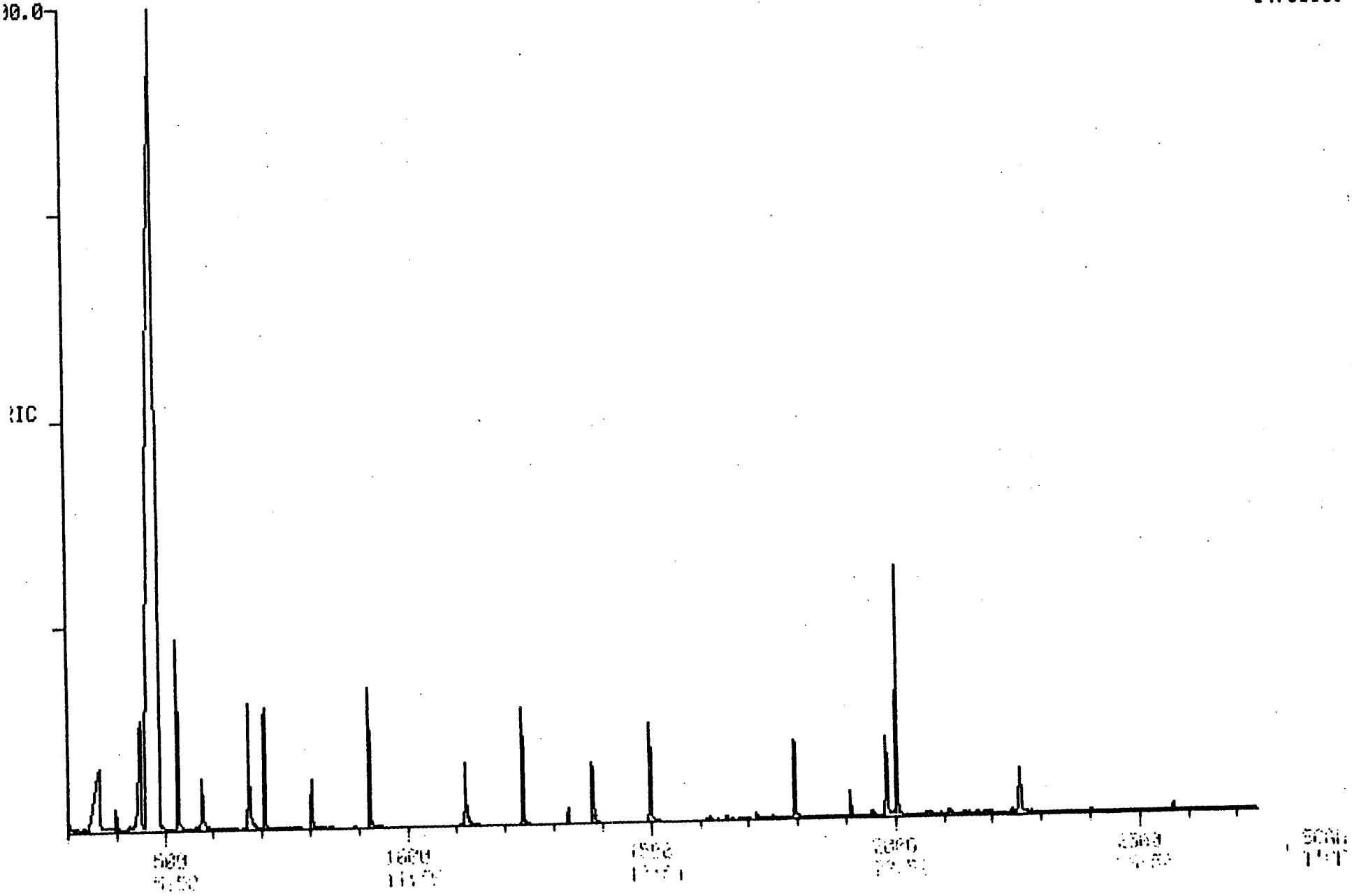
CAS Number		ug/Kg	
606-20-2	2,6-Dinitrotoluene	440	<
99-09-2	3-Nitroaniline	2100	<
83-32-9	Acenaphthene	440	<
51-28-5	2,4-Dinitrophenol	2100	<
100-02-7	4-Nitrophenol	2100	<
132-64-9	Dibenzofuran	440	<
121-14-2	2,4-Dinitrotoluene	440	<
84-66-2	Diethylphthalate	440	<
7005-72-3	4-Chlorophenyl phenyl ether	440	<
86-73-7	Fluorene	440	<
100-01-6	4-Nitroaniline	2100	<
534-52-1	4,6-Dinitro-2-Methylphenol	2100	<
86-30-6	N-Nitrosodiphenylamine (1)	440	<
101-55-3	4-Bromophenyl phenyl ether	440	<
118-74-1	Hexachlorobenzene	440	<
87-86-5	Pentachlorophenol	2100	<
85-01-8	Phenanthrene	440	<
120-12-7	Anthracene	440	<
84-74-2	Di-n-Butylphthalate	440	<
206-44-0	Fluoranthene	440	<
129-00-0	Pyrene	440	<
85-68-7	Butylbenzylphthalate	440	<
91-94-1	3,3'-Dichlorobenzidine	880	<
56-55-3	Benzo(a)Anthracene	440	<
117-81-7	bis(2-Ethylhexyl)Phthalate	2300	
218-01-9	Chrysene	440	<
117-84-0	Di-n-Octyl Phthalate	440	<
205-99-2	Benzo(b)Fluoranthene	440	<
207-08-9	Benzo(k)Fluoranthene	440	<
50-32-8	Benzo(a)Pyrene	440	<
193-39-5	Indeno(1,2,3-cd)Pyrene	440	<
53-70-3	Dibenz(a,h)Anthracene	440	<
191-24-2	Benzo(g,h,i)Perylene	440	<

The Lab ID for data on this page is A54382.
(1) - Cannot be separated from diphenylamine

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC DATA: A54382 #1 SCANS 300 TO 2741
02/08/91 17:16:00 CALI: A54382 #3
SAMPLE: CLP,A5438,A5438,B-3B-B-5-7,LOW,SOIL,A5438-2,BNA,EPA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

1476610.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-6
ent Sample ID: B-4B-A-1-3

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 16.8

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 1.0

SEMIVOLATILE COMPOUNDS

CAS Number		ug/Kg		CAS Number		ug/Kg	
108-95-2	Phenol	400	<	606-20-2	2,6-Dinitrotoluene	400	<
62-53-3	Aniline	400	<	99-09-2	3-Nitroaniline	1900	<
111-44-4	bis(2-Chloroethyl)Ether	400	<	83-32-9	Acenaphthene	400	<
95-57-8	2-Chlorophenol	400	<	51-28-5	2,4-Dinitrophenol	1900	<
541-73-1	1,3-Dichlorobenzene	400	<	100-02-7	4-Nitrophenol	1900	<
106-46-7	1,4-Dichlorobenzene	400	<	132-64-9	Dibenzofuran	400	<
100-51-6	Benzyl Alcohol	400	<	121-14-2	2,4-Dinitrotoluene	400	<
95-50-1	1,2-Dichlorobenzene	400	<	84-66-2	Diethylphthalate	400	<
95-48-7	2-Methylphenol	400	<	7005-72-3	4-Chlorophenyl phenyl ether	400	<
39638-32-9	bis(2-Chloroisopropyl)Ether	400	<	86-73-7	Fluorene	400	<
106-44-5	4-Methylphenol	400	<	100-01-6	4-Nitroaniline	1900	<
621-64-7	N-Nitroso-Di-n-Propylamine	400	<	534-52-1	4,6-Dinitro-2-Methylphenol	1900	<
67-72-1	Hexachloroethane	400	<	86-30-6	N-Nitrosodiphenylamine (1)	400	<
98-95-3	Nitrobenzene	400	<	101-55-3	4-Bromophenyl phenyl ether	400	<
78-59-1	Isophorone	400	<	118-74-1	Hexachlorobenzene	400	<
88-75-5	2-Nitrophenol	400	<	87-86-5	Pentachlorophenol	1900	<
105-67-9	2,4-Dimethylphenol	400	<	85-01-8	Phenanthrene	400	<
65-85-0	Benzoic Acid	1900	<	120-12-7	Anthracene	400	<
111-91-1	bis(2-Chloroethoxy)Methane	400	<	84-74-2	Di-n-Butylphthalate	400	<
120-83-2	2,4-Dichlorophenol	400	<	206-44-0	Fluoranthene	400	<
1-82-1	1,2,4-Trichlorobenzene	400	<	129-00-0	Pyrene	400	<
-20-3	Naphthalene	400	<	85-68-7	Butylbenzylphthalate	400	<
106-47-8	4-Chloroaniline	400	<	91-94-1	3,3'-Dichlorobenzidine	790	<
87-68-3	Hexachlorobutadiene	400	<	56-55-3	Benzo(a)Anthracene	400	<
59-50-7	4-Chloro-3-Methylphenol	400	<	117-81-7	bis(2-Ethylhexyl)Phthalate	740	
91-57-6	2-Methylnaphthalene	400	<	218-01-9	Chrysene	400	<
77-47-4	Hexachlorocyclopentadiene	400	<	117-84-0	Di-n-Octyl Phthalate	400	<
88-06-2	2,4,6-Trichlorophenol	400	<	205-99-2	Benzo(b)Fluoranthene	400	<
95-95-4	2,4,5-Trichlorophenol	1900	<	207-08-9	Benzo(k)Fluoranthene	400	<
91-58-7	2-Chloronaphthalene	400	<	50-32-8	Benzo(a)Pyrene	400	<
88-74-4	2-Nitroaniline	1900	<	193-39-5	Indeno(1,2,3-cd)Pyrene	400	<
131-11-3	Dimethyl Phthalate	400	<	53-70-3	Dibenz(a,h)Anthracene	400	<
208-96-8	Acenaphthylene	400	<	191-24-2	Benzo(g,h,i)Perylene	400	<

The Lab ID for data on this page is A54386.
(1) - Cannot be separated from diphenylamine

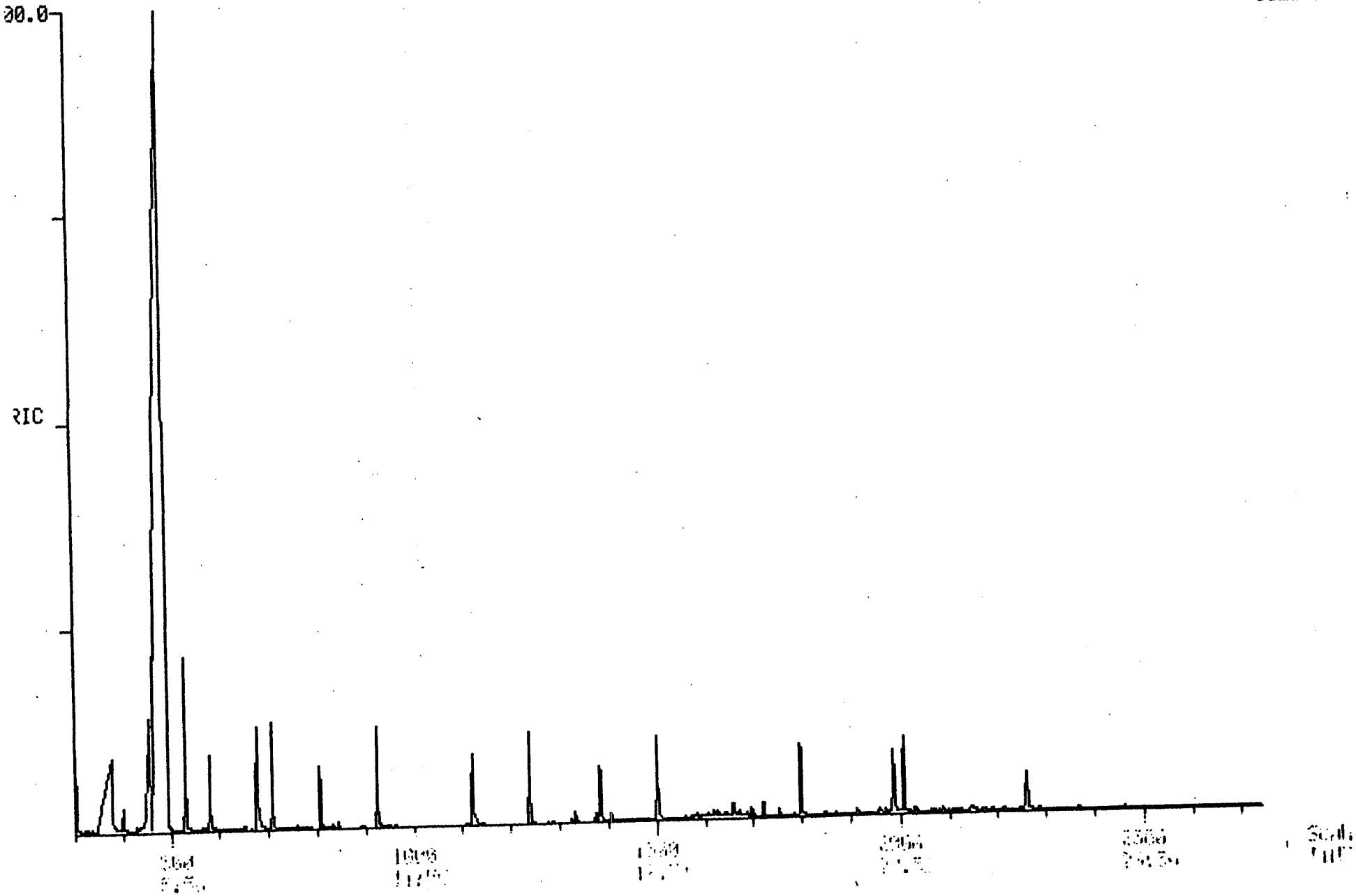
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 17:56:00
SAMPLE: CLP,A5438,A5438,B-4B-A-1-3,LOW,SOIL,A5438-6,BNA,EPA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54386 #1
CALI: A54386 #3

SCANS 300 TO 2741

1523710.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-7
Client Sample ID: B-4B-A-5-7

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 17.7

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 1.0

SEMIVOLATILE COMPOUNDS

CAS Number		ug/Kg	
108-95-2	Phenol	400	<
62-53-3	Aniline	400	<
111-44-4	bis(2-Chloroethyl)Ether	400	<
95-57-8	2-Chlorophenol	400	<
541-73-1	1,3-Dichlorobenzene	400	<
106-46-7	1,4-Dichlorobenzene	400	<
100-51-6	Benzyl Alcohol	400	<
95-50-1	1,2-Dichlorobenzene	400	<
95-48-7	2-Methylphenol	400	<
39638-32-9	bis(2-Chloroisopropyl)Ether	400	<
106-44-5	4-Methylphenol	400	<
621-64-7	N-Nitroso-Di-n-Propylamine	400	<
67-72-1	Hexachloroethane	400	<
98-95-3	Nitrobenzene	400	<
78-59-1	Isophorone	400	<
88-75-5	2-Nitrophenol	400	<
105-67-9	2,4-Dimethylphenol	400	<
65-85-0	Benzoic Acid	1900	<
111-91-1	bis(2-Chloroethoxy)Methane	400	<
120-83-2	2,4-Dichlorophenol	400	<
[illegible]-82-1	1,2,4-Trichlorobenzene	400	<
[illegible]-20-3	Naphthalene	400	<
106-47-8	4-Chloroaniline	400	<
87-68-3	Hexachlorobutadiene	400	<
59-50-7	4-Chloro-3-Methylphenol	400	<
91-57-6	2-Methylnaphthalene	400	<
77-47-4	Hexachlorocyclopentadiene	400	<
88-06-2	2,4,6-Trichlorophenol	400	<
95-95-4	2,4,5-Trichlorophenol	1900	<
91-58-7	2-Chloronaphthalene	400	<
88-74-4	2-Nitroaniline	1900	<
131-11-3	Dimethyl Phthalate	400	<
208-96-8	Acenaphthylene	400	<

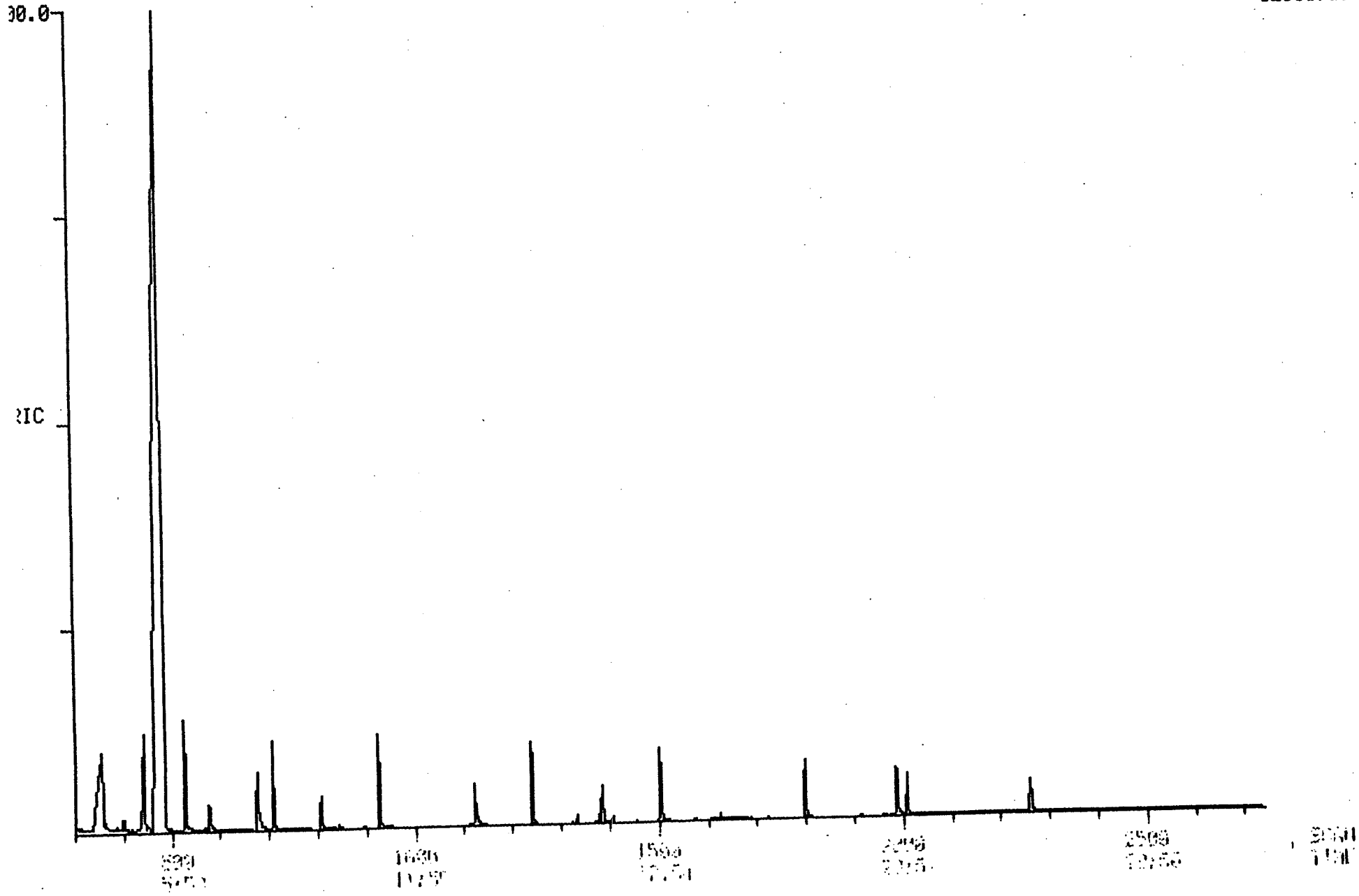
CAS Number		ug/Kg	
606-20-2	2,6-Dinitrotoluene	400	<
99-09-2	3-Nitroaniline	1900	<
83-32-9	Acenaphthene	400	<
51-28-5	2,4-Dinitrophenol	1900	<
100-02-7	4-Nitrophenol	1900	<
132-64-9	Dibenzofuran	400	<
121-14-2	2,4-Dinitrotoluene	400	<
84-66-2	Diethylphthalate	400	<
7005-72-3	4-Chlorophenyl phenyl ether	400	<
86-73-7	Fluorene	400	<
100-01-6	4-Nitroaniline	1900	<
534-52-1	4,6-Dinitro-2-Methylphenol	1900	<
86-30-6	N-Nitrosodiphenylamine (1)	400	<
101-55-3	4-Bromophenyl phenyl ether	400	<
118-74-1	Hexachlorobenzene	400	<
87-86-5	Pentachlorophenol	1900	<
85-01-8	Phenanthrene	400	<
120-12-7	Anthracene	400	<
84-74-2	Di-n-Butylphthalate	400	<
206-44-0	Fluoranthene	400	<
129-00-0	Pyrene	400	<
85-68-7	Butylbenzylphthalate	400	<
91-94-1	3,3'-Dichlorobenzidine	800	<
56-55-3	Benzo(a)Anthracene	400	<
117-81-7	bis(2-Ethylhexyl)Phthalate	510	
218-01-9	Chrysene	400	<
117-84-0	Di-n-Octyl Phthalate	400	<
205-99-2	Benzo(b)Fluoranthene	400	<
207-08-9	Benzo(k)Fluoranthene	400	<
50-32-8	Benzo(a)Pyrene	400	<
193-39-5	Indeno(1,2,3-cd)Pyrene	400	<
53-70-3	Dibenz(a,h)Anthracene	400	<
191-24-2	Benzo(g,h,i)Perylene	400	<

The Lab ID for data on this page is A54387.
(1) - Cannot be separated from diphenylamine

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC DATA: A54387 #1 SCANS 300 TO 2741
02/08/91 18:36:00 CALI: A54387 #3
SAMPLE: CLP,A5438,A5438,B-48-A-5-7,LOW,SOIL,A5438-7,BNA,EPA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

1261570.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-18
ent Sample ID: BKG-2B-C-10-1

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 17.4

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 0.99

SEMIVOLATILE COMPOUNDS

CAS Number		ug/Kg	
108-95-2	Phenol	400	<
62-53-3	Aniline	400	<
111-44-4	bis(2-Chloroethyl)Ether	400	<
95-57-8	2-Chlorophenol	400	<
541-73-1	1,3-Dichlorobenzene	400	<
106-46-7	1,4-Dichlorobenzene	400	<
100-51-6	Benzyl Alcohol	400	<
95-50-1	1,2-Dichlorobenzene	400	<
95-48-7	2-Methylphenol	400	<
39638-32-9	bis(2-Chloroisopropyl)Ether	400	<
106-44-5	4-Methylphenol	400	<
621-64-7	N-Nitroso-Di-n-Propylamine	400	<
67-72-1	Hexachloroethane	400	<
98-95-3	Nitrobenzene	400	<
78-59-1	Isophorone	400	<
88-75-5	2-Nitrophenol	400	<
105-67-9	2,4-Dimethylphenol	400	<
65-85-0	Benzoic Acid	1900	<
111-91-1	bis(2-Chloroethoxy)Methane	400	<
120-83-2	2,4-Dichlorophenol	400	<
9-82-1	1,2,4-Trichlorobenzene	400	<
-20-3	Naphthalene	400	<
106-47-8	4-Chloroaniline	400	<
87-68-3	Hexachlorobutadiene	400	<
59-50-7	4-Chloro-3-Methylphenol	400	<
91-57-6	2-Methylnaphthalene	400	<
77-47-4	Hexachlorocyclopentadiene	400	<
88-06-2	2,4,6-Trichlorophenol	400	<
95-95-4	2,4,5-Trichlorophenol	1900	<
91-58-7	2-Chloronaphthalene	400	<
88-74-4	2-Nitroaniline	1900	<
131-11-3	Dimethyl Phthalate	400	<
208-96-8	Acenaphthylene	400	<

CAS Number		ug/Kg	
606-20-2	2,6-Dinitrotoluene	400	<
99-09-2	3-Nitroaniline	1900	<
83-32-9	Acenaphthene	400	<
51-28-5	2,4-Dinitrophenol	1900	<
100-02-7	4-Nitrophenol	1900	<
132-64-9	Dibenzofuran	400	<
121-14-2	2,4-Dinitrotoluene	400	<
84-66-2	Diethylphthalate	400	<
7005-72-3	4-Chlorophenyl phenyl ether	400	<
86-73-7	Fluorene	400	<
100-01-6	4-Nitroaniline	1900	<
534-52-1	4,6-Dinitro-2-Methylphenol	1900	<
86-30-6	N-Nitrosodiphenylamine (1)	400	<
101-55-3	4-Bromophenyl phenyl ether	400	<
118-74-1	Hexachlorobenzene	400	<
87-86-5	Pentachlorophenol	1900	<
85-01-8	Phenanthrene	400	<
120-12-7	Anthracene	400	<
84-74-2	Di-n-Butylphthalate	400	<
206-44-0	Fluoranthene	400	<
129-00-0	Pyrene	400	<
85-68-7	Butylbenzylphthalate	400	<
91-94-1	3,3'-Dichlorobenzidine	790	<
56-55-3	Benzo(a)Anthracene	400	<
117-81-7	bis(2-Ethylhexyl)Phthalate	400	<
218-01-9	Chrysene	400	<
117-84-0	Di-n-Octyl Phthalate	400	<
205-99-2	Benzo(b)Fluoranthene	400	<
207-08-9	Benzo(k)Fluoranthene	400	<
50-32-8	Benzo(a)Pyrene	400	<
193-39-5	Indeno(1,2,3-cd)Pyrene	400	<
53-70-3	Dibenz(a,h)Anthracene	400	<
191-24-2	Benzo(g,h,i)Perylene	400	<

The Lab ID for data on this page is A543818.
(1) - Cannot be separated from diphenylamine

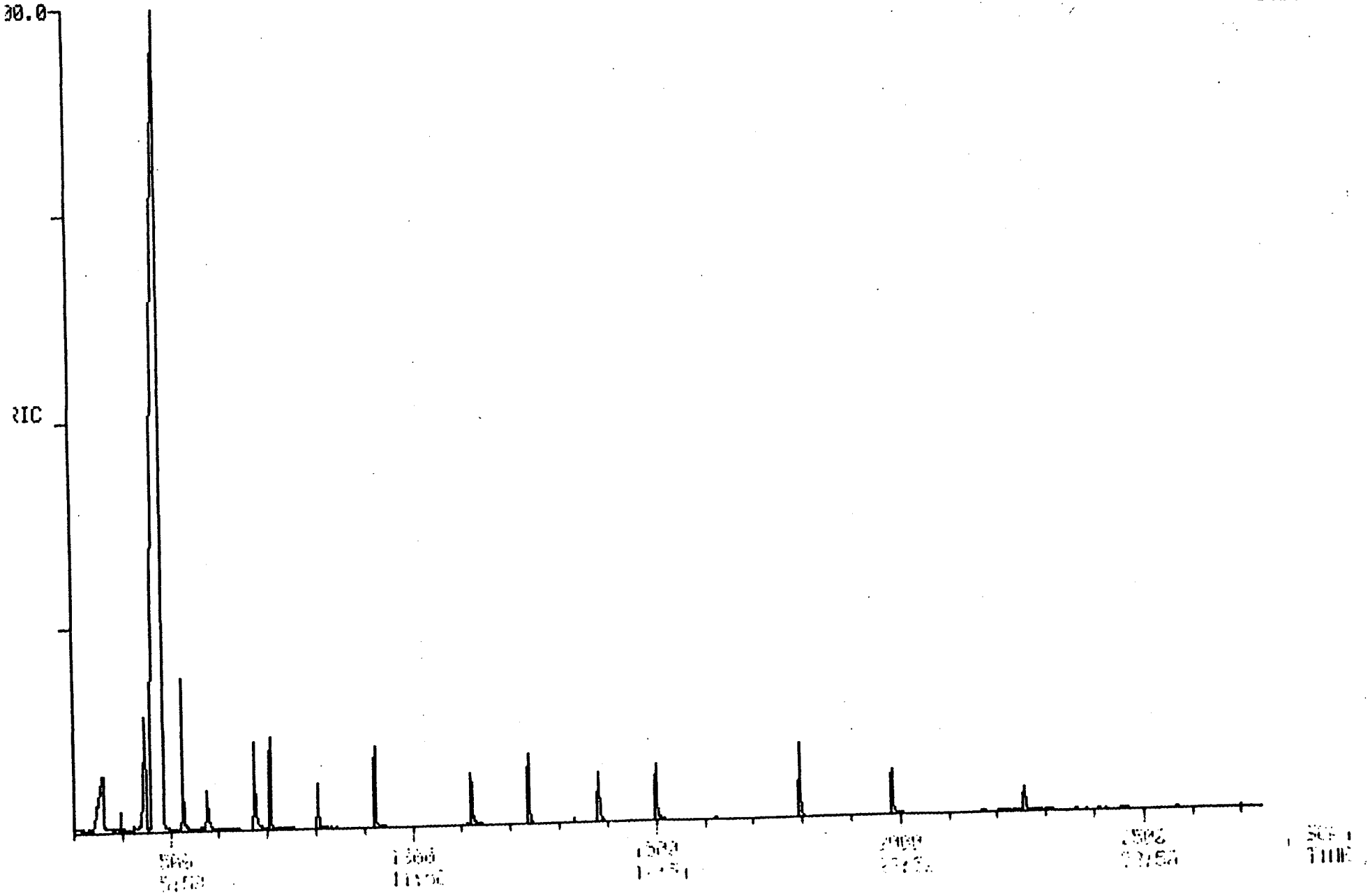
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 19:15:00
SAMPLE: CLP,A5438,A5438,BKG-2B-C-10-12,LOW,SOIL,A5438-18,BNA,EPA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543818 #1
CALI: A543818 #3

SCANS 300 TO 2741

1464320.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-19
ent Sample ID: BKG-2B-D-15-1

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 21.0

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 1.0

SEMIVOLATILE COMPOUNDS

CAS Number		ug/Kg	
108-95-2	Phenol	420	<
62-53-3	Aniline	420	<
111-44-4	bis(2-Chloroethyl)Ether	420	<
95-57-8	2-Chlorophenol	420	<
541-73-1	1,3-Dichlorobenzene	420	<
106-46-7	1,4-Dichlorobenzene	420	<
100-51-6	Benzyl Alcohol	420	<
95-50-1	1,2-Dichlorobenzene	420	<
95-48-7	2-Methylphenol	420	<
39638-32-9	bis(2-Chloroisopropyl)Ether	420	<
106-44-5	4-Methylphenol	420	<
621-64-7	N-Nitroso-Di-n-Propylamine	420	<
67-72-1	Hexachloroethane	420	<
98-95-3	Nitrobenzene	420	<
78-59-1	Isophorone	420	<
88-75-5	2-Nitrophenol	420	<
105-67-9	2,4-Dimethylphenol	420	<
65-85-0	Benzoic Acid	2000	<
111-91-1	bis(2-Chloroethoxy)Methane	420	<
120-83-2	2,4-Dichlorophenol	420	<
9-82-1	1,2,4-Trichlorobenzene	420	<
-20-3	Naphthalene	420	<
106-47-8	4-Chloroaniline	420	<
87-68-3	Hexachlorobutadiene	420	<
59-50-7	4-Chloro-3-Methylphenol	420	<
91-57-6	2-Methylnaphthalene	420	<
77-47-4	Hexachlorocyclopentadiene	420	<
88-06-2	2,4,6-Trichlorophenol	420	<
95-95-4	2,4,5-Trichlorophenol	2000	<
91-58-7	2-Chloronaphthalene	420	<
88-74-4	2-Nitroaniline	2000	<
131-11-3	Dimethyl Phthalate	420	<
208-96-8	Acenaphthylene	420	<

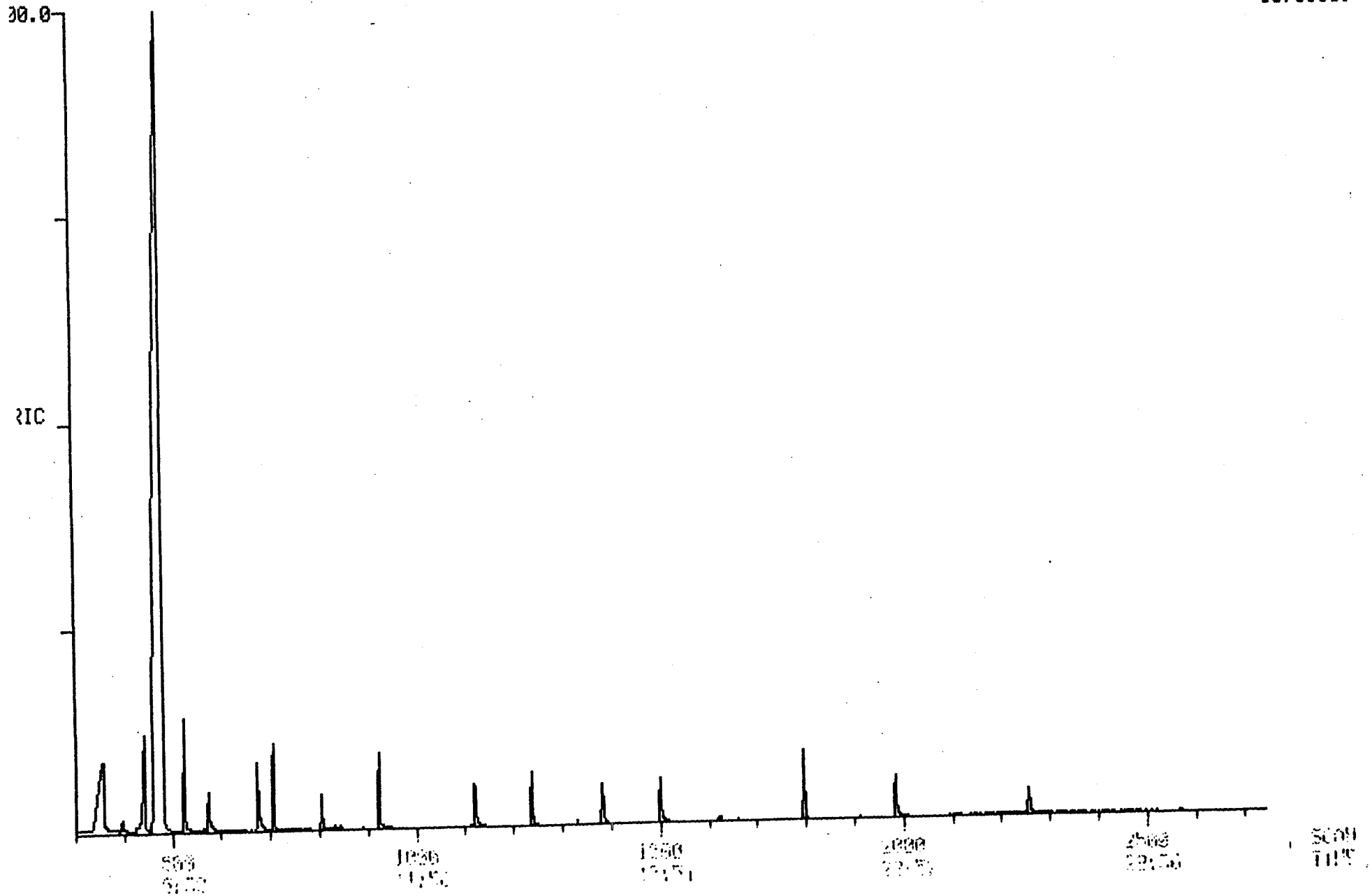
CAS Number		ug/Kg	
606-20-2	2,6-Dinitrotoluene	420	<
99-09-2	3-Nitroaniline	2000	<
83-32-9	Acenaphthene	420	<
51-28-5	2,4-Dinitrophenol	2000	<
100-02-7	4-Nitrophenol	2000	<
132-64-9	Dibenzofuran	420	<
121-14-2	2,4-Dinitrotoluene	420	<
84-66-2	Diethylphthalate	420	<
7005-72-3	4-Chlorophenyl phenyl ether	420	<
86-73-7	Fluorene	420	<
100-01-6	4-Nitroaniline	2000	<
534-52-1	4,6-Dinitro-2-Methylphenol	2000	<
86-30-6	N-Nitrosodiphenylamine (1)	420	<
101-55-3	4-Bromophenyl phenyl ether	420	<
118-74-1	Hexachlorobenzene	420	<
87-86-5	Pentachlorophenol	2000	<
85-01-8	Phenanthrene	420	<
120-12-7	Anthracene	420	<
84-74-2	Di-n-Butylphthalate	420	<
206-44-0	Fluoranthene	420	<
129-00-0	Pyrene	420	<
85-68-7	Butylbenzylphthalate	420	<
91-94-1	3,3'-Dichlorobenzidine	830	<
56-55-3	Benzo(a)Anthracene	420	<
117-81-7	bis(2-Ethylhexyl)Phthalate	420	<
218-01-9	Chrysene	420	<
117-84-0	Di-n-Octyl Phthalate	420	<
205-99-2	Benzo(b)Fluoranthene	420	<
207-08-9	Benzo(k)Fluoranthene	420	<
50-32-8	Benzo(a)Pyrene	420	<
193-39-5	Indeno(1,2,3-cd)Pyrene	420	<
53-70-3	Dibenz(a,h)Anthracene	420	<
191-24-2	Benzo(g,h,i)Perylene	420	<

The Lab ID for data on this page is A543819.
(1) - Cannot be separated from diphenylamine

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC DATA: A543813 #1 SCANS 300 TO 2741
02/08/91 19:55:00 CALI: A543813 #3
SAMPLE: CLP,A5438,A5438,BKG-2B-D-15-17,LOW,SOIL,A5438-19,BNA,EPA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

1370110.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-20
Client Sample ID: BKG-2B-E-20-2

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 21.2

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 0.99

SEMIVOLATILE COMPOUNDS

CAS Number		ug/Kg	
108-95-2	Phenol	420	<
62-53-3	Aniline	420	<
111-44-4	bis(2-Chloroethyl)Ether	420	<
95-57-8	2-Chlorophenol	420	<
541-73-1	1,3-Dichlorobenzene	420	<
106-46-7	1,4-Dichlorobenzene	420	<
100-51-6	Benzyl Alcohol	420	<
95-50-1	1,2-Dichlorobenzene	420	<
95-48-7	2-Methylphenol	420	<
39638-32-9	bis(2-Chloroisopropyl)Ether	420	<
106-44-5	4-Methylphenol	420	<
621-64-7	N-Nitroso-Di-n-Propylamine	420	<
67-72-1	Hexachloroethane	420	<
98-95-3	Nitrobenzene	420	<
78-59-1	Isophorone	420	<
88-75-5	2-Nitrophenol	420	<
105-67-9	2,4-Dimethylphenol	420	<
65-85-0	Benzoic Acid	2000	<
111-91-1	bis(2-Chloroethoxy)Methane	420	<
120-83-2	2,4-Dichlorophenol	420	<
[illegible]-82-1	1,2,4-Trichlorobenzene	420	<
[illegible]20-3	Naphthalene	420	<
106-47-8	4-Chloroaniline	420	<
87-68-3	Hexachlorobutadiene	420	<
59-50-7	4-Chloro-3-Methylphenol	420	<
91-57-6	2-Methylnaphthalene	420	<
77-47-4	Hexachlorocyclopentadiene	420	<
88-06-2	2,4,6-Trichlorophenol	420	<
95-95-4	2,4,5-Trichlorophenol	2000	<
91-58-7	2-Chloronaphthalene	420	<
88-74-4	2-Nitroaniline	2000	<
131-11-3	Dimethyl Phthalate	420	<
208-96-8	Acenaphthylene	420	<

CAS Number		ug/Kg	
606-20-2	2,6-Dinitrotoluene	420	<
99-09-2	3-Nitroaniline	2000	<
83-32-9	Acenaphthene	420	<
51-28-5	2,4-Dinitrophenol	2000	<
100-02-7	4-Nitrophenol	2000	<
132-64-9	Dibenzofuran	420	<
121-14-2	2,4-Dinitrotoluene	420	<
84-66-2	Diethylphthalate	420	<
7005-72-3	4-Chlorophenyl phenyl ether	420	<
86-73-7	Fluorene	420	<
100-01-6	4-Nitroaniline	2000	<
534-52-1	4,6-Dinitro-2-Methylphenol	2000	<
86-30-6	N-Nitrosodiphenylamine (1)	420	<
101-55-3	4-Bromophenyl phenyl ether	420	<
118-74-1	Hexachlorobenzene	420	<
87-86-5	Pentachlorophenol	2000	<
85-01-8	Phenanthrene	420	<
120-12-7	Anthracene	420	<
84-74-2	Di-n-Butylphthalate	420	<
206-44-0	Fluoranthene	420	<
129-00-0	Pyrene	420	<
85-68-7	Butylbenzylphthalate	420	<
91-94-1	3,3'-Dichlorobenzidine	830	<
56-55-3	Benzo(a)Anthracene	420	<
117-81-7	bis(2-Ethylhexyl)Phthalate	420	<
218-01-9	Chrysene	420	<
117-84-0	Di-n-Octyl Phthalate	420	<
205-99-2	Benzo(b)Fluoranthene	420	<
207-08-9	Benzo(k)Fluoranthene	420	<
50-32-8	Benzo(a)Pyrene	420	<
193-39-5	Indeno(1,2,3-cd)Pyrene	420	<
53-70-3	Dibenz(a,h)Anthracene	420	<
191-24-2	Benzo(g,h,i)Perylene	420	<

The Lab ID for data on this page is A543820.
(1) - Cannot be separated from diphenylamine

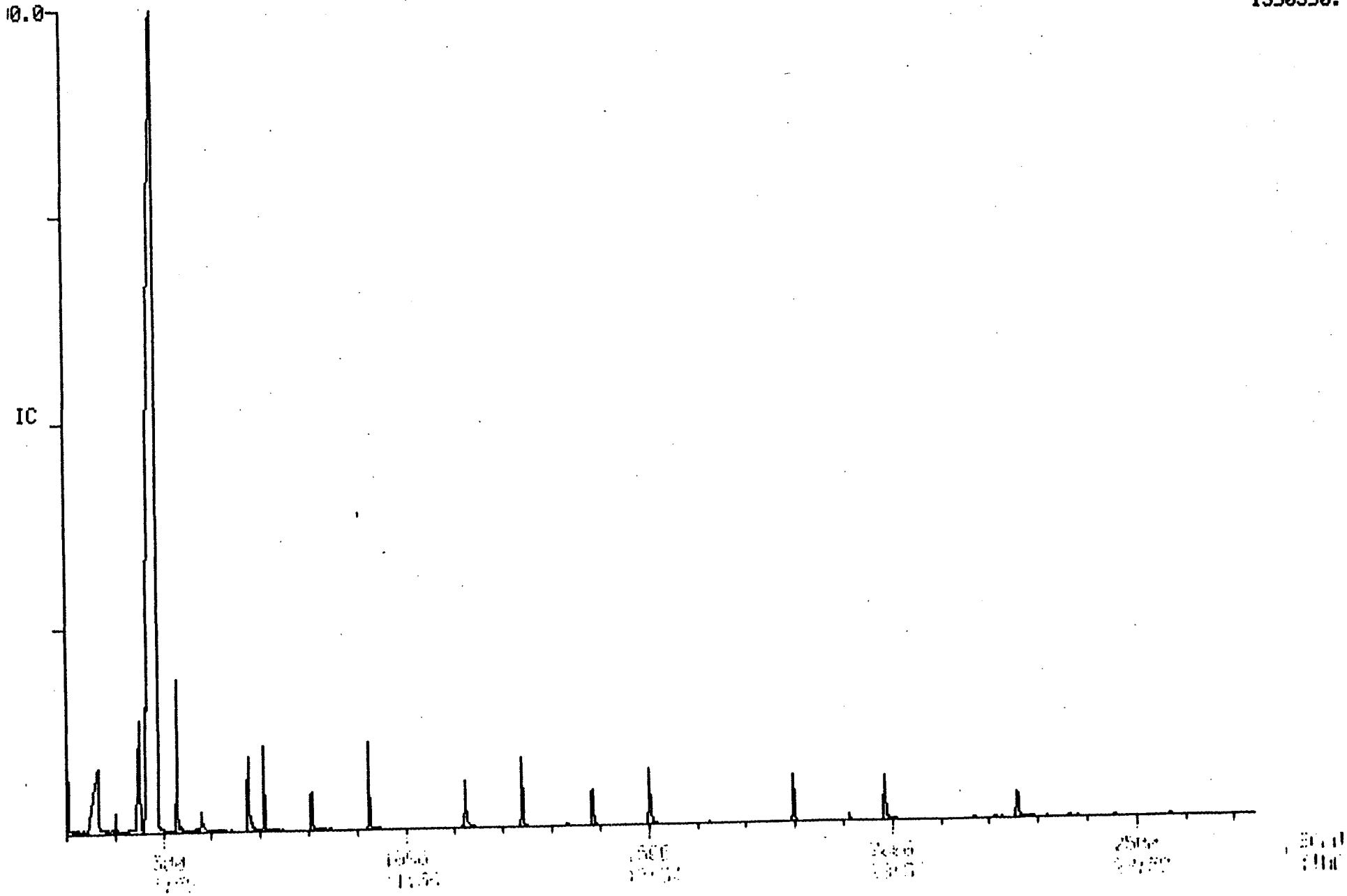
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 20:34:00
SAMPLE: CLP,A5438,A5438,BKG-2B-E-20-22,LOW,SOIL,A5438-20,BNA,EPA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543820 #1
CALI: A543820 #3

SCANS 300 TO 2741

1390590.



[illegible]ng Report
[illegible]8/91 10:21:00 + 7:32
[illegible]rument: FINN
[illegible]1 to #632 summed - #626 to #629 - #634 to #639
[illegible] Number:

Data: DF020891E1 # 631
Cali: CALTAB # 3
Analyst: BPB
Laboratory:

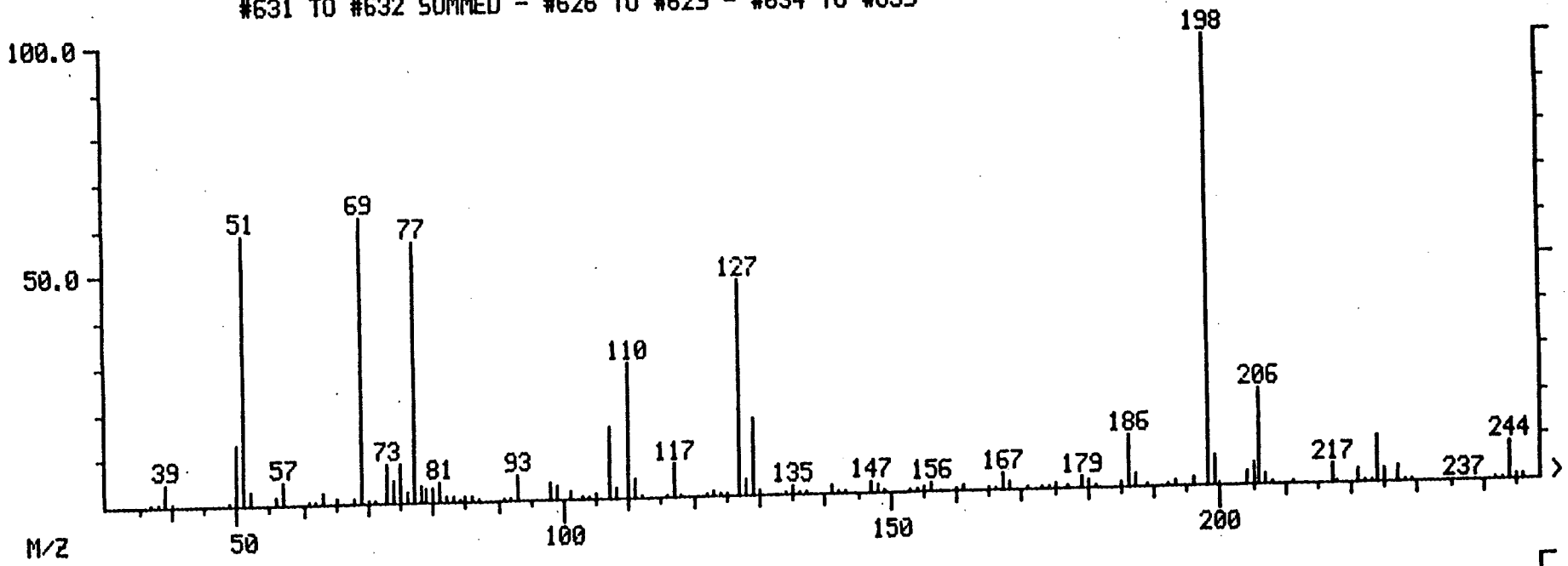
Base m/z: 198
RIC: 185856.
Acct. No.: 8506-091
Contract:

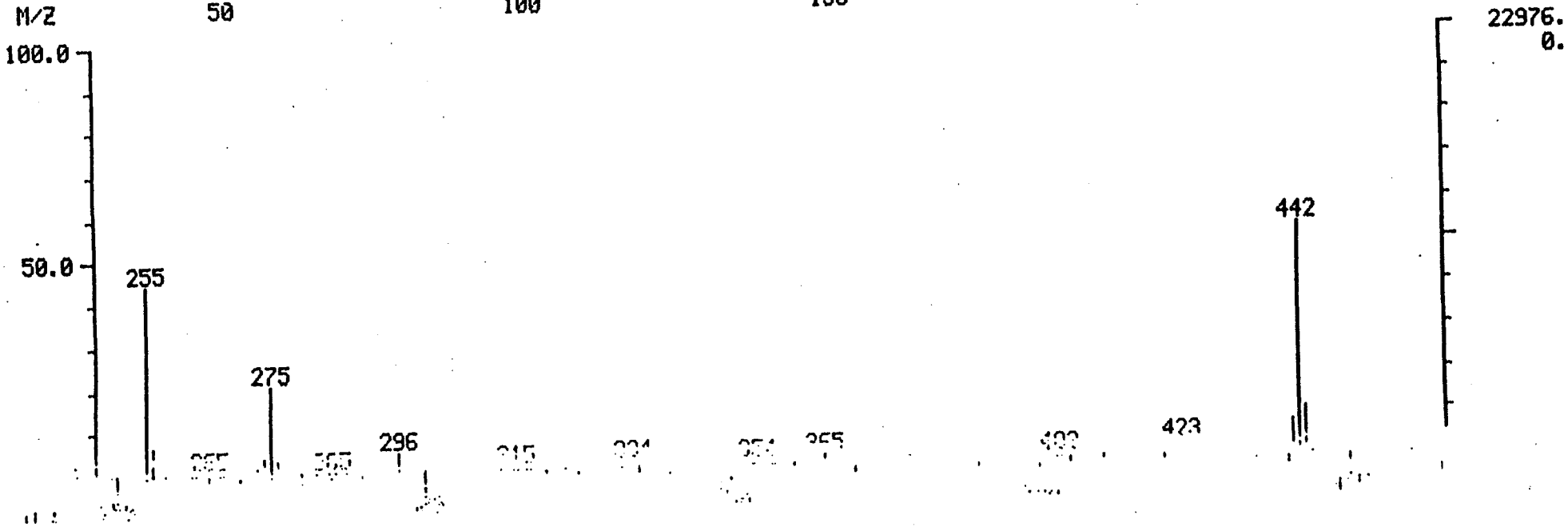
m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
[illegible]1	13424.	58.4	30.0	60.0	198	58.4	PASS
[illegible]8	218.	0.9	---	2.0	69	1.5	PASS
[illegible]9	14352.	62.5	---	---	---	62.5	PASS
[illegible]0	98.	0.4	---	2.0	69	0.7	PASS
[illegible]7	10896.	47.4	40.0	60.0	198	47.4	PASS
[illegible]7	0.	0.0	---	1.0	198	0.0	PASS
[illegible]8	22976.	100.0	100.0	---	---	100.0	PASS
[illegible]9	1506.	6.6	5.0	9.0	198	6.6	PASS
[illegible]5	4704.	20.5	10.0	30.0	198	20.5	PASS
[illegible]5	378.	1.6	1.0	---	198	1.6	PASS
[illegible]1	1740.	7.6	---	100.0	443	71.4	PASS
[illegible]2	12336.	53.7	40.0	---	198	53.7	PASS
[illegible]3	2436.	10.6	17.0	23.0	442	19.7	PASS

MASS SPECTRUM
02/08/91 10:21:00 + 7:32
SAMPLE: DFTPP 50 NG
CONDS.: I50E
TEMP: 248 DEG. C
#631 TO #632 SUMMED - #626 TO #629 - #634 TO #639

DATA: DF020991E1 #631
CALI: CALTAB #3

BASE M/Z: 198
RIC: 185856.





Sample: DFTPP 50 NG
Comments: I50E
Scan #631 to #632 summed - #626 to #629 - #634 to #639

75		0.00	0.	Minima	Min	Inten:	165.
444				Maxima	#	0	
Mass		% RA	Inten.	Mass		% RA	Inten.
158?	S	0.82	188.	156		1.71	392.
159?	S	5.04	1158.	161		1.01	232.
160?	S	13.25	3044.	167	S	3.40	781.
161?	S	58.43	13424.	168		1.68	386.
162?	S	3.04	698.	175		1.41	324.
166?	S	1.78	409.	179		2.48	570.
167?	S	4.61	1060.	180		1.81	416.
182?		0.86	198.	181		0.80	184.
183?		2.13	490.	185		1.25	288.
185?		1.11	256.	186	S	11.30	2596.
188?		0.95	218.	187		3.19	734.
189	S	62.47	14352.	192		0.74	170.
193	S	8.55	1964.	193		1.02	234.
194	S	4.98	1144.	196		1.75	402.
195	S	8.23	1890.	198	S	100.00	22976.
196		2.31	530.	199	S	6.55	1506.
197	S	56.69	13024.	204		2.74	630.
198	S	3.74	860.	205	S	4.82	1108.
199	S	3.19	734.	206	S	20.93	4808.
210		2.81	646.	207	S	2.52	579.
211	S	4.05	930.	211		0.79	182.
212	S	1.19	274.	217		4.39	1008.
213	S	0.91	209.	221	S	2.77	637.
215	S	0.97	224.	223	S	0.83	190.
216	S	1.04	240.	224	S	10.15	2332.
221	S	0.87	199.	225		2.76	634.
222		0.81	186.	227		3.60	828.
223	S	5.18	1190.	229		0.84	192.
228	S	3.60	827.	244	S	8.10	1862.
229	S	3.19	734.	245		1.05	242.
301		1.85	424.	246		1.28	294.
304		0.87	200.	255	S	44.29	10176.
305		0.91	208.	256	S	6.50	1494.
307	S	15.44	3548.	258		1.86	428.
308		2.49	572.	265	S	0.79	182.
310	S	29.35	6744.	273		1.09	250.
311	S	3.97	911.	274		3.79	870.
312		0.73	168.	275	S	20.47	4704.
317	S	7.28	1672.	276		2.75	632.
323		1.31	302.	277		1.45	334.
327	S	47.42	10896.	296	S	4.07	935.
328	S	3.41	783.	323		1.74	400.
329	S	16.49	3788.	334		1.08	248.
330		1.48	340.	365		1.65	378.
335		1.51	348.	372		0.87	200.
337		0.74	170.	423		2.98	684.
-1		2.05	472.	441		7.57	1740.
447	S	2.36	542.	442	S	53.69	12336.
448	S	2.02	464.	443	S	10.60	2436.
445		1.01	232.	444		0.99	228.

CONTINUING CALIBRATION CHECK
SEMIVOLATILE HSL COMPOUNDS
(Page 1)

Case No: CALIB Region: _____ Calibration Date: 02/08/91
Contractor: AnalytiKEM-Hou Time: 10:41
Contract No: _____ Laboratory ID: CC020891E1
Instrument ID: FINN Initial Cali. Date: 11/26/90

Minimum RF for SPCC is 0.050 Maximum %D for CCC is 30%

Compound	AVE RF	RF(50)	% D	CCC	SPCC
Phenol	2.663	2.956	-11.0	*	
bis(2-Chloroethyl)Ether	2.093	2.350	-12.3		
2-Chlorophenol	1.644	1.960	-19.2		
1,3-Dichlorobenzene	1.727	2.027	-17.4		
1,4-Dichlorobenzene	1.808	2.139	-18.3	*	
Benzyl Alcohol	1.091	0.850	22.1		
1,2-Dichlorobenzene	1.643	1.931	-17.5		
2-Methylphenol	1.700	1.870	-10.0		
bis(2-Chloroisopropyl)Ether	2.375	3.357	-41.3		
4-Methylphenol	1.780	1.891	-6.2		
N-Nitroso-Di-n-Propylamine	1.355	2.122	-56.6		* *
Hexachloroethane	0.720	0.875	-21.5		
Nitrobenzene	0.454	0.573	-26.2		
Isophorone	0.739	0.626	15.3		
2-Nitrophenol	0.185	0.201	-8.6	*	
2,4-Dimethylphenol	0.352	0.359	-2.0		
Benzoic Acid x	0.181	0.185	-2.2		
bis(2-Chloroethoxy)Methane	0.538	0.623	-15.8		
2,4-Dichlorophenol	0.257	0.287	-11.7	*	
2,4-Trichlorobenzene	0.278	0.330	-18.7		
Naphthalene	1.102	1.283	-16.4		
4-Chloroaniline	0.170	0.239	-40.6		
Hexachlorobutadiene	0.138	0.165	-19.6	*	
4-Chloro-3-Methylphenol	0.330	0.360	-9.1	*	
2-Methylnaphthalene	0.669	0.765	-14.3		
Hexachlorocyclopentadiene	0.265	0.073	72.5		* *
2,4,6-Trichlorophenol	0.322	0.329	-2.2	*	
2,4,5-Trichlorophenol x	0.360	0.373	-3.6		
2-Chloronaphthalene	1.219	1.183	3.0		
2-Nitroaniline x	0.468	0.552	-17.9		
Dimethyl Phthalate	1.324	1.223	7.6		
Acenaphthylene	1.348	1.619	12.4		
2,6-Dinitrotoluene	0.273	0.246	9.9		
3-Nitroaniline x	0.200	0.300	-50.0		
Acenapnthene	1.329	1.304	1.9	*	
2,4-Dinitrophenol x	0.091	0.102	-12.1		* *
4-Nitrophenol x	0.158	0.097	38.6		* *

RF(50) - Response Factor from daily standard file at concentration indicated (50 total nanograms)
AVE RF - Average Response Factor from initial calibration Form VI
%D - - - Percent Difference
x - - - Due to low response analyze at 80 total nanograms
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)

Form VII

CONTINUING CALIBRATION CHECK
SEMIVOLATILE HSL COMPOUNDS
(Page 2)

Case No: CALIB Region: _____ Calibration Date: 02/08/91
Contractor: AnalytiKEM-Hou Time: 10:41
Contract No: _____ Laboratory ID: CC020891E1
Instrument ID: FINN Initial Cali. Date: 11/26/90

Minimum RF for SPCC is 0.050 Maximum %D for CCC is 30%

Compound		AVE RF	RF(50)	% D	CCC	SPCC
Dibenzofuran		1.558	1.528	1.9		
2,4-Dinitrotoluene		0.361	0.322	10.8		
Diethylphthalate		1.663	1.321	20.6		
4-Chlorophenyl phenyl ether		0.550	0.591	-7.5		
Fluorene		1.465	1.379	5.9		
4-Nitroaniline	x	0.124	0.204	-64.5		
4,6-Dinitro-2-Methylphenol	x	0.093	0.117	-25.8		
N-Nitrosodiphenylamine (1)		0.420	0.535	-27.4	*	
4-Bromophenyl phenyl ether		0.190	0.227	-19.5		
Hexachlorobenzene		0.237	0.263	-11.0		
Pentachlorophenol	x	0.126	0.105	16.7	*	
Phenanthrene		1.170	1.185	-1.3		
Anthracene		1.106	1.030	6.9		
Di-n-Butylphthalate		1.588	1.548	2.5		
Fluoranthene		1.107	1.102	0.5	*	
Pyrene		1.589	1.735	-9.2		
Butylbenzylphthalate		0.797	0.947	-18.8		
3,3'-Dichlorobenzidine		0.147	0.099	32.7		
Benzo(a)Anthracene		1.180	1.311	-11.1		
bis(2-Ethylhexyl)Phthalate		1.213	1.356	-11.8		
Chrysene		1.126	1.241	-10.2		
Di-n-Octyl Phthalate		2.995	3.131	-4.5	*	
Benzo(b)Fluoranthene		1.690	1.662	1.7		
Benzo(k)Fluoranthene		1.690	1.662	1.7		
Benzo(a)Pyrene		1.376	1.430	-3.9	*	
Indeno(1,2,3-cd)Pyrene		1.330	1.562	-17.4		
Dibenz(a,h)Anthracene		1.082	1.358	-25.5		
Benzo(g,h,i)Perylene		1.095	1.250	-14.2		

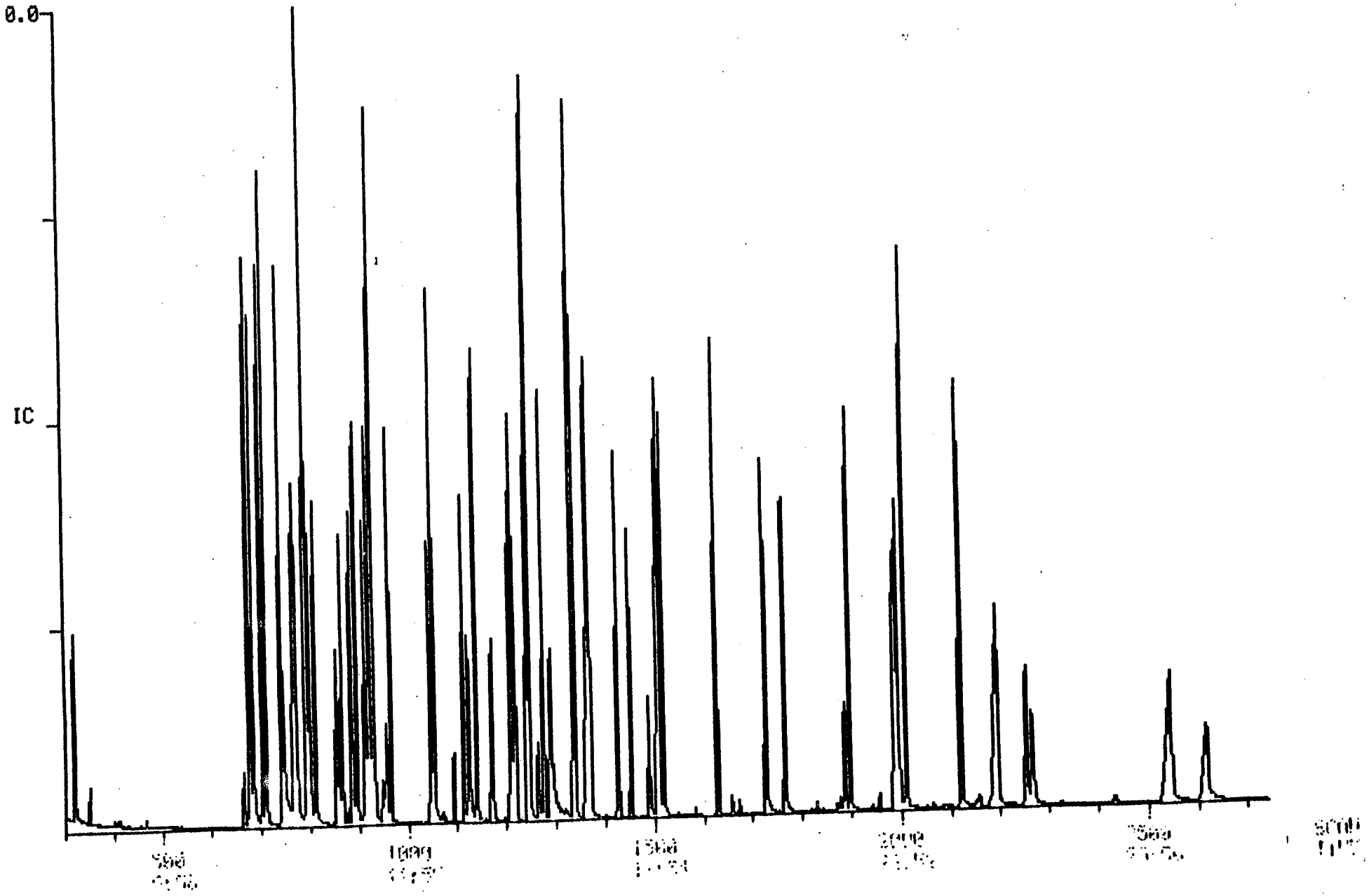
RF(50) - Response Factor from daily standard file at concentration indicated (50 total nanograms)
AVE RF - Average Response Factor from initial calibration Form VI
%D - - - Percent Difference
x - - - Due to low response analyze at 80 total nanograms
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Cannot be separated from diphenylamine

Form VII

RIC
02/08/91 10:41:00
SAMPLE: CONTINUING CALIBRATION 50 NG BNA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: CC020891E1 #1 SCANS 300 TO 2741
CALI: CC020891E1 #3

550912.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: MB3096LS
Client Sample ID: MB3096LS

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: _____

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 1.0

SEMIVOLATILE COMPOUNDS

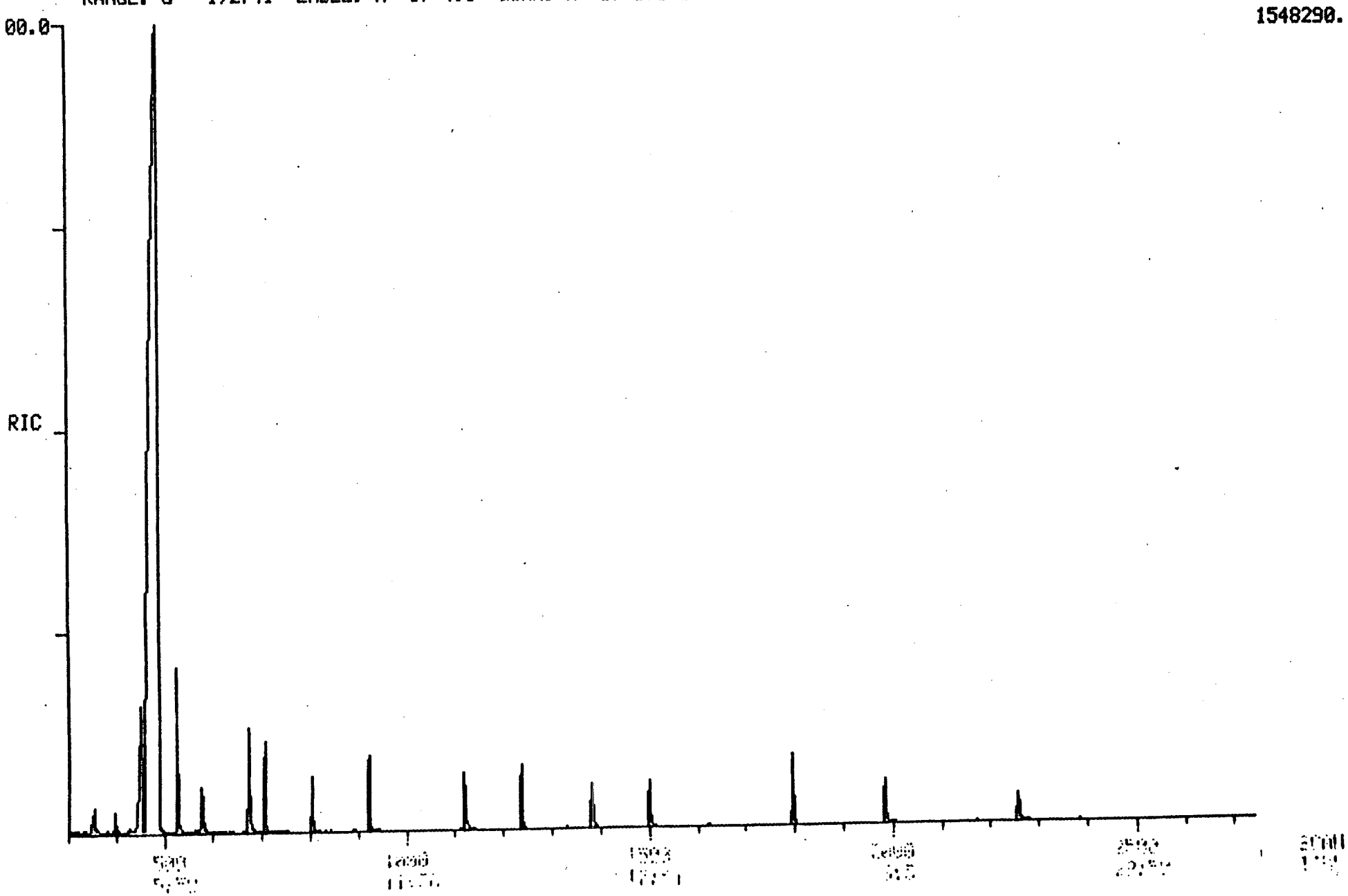
CAS Number		ug/Kg	
108-95-2	Phenol	330	<
62-53-3	Aniline	330	<
111-44-4	bis(2-Chloroethyl)Ether	330	<
95-57-8	2-Chlorophenol	330	<
541-73-1	1,3-Dichlorobenzene	330	<
106-46-7	1,4-Dichlorobenzene	330	<
100-51-6	Benzyl Alcohol	330	<
95-50-1	1,2-Dichlorobenzene	330	<
95-48-7	2-Methylphenol	330	<
39638-32-9	bis(2-Chloroisopropyl)Ether	330	<
106-44-5	4-Methylphenol	330	<
621-64-7	N-Nitroso-Di-n-Propylamine	330	<
67-72-1	Hexachloroethane	330	<
98-95-3	Nitrobenzene	330	<
78-59-1	Isophorone	330	<
88-75-5	2-Nitrophenol	330	<
105-67-9	2,4-Dimethylphenol	330	<
65-85-0	Benzoic Acid	1600	<
111-91-1	bis(2-Chloroethoxy)Methane	330	<
120-83-2	2,4-Dichlorophenol	330	<
120-82-1	1,2,4-Trichlorobenzene	330	<
91-20-3	Naphthalene	330	<
106-47-8	4-Chloroaniline	330	<
87-68-3	Hexachlorobutadiene	330	<
59-50-7	4-Chloro-3-Methylphenol	330	<
91-57-6	2-Methylnaphthalene	330	<
77-47-4	Hexachlorocyclopentadiene	330	<
88-06-2	2,4,6-Trichlorophenol	330	<
95-95-4	2,4,5-Trichlorophenol	1600	<
91-58-7	2-Chloronaphthalene	330	<
88-74-4	2-Nitroaniline	1600	<
131-11-3	Dimethyl Phthalate	330	<
208-96-8	Acenaphthylene	330	<

CAS Number		ug/Kg	
606-20-2	2,6-Dinitrotoluene	330	<
99-09-2	3-Nitroaniline	1600	<
83-32-9	Acenaphthene	330	<
51-28-5	2,4-Dinitrophenol	1600	<
100-02-7	4-Nitrophenol	1600	<
132-64-9	Dibenzofuran	330	<
121-14-2	2,4-Dinitrotoluene	330	<
84-66-2	Diethylphthalate	330	<
7005-72-3	4-Chlorophenyl phenyl ether	330	<
86-73-7	Fluorene	330	<
100-01-6	4-Nitroaniline	1600	<
534-52-1	4,6-Dinitro-2-Methylphenol	1600	<
86-30-6	N-Nitrosodiphenylamine (1)	330	<
101-55-3	4-Bromophenyl phenyl ether	330	<
118-74-1	Hexachlorobenzene	330	<
87-86-5	Pentachlorophenol	1600	<
85-01-8	Phenanthrene	330	<
120-12-7	Anthracene	330	<
84-74-2	Di-n-Butylphthalate	330	<
206-44-0	Fluoranthene	330	<
129-00-0	Pyrene	330	<
85-68-7	Butylbenzylphthalate	330	<
91-94-1	3,3'-Dichlorobenzidine	660	<
56-55-3	Benzo(a)Anthracene	330	<
117-81-7	bis(2-Ethylhexyl)Phthalate	330	<
218-01-9	Chrysene	330	<
117-84-0	Di-n-Octyl Phthalate	330	<
205-99-2	Benzo(b)Fluoranthene	330	<
207-08-9	Benzo(k)Fluoranthene	330	<
50-32-8	Benzo(a)Pyrene	330	<
193-39-5	Indeno(1,2,3-cd)Pyrene	330	<
53-70-3	Dibenz(a,h)Anthracene	330	<
191-24-2	Benzo(g,h,i)Perylene	330	<

The Lab ID for data on this page is MB3096LS.
(1) - Cannot be separated from diphenylamine

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC DATA: MB3096LS #1 SCANS 300 TO 2741
02/08/91 21:14:00 CALI: MB3096LS #3
SAMPLE: CLP,BLANK,BLANK,MB3096LS,LOW,SOIL,MB3096LS,BNA,EPA
CONDS.: I50E
RANGE: G 1,2741 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



SOIL SURROGATE PERCENT RECOVERY SUMMARY
(Page 1)

Case No. A5438 Contract Laboratory AnalytiKEM-Hou Contract No. _____

XXX Medium _____

	VOLATILE				SEMI-VOLATILE							PEST
	Toluene-d8	Bromofluorobenzene	1,2-Dichloroethane-d4	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14	Benzene-d6		Phenol-d5	2-Fluorophenol	2,4,6-Tribromophenol	Dibutylchlorendate **
SMO TRAFFIC NO.	81 117	74 121	70 114	20 140	20 140	20 150	75 125		20 122	24 133	10 114	20 150
B-3B-A-1-3	____	____	____	51	42	48	____		77	88	109	____
BKG-2B-C-10	____	____	____	48	40	56	____		76	82	119*	____
BKG-2B-D-15	____	____	____	42	39	54	____		67	69	110	____
B-3B-B-5-7	____	____	____	37	31	39	____		68	68	82	____
BKG-2B-E-20	____	____	____	42	36	39	____		70	74	92	____
B-4B-A-1-3	____	____	____	47	39	40	____		78	79	83	____
B-4B-A-5-7	____	____	____	32	28	39	____		54	54	78	____

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS
** ADVISORY LIMITS ONLY

Volatiles: ____ out of 28; outside of QC limits
Semi-Volatiles: 1 out of 42; outside of QC limits
Pesticides: ____ out of 7; outside of QC limits

Comments:

FORM II

INITIAL CALIBRATION DATA
SEMIVOLATILE HSL COMPOUNDS
(Page 2)

C: No: CALIB Region: _____ Instrument ID: FINN
Co ractor: ENSR LAB-HOU Calibration Date: 11/26/90
Contract No: _____

Minimum AVE RF for SPCC is 0.050 Maximum %RSD for CCC is 30%

Laboratory ID	IC1126E020		IC1126E080		IC1126E160			CCC*
	CC112590E1		IC1126E120					
Compound	RF(20)	RF(50)	RF(80)	RF(120)	RF(160)	AVE RF	% RSD	SPCC**
Dibenzofuran	1.662	1.593	1.610	1.548	1.376	1.558	7.0	
2,4-Dinitrotoluene	0.361	0.443	0.347	0.340	0.314	0.361	13.5	
Diethylphthalate	1.531	1.941	1.607	1.642	1.594	1.663	9.7	
4-Chlorophenyl phenyl ether .	0.552	0.587	0.570	0.570	0.473	0.550	8.2	
Fluorene	1.396	1.561	1.530	1.522	1.314	1.465	7.2	
4-Nitroaniline	x	0.216	0.051	0.122	0.109	0.124	54.9	
4,6-Dinitro-2-Methylphenol . .	x	0.085	0.100	0.104	0.084	0.093	11.0	
N-Nitrosodiphenylamine (1) . .	0.328	0.443	0.463	0.501	0.366	0.420	17.0	*
4-Bromophenyl phenyl ether . .	0.205	0.180	0.208	0.194	0.162	0.190	10.0	
Hexachlorobenzene	0.262	0.237	0.250	0.240	0.198	0.237	10.2	
Pentachlorophenol	x	0.124	0.133	0.133	0.112	0.126	7.9	*
Phenanthrene	1.251	1.180	1.202	1.207	1.010	1.170	8.0	
Anthracene	1.203	1.035	1.144	1.178	0.970	1.106	9.0	
Di-n-Butylphthalate	1.563	1.804	1.545	1.670	1.360	1.588	10.3	
Fluoranthene	1.147	1.218	1.040	1.201	0.928	1.107	11.0	*
Pyrene	1.839	1.704	1.605	1.604	1.192	1.589	15.2	
[illegible]lbenzylphthalate	0.884	0.859	0.817	0.810	0.615	0.797	13.3	
[illegible]-Dichlorobenzidine	0.174	0.046	0.185	0.199	0.133	0.147	41.9	
Benzo(a)Anthracene	1.324	1.197	1.296	1.127	0.958	1.180	12.5	
bis(2-Ethylhexyl)Phthalate . .	1.349	1.252	1.275	1.243	0.946	1.213	12.8	
Chrysene	1.450	1.048	1.187	1.133	0.810	1.126	20.6	
Di-n-Octyl Phthalate	3.360	3.083	3.095	3.327	2.110	2.995	17.1	*
Benzo(b)Fluoranthene	2.236	1.539	1.781	1.723	1.171	1.690	22.9	
Benzo(k)Fluoranthene	2.236	1.539	1.781	1.723	1.171	1.690	22.9	
Benzo(a)Pyrene	1.851	1.230	1.440	1.386	0.973	1.376	23.4	*
Indeno(1,2,3-cd)Pyrene	1.827	1.186	1.417	1.292	0.929	1.330	24.9	
Dibenz(a,h)Anthracene	1.369	1.022	1.134	1.091	0.796	1.082	19.1	
Benzo(g,h,i)Perylene	1.508	1.006	1.137	1.071	0.755	1.095	24.9	

Response Factor (number is the amount of nanograms)
AVE RF - Average Response Factor
%RSD - - Percent Relative Standard Deviation
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
x - - - Not detectable at 20 ng
(1) - - Cannot be separated from diphenylamine

Form VI

INITIAL CALIBRATION DATA
SEMIVOLATILE HSL COMPOUNDS
(Page 1)

C[illegible] No: CALIB Region: _____ Instrument ID: FINN
C[illegible]ractor: ENSR LAB-HOU Calibration Date: 11/26/90
Contract No: _____

Minimum AVE RF for SPCC is 0.050 Maximum %RSD for CCC is 30%

Laboratory ID	IC1126E020		IC1126E080		IC1126E160			
	CC112590E1		IC1126E120					CCC*
Compound	RF(20)	RF(50)	RF(80)	RF(120)	RF(160)	AVE RF	% RSD	SPCC**
Phenol	2.716	2.958	2.561	2.657	2.423	2.663	7.5	*
bis(2-Chloroethyl)Ether	1.962	2.226	2.045	1.985	2.245	2.093	6.4	
2-Chlorophenol	1.677	1.931	1.543	1.583	1.487	1.644	10.6	
1,3-Dichlorobenzene	1.771	1.969	1.637	1.672	1.585	1.727	8.8	
1,4-Dichlorobenzene	1.829	2.077	1.699	1.765	1.668	1.808	9.0	*
Benzyl Alcohol	1.073	1.311	1.035	1.068	0.967	1.091	11.9	
1,2-Dichlorobenzene	1.674	1.874	1.551	1.608	1.510	1.643	8.7	
2-Methylphenol	1.670	2.082	1.578	1.645	1.527	1.700	13.0	
bis(2-Chloroisopropyl)Ether	2.345	2.675	2.273	2.421	2.162	2.375	8.1	
4-Methylphenol	1.701	2.167	1.709	1.723	1.601	1.780	12.4	
N-Nitroso-Di-n-Propylamine	1.405	1.584	1.264	1.325	1.196	1.355	11.0	* *
Hexachloroethane	0.702	0.794	0.704	0.730	0.670	0.720	6.5	
Nitrobenzene	0.492	0.500	0.445	0.432	0.403	0.454	9.0	
Isophorone	0.826	0.848	0.737	0.673	0.611	0.739	13.6	
2-Nitrophenol	0.185	0.209	0.184	0.180	0.167	0.185	8.2	*
2,4-Dimethylphenol	0.360	0.386	0.352	0.340	0.321	0.352	6.9	
[illegible]zoic Acid	x	0.261	0.201	0.096	0.167	0.181	38.0	
[illegible](2-Chloroethoxy)Methane	0.553	0.612	0.528	0.519	0.477	0.538	9.2	
2,4-Dichlorophenol	0.257	0.290	0.251	0.253	0.236	0.257	7.7	*
1,2,4-Trichlorobenzene	0.285	0.307	0.274	0.270	0.255	0.278	7.0	
Naphthalene	1.152	1.218	1.099	1.047	0.993	1.102	8.0	
4-Chloroaniline	0.148	0.222	0.227	0.129	0.126	0.170	29.4	
Hexachlorobutadiene	0.143	0.148	0.134	0.137	0.127	0.138	5.9	*
4-Chloro-3-Methylphenol	0.324	0.372	0.336	0.314	0.306	0.330	7.8	*
2-Methylnaphthalene	0.700	0.734	0.666	0.635	0.610	0.669	7.4	
Hexachlorocyclopentadiene	0.297	0.166	0.301	0.316	0.247	0.265	23.1	* *
2,4,6-Trichlorophenol	0.330	0.318	0.328	0.339	0.296	0.322	5.1	*
2,4,5-Trichlorophenol	x	0.369	0.365	0.373	0.331	0.360	5.4	
2-Chloronaphthalene	1.283	1.189	1.256	1.269	1.098	1.219	6.3	
2-Nitroaniline	x	0.498	0.475	0.476	0.421	0.468	7.0	
Dimethyl Phthalate	1.311	1.479	1.316	1.342	1.172	1.324	8.2	
Acenaphthylene	1.491	1.847	2.005	2.113	1.782	1.848	12.9	
2,6-Dinitrotoluene	0.267	0.300	0.262	0.280	0.255	0.273	6.5	
3-Nitroaniline	x	0.259	0.163	0.225	0.154	0.200	25.1	
Acenaphthene	1.341	1.339	1.394	1.367	1.202	1.329	5.6	*
2,4-Dinitrophenol	x	0.081	0.095	0.104	0.084	0.091	11.6	* *
4-Nitrophenol	x	0.162	0.156	0.172	0.144	0.158	7.4	* *

Response Factor (number is the amount of nanograms)
AVE RF - Average Response Factor
%RSD - - Percent Relative Standard Deviation
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
x - - - Not detectable at 20 ng

Form VI

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/07/91
Lab Sample ID:	A5438-1	Sample Matrix:	SOIL	Date Analyzed:	02/07/91
Client Sample ID:	B-3B-B-5-7	Percent Moisture:	16.8	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	60 <	107-18-6	Allyl Alcohol	600 <

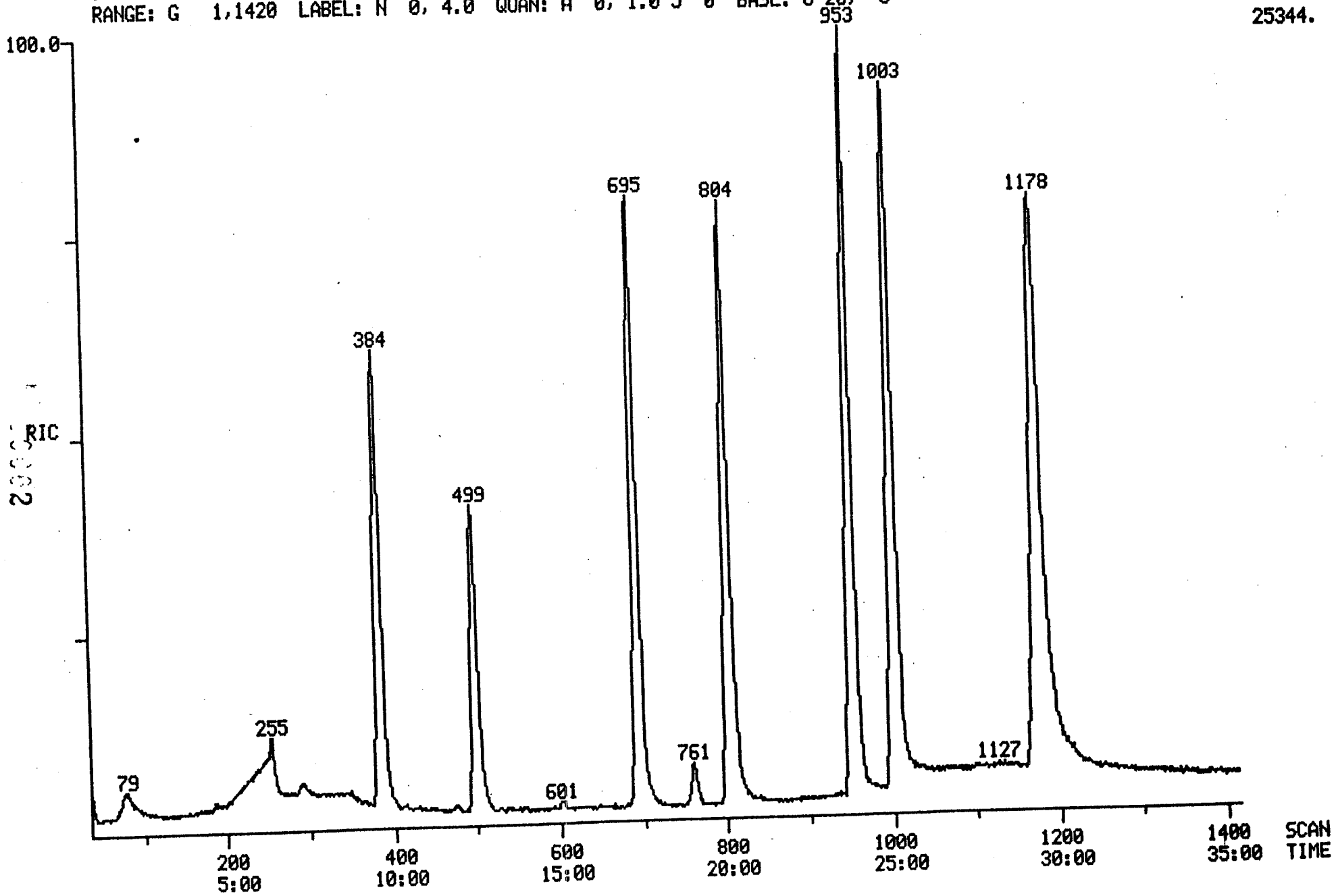
The Lab ID for data on this page is A54381.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 12:22:00
SAMPLE: B-3B-B,5-7'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54381 #1
CALI: A54381 #3

SCANS 35 TO 1415

25344.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-2
Client Sample ID: B-3B-B-5-7

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 25.4

Date Extracted: 02/07/91
Date Analyzed: 02/07/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	67 <	107-18-6	Allyl Alcohol	670 <

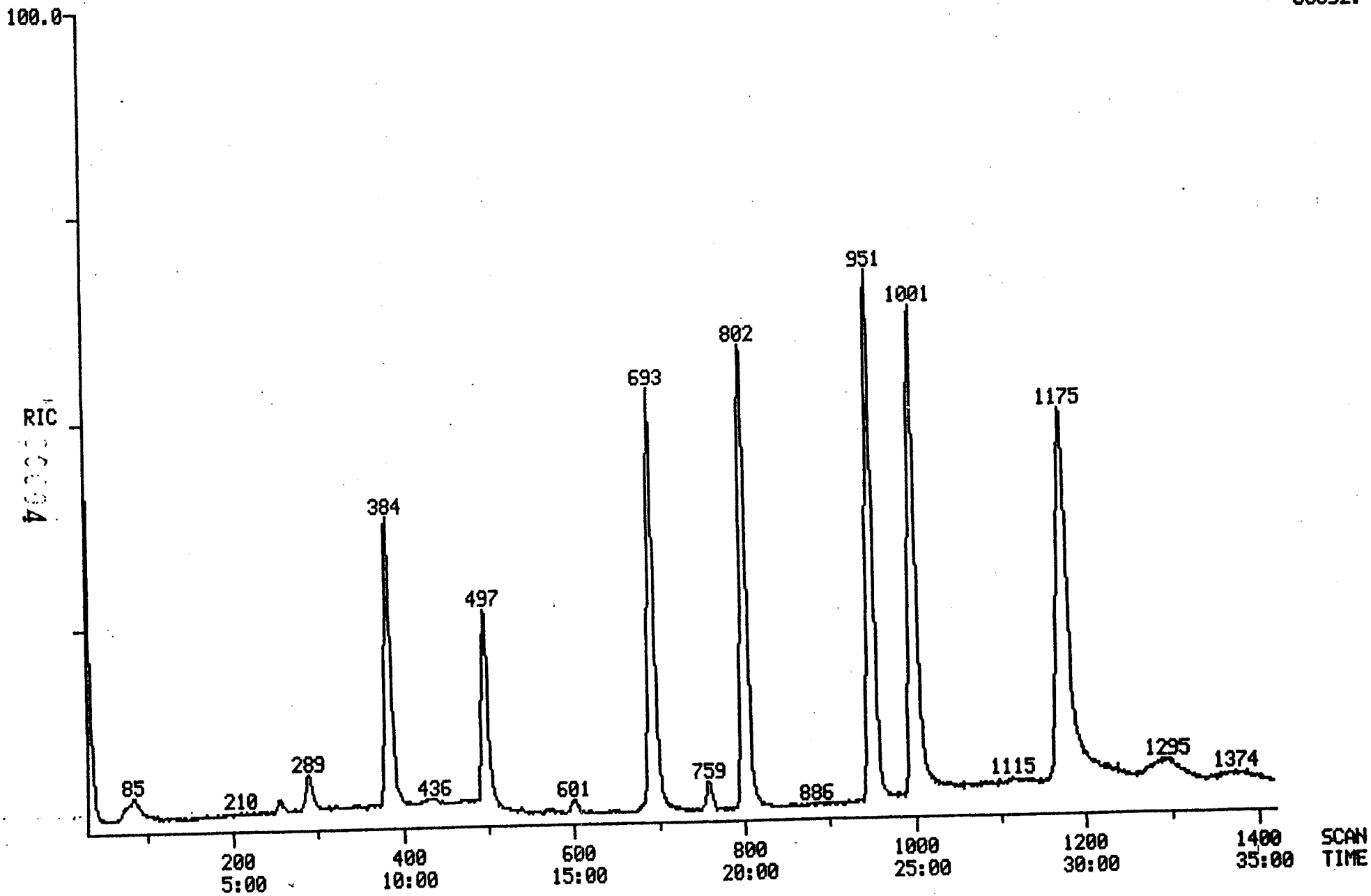
The Lab ID for data on this page is A54382.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 13:02:00
SAMPLE: B-3B-B,5-7'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54382 #1
CALI: A54382 #3

SCANS 30 TO 1420

38592.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-3
Client Sample ID: B-3B-C-10-12

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 21.3

Date Extracted: 02/07/91
Date Analyzed: 02/07/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	64 <	107-18-6	Allyl Alcohol	640 <

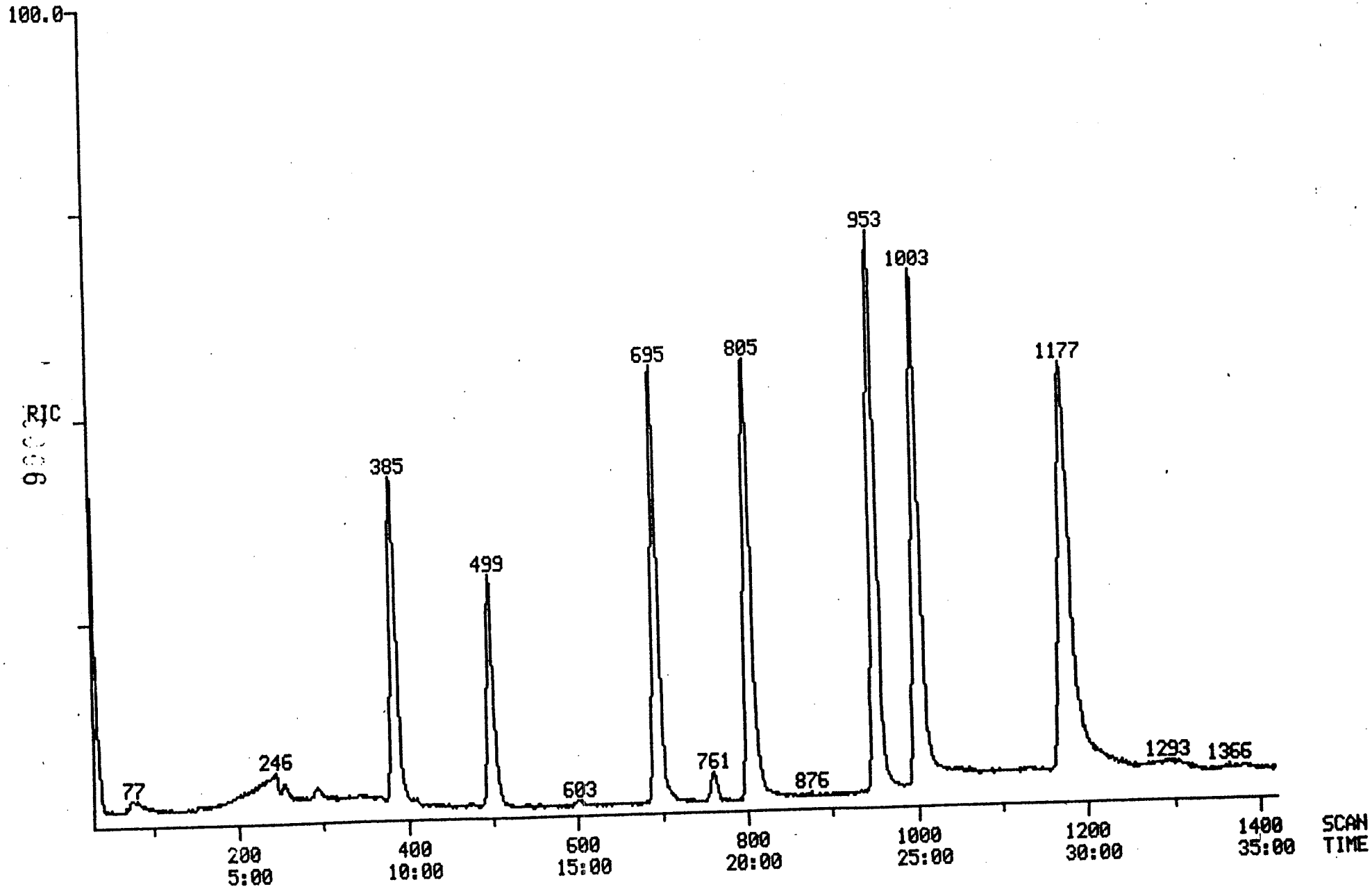
The Lab ID for data on this page is A54383.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 13:42:00
SAMPLE: B-3B-C,10-12'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54383 #1
CALI: A54383 #3

SCANS 30 TO 1420

36160.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-4
Client Sample ID: B-3B-D-15-17

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 12.9

Date Extracted: 02/07/91
Date Analyzed: 02/07/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	57 <	107-18-6	Allyl Alcohol	570 <

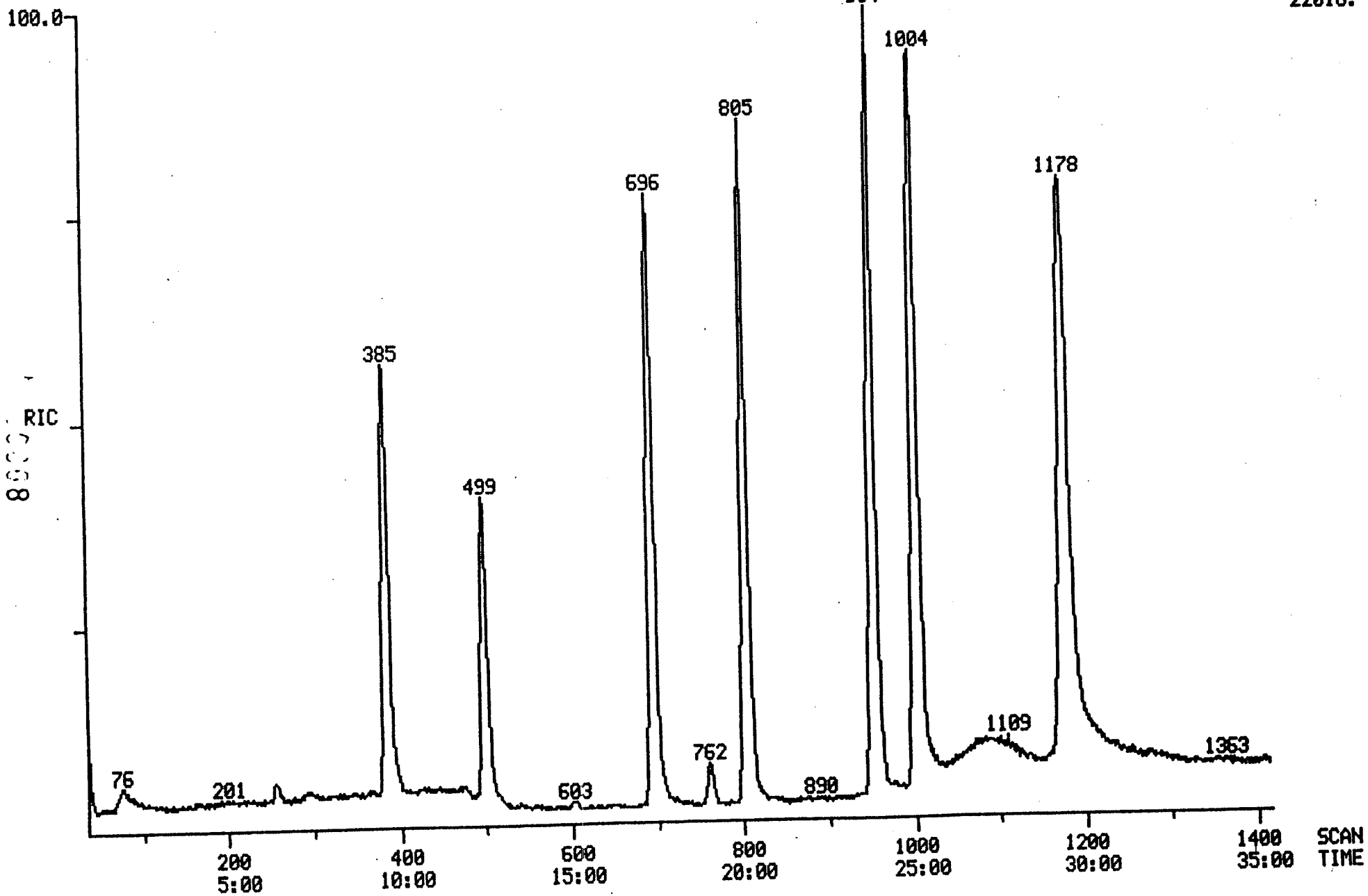
The Lab ID for data on this page is A54384.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 14:23:00
SAMPLE: B-3B-D,15-17'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54384 #1
CALI: A54384 #3

SCANS 35 TO 1415

22016.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-5
Client Sample ID: B-3B-E-20-25

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 23.2

Date Extracted: 02/07/91
Date Analyzed: 02/07/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	65 <	107-18-6	Allyl Alcohol	650 <

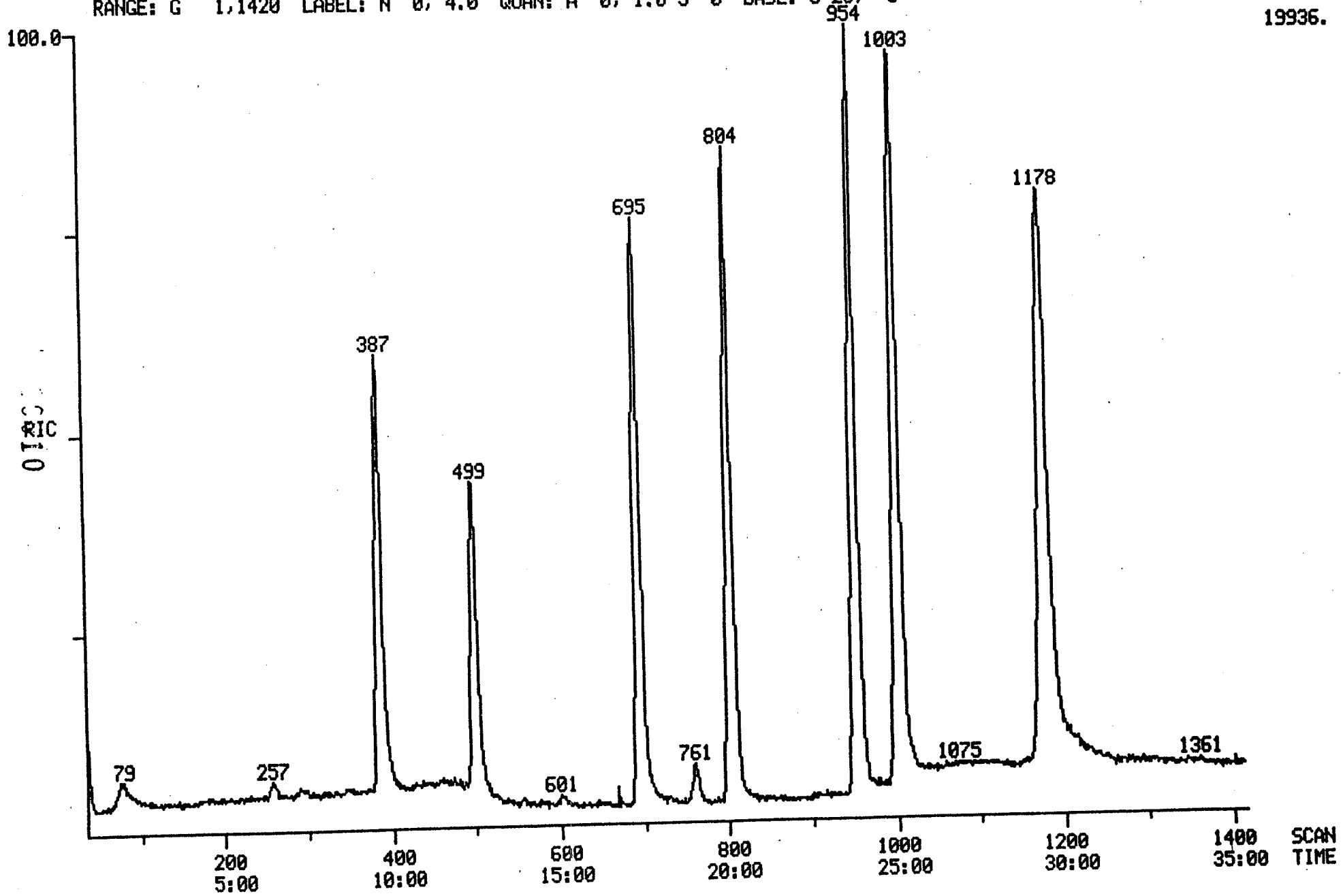
The Lab ID for data on this page is A54385.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 15:03:00
SAMPLE: B-3B-E,20-25'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54385 #1
CALI: A54385 #3

SCANS 35 TO 1415

19936.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-6
Client Sample ID: B-4B-A-1-5

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 16.8

Date Extracted: 02/07/91
Date Analyzed: 02/07/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	60 <	107-18-6	Allyl Alcohol	600 <

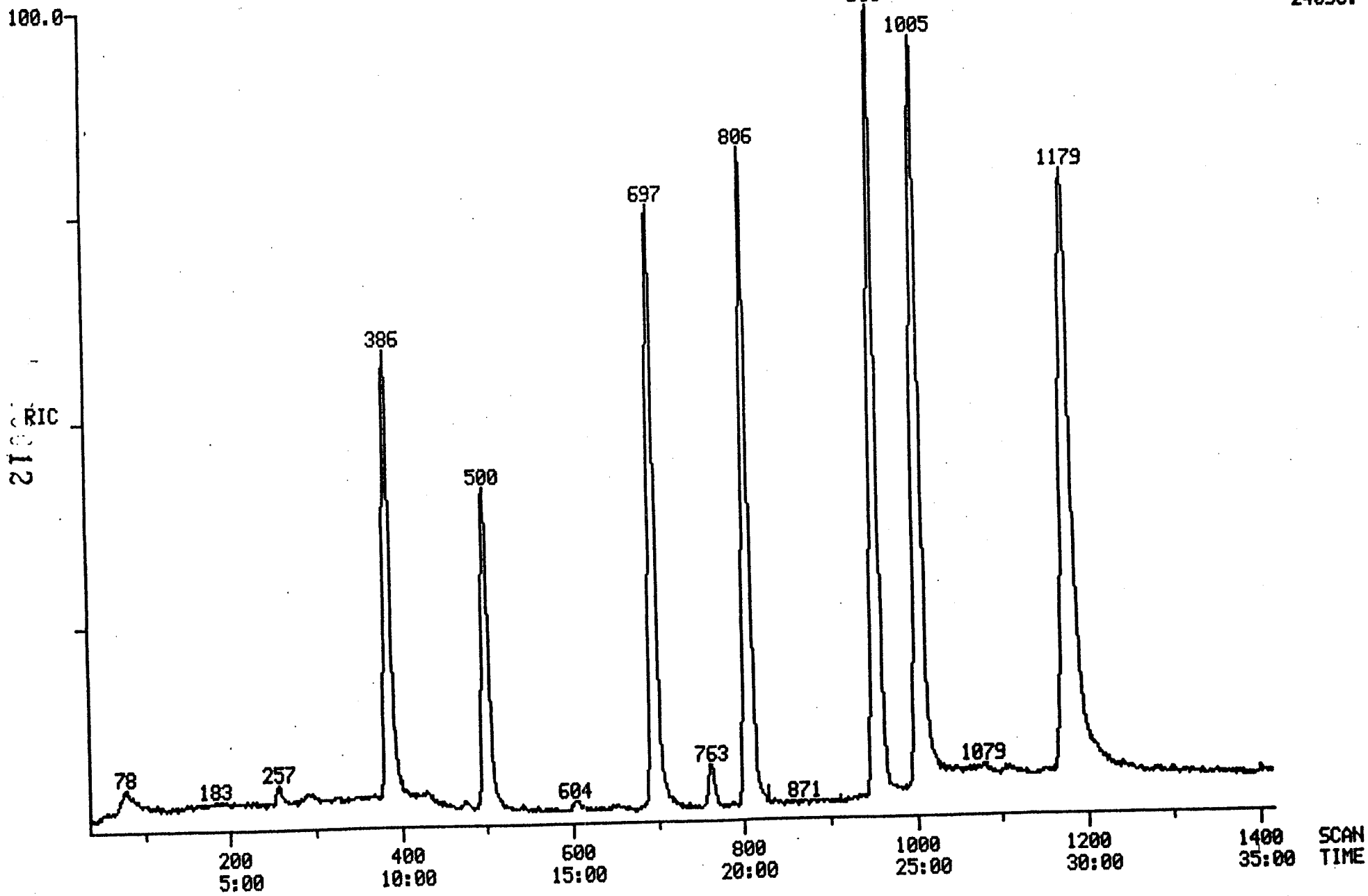
The Lab ID for data on this page is A54386.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 15:44:00
SAMPLE: B-4B-A,1-5'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54386 #1
CALI: A54386 #3

SCANS 35 TO 1415

24096.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-7
Client Sample ID: B-4B-5-7

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 17.7

Date Extracted: 02/07/91
Date Analyzed: 02/07/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

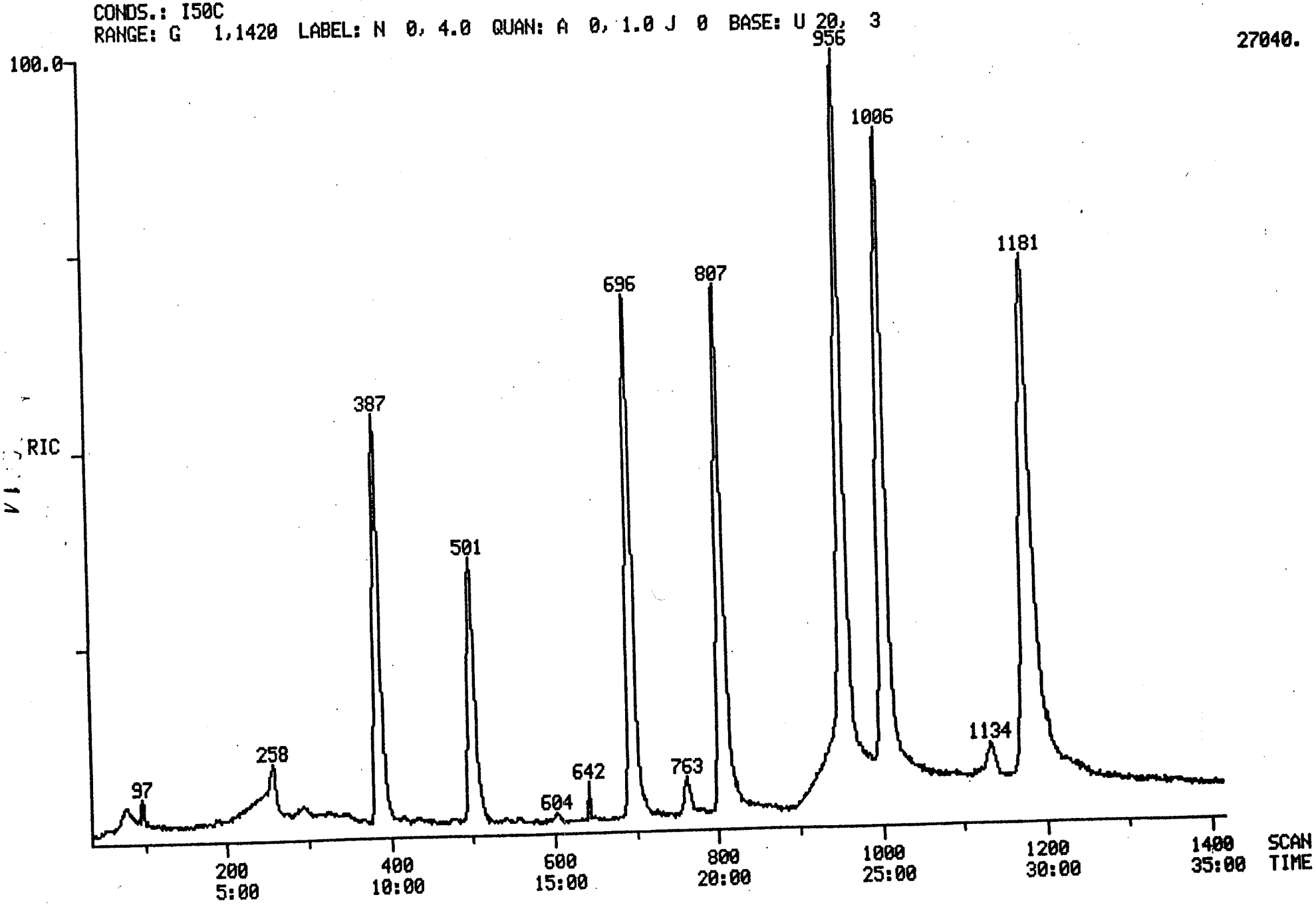
CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	61 <	107-18-6	Allyl Alcohol	610 <

The Lab ID for data on this page is A54387.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 16:24:00
SAMPLE: B-4B-B,5-7'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54387 #1
CALI: A54387 #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-8
Client Sample ID: B-4B-10-12

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 24.6

Date Extracted: 02/07/91
Date Analyzed: 02/07/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	66 <	107-18-6	Allyl Alcohol	660 <

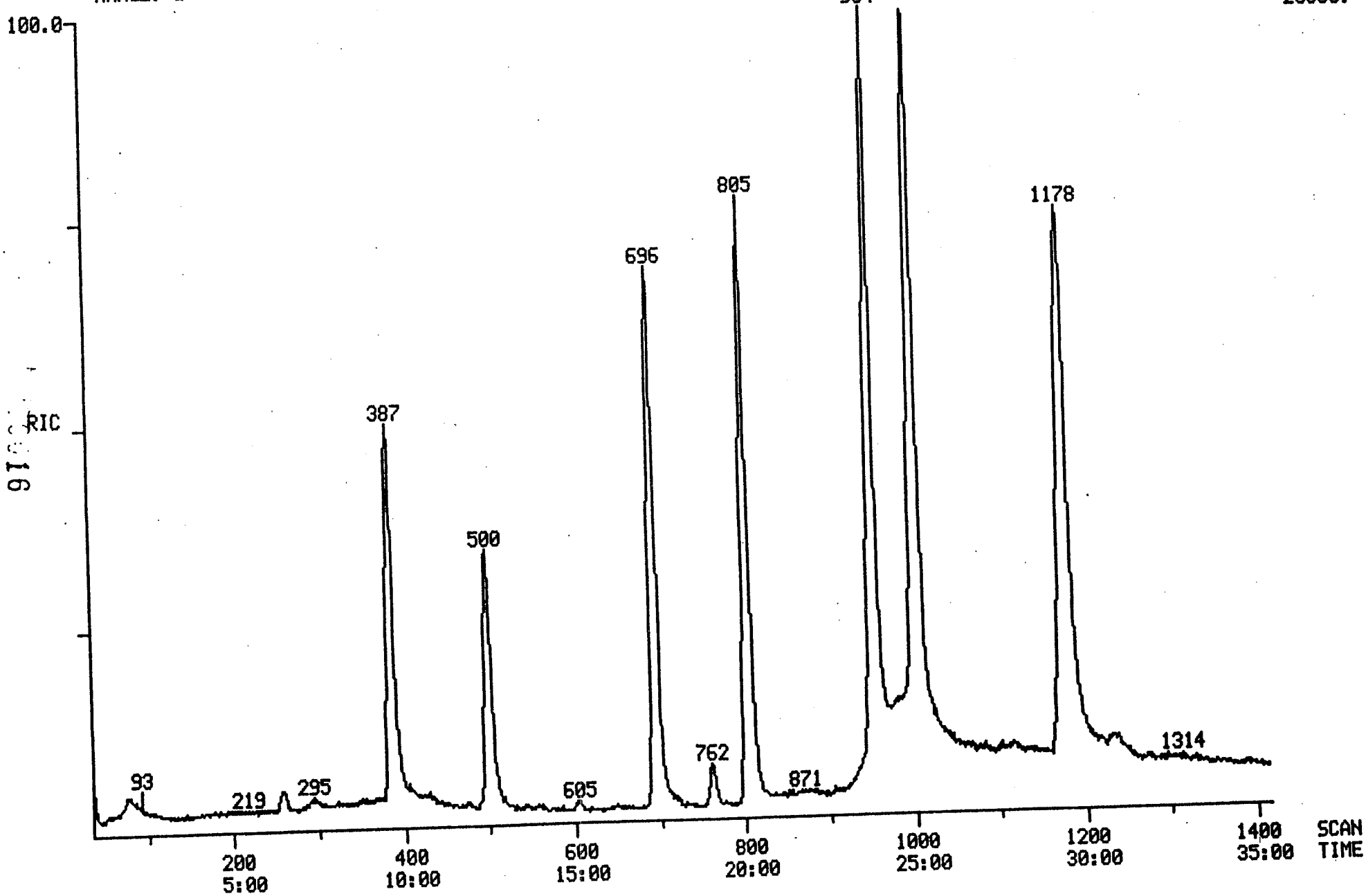
The Lab ID for data on this page is A54388.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 17:05:00
SAMPLE: B-4B-C,10-12'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54388 #1
CALI: A54388 #3

SCANS 35 TO 1415

28608.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-9
Client Sample ID: B-4B-D-15-17

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 17.3

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	60 <	107-18-6	Allyl Alcohol	600 <

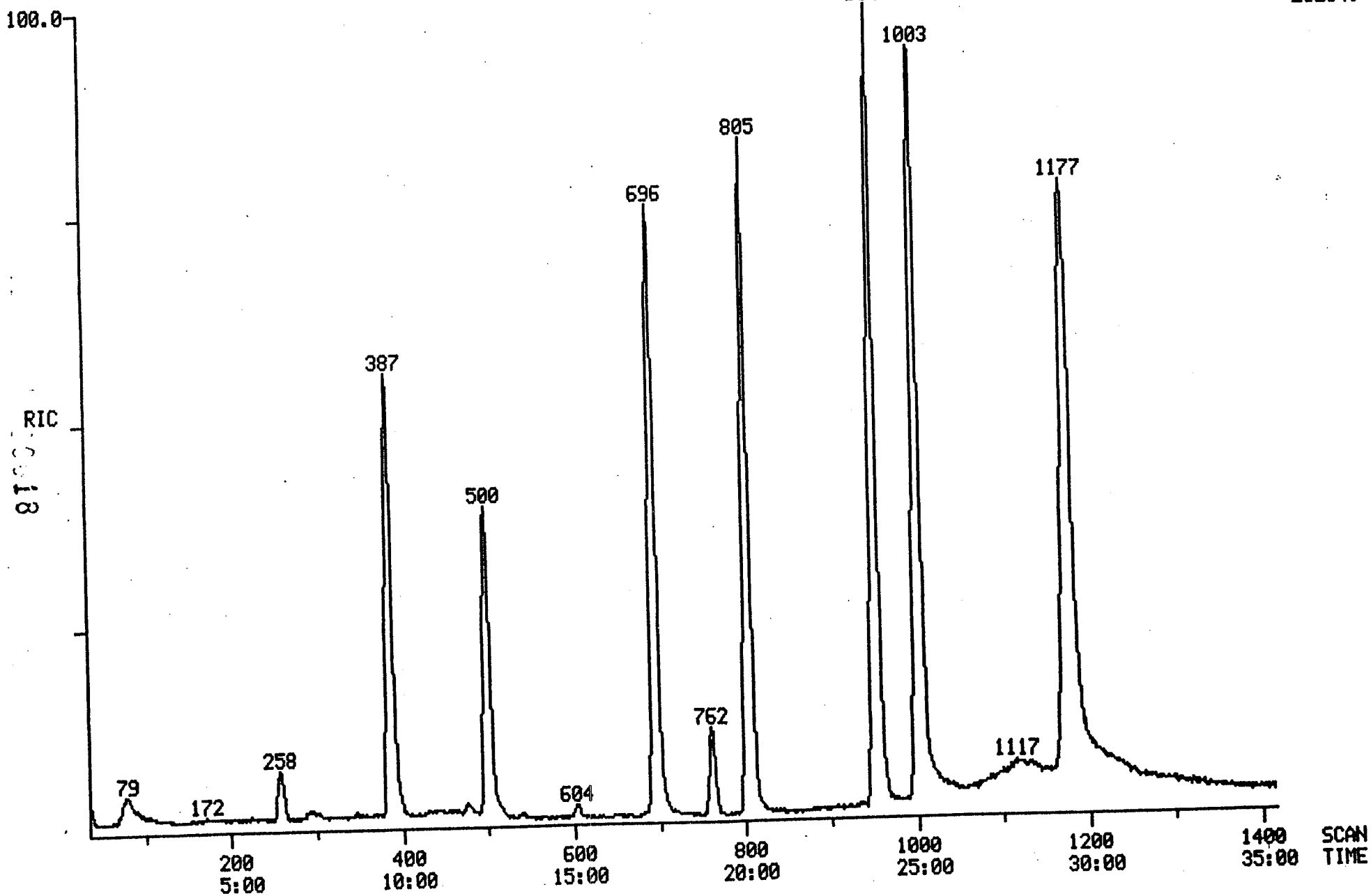
The Lab ID for data on this page is A54389A.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 12:21:00
SAMPLE: B-4B-D,15-17'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54389A #1
CALI: A54389A #3

SCANS 35 TO 1415

23264.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-10
Client Sample ID: B-4B-E-20-25

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 22.9

Date Extracted: 02/07/91
Date Analyzed: 02/07/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	65 <	107-18-6	Allyl Alcohol	650 <

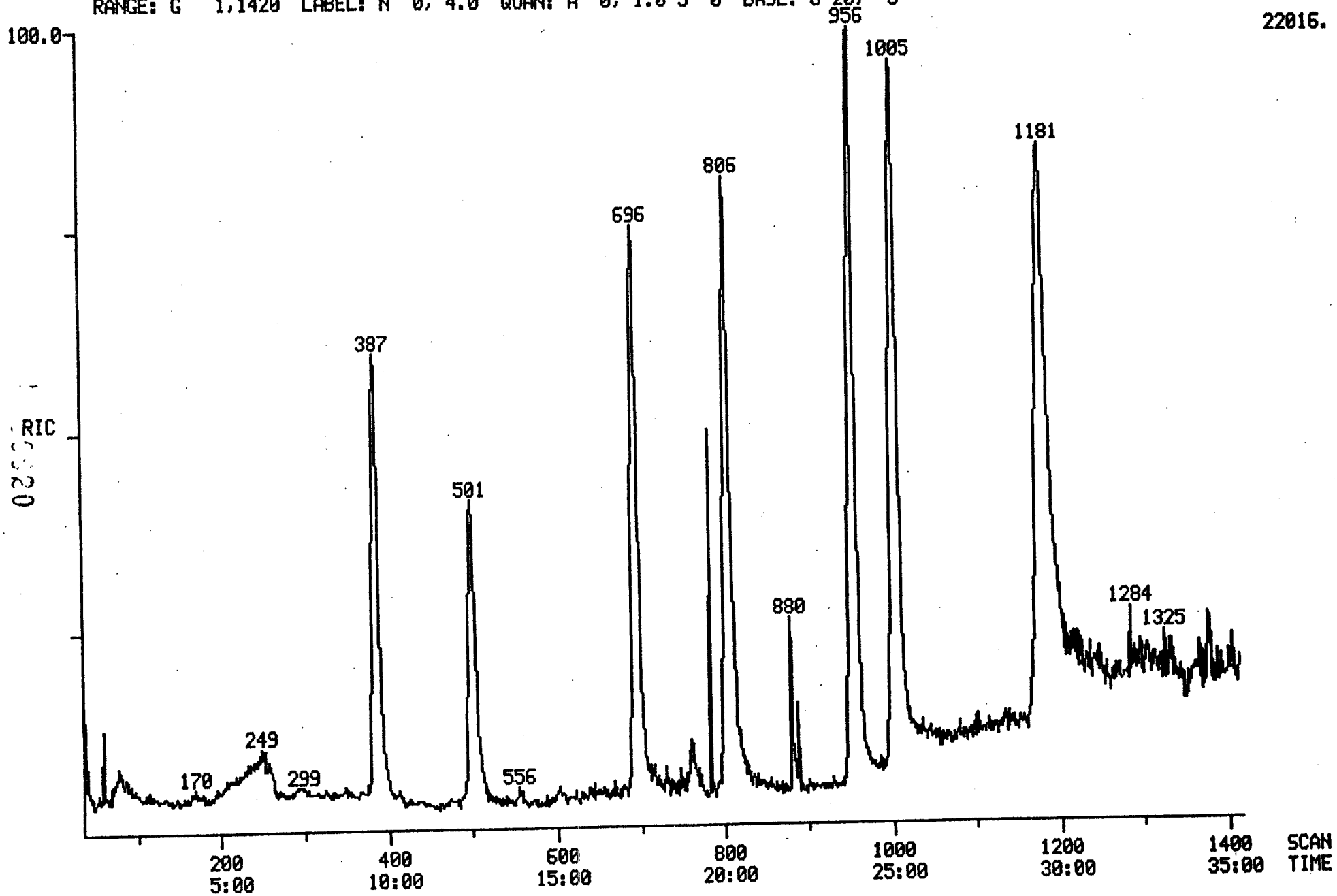
The Lab ID for data on this page is A543810.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 18:26:00
SAMPLE: B-4B-E,20-25'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543810 #1
CALI: A543810 #3

SCANS 35 TO 1415

22016.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-11
Client Sample ID: BKG1B1-A-1-3

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 26.4

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	68 <	107-18-6	Allyl Alcohol	680 <

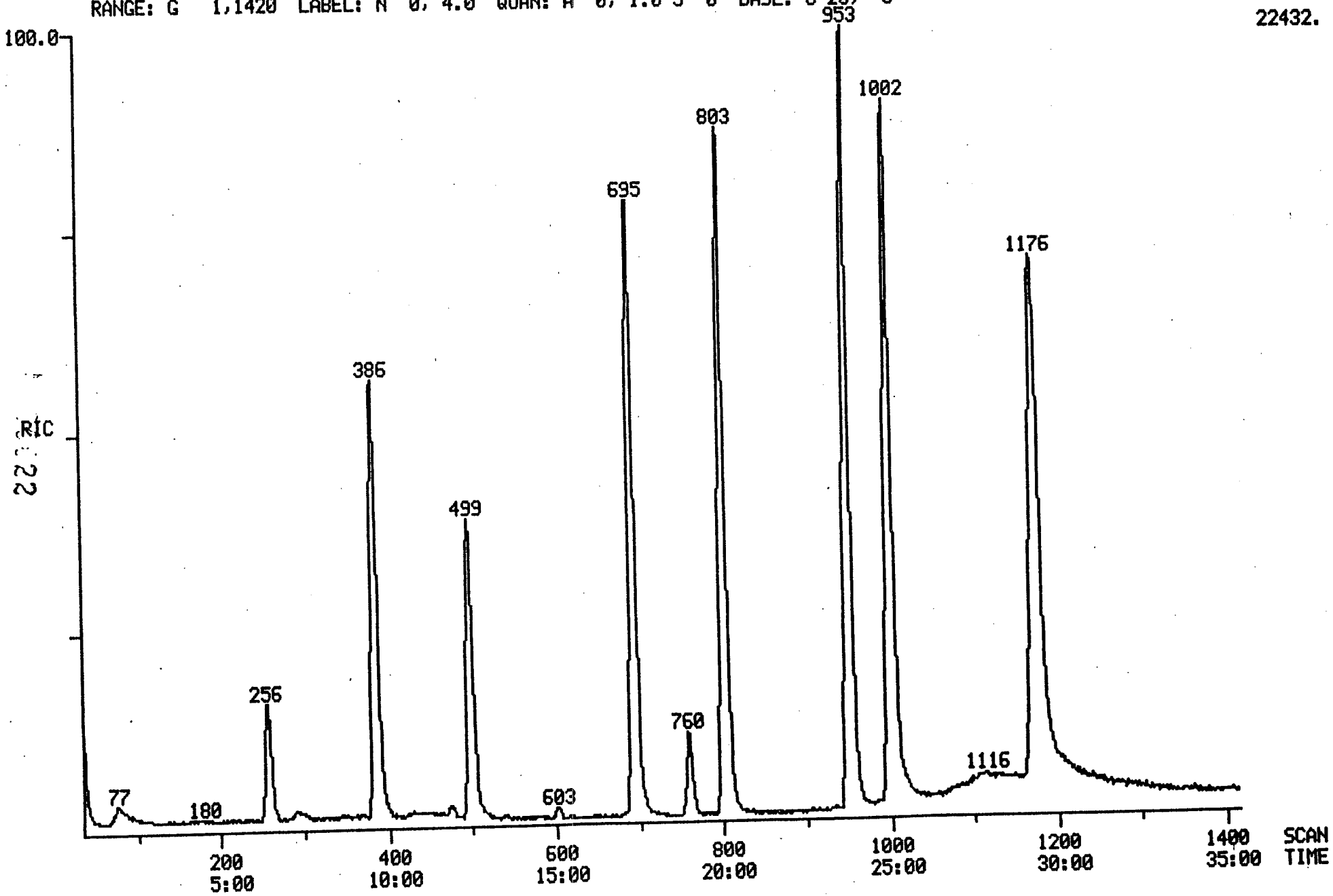
The Lab ID for data on this page is A543811A.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 13:42:00
SAMPLE: BKG-1B1-A,1-3'
CONDS.: I55C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543811A #1
CALI: A543811A #3

SCANS 35 TO 1415

22432.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-12	Sample Matrix:	SOIL	Date Analyzed:	02/08/91
Client Sample ID:	BKG-1B-B-5-7	Percent Moisture:	23.6	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	65 <	107-18-6	Allyl Alcohol	650 <

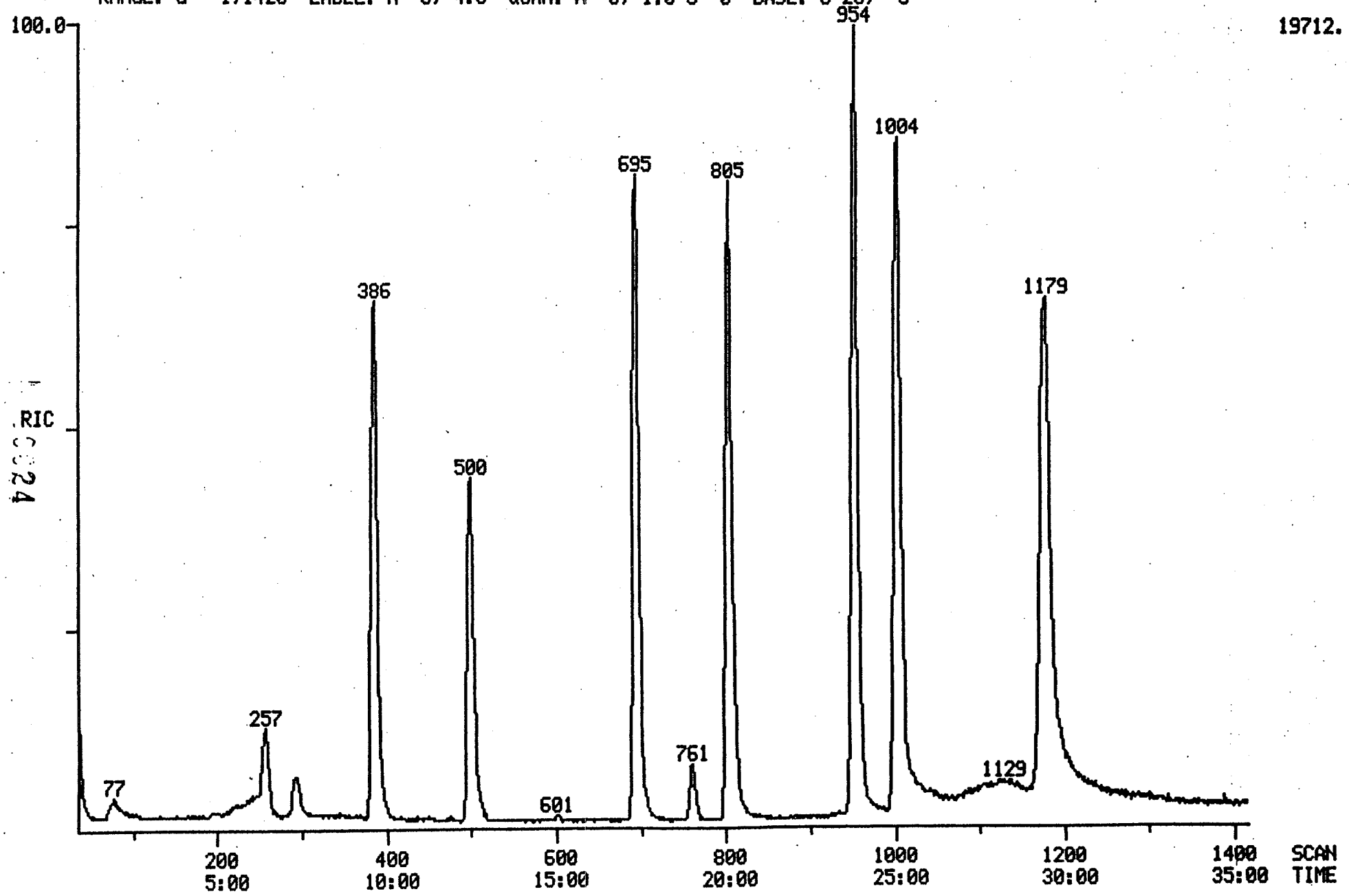
The Lab ID for data on this page is A543812B.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 14:23:00
SAMPLE: BKG-1B-B,5-7'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543812B #1
CALI: A543812B #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-13	Sample Matrix:	SOIL	Date Analyzed:	02/08/91
Client Sample ID:	BKG1B-C-10-12	Percent Moisture:	11.4	Dilution Factor:	1.0

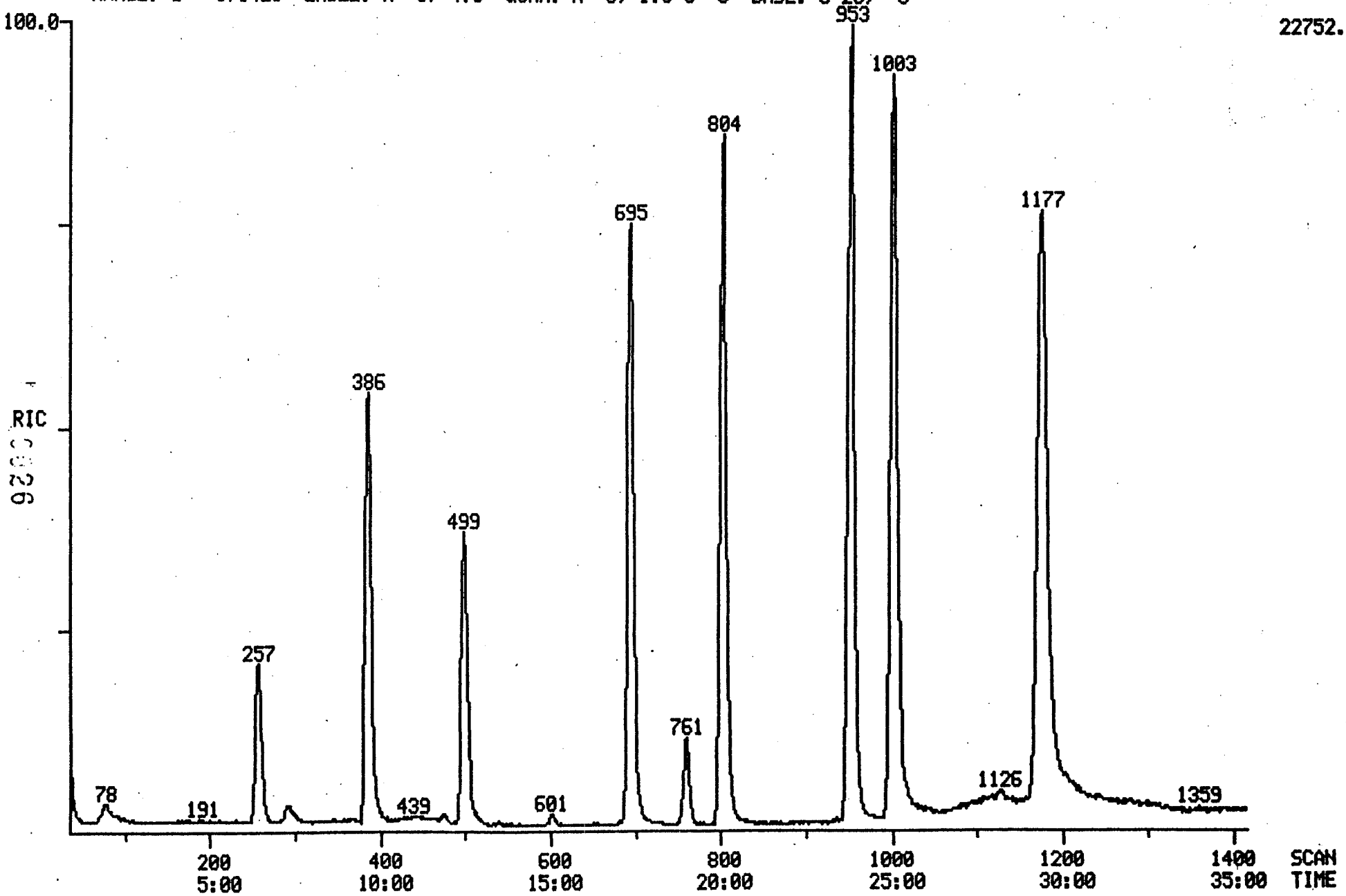
ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	56 <	107-18-6	Allyl Alcohol	560 <

The Lab ID for data on this page is A543813A.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 15:03:00
SAMPLE: BKG-1B-C,10-12'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543813A #1 SCANS 35 TO 1415
CALI: A543813A #3



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-14	Sample Matrix:	SOIL	Date Analyzed:	02/08/91
Client Sample ID:	BKG-1BD-15-16	Percent Moisture:	18.0	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	61 <	107-18-6	Allyl Alcohol	610 <

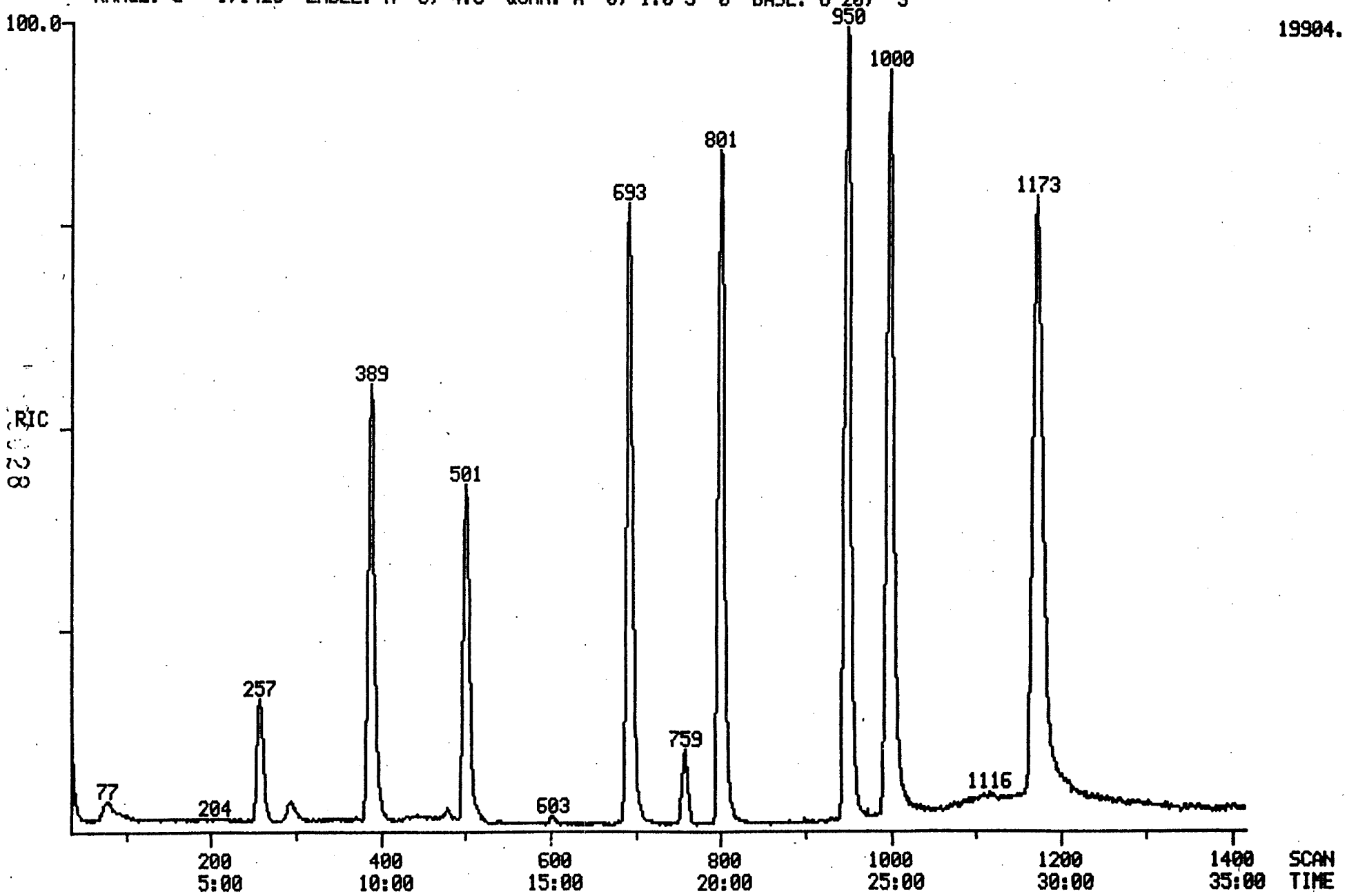
The Lab ID for data on this page is A543814A.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 15:44:00
SAMPLE: BKG-1B-D,15-16'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543814A #1
CALI: A543814A #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-15	Sample Matrix:	SOIL	Date Analyzed:	02/08/91
Client Sample ID:	BKG1B-E-20-22	Percent Moisture:	23.8	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	66 <	107-18-6	Allyl Alcohol	660 <

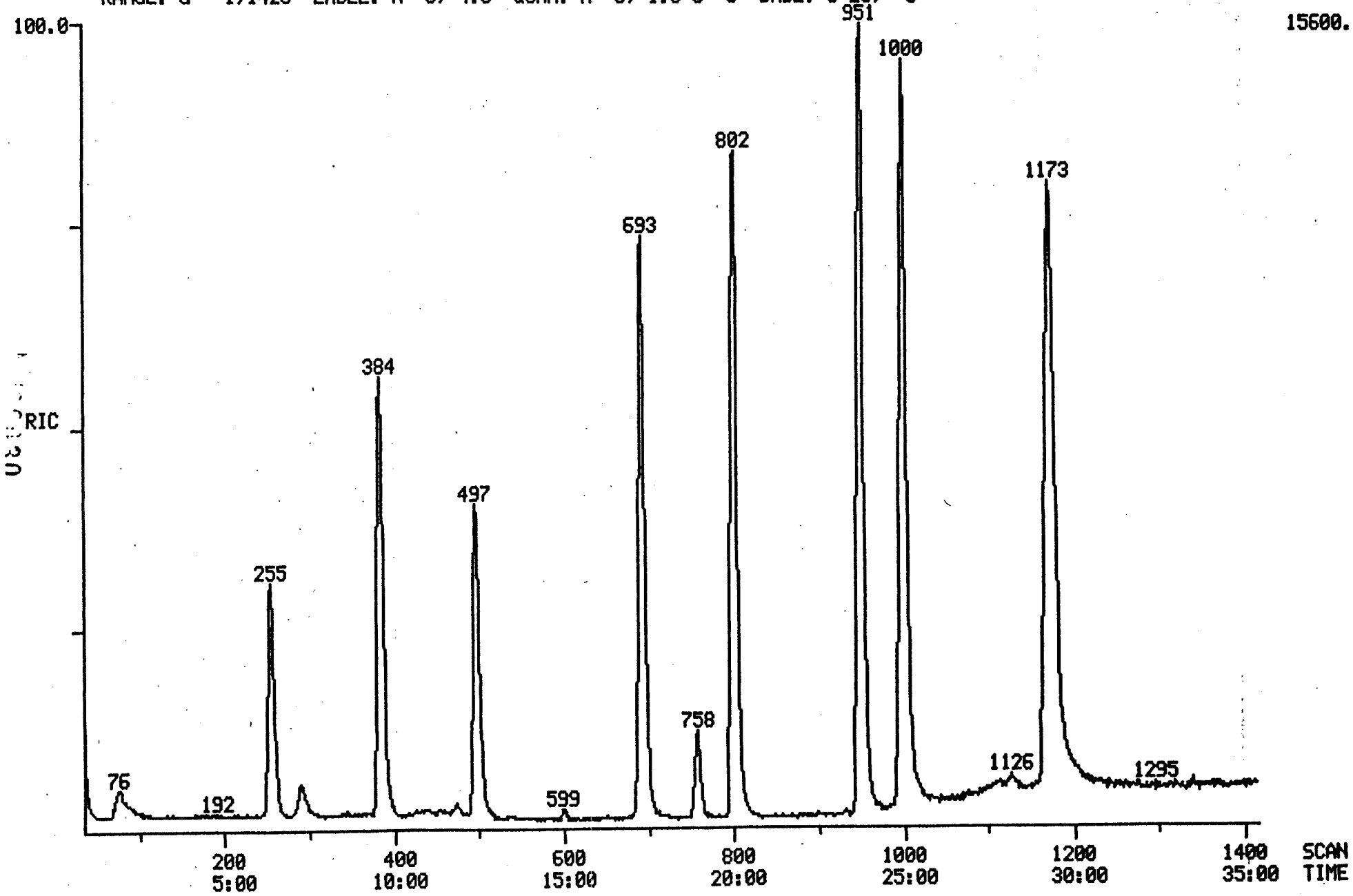
The Lab ID for data on this page is A543815A.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 16:24:00
SAMPLE: BKG-1B-E,20-22'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543815A #1
CALI: A543815A #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-16	Sample Matrix:	SOIL	Date Analyzed:	02/08/91
Client Sample ID:	BKG-2B-A-1-3	Percent Moisture:	24.9	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

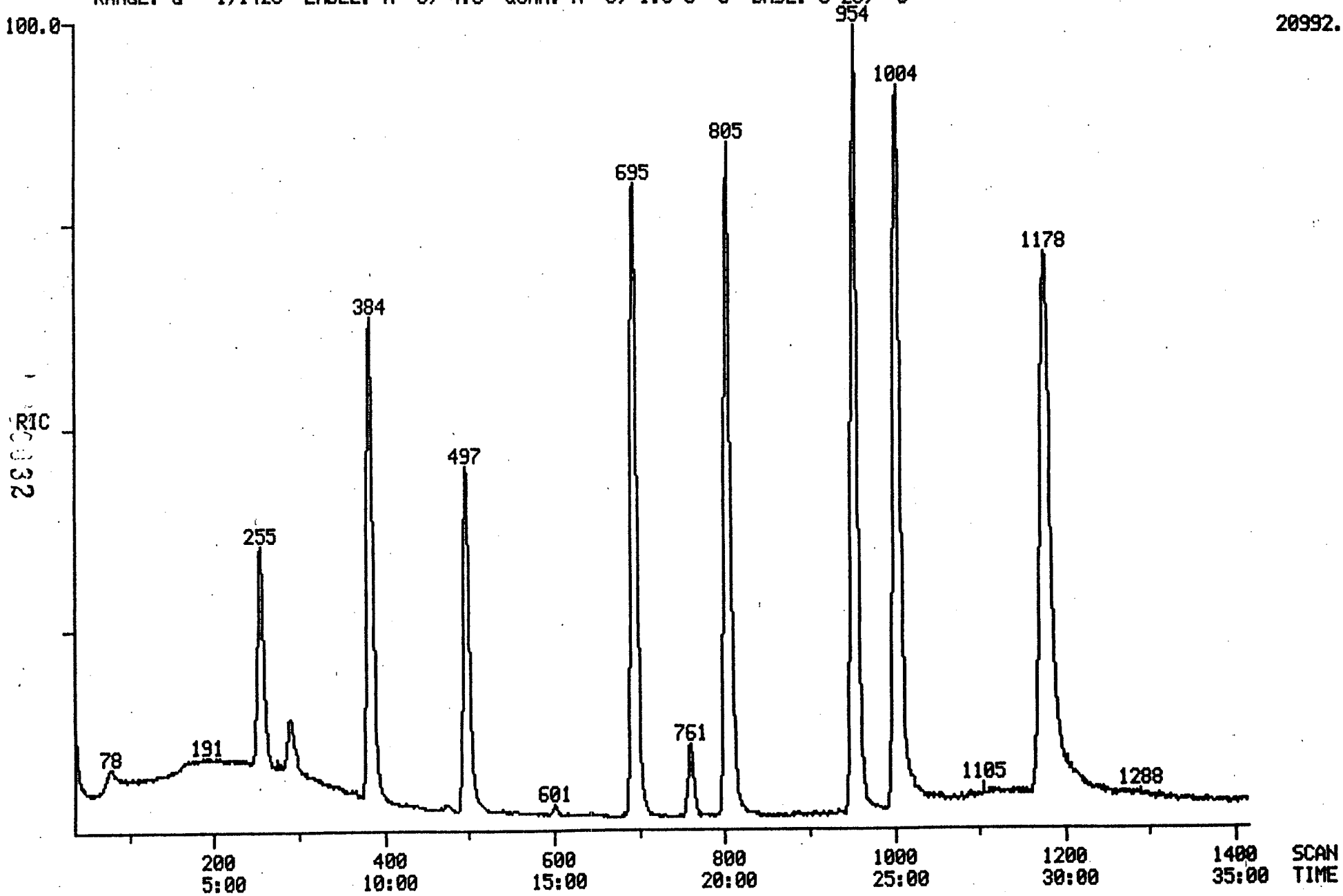
CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	67 <	107-18-6	Allyl Alcohol	670 <

The Lab ID for data on this page is A543816A.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 17:05:00
SAMPLE: BKG-2B-A,1-3'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543816A #1
CALI: A543816A #3

SCANS 35 TO 1415



RIC

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-17	Sample Matrix:	SOIL	Date Analyzed:	02/08/91
Client Sample ID:	BKG-2B-B-5-7	Percent Moisture:	18.4	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	61 <	107-18-6	Allyl Alcohol	610 <

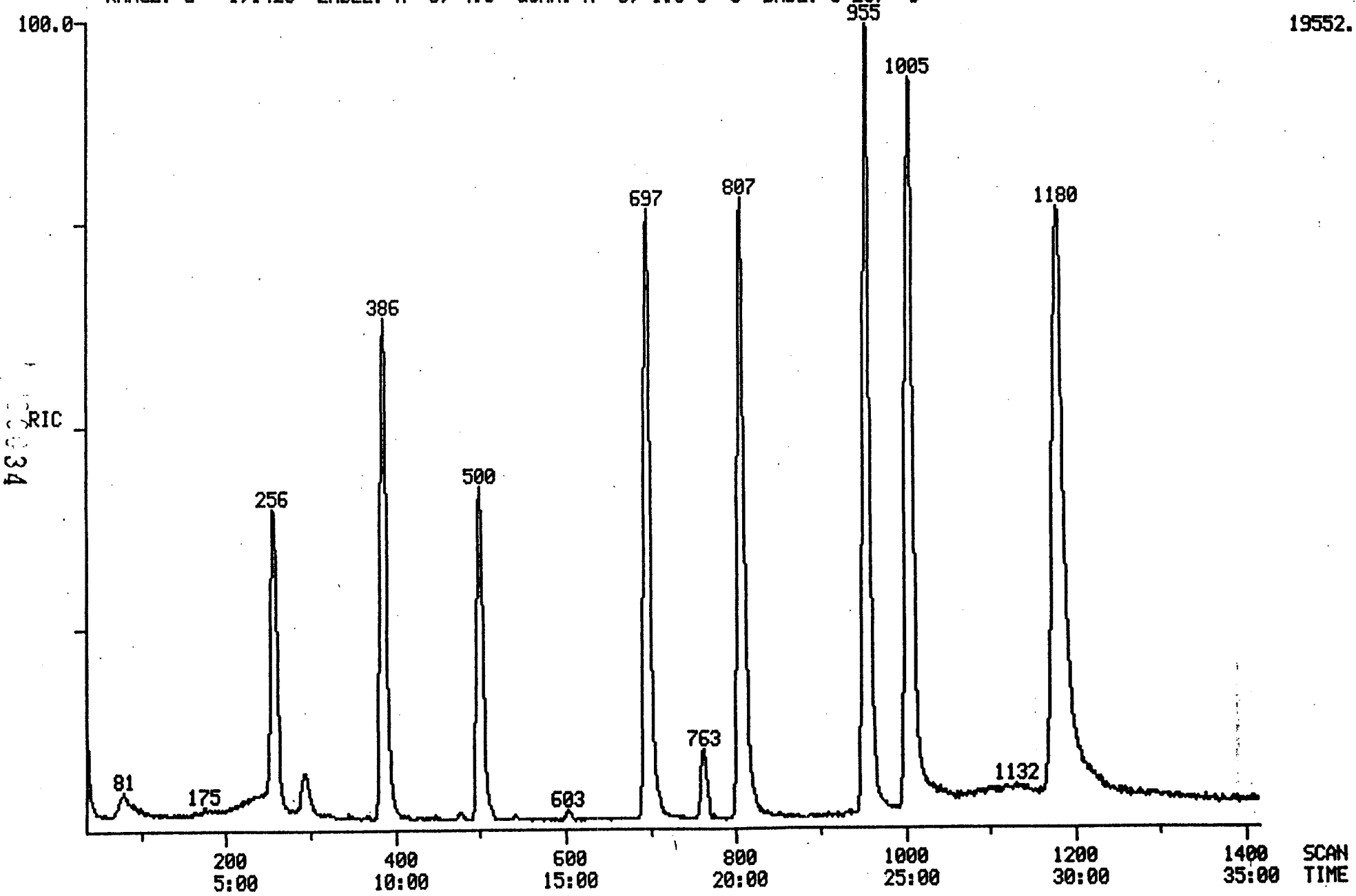
The Lab ID for data on this page is A543817A.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 17:45:00
SAMPLE: BKG-2B-B,5-7'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543817A #1
CALI: A543817A #3

SCANS 35 TO 1415



34

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-18	Sample Matrix:	SOIL	Date Analyzed:	02/08/91
Client Sample ID:	BKG2B-C-10-12	Percent Moisture:	17.4	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	61 <	107-18-6	Allyl Alcohol	610 <

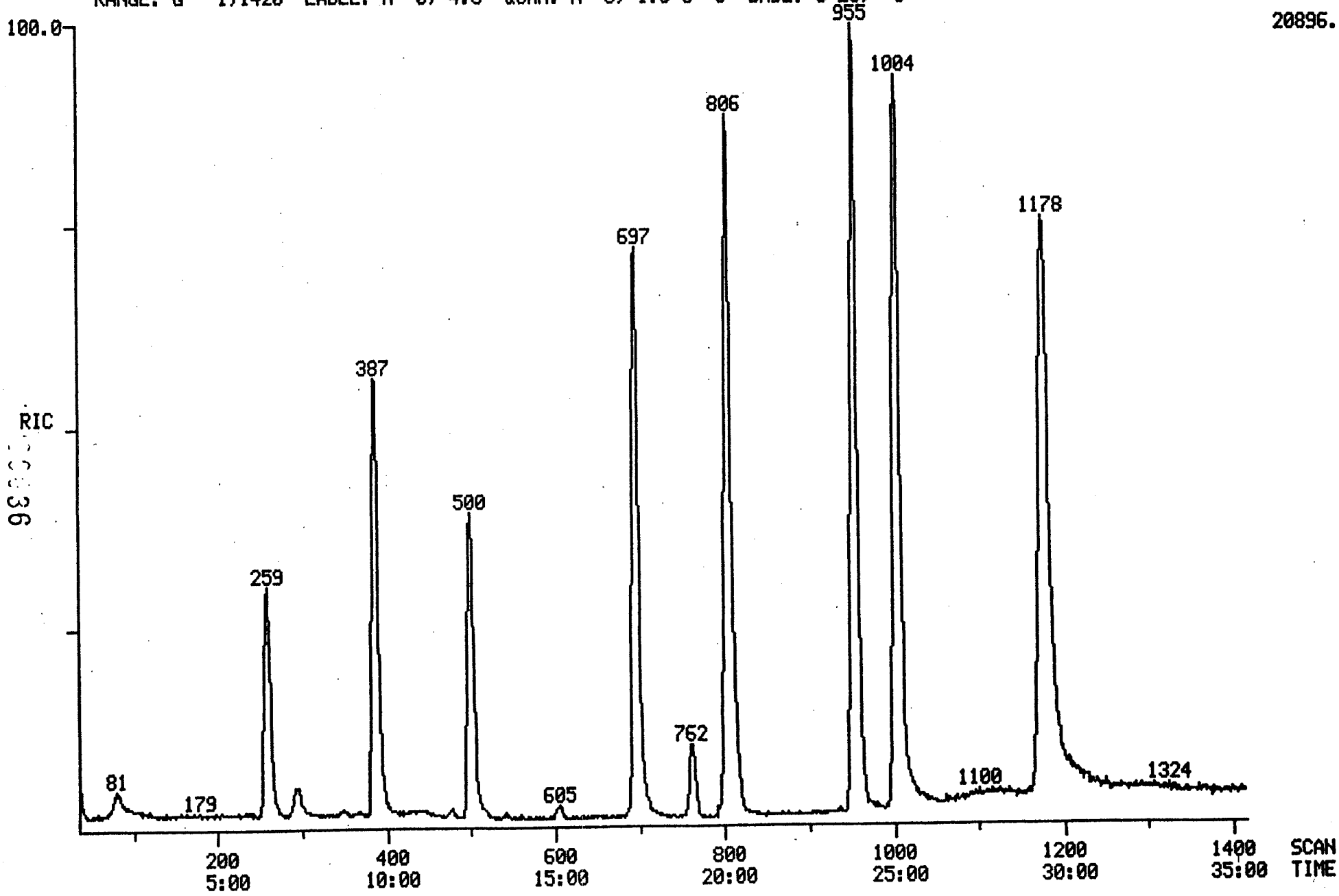
The Lab ID for data on this page is A543818A.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 18:26:00
SAMPLE: BKG-2B-C,10-12'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543818A #1
CALI: A543818A #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/11/91
Lab Sample ID:	A5438-19	Sample Matrix:	SOIL	Date Analyzed:	02/11/91
Client Sample ID:	BKG-2BD-15-17	Percent Moisture:	21.0	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	63 <	107-18-6	Allyl Alcohol	630 <

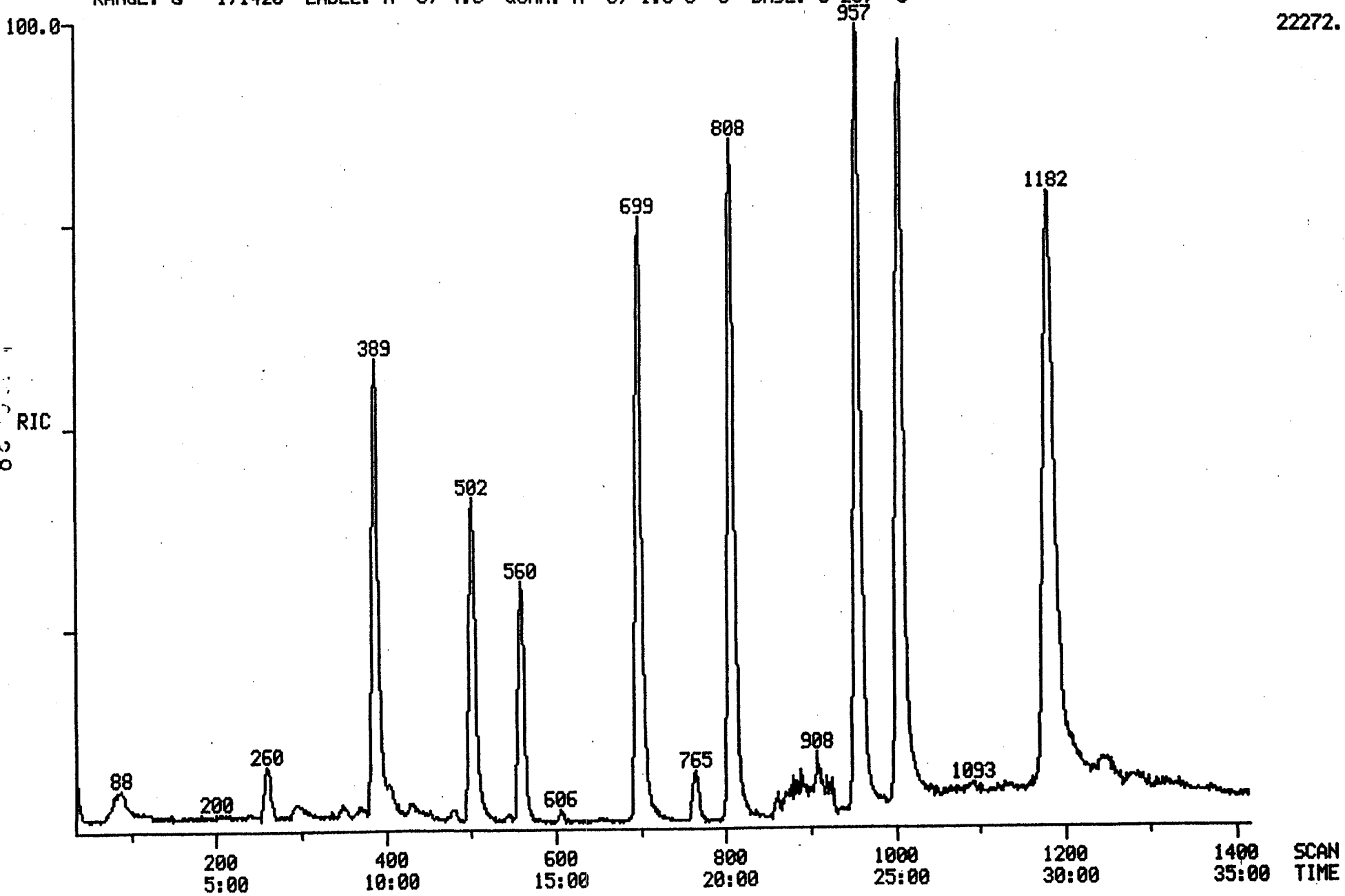
The Lab ID for data on this page is A543819B.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/11/91 10:31:00
SAMPLE: BKG-2B-D,15-17'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543819B #1
CALI: A543819B #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-20	Sample Matrix:	SOIL	Date Analyzed:	02/08/91
Client Sample ID:	BKG2B-E-20-22	Percent Moisture:	21.2	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

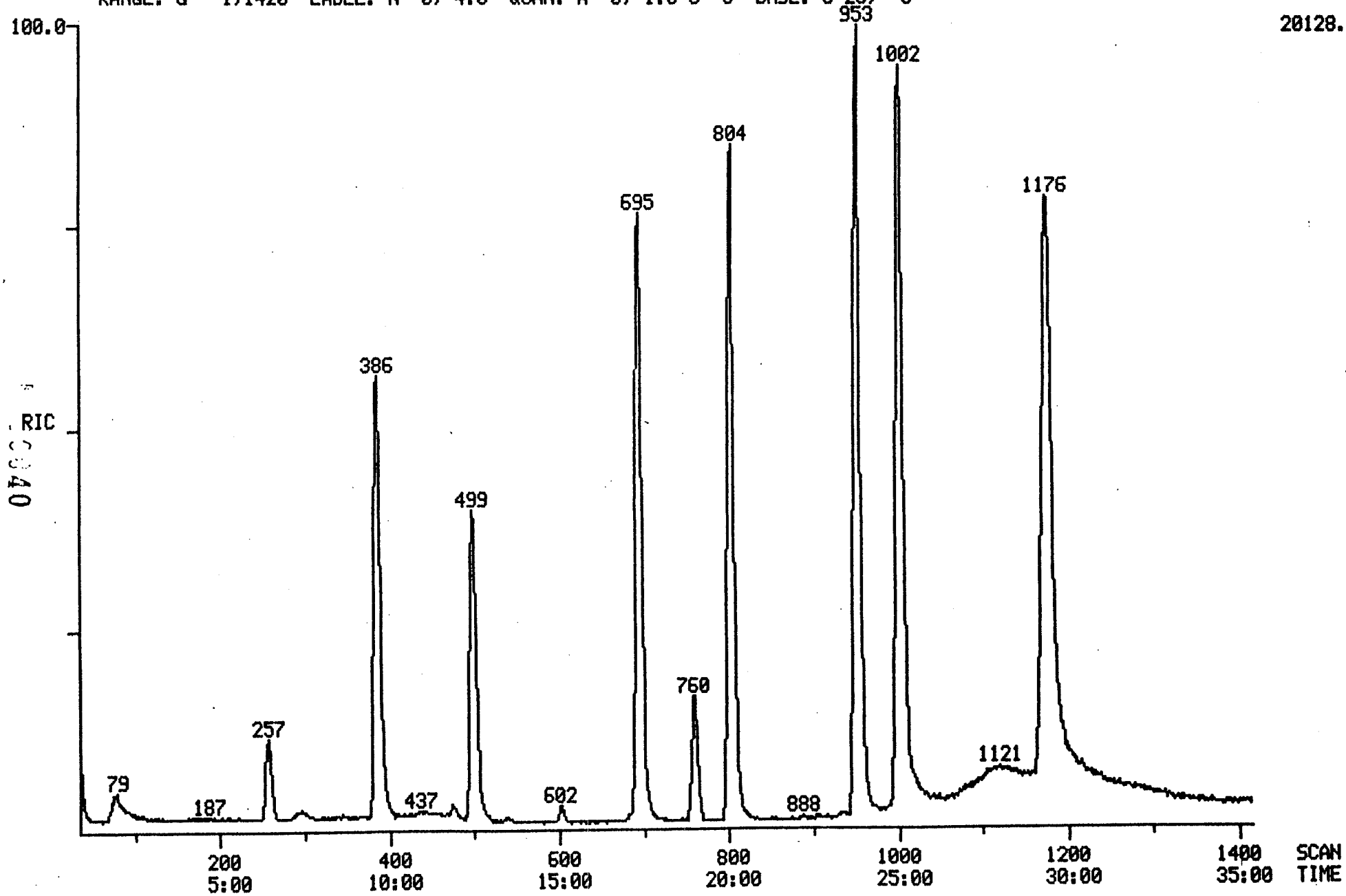
CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	63 <	107-18-6	Allyl Alcohol	630 <

The Lab ID for data on this page is A543820A.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 13:02:00
SAMPLE: BKG-2B-E,20-22'
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543820A #1
CALI: A543820A #3

SCANS 35 TO 1415



0440

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/07/91
Lab Sample ID:	A5438-21	Sample Matrix:	WATER	Date Analyzed:	02/07/91
Client Sample ID:	EQ-BLANK	Percent Moisture:	100.0	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

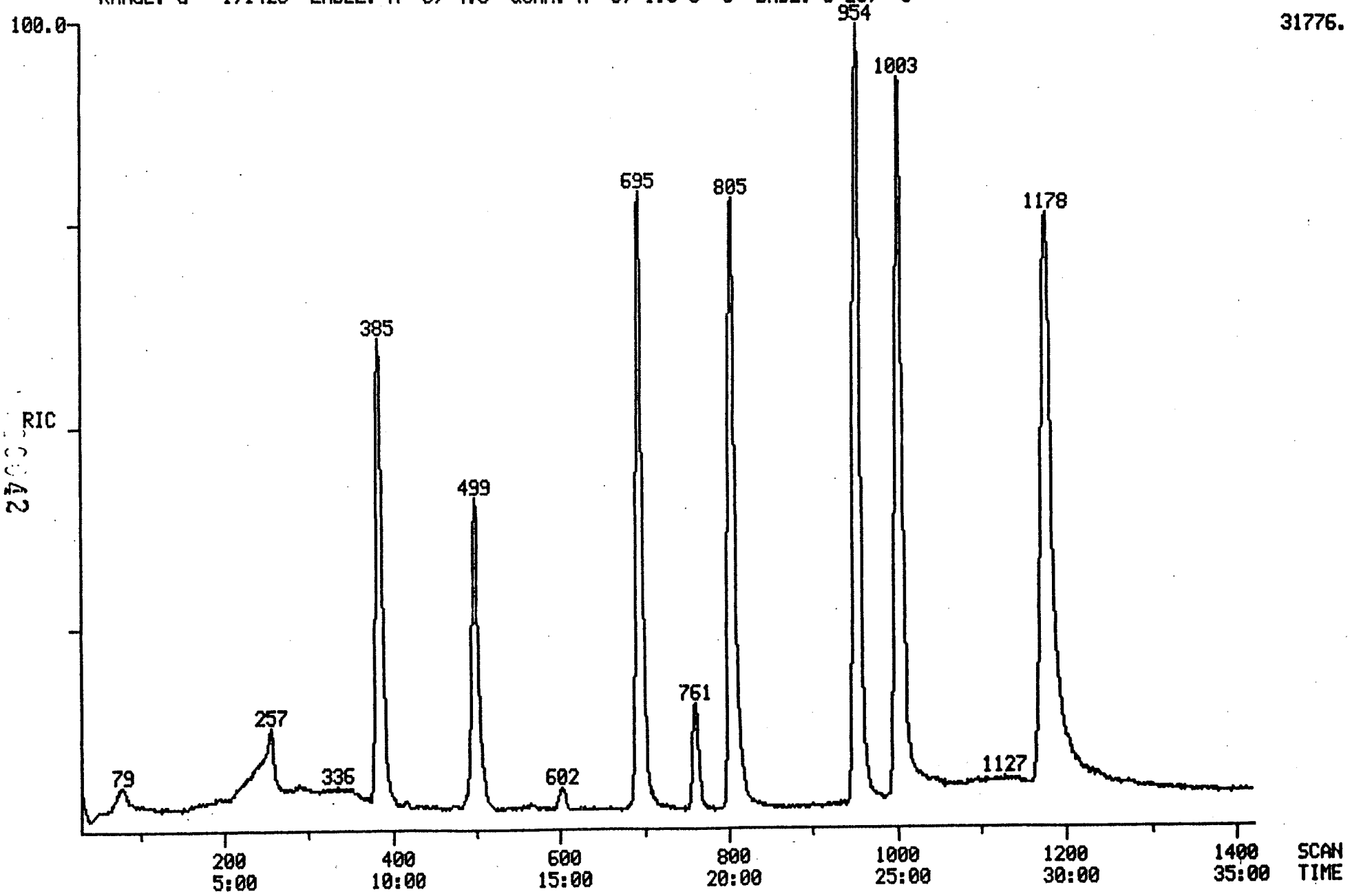
CAS Number		UG/L	CAS Number		UG/L
107-02-8	Acrolein	50 <	107-18-6	Allyl Alcohol	500 <

The Lab ID for data on this page is A543821.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 11:00:00
SAMPLE: EQ-BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543821 #1
CALI: A543821 #3

SCANS 30 TO 1420



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-22	Sample Matrix:	WATER	Date Analyzed:	02/08/91
Client Sample ID:	TRIP-BLANK	Percent Moisture:	100.0	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/L	CAS Number		UG/L
107-02-8	Acrolein	50 <	107-18-6	Allyl Alcohol	500 <

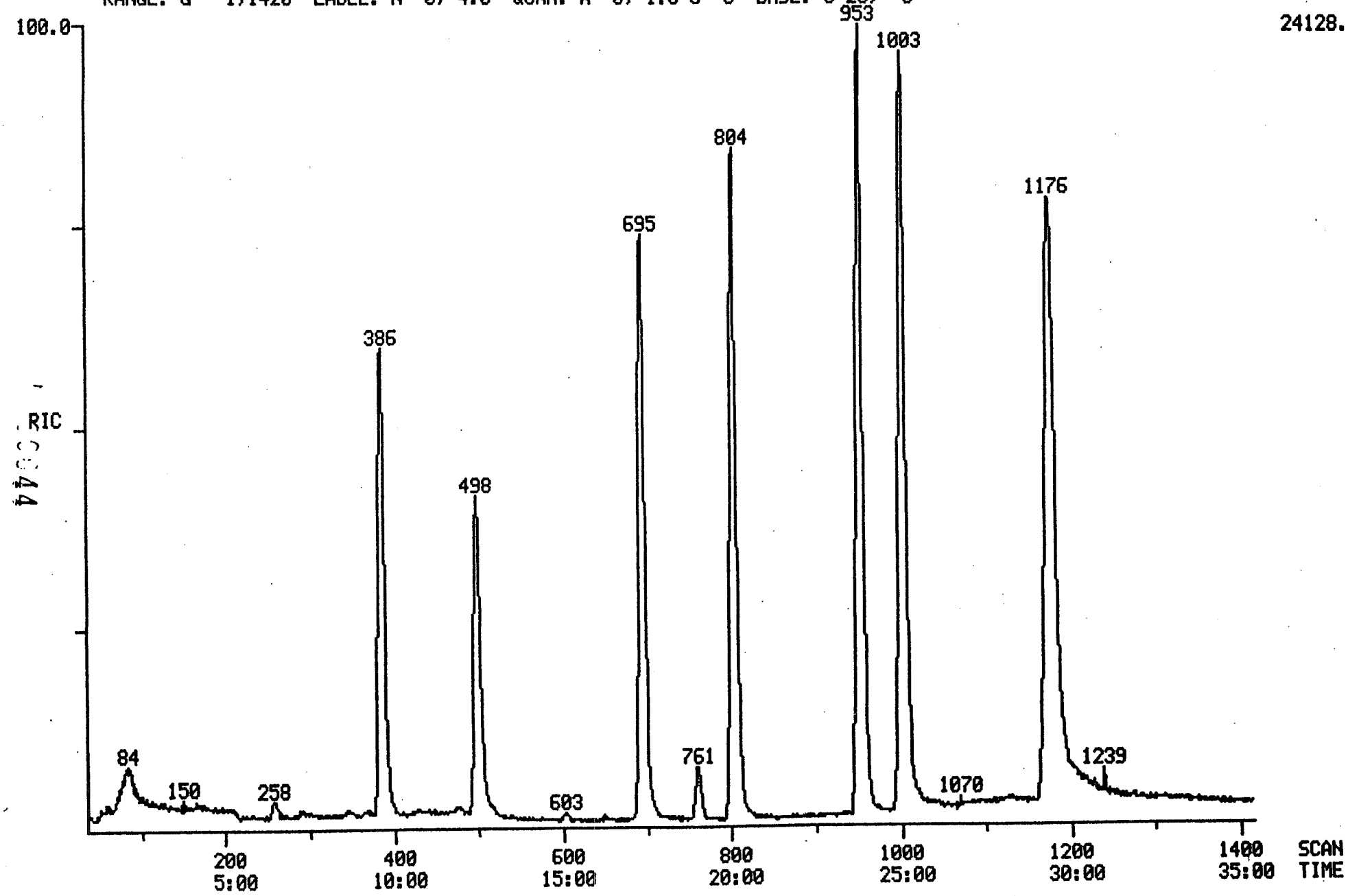
The Lab ID for data on this page is A543822A.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 10:23:00
SAMPLE: TRIP BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A543822A #1
CALI: A543822A #3

SCANS 35 TO 1415



BROMOFLUOROBENZENE

Tuning Report
02/07/91 6:39:00 + 7:34
Instrument: I50C
#291 to #316 averaged - #325
ase Number:

Data: BF020791C2 # 303
Cali: CALTAB # 3
Analyst: BPB
Laboratory:

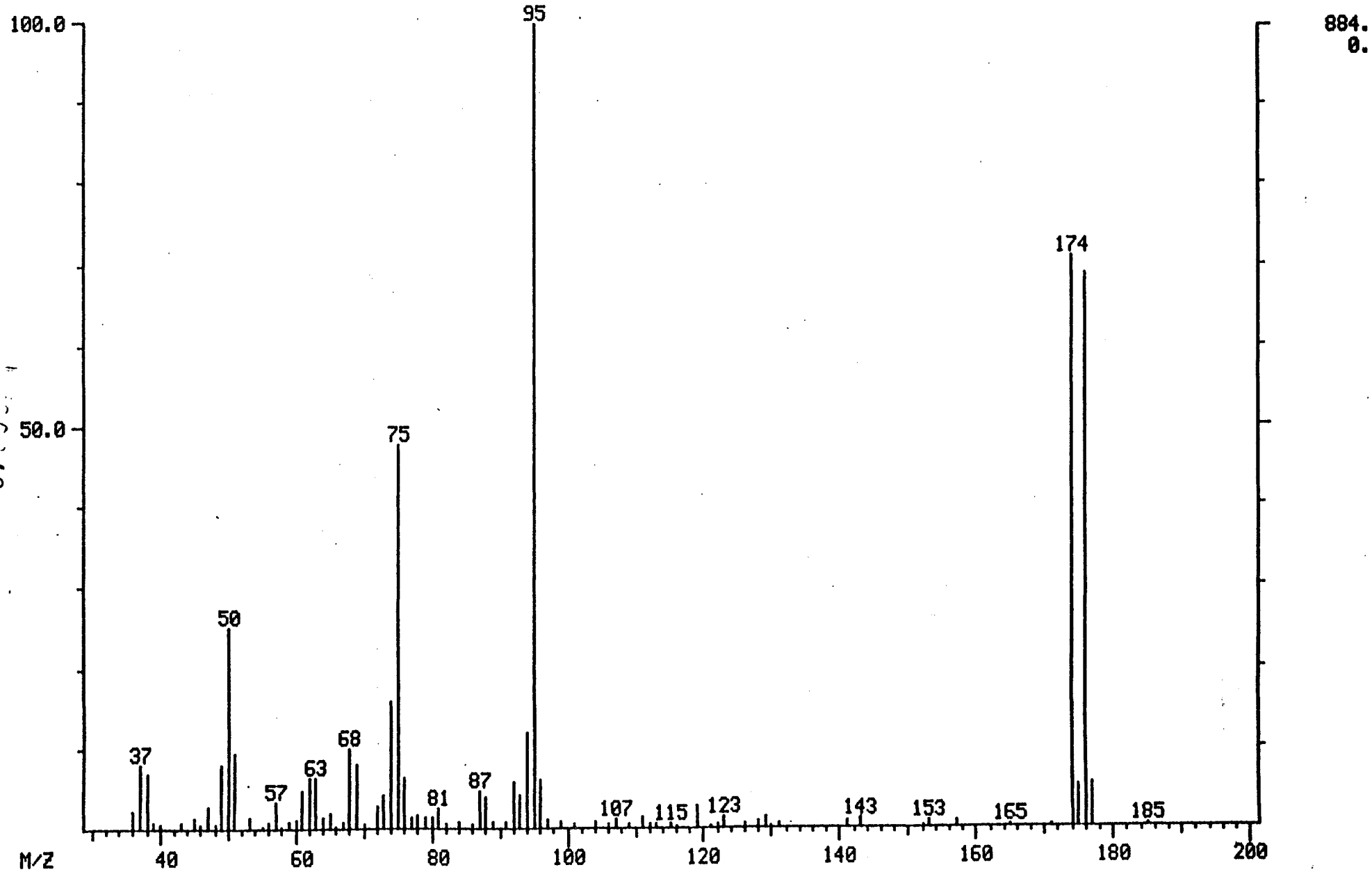
Base m/z: 95
RIC: 4576.
Acct. No.: 8506-091
Contract:

m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	221.	25.0	15.0	40.0	95	25.0	PASS
75	423.	47.9	30.0	60.0	95	47.9	PASS
95	884.	100.0	100.0	---	---	100.0	PASS
96	54.	6.1	5.0	9.0	95	6.1	PASS
173	0.	0.0	---	2.0	174	0.0	PASS
174	627.	70.9	50.0	---	95	70.9	PASS
175	47.	5.3	5.0	9.0	174	7.5	PASS
176	608.	68.8	95.0	101.0	174	97.0	PASS
177	50.	5.7	5.0	9.0	176	8.2	PASS

MASS SPECTRUM
02/07/91 6:39:00 + 7:34
SAMPLE: BFB CALIBRATION
CONDS.: I50C
TEMP: 225 DEG. C
#291 TO #316 AVERAGED - #325 - #288

DATA: BF020791C2 #303
CALI: CALTAB #3

BASE M/Z: 95
RIC: 4576.



Mass List Data: BF020791C2 # 303 Base m/z: 95
02/07/91 6:39:00 + 7:34 Cali: CALTAB # 3 RIC: 4576.
Sample: BFB CALIBRATION
Conds.: I50C
#291 to #316 averaged - #325

36		0.00	0.	Minima	Min	Inten:	0.
185				Maxima	#	0	
Mass		% RA	Inten.	Mass		% RA	Inten.
36?	S	2.26	20.	94	S	11.76	104.
37?	S	8.03	71.	95	S	100.00	884.
38?	S	7.01	62.	96	S	6.11	54.
39?	S	0.90	8.	97	S	1.02	9.
40?	S	0.57	5.	99	S	0.79	7.
43?	S	0.90	8.	101	S	0.57	5.
45?	S	1.36	12.	103	S	0.11	1.
46?	S	0.57	5.	104	S	0.79	7.
47?	S	2.71	24.	106	S	0.57	5.
48?	S	0.45	4.	107	S	1.13	10.
49?	S	8.14	72.	109	S	0.68	6.
50?	S	25.00	221.	111	S	1.24	11.
51?	S	9.39	83.	112	S	0.57	5.
53?	S	1.24	11.	113	S	0.45	4.
55?	S	0.34	3.	115	S	0.68	6.
56?	S	0.90	8.	116	S	0.34	3.
57?	S	3.39	30.	119	S	2.83	25.
58?	S	0.23	2.	121	S	0.23	2.
59?	S	0.79	7.	122	S	0.45	4.
60?	S	1.02	9.	123	S	1.47	13.
61?	S	4.64	41.	126	S	0.45	4.
62?	S	6.33	56.	128	S	0.79	7.
63?	S	6.45	57.	129	S	1.24	11.
64?	S	1.24	11.	130	S	0.23	2.
65?	S	2.04	18.	131	S	0.57	5.
66?	S	0.34	3.	141	S	0.79	7.
67?	S	0.79	7.	143	S	1.13	10.
68?	S	10.07	89.	148	S	0.11	1.
69	S	8.03	71.	149	S	0.11	1.
70	S	0.68	6.	152	S	0.34	3.
71	S	0.11	1.	153	S	0.79	7.
72	S	2.83	25.	157	S	0.79	7.
73	S	4.07	36.	163	S	0.11	1.
74	S	15.84	140.	165	S	0.34	3.
75	S	47.85	423.	171	S	0.23	2.
76	S	6.45	57.	174	S	70.93	627.
77	S	1.36	12.	175	S	5.32	47.
78	S	1.70	15.	176	S	68.78	608.
79	S	1.36	12.	177	S	5.66	50.
80	S	1.47	13.	185	S	0.34	3.
81	S	2.38	21.				
82	S	0.45	4.				
84	S	0.79	7.				
86	S	0.57	5.				
87	S	4.75	42.				
88	S	3.85	34.				
89	S	0.90	8.				
91	S	0.90	8.				
92	S	5.77	51.				
93	S	4.19	37.				

BROMOFLUOROBENZENE

Tuning Report
02/08/91 8:17:00 + 7:22
Instrument: I50C
#282 to #308 averaged - #315

Data: BF020891C1 # 295
Cali: BF020891C1 # 3
Analyst: BPB

Base m/z: 95
RIC: 2776.
Acct. No.: 8506-090

Case Number:

Laboratory:

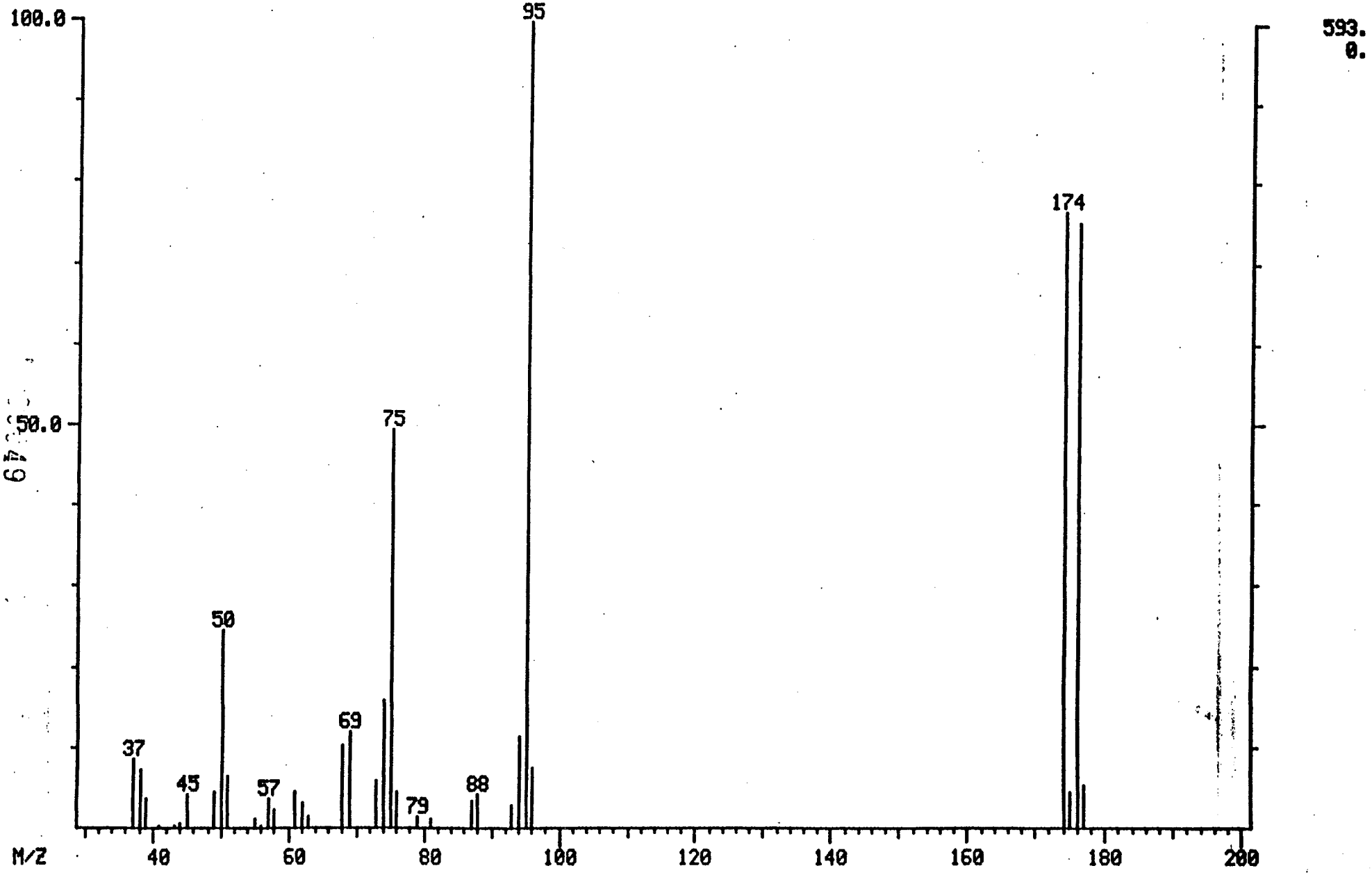
Contract:

m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	145.	24.5	15.0	40.0	95	24.5	PASS
75	293.	49.4	30.0	60.0	95	49.4	PASS
95	593.	100.0	100.0	---	---	100.0	PASS
96	45.	7.6	5.0	9.0	95	7.6	PASS
173	0.	0.0	---	2.0	174	0.0	PASS
174	454.	76.6	50.0	---	95	76.6	PASS
175	27.	4.6	5.0	9.0	174	5.9	PASS
176	445.	75.0	95.0	101.0	174	98.0	PASS
177	31.	5.2	5.0	9.0	176	7.0	PASS

MASS SPECTRUM
02/08/91 8:17:00 + 7:22
SAMPLE: BFB CALIBRATION
CONDS.: I50C
TEMP: 225 DEG. C
#282 TO #308 AVERAGED - #315 - #274 TO #275

DATA: BF020891C1 #295
CALI: BF020891C1 #3

BASE M/Z: 95
RIC: 2776.



Mass List
02/08/91 8:17:00 + 7:22
Sample: BFB CALIBRATION
Conds.: I50C
#282 to #308 averaged - #315

Data: BF020891C1 # 295
Cali: BF020891C1 # 3

Base m/z: 95
RIC: 2776.

37		0.00	0.	Minima	Min Inten:	0.
177				Maxima	#	0
Mass		% RA	Inten.			
37?	S	8.60	51.			
38?	S	7.08	42.			
39?	S	3.71	22.			
41?	S	0.17	1.			
43?	S	0.34	2.			
44?	S	0.51	3.			
45?	S	4.05	24.			
49?	S	4.55	27.			
50?	S	24.45	145.			
51?	S	6.24	37.			
55?	S	1.18	7.			
56?	S	0.34	2.			
57?	S	3.54	21.			
58?	S	2.19	13.			
61?	S	4.38	26.			
62?	S	3.04	18.			
63?	S	1.52	9.			
68?	S	10.12	60.			
69	S	11.80	70.			
73	S	5.73	34.			
74	S	15.85	94.			
75	S	49.41	293.			
76	S	4.38	26.			
79	S	1.35	8.			
81	S	1.18	7.			
87	S	3.37	20.			
88	S	4.22	25.			
93	S	2.87	17.			
94	S	11.30	67.			
95	S	100.00	593.			
96	S	7.59	45.			
174	S	76.56	454.			
175	S	4.55	27.			
176	S	75.04	445.			
177	S	5.23	31.			

Tuning Report
02/11/91 7:30:00 + 7:36
Instrument: I50C

Data: BF021191C1 # 304
Cali: BF021191C1 # 3
Analyst: BPB

Base m/z: 95
RIC: 4320.
Acct. No.: 8506-090

#294 to #314 averaged - #324 to #325 - #286 to #287

Case Number:

Laboratory:

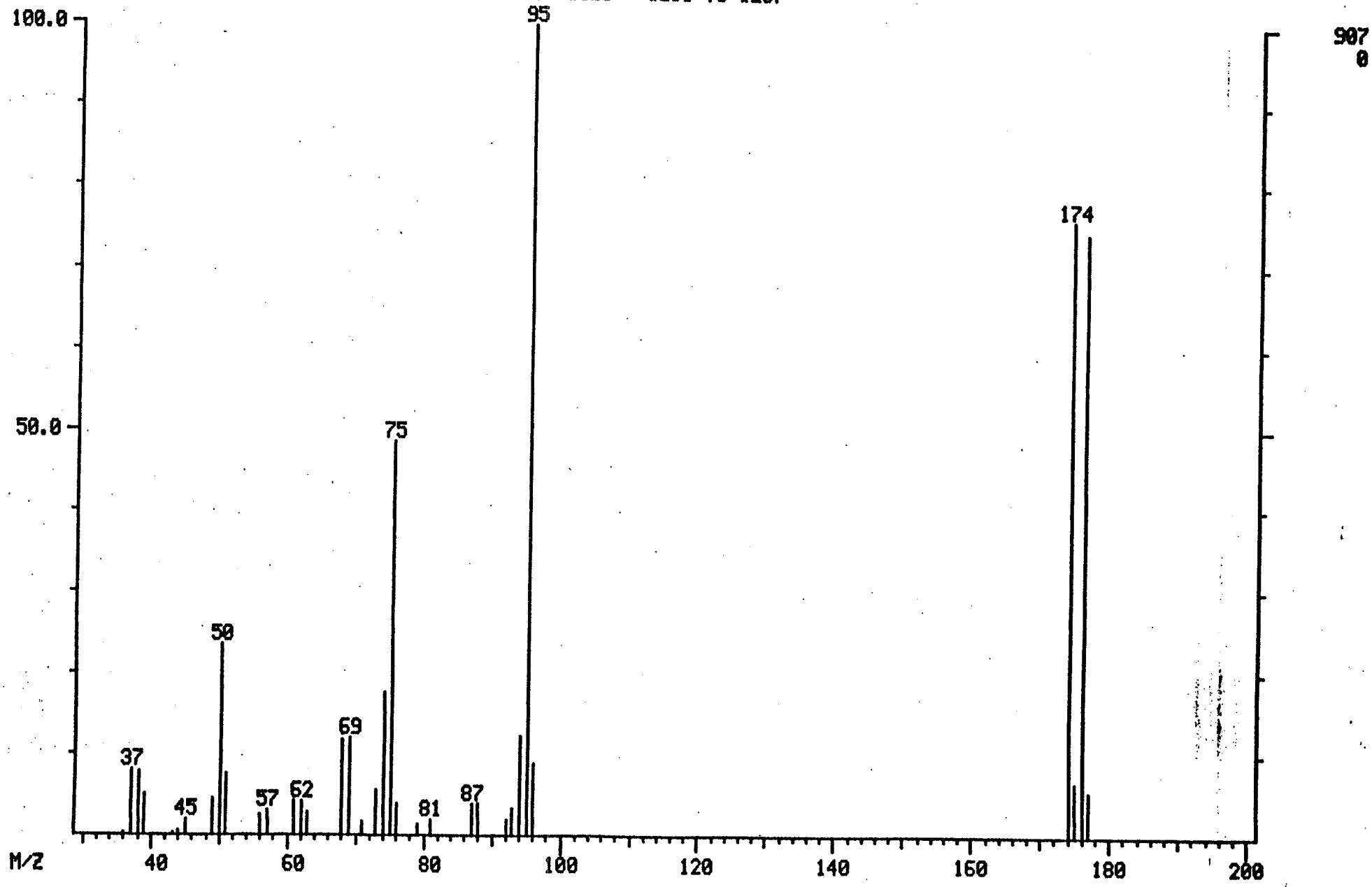
Contract:

m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	214.	23.6	15.0	40.0	95	23.6	PASS
75	441.	48.6	30.0	60.0	95	48.6	PASS
95	907.	100.0	100.0	---	---	100.0	PASS
96	79.	8.7	5.0	9.0	95	8.7	PASS
173	0.	0.0	---	2.0	174	0.0	PASS
174	689.	76.0	50.0	---	95	76.0	PASS
175	59.	6.5	5.0	9.0	174	8.6	PASS
176	673.	74.2	95.0	101.0	174	97.7	PASS
177	49.	5.4	5.0	9.0	176	7.3	PASS

MASS SPECTRUM
02/11/91 7:30:00 + 7:36
SAMPLE: BFB CALIBRATION
CONDS.: I50C
TEMP: 225 DEG. C
#294 TO #314 AVERAGED - #324 TO #325 - #286 TO #287

DATA: BF021191C1 #304
CALI: BF021191C1 #3

BASE M/Z: 95
RIC: 4320.



02/11/91 7:30:00 + 7:36 : Cali: BF021191C1 # 3 RIC: 4320.
Sample: BFB CALIBRATION
Conds.: I50C
#294 to #314 averaged - #324 to #325 - #286 to #287

36		0.00	0.	Minima	Min Inten:	0.
177				Maxima	#	0
Mass		% RA	Inten.			
36?	S	0.22	2.			
37?	S	7.94	72.			
38?	S	7.61	69.			
39?	S	4.96	45.			
41?	S	0.11	1.			
43?	S	0.22	2.			
44?	S	0.66	6.			
45?	S	1.87	17.			
49?	S	4.52	41.			
50?	S	23.59	214.			
51?	S	7.50	68.			
56?	S	2.43	22.			
57?	S	3.09	28.			
61?	S	4.08	37.			
62?	S	4.19	38.			
63?	S	2.65	24.			
68?	S	11.69	106.			
69	S	11.80	107.			
71	S	1.65	15.			
73	S	5.62	51.			
74	S	17.31	157.			
75	S	48.62	441.			
76	S	3.97	36.			
79	S	1.32	12.			
81	S	1.98	18.			
87	S	3.97	36.			
88	S	3.75	34.			
92	S	1.87	17.			
93	S	3.42	31.			
94	S	12.13	110.			
95	S	100.00	907.			
96	S	8.71	79.			
174	S	75.96	689.			
175	S	6.50	59.			
176	S	74.20	673.			
177	S	5.40	49.			

CONTINUING CALIBRATION CHECK
VOLATILE HSL COMPOUNDS

Case No: CALIB
Contractor: AnalytiKEM-Hou
Contract No:
Instrument ID: I50C

Region:

Calibration Date: 02/07/91
Time: 06:56
Laboratory ID: CC020791C1
Initial Cali. Date: 01/14/91

Minimum RF for SPCC is 0.300 (1) Maximum %D for CCC is 25%

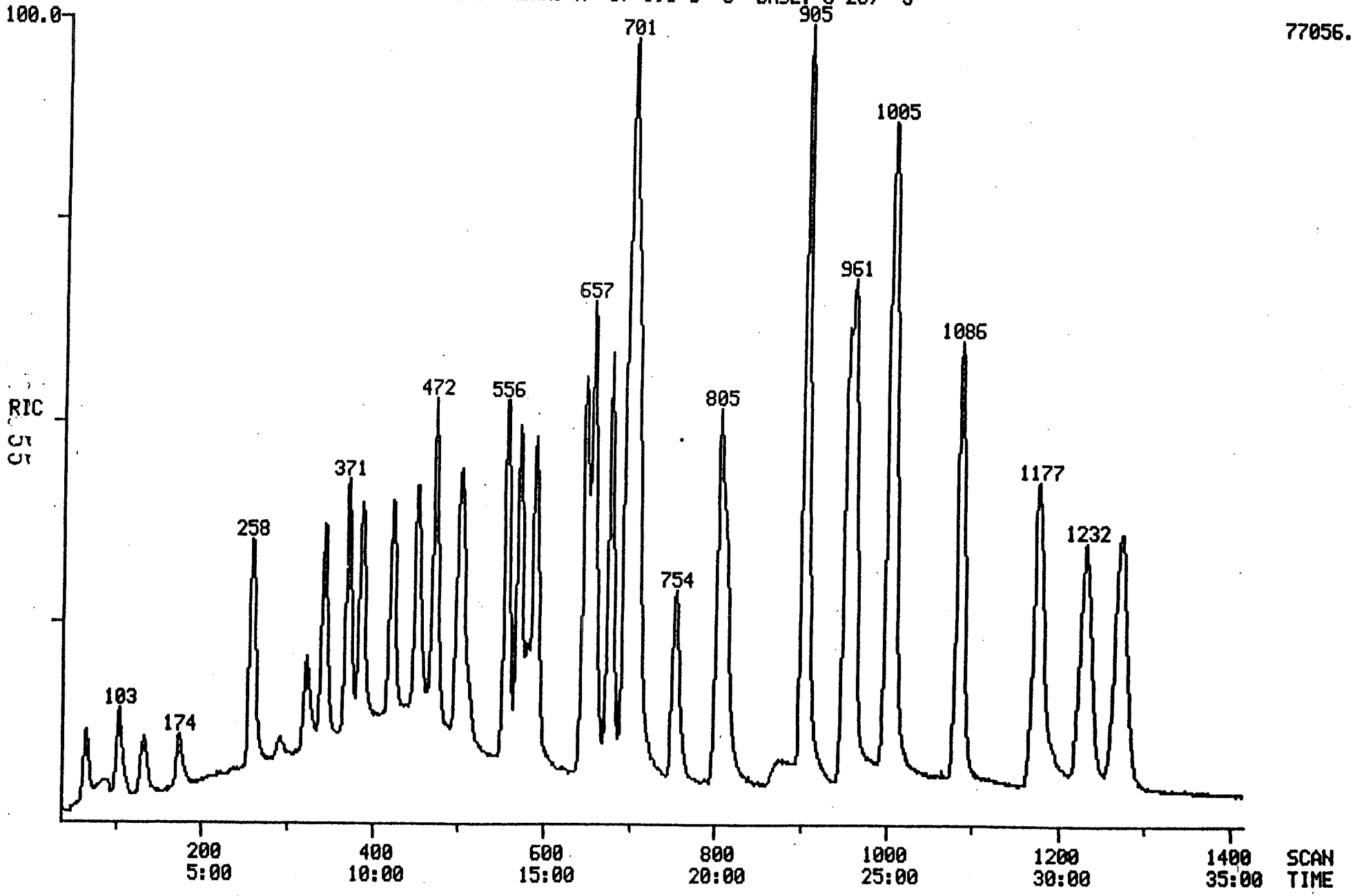
Compound	AVE RF	RF(50)	% D	CCC	SPCC
Chloromethane	1.103	1.555	-41.0		* *
Bromomethane	1.054	1.266	-20.1		
Vinyl Chloride	1.025	1.108	-8.1	*	
Chloroethane	0.677	0.983	-45.2		
Methylene Chloride	1.157	1.711	-47.9		
Acetone	0.514	0.499	2.9		
Carbon Disulfide	2.278	2.934	-28.8		
1,1-Dichloroethene	1.207	1.409	-16.7	*	
1,1-Dichloroethane	2.687	3.849	-43.2		* *
trans-1,2-Dichloroethene	1.313	1.529	-16.5		
Chloroform	3.006	3.533	-17.5	*	
1,2-Dichloroethane	2.230	2.893	-29.7		
2-Butanone	0.044	0.043	2.3		
1,1,1-Trichloroethane	0.585	0.713	-21.9		
Carbon Tetrachloride	0.530	0.647	-22.1		
Vinyl Acetate	0.650	0.574	11.7		
Bromodichloromethane	0.656	0.781	-19.1		
1,2-Dichloropropane	0.387	0.443	-14.5	*	
[illegible]-1,3-Dichloropropene	0.544	0.620	-14.0		
[illegible]chloroethene	0.475	0.506	-6.5		
Dibromochloromethane	0.677	0.627	7.4		
1,1,2-Trichloroethane	0.399	0.379	5.0		
Benzene	1.020	1.042	-2.2		
Trans-1,3-Dichloropropene	0.545	0.538	1.3		
2-Chloroethylvinylether	0.302	0.292	3.3		
Bromoform	0.591	0.488	17.4		* *
4-Methyl-2-Pentanone	0.528	0.104	80.3		
2-Hexanone	0.215	0.460	-114.0		
Tetrachloroethene	0.493	0.519	-5.3		
1,1,2,2-Tetrachloroethane	0.681	0.674	1.0		* *
Toluene	0.779	0.841	-8.0	*	
Chlorobenzene	1.076	1.149	-6.8		* *
Ethylbenzene	0.534	0.542	-1.5	*	
Styrene	0.912	0.801	12.2		
Xylene (total)	0.607	0.504	17.0		

RF(50) - Response Factor from daily standard file at 50 ug/l
AVE RF - Average Response Factor from initial calibration Form VI
%D - - - Percent Difference
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Mininum RF for Bromoform is 0.250

Form VII

RIC
02/07/91 6:56:00
SAMPLE: CONTINUING CALIBRATION
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: CC020791C1 #1 SCANS 35 TO 1415
CALI: CC020791C1 #3



CONTINUING CALIBRATION CHECK
VOLATILE HSL COMPOUNDS

Case No: CALIB Region:
Contractor: AnalytiKEM-Hou
ntract No:
strument ID: I50C

Calibration Date: 02/08/91
Time: 08:32
Laboratory ID: CC020891C1
Initial Cali. Date: 01/14/91

Minimum RF for SPCC is 0.300 (1) Maximum %D for CCC is 25%

Compound	AVE RF	RF(50)	% D	CCC	SPCC
Chloromethane	1.103	1.277	-15.8		* *
Bromomethane	1.054	1.230	-16.7		
Vinyl Chloride	1.025	1.172	-14.3	*	
Chloroethane	0.677	0.955	-41.1		
Methylene Chloride	1.157	1.527	-32.0		
Acetone	0.514	0.383	25.5		
Carbon Disulfide	2.278	2.410	-5.8		
1,1-Dichloroethene	1.207	1.391	-15.2	*	
1,1-Dichloroethane	2.687	3.253	-21.1		* *
trans-1,2-Dichloroethene	1.313	1.545	-17.7		
Chloroform	3.006	3.500	-16.4	*	
1,2-Dichloroethane	2.230	2.499	-12.1		
2-Butanone	0.044	0.043	2.3		
1,1,1-Trichloroethane	0.585	0.642	-9.7		
Carbon Tetrachloride	0.530	0.605	-14.2		
Vinyl Acetate	0.650	0.450	30.8		
Bromodichloromethane	0.656	0.680	-3.7		
1,2-Dichloropropane	0.387	0.427	-10.3	*	
cis-1,3-Dichloropropene	0.544	0.551	-1.3		
chloroethene	0.475	0.492	-3.6		
bromochloromethane	0.677	0.613	9.5		
1,1,2-Trichloroethane	0.399	0.355	11.0		
Benzene	1.020	0.944	7.5		
Trans-1,3-Dichloropropene	0.545	0.489	10.3		
2-Chloroethylvinylether	0.302	0.260	13.9		
Bromoform	0.591	0.500	15.4		* *
4-Methyl-2-Pentanone	0.528	0.385	27.1		
2-Hexanone	0.215	0.138	35.8		
Tetrachloroethene	0.493	0.509	-3.2		
1,1,2,2-Tetrachloroethane	0.681	0.605	11.2		* *
Toluene	0.779	0.765	1.8	*	
Chlorobenzene	1.076	1.058	1.7		* *
Ethylbenzene	0.534	0.524	1.9	*	
Styrene	0.912	0.724	20.6		
Xylene (total)	0.607	0.497	18.1		

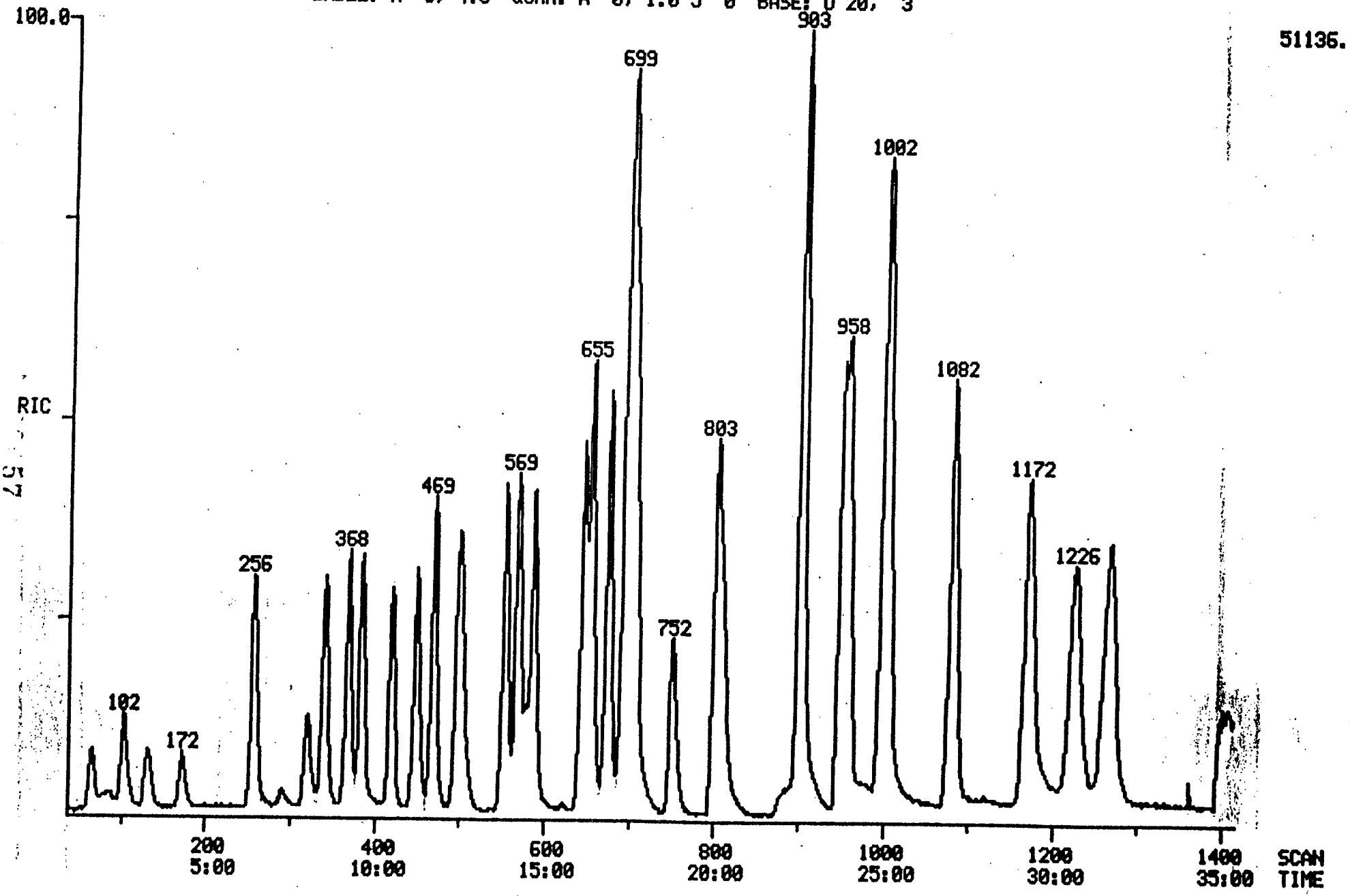
RF(50) - Response Factor from daily standard file at 50 ug/l
AVE RF - Average Response Factor from initial calibration Form VI
%D - - - Percent Difference
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
1) - - Mininum RF for Bromoform is 0.250

Form VII

02/08/91 8:32:00
SAMPLE: CONTINUING CALIBRATION
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: CC020891C1 #1
CALI: CC020891C1 #3

SCANS 35 TO 1415



CONTINUING CALIBRATION CHECK
VOLATILE HSL COMPOUNDS

Case No: CALIB
Contractor: AnalytiKEM-Hou
Contract No:
Instrument ID: I50C

Region:

Calibration Date: 02/11/91
Time: 07:47
Laboratory ID: CC021191C1
Initial Cali. Date: 01/14/91

Minimum RF for SPCC is 0.300 (1) Maximum %D for CCC is 25%

Compound	AVE RF	RF(50)	% D	CCC	SPCC
Chloromethane	1.103	1.074	2.6		* *
Bromomethane	1.054	1.051	0.3		
Vinyl Chloride	1.025	1.116	-8.9	*	
Chloroethane	0.677	0.749	-10.6		
Methylene Chloride	1.157	1.446	-25.0		
Acetone	0.514	0.568	-10.5		
Carbon Disulfide	2.278	2.148	5.7		
1,1-Dichloroethene	1.207	1.305	-8.1	*	
1,1-Dichloroethane	2.687	2.878	-7.1		* *
trans-1,2-Dichloroethene	1.313	1.414	-7.7		
Chloroform	3.006	3.661	-21.8	*	
1,2-Dichloroethane	2.230	2.722	-22.1		
2-Butanone	0.044	0.048	-9.1		
1,1,1-Trichloroethane	0.585	0.734	-25.5		
Carbon Tetrachloride	0.530	0.680	-28.3		
Vinyl Acetate	0.650	0.488	24.9		
Bromodichloromethane	0.656	0.732	-11.6		
1,2-Dichloropropane	0.387	0.464	-19.9	*	
cis-1,3-Dichloropropene	0.544	0.563	-3.5		
Trichloroethene	0.475	0.519	-9.3		
Dibromochloromethane	0.677	0.642	5.2		
1,1,2-Trichloroethane	0.399	0.372	6.8		
Benzene	1.020	1.026	-0.6		
Trans-1,3-Dichloropropene	0.545	0.484	11.2		
2-Chloroethylvinylether	0.302	0.249	17.5		
Bromoform	0.591	0.448	24.2		* *
4-Methyl-2-Pentanone	0.528				
2-Hexanone	0.215	0.189	12.1		
Tetrachloroethene	0.493	0.508	-3.0		
1,1,2,2-Tetrachloroethane	0.681	0.572	16.0		* *
Toluene	0.779	0.759	2.6	*	
Chlorobenzene	1.076	1.076	0.0		* *
Ethylbenzene	0.534	0.528	1.1	*	
Styrene	0.912	0.762	16.4		
Xylene (total)	0.607	0.489	19.4		

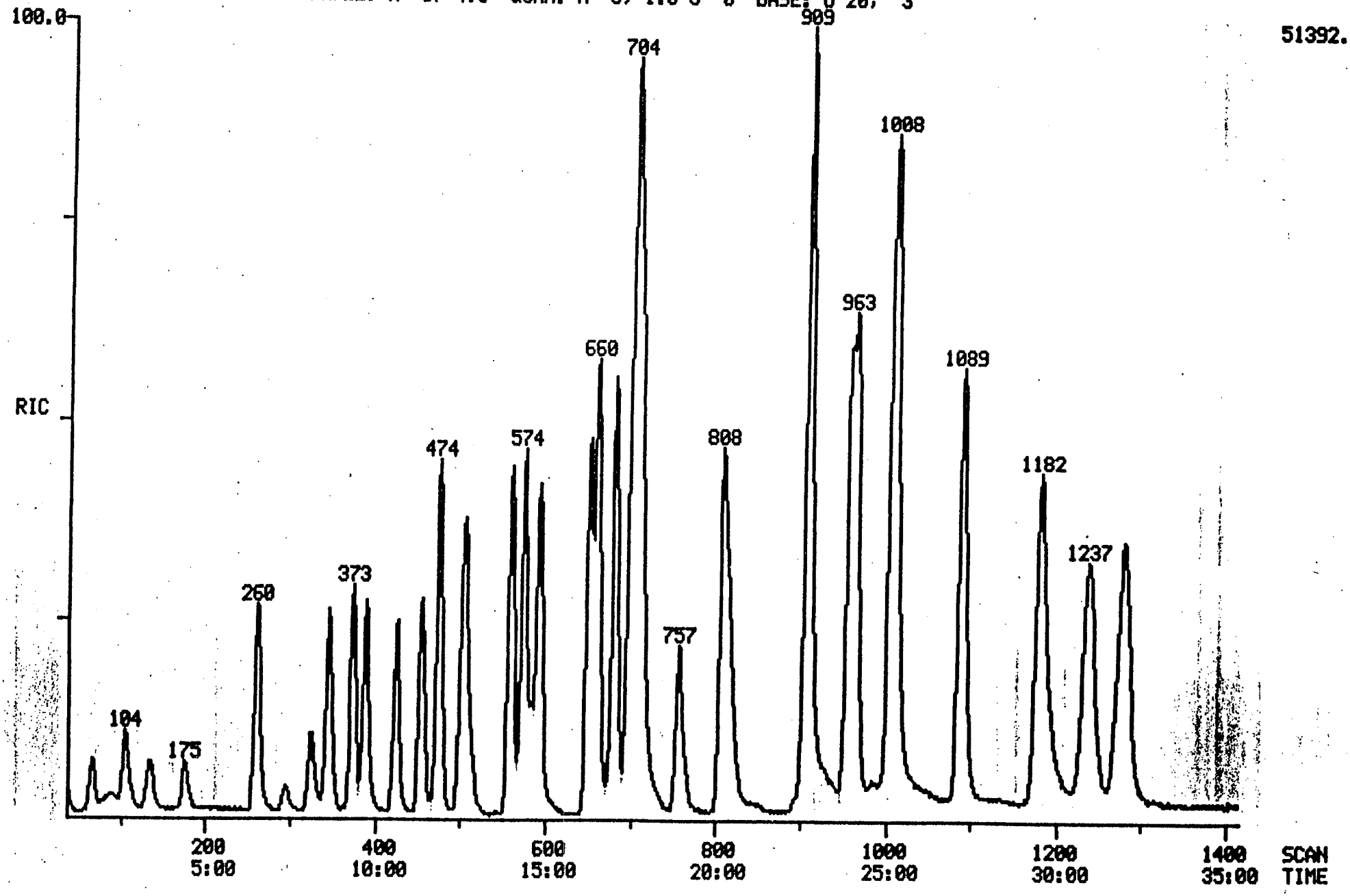
RF(50) - Response Factor from daily standard file at 50 ug/l
AVE RF - Average Response Factor from initial calibration Form VI
%D - - - Percent Difference
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Mininum RF for Bromoform is 0.250

Form VII

RIC
02/11/91 7:47:00
SAMPLE: CONTINUING CALIBRATION
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: CC021191C1 #1
CALI: CC021191C1 #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/07/91
Lab Sample ID:	MB020791C1	Sample Matrix:	WATER	Date Analyzed:	02/07/91
ent Sample ID:	MB020791C1	Percent Moisture:	100.0	Dilution Factor:	1.0

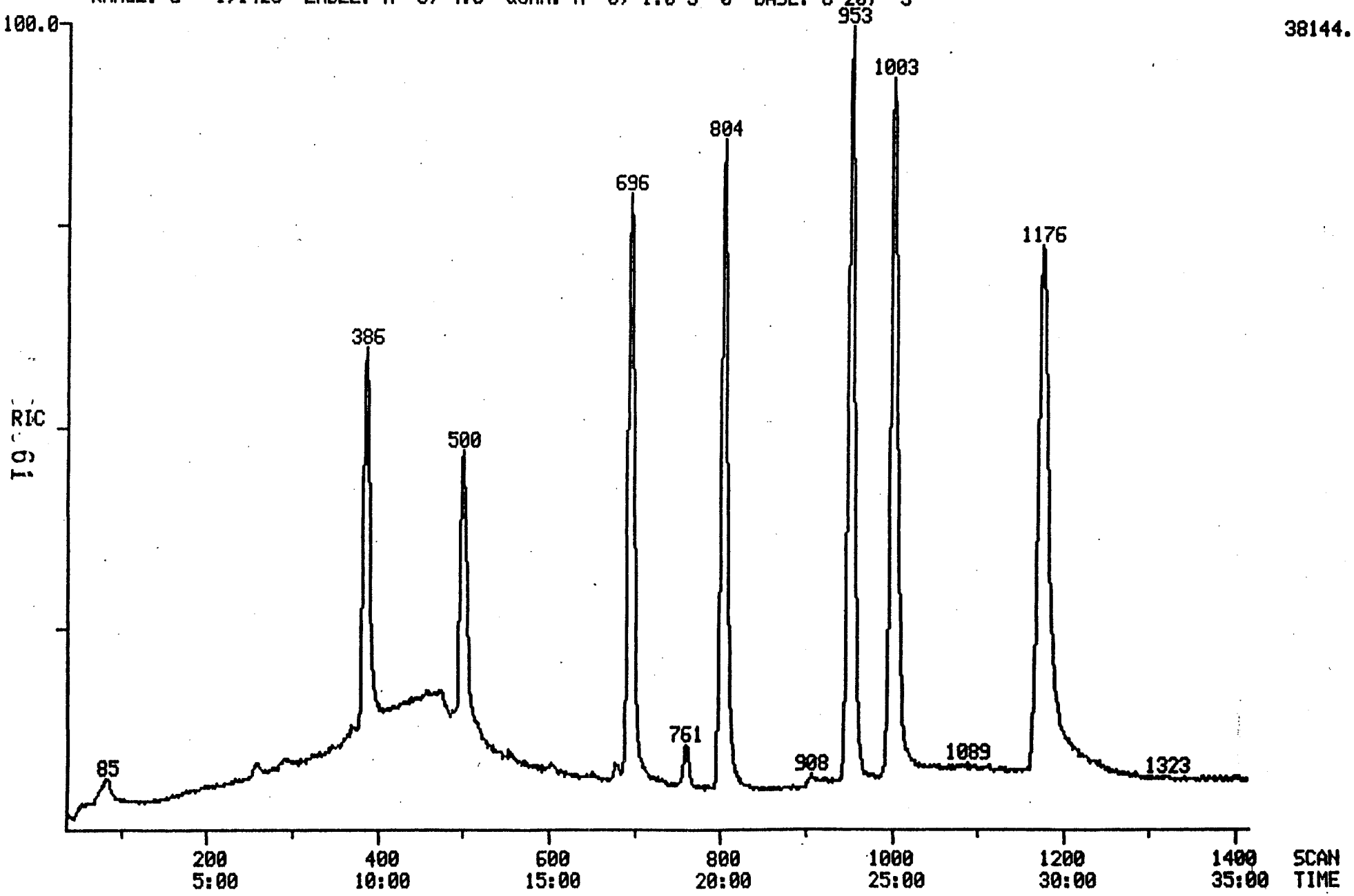
VOLATILE COMPOUNDS

CAS Number		UG/L		CAS Number		UG/L	
74-87-3	Chloromethane	10	<	78-87-5	1,2-Dichloropropane	5	<
74-83-9	Bromomethane	10	<	10061-01-5	cis-1,3-Dichloropropene	5	<
75-01-4	Vinyl Chloride	10	<	79-01-6	Trichloroethene	5	<
75-00-3	Chloroethane	10	<	124-48-1	Dibromochloromethane	5	<
75-09-2	Methylene Chloride	5	<	79-00-5	1,1,2-Trichloroethane	5	<
67-64-1	Acetone	11		71-43-2	Benzene	5	<
75-15-0	Carbon Disulfide	5	<	10061-02-6	Trans-1,3-Dichloropropene	5	<
75-35-4	1,1-Dichloroethene	5	<	110-75-8	2-Chloroethylvinylether	10	<
75-34-3	1,1-Dichloroethane	5	<	75-25-2	Bromoform	5	<
156-60-5	trans-1,2-Dichloroethene	5	<	108-10-1	4-Methyl-2-Pentanone	10	<
67-66-3	Chloroform	5	<	591-78-6	2-Hexanone	10	<
107-06-2	1,2-Dichloroethane	5	<	127-18-4	Tetrachloroethene	5	<
78-93-3	2-Butanone	8	≈	79-34-5	1,1,2,2-Tetrachloroethane	5	<
71-55-6	1,1,1-Trichloroethane	5	<	108-88-3	Toluene	5	<
56-23-5	Carbon Tetrachloride	5	<	108-90-7	Chlorobenzene	5	<
108-05-4	Vinyl Acetate	5	<	100-41-4	Ethylbenzene	5	<
75-27-4	Bromodichloromethane	5	<	100-42-5	Styrene	5	<
				1330-20-7	Xylene (total)	5	<

ıe Lab ID for data on this page is MB020791C1.
- Reported value is less than the detection limit.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/07/91 7:53:00
SAMPLE: METHOD BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: MB020791C1 #1 SCANS 35 TO 1415
CALI: MB020791C1 #3



61

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: MB020891C1
Client Sample ID: MB020891C1

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: 100.0

Date Extracted: 02/08/91
Date Analyzed: 02/08/91
Dilution Factor: 1.0

VOLATILE COMPOUNDS

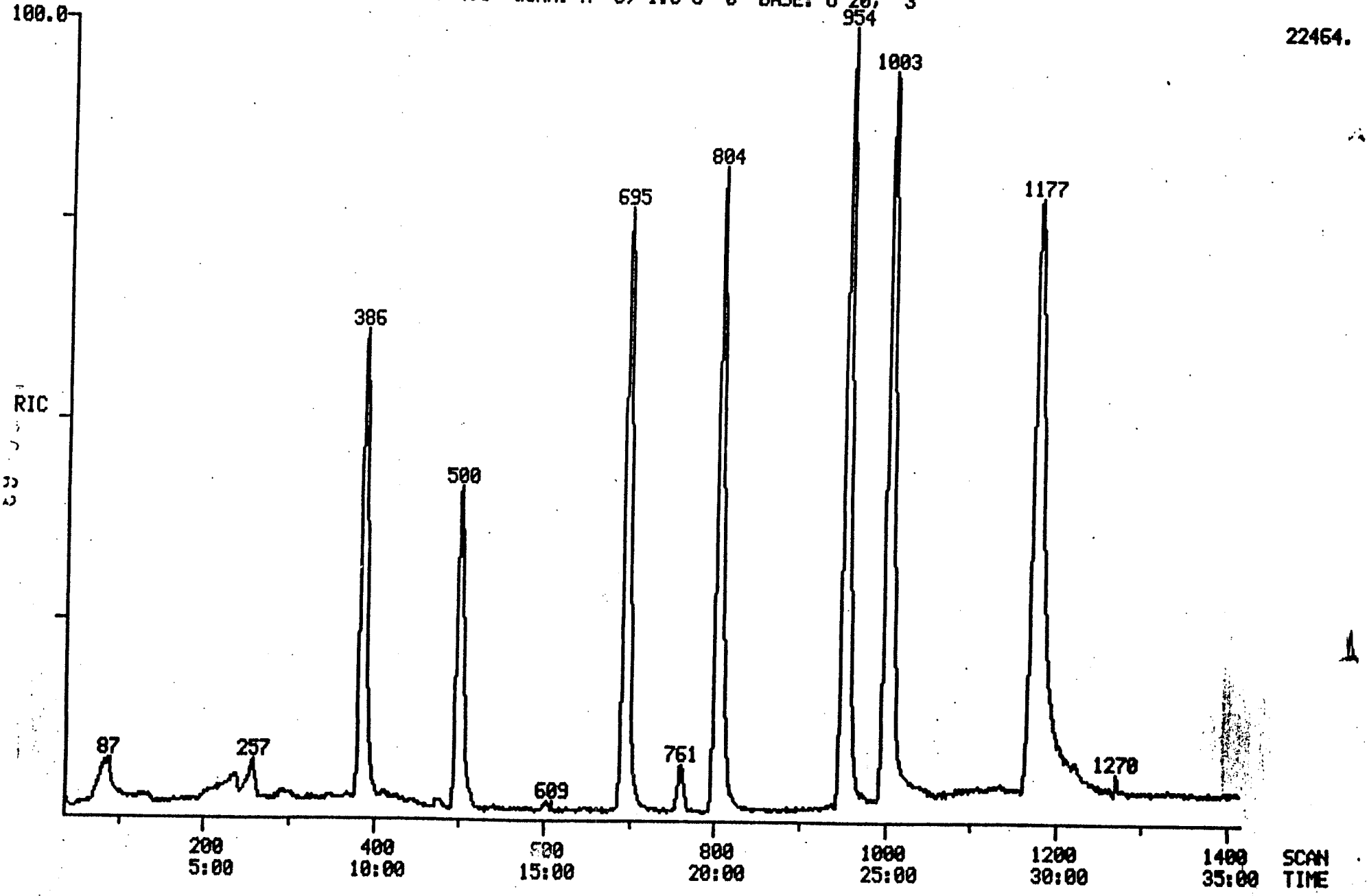
CAS Number		UG/L	
74-87-3	Chloromethane	10	<
74-83-9	Bromomethane	10	<
75-01-4	Vinyl Chloride	10	<
75-00-3	Chloroethane	10	<
75-09-2	Methylene Chloride	5	<
67-64-1	Acetone	8	≈
75-15-0	Carbon Disulfide	5	<
75-35-4	1,1-Dichloroethene	5	<
75-34-3	1,1-Dichloroethane	5	<
156-60-5	trans-1,2-Dichloroethene	5	<
67-66-3	Chloroform	5	<
107-06-2	1,2-Dichloroethane	5	<
78-93-3	2-Butanone	10	<
71-55-6	1,1,1-Trichloroethane	5	<
56-23-5	Carbon Tetrachloride	5	<
108-05-4	Vinyl Acetate	5	<
75-27-4	Bromodichloromethane	5	<

CAS Number		UG/L	
78-87-5	1,2-Dichloropropane	5	<
10061-01-5	cis-1,3-Dichloropropene	5	<
79-01-6	Trichloroethene	5	<
124-48-1	Dibromochloromethane	5	<
79-00-5	1,1,2-Trichloroethane	5	<
71-43-2	Benzene	5	<
10061-02-6	Trans-1,3-Dichloropropene	5	<
110-75-8	2-Chloroethylvinylether	10	<
75-25-2	Bromoform	5	<
108-10-1	4-Methyl-2-Pentanone	10	<
591-78-6	2-Hexanone	10	<
127-18-4	Tetrachloroethene	5	<
79-34-5	1,1,2,2-Tetrachloroethane	5	<
108-88-3	Toluene	5	<
108-90-7	Chlorobenzene	5	<
100-41-4	Ethylbenzene	5	<
100-42-5	Styrene	5	<
1330-20-7	Xylene (total)	5	<

The Lab ID for data on this page is MB020891C1.
- Reported value is less than the detection limit.
- Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/08/91 9:32:00
SAMPLE: METHOD BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: MB020891C1 #1 SCANS 35 TO 1415
CALI: MB020891C1 #3



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/11/91
Lab Sample ID:	MB021191C1	Sample Matrix:	WATER	Date Analyzed:	02/11/91
Client Sample ID:	MB021191C1	Percent Moisture:	100.0	Dilution Factor:	1.0

VOLATILE COMPOUNDS

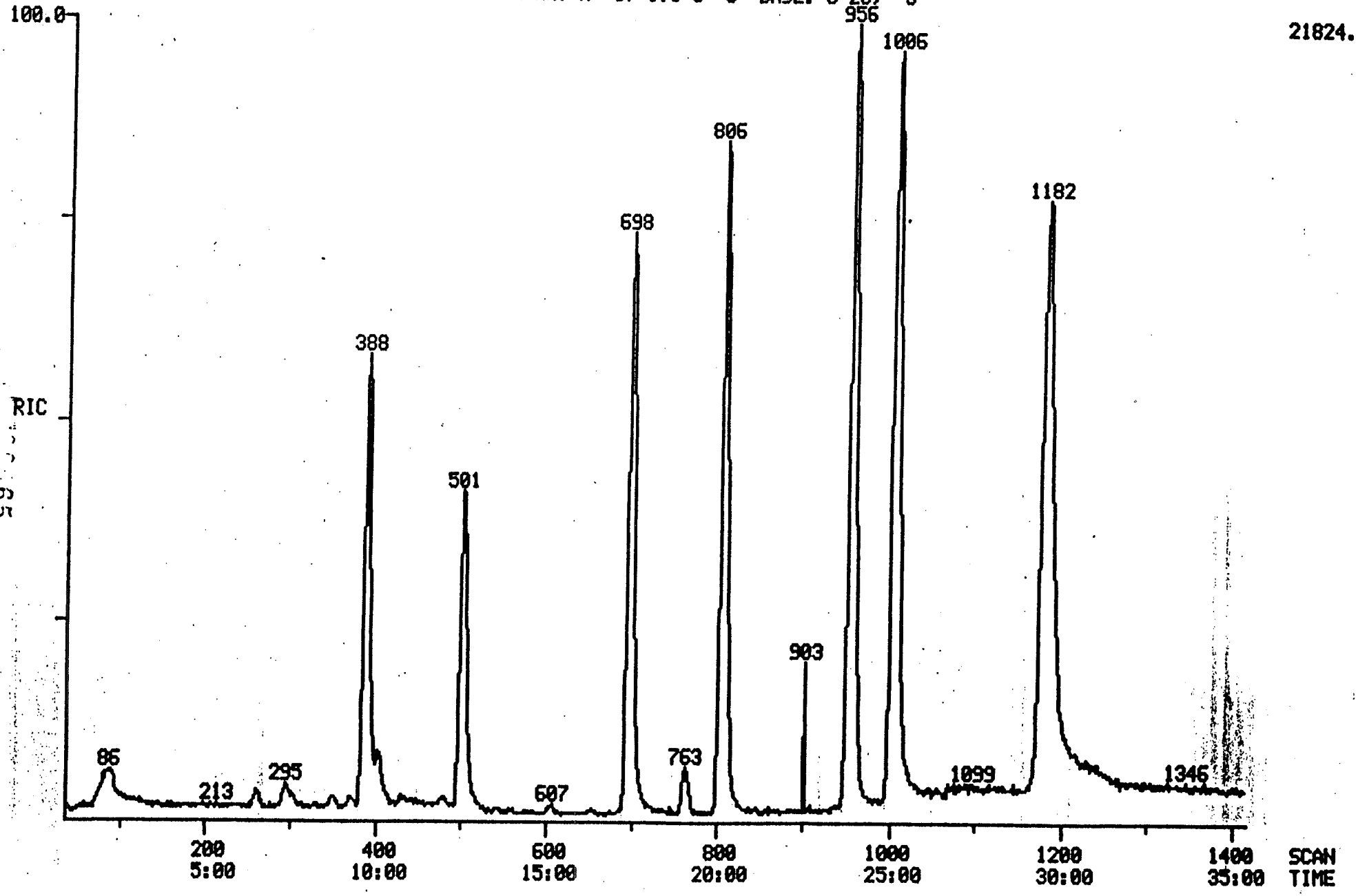
CAS Number		UG/L		CAS Number		UG/L	
74-87-3	Chloromethane	10	<	78-87-5	1,2-Dichloropropane	5	<
74-83-9	Bromomethane	10	<	10061-01-5	cis-1,3-Dichloropropene	5	<
75-01-4	Vinyl Chloride	10	<	79-01-6	Trichloroethene	5	<
75-00-3	Chloroethane	10	<	124-48-1	Dibromochloromethane	5	<
75-09-2	Methylene Chloride	5	<	79-00-5	1,1,2-Trichloroethane	5	<
67-64-1	Acetone	12		71-43-2	Benzene	5	<
75-15-0	Carbon Disulfide	5	<	10061-02-6	Trans-1,3-Dichloropropene	5	<
75-35-4	1,1-Dichloroethene	5	<	110-75-8	2-Chloroethylvinylether	10	<
75-34-3	1,1-Dichloroethane	5	<	75-25-2	Bromoform	5	<
156-60-5	trans-1,2-Dichloroethene	5	<	108-10-1	4-Methyl-2-Pentanone	10	<
67-66-3	Chloroform	5	<	591-78-6	2-Hexanone	10	<
107-06-2	1,2-Dichloroethane	5	<	127-18-4	Tetrachloroethene	5	<
78-93-3	2-Butanone	10	<	79-34-5	1,1,2,2-Tetrachloroethane	5	<
71-55-6	1,1,1-Trichloroethane	5	<	108-88-3	Toluene	5	<
56-23-5	Carbon Tetrachloride	5	<	108-90-7	Chlorobenzene	5	<
108-05-4	Vinyl Acetate	5	<	100-41-4	Ethylbenzene	5	<
75-27-4	Bromodichloromethane	5	<	100-42-5	Styrene	5	<
				1330-20-7	Xylene (total)	5	<

The Lab ID for data on this page is MB021191C1.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/11/91 9:40:00
SAMPLE: METHOD BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: MB021191C1 #1 SCANS 35 TO 1415
CALI: MB021191C1 #3



WATER SURROGATE PERCENT RECOVERY SUMMARY
(Page 1)

Case No. A5438 Contract Laboratory AnalytiKEM-Hou Contract No.

	VOLATILE			SEMI-VOLATILE								PEST
	Toluene-d8	Bromofluorobenzene	1,2-Dichloroethane-d4	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14	Benzene-d6		Phenol-d5	2-Fluorophenol	2,4,6-Tribromophenol	Dibutylchlorendate **
SMO TRAFFIC NO.	86	85	77	41	44	38	75		15	23	10	48
	119	121	120	120	119	128	125		103	121	130	136
EQ-BLANK	107	97	101				114					
TRIP-BLANK	100	94	98				101					

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS
** ADVISORY LIMITS ONLY

Volatiles: 0 out of 8; outside of QC limits
Semi-Volatiles: out of 12; outside of QC limits
Pesticides: out of 2; outside of QC limits

Comments:

FORM II

SOIL SURROGATE PERCENT RECOVERY SUMMARY
(Page 1)

Case No. A5438 Contract Laboratory AnalytiKEM-Hou Contract No.
I[illegible] XXX Medium

	VOLATILE				SEMI-VOLATILE							PEST
	Toluene-d8	Bromofluorobenzene	1,2-Dichloroethane-d4	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14	Benzene-d6		Phenol-d5	2-Fluorophenol	2,4,6-Tribromophenol	Dibutylchlorendate **
SMO TRAFFIC NO.	81 117	74 121	70 121	20 140	20 140	20 150	75 125		20 122	24 133	10 114	20 150
B-3B-B-5-7	106	104	98				112					
B-4B-E-20-2	106	94	94				94					
BKG1B1-A-1-	108	90	94				103					
BKG-1B-B-5-	106	86	88				111					
BKG1B-C-10-	102	91	93				103					
BKG-1BD-15-	101	92	100				109					
BKG1B-E-20-	101	99	101				100					
BKG-2B-A-1-	103	83	103				106					
BKG-2B-B-5-	102	95	85				108					
BKG2B-C-10-	103	89	95				99					
BKG-2BD-15-	99	95	103				106					
2BD-15-17-M	104	94	86				110					
2BD-15-17-M	101	90	82				110					
B-3B-B-5-7	107	95	107				110					
BKG2B-E-20-	98	92	100				105					
B-[illegible]B-C-10-1	105	99	100				113					
[illegible]-D-15-1	106	98	106				107					
B-3B-E-20-2	101	97	101				97					
B-4B-A-1-5	103	101	105				106					
B-4B-5-7	103	97	94				108					
B-4B-10-12	101	97	103				106					
B-4B-D-15-1	102	96	97				103					

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS
** ADVISORY LIMITS ONLY

Volatiles: 0 out of 88; outside of QC limits
Semi-Volatiles: out of 132; outside of QC limits
Pesticides: out of 22; outside of QC limits

Comments:

FORM II

INITIAL CALIBRATION DATA
VOLATILE HSL COMPOUNDS

e No: CAL
Contractor: ENSR LAB-HOU
Contract No:

Region:

Instrument ID: I50C
Calibration Date: 01/14/91

Min AVE RF for SPCC is 0.300 (1) Max %RSD for CCC is 30%

Laboratory ID	IC0114020C1	IC0114050C1	IC0114100C1	IC0114150C1	IC0114200C1			
Compound	RF(20)	RF(50)	RF(100)	RF(150)	RF(200)	AVE RF	% RSD	CCC* SPCC**
Chloromethane	1.207	1.126	1.025	1.036	1.119	1.103	6.8	* *
Bromomethane	1.368	1.066	1.096	0.957	0.785	1.054	20.2	
Vinyl Chloride	1.166	0.987	1.026	0.995	0.950	1.025	8.1	*
Chloroethane	0.730	0.676	0.688	0.643	0.649	0.677	5.2	
Methylene Chloride	1.336	1.132	0.983	1.132	1.203	1.157	11.1	
Acetone	0.717	0.484	0.378	0.523	0.469	0.514	24.4	
Carbon Disulfide	2.166	2.015	2.044	2.544	2.621	2.278	12.5	
1,1-Dichloroethene	1.155	1.277	1.223	1.179	1.201	1.207	3.9	*
1,1-Dichloroethane	2.508	2.788	2.808	2.611	2.722	2.687	4.7	* *
trans-1,2-Dichloroethene	1.221	1.380	1.341	1.268	1.353	1.313	5.0	
Chloroform	2.854	3.147	3.135	2.900	2.995	3.006	4.4	*
1,2-Dichloroethane	2.009	2.299	2.366	2.231	2.245	2.230	6.0	
2-Butanone	0.034	0.047	0.048	0.048	0.042	0.044	13.7	
1,1,1-Trichloroethane	0.583	0.610	0.649	0.537	0.548	0.585	7.8	
Carbon Tetrachloride	0.493	0.563	0.589	0.499	0.508	0.530	8.1	
Vinyl Acetate	0.536	0.719	0.769	0.398	0.827	0.650	27.4	
Bromodichloromethane	0.581	0.676	0.707	0.631	0.685	0.656	7.7	
1,2-Dichloropropane	0.331	0.401	0.400	0.374	0.427	0.387	9.4	*
cis-1,3-Dichloropropene	0.418	0.540	0.597	0.555	0.612	0.544	14.1	
Trichloroethene	0.414	0.486	0.498	0.489	0.488	0.475	7.2	
Dibromochloromethane	0.583	0.693	0.726	0.681	0.700	0.677	8.1	
1,1,2-Trichloroethane	0.343	0.425	0.422	0.395	0.411	0.399	8.4	
Benzene	0.937	1.075	1.089	0.985	1.015	1.020	6.2	
Trans-1,3-Dichloropropene	0.500	0.528	0.579	0.540	0.576	0.545	6.1	
2-Chloroethylvinylether	0.219	0.300	0.317	0.323	0.351	0.302	16.5	
Bromoform	0.444	0.552	0.659	0.648	0.654	0.591	15.8	* *
4-Methyl-2-Pentanone	0.257	0.386	0.569	0.694	0.736	0.528	38.6	
2-Hexanone	0.054	0.096	0.245	0.365	0.313	0.215	63.0	
Tetrachloroethene	0.456	0.502	0.514	0.498	0.496	0.493	4.4	
1,1,2,2-Tetrachloroethane	0.536	0.684	0.702	0.708	0.773	0.681	12.9	* *
Toluene	0.714	0.724	0.844	0.788	0.824	0.779	7.5	*
Chlorobenzene	1.006	1.089	1.145	1.068	1.074	1.076	4.6	* *
Ethylbenzene	0.502	0.541	0.569	0.524	0.535	0.534	4.6	*
Styrene	0.775	0.957	0.980	0.906	0.941	0.912	8.9	
Xylene (total)	0.584	0.643	0.626	0.571	0.610	0.607	4.9	

Response Factor (number is the amount of ug/L)
AVE RF - Average Response Factor
%RSD - - Percent Relative Standard Deviation
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Minimum AVE RF for Bromoform is 0.250

Form VI

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-1
Client Sample ID: B-3B-A-1-3

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: _____

Date Extracted: 02/08/91
Date Analyzed: 02/12/91
Dilution Factor: 10

PESTICIDE/PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number		ug/Kg	
319-84-6	alpha-BHC	2	<	1031-07-8	Endosulfan sulfate	2	<
319-85-7	beta-BHC	2	<	50-29-3	4,4'-DDT	2	<
319-86-8	delta-BHC	2	<	72-43-5	Methoxychlor	2	<
58-89-9	gamma-BHC (Lindane)	2	<	7421-93-4	Endrin aldehyde	2	<
77-44-8	Heptachlor	2	<	57-74-9	Chlordane (technical)	2	<
309-00-2	Aldrin	2	<	8001-35-2	Toxaphene	33	<
1024-57-3	Heptachlor epoxide	2	<	12674-11-2	Aroclor-1016	33	<
959-98-8	Endosulfan I	2	<	11104-28-2	Aroclor-1221	33	<
60-57-1	Dieldrin	2	<	11141-16-5	Aroclor-1232	33	<
72-55-9	4,4'-DDE	2	<	53469-21-9	Aroclor-1242	33	<
72-20-8	Endrin	2	<	12672-29-6	Aroclor-1248	33	<
33213-65-9	Endosulfan II	2	<	11097-69-1	Aroclor-1254	33	<
72-54-8	4,4'-DDD	2	<	11096-82-5	Aroclor-1260	33	<

The Lab ID for data on this page is A54381P.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-2
Client Sample ID: B-3B-B-5-7

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: _____

Date Extracted: 02/08/91
Date Analyzed: 02/12/91
Dilution Factor: 10

PESTICIDE/PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number		ug/Kg	
319-84-6	alpha-BHC	2	<	1031-07-8	Endosulfan sulfate	2	<
319-85-7	beta-BHC	2	<	50-29-3	4,4'-DDT	2	<
319-86-8	delta-BHC	2	<	72-43-5	Methoxychlor	2	<
58-89-9	gamma-BHC (Lindane)	2	<	7421-93-4	Endrin aldehyde	2	<
77-44-8	Heptachlor	2	<	57-74-9	Chlordane (technical)	2	<
309-00-2	Aldrin	2	<	8001-35-2	Toxaphene	33	<
1024-57-3	Heptachlor epoxide	2	<	12674-11-2	Aroclor-1016	33	<
959-98-8	Endosulfan I	2	<	11104-28-2	Aroclor-1221	33	<
60-57-1	Dieldrin	2	<	11141-16-5	Aroclor-1232	33	<
72-55-9	4,4'-DDE	2	<	53469-21-9	Aroclor-1242	33	<
72-20-8	Endrin	2	<	12672-29-6	Aroclor-1248	33	<
33213-65-9	Endosulfan II	2	<	11097-69-1	Aroclor-1254	33	<
72-54-8	4,4'-DDD	2	<	11096-82-5	Aroclor-1260	33	<

The Lab ID for data on this page is A54382P.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-6
Client Sample ID: B-4B-A-1-3

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: _____

Date Extracted: 02/08/91
Date Analyzed: 02/12/91
Dilution Factor: 10

PESTICIDE/PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number		ug/Kg	
319-84-6	alpha-BHC	2	<	1031-07-8	Endosulfan sulfate	2	<
319-85-7	beta-BHC	2	<	50-29-3	4,4'-DDT	2	<
319-86-8	delta-BHC	2	<	72-43-5	Methoxychlor	2	<
58-89-9	gamma-BHC (Lindane)	2	<	7421-93-4	Endrin aldehyde	2	<
77-44-8	Heptachlor	2	<	57-74-9	Chlordane (technical)	2	<
309-00-2	Aldrin	2	<	8001-35-2	Toxaphene	33	<
1024-57-3	Heptachlor epoxide	2	<	12674-11-2	Aroclor-1016	33	<
959-98-8	Endosulfan I	2	<	11104-28-2	Aroclor-1221	33	<
60-57-1	Dieldrin	2	<	11141-16-5	Aroclor-1232	33	<
72-55-9	4,4'-DDE	2	<	53469-21-9	Aroclor-1242	33	<
72-20-8	Endrin	2	<	12672-29-6	Aroclor-1248	33	<
33213-65-9	Endosulfan II	2	<	11097-69-1	Aroclor-1254	33	<
72-54-8	4,4'-DDD	2	<	11096-82-5	Aroclor-1260	33	<

The Lab ID for data on this page is A54386P.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-7
Client Sample ID: B-4B-A-5-7

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: _____

Date Extracted: 02/08/91
Date Analyzed: 02/12/91
Dilution Factor: 10

PESTICIDE/PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number		ug/Kg	
319-84-6	alpha-BHC	2	<	1031-07-8	Endosulfan sulfate	2	<
319-85-7	beta-BHC	2	<	50-29-3	4,4'-DDT	2	<
319-86-8	delta-BHC	2	<	72-43-5	Methoxychlor	2	<
58-89-9	gamma-BHC (Lindane)	2	<	7421-93-4	Endrin aldehyde	2	<
77-44-8	Heptachlor	2	<	57-74-9	Chlordane (technical)	2	<
309-00-2	Aldrin	2	<	8001-35-2	Toxaphene	33	<
1024-57-3	Heptachlor epoxide	2	<	12674-11-2	Aroclor-1016	33	<
959-98-8	Endosulfan I	2	<	11104-28-2	Aroclor-1221	33	<
60-57-1	Dieldrin	2	<	11141-16-5	Aroclor-1232	33	<
72-55-9	4,4'-DDE	2	<	53469-21-9	Aroclor-1242	33	<
72-20-8	Endrin	2	<	12672-29-6	Aroclor-1248	33	<
33213-65-9	Endosulfan II	2	<	11097-69-1	Aroclor-1254	33	<
72-54-8	4,4'-DDD	2	<	11096-82-5	Aroclor-1260	33	<

The Lab ID for data on this page is A54387P.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/08/91
Lab Sample ID:	A5438-18	Sample Matrix:	SOIL	Date Analyzed:	02/13/91
Client Sample ID:	BKG-2B-C-10-1	Percent Moisture:		Dilution Factor:	10

PESTICIDE/PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number		ug/Kg	
319-84-6	alpha-BHC	2	<	1031-07-8	Endosulfan sulfate	2	<
319-85-7	beta-BHC	2	<	50-29-3	4,4'-DDT	2	<
319-86-8	delta-BHC	2	<	72-43-5	Methoxychlor	2	<
58-89-9	gamma-BHC (Lindane)	2	<	7421-93-4	Endrin aldehyde	2	<
77-44-8	Heptachlor	2	<	57-74-9	Chlordane (technical)	2	<
309-00-2	Aldrin	2	<	8001-35-2	Toxaphene	33	<
1024-57-3	Heptachlor epoxide	2	<	12674-11-2	Aroclor-1016	33	<
959-98-8	Endosulfan I	2	<	11104-28-2	Aroclor-1221	33	<
60-57-1	Dieldrin	2	<	11141-16-5	Aroclor-1232	33	<
72-55-9	4,4'-DDE	2	<	53469-21-9	Aroclor-1242	33	<
72-20-8	Endrin	2	<	12672-29-6	Aroclor-1248	33	<
33213-65-9	Endosulfan II	2	<	11097-69-1	Aroclor-1254	33	<
72-54-8	4,4'-DDD	2	<	11096-82-5	Aroclor-1260	33	<

The Lab ID for data on this page is A543818P.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-19
Client Sample ID: BKG-2B-D-15-1

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: _____

Date Extracted: 02/08/91
Date Analyzed: 02/19/91
Dilution Factor: 10

PESTICIDE/PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number		ug/Kg	
319-84-6	alpha-BHC	2	<	1031-07-8	Endosulfan sulfate	2	<
319-85-7	beta-BHC	2	<	50-29-3	4,4'-DDT	2	<
319-86-8	delta-BHC	2	<	72-43-5	Methoxychlor	2	<
58-89-9	gamma-BHC (Lindane)	2	<	7421-93-4	Endrin aldehyde	2	<
77-44-8	Heptachlor	2	<	57-74-9	Chlordane (technical)	2	<
309-00-2	Aldrin	2	<	8001-35-2	Toxaphene	33	<
1024-57-3	Heptachlor epoxide	2	<	12674-11-2	Aroclor-1016	33	<
959-98-8	Endosulfan I	2	<	11104-28-2	Aroclor-1221	33	<
60-57-1	Dieldrin	2	<	11141-16-5	Aroclor-1232	33	<
72-55-9	4,4'-DDE	2	<	53469-21-9	Aroclor-1242	33	<
72-20-8	Endrin	2	<	12672-29-6	Aroclor-1248	33	<
33213-65-9	Endosulfan II	2	<	11097-69-1	Aroclor-1254	33	<
72-54-8	4,4'-DDD	2	<	11096-82-5	Aroclor-1260	33	<

The Lab ID for data on this page is A543819P.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5438-20
Client Sample ID: BKG-2B-E-20-2

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: _____

Date Extracted: 02/08/91
Date Analyzed: 02/13/91
Dilution Factor: 10

PESTICIDE/PCB COMPOUNDS

CAS Number		ug/Kg		CAS Number		ug/Kg	
319-84-6	alpha-BHC	2	<	1031-07-8	Endosulfan sulfate	2	<
319-85-7	beta-BHC	2	<	50-29-3	4,4'-DDT	2	<
319-86-8	delta-BHC	2	<	72-43-5	Methoxychlor	2	<
58-89-9	gamma-BHC (Lindane)	2	<	7421-93-4	Endrin aldehyde	2	<
77-44-8	Heptachlor	2	<	57-74-9	Chlordane (technical)	2	<
309-00-2	Aldrin	2	<	8001-35-2	Toxaphene	33	<
1024-57-3	Heptachlor epoxide	2	<	12674-11-2	Aroclor-1016	33	<
959-98-8	Endosulfan I	2	<	11104-28-2	Aroclor-1221	33	<
60-57-1	Dieldrin	2	<	11141-16-5	Aroclor-1232	33	<
72-55-9	4,4'-DDE	2	<	53469-21-9	Aroclor-1242	33	<
72-20-8	Endrin	2	<	12672-29-6	Aroclor-1248	33	<
33213-65-9	Endosulfan II	2	<	11097-69-1	Aroclor-1254	33	<
72-54-8	4,4'-DDD	2	<	11096-82-5	Aroclor-1260	33	<

The Lab ID for data on this page is A543820P.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

AnalytiKEM LABORATORIES - HOUSTON
QUALITY CONTROL LOG
CW 846: 8080; PESTICIDE/PCB ANALYSIS

SURROGATE RECOVERY:

BLANK EXTRACTION DATE: 2/8/91

NO PESTICIDE/PCBS DETECTED AT STATED METHOD DETECTION LIMITS

LAB NO.	CALC AMT(UG)	PERCENT RECOVERY (20-150%)
B3099LS	0.60	121
B3100LS	0.43	87
5438-1	0.42	85
5438-2	0.70	139
5438-6	0.59	118
5438-6MS	0.53	107
5438-6MSD	0.60	120
5438-7	0.55	110
5438-18	0.59	117
5438-19	0.62	124
543	0.65	130

Al Bernn 2-14-91
ANALYST DATE

Brenda L. Basile 2/15/91
QA/QC COORDINATOR DATE

SW 846: 8080; PESTICIDE/PCB ANALYSIS
MATRIX SPIKE RESULTS - SOIL

SAMPLE: -

ANALYTE	SPIKE (UG/KG)	CONC MS	% REC	QC LIMIT %REC
LINDANE	133.3	77	58	46-127
HEPTACHLO	133.3	67	50	35-130
ALDRIN	133.3	69	52	34-132
DIELDRIN	333.3	160	48	31-134
ENDRIN	333.3	162	49	42-139
4,4'-DDT	333.3	216	65	23-134

SW 846: 8080; PESTICIDE/PCB ANALYSIS
MATRIX SPIKE RESULTS - SOIL

SAMPLE: -

ANALYTE	SPIKE (UG/KG)	SAMPLE (UG/KG)	CONC MS	% REC	CONC MSD	% REC	RPD	QC LIMITS RPD	QC LIMITS %REC
LINDANE	133.3	0	95	71	100	75	-9	50	46-127
HE LO	133.3	0	86	64	94	71	-19	31	35-130
ALDRIN	133.3	0	89	67	97	73	-18	43	34-132
DIELDRIN	333.3	0	184	55	206	62	-22	38	31-134
ENDRIN	333.3	0	202	60	225	67	-22	45	42-139
4,4'-DDT	333.3	0	236	71	271	81	-27	50	23-134

[signature] 2-14-91 Brenda R. Lasite 2/15/91

ANALYST DATE QA/QC COORDINATOR DATE

AnalytiKEM *An American NuKEM Company*

AnalytiKEM Inc.
2925 Richmond Avenue
Houston, TX 77098
713/520-1495
713/520-9900
Fax: 713/523-7107

DATE: 02/12/91

TO: Derrick Vallance

FROM: Bo Blankfield, Lab Director

PROJ. NO.: 2810-018 LAB NO.: A5421

Attached are reports of chemical analyses of samples received February 1, 1991. These analyses are:

Count	Test Code		Test Name	Test Method	Sampled	Matrix
2	Ag	- - -HOU	SILVER	EPA SW-846: 7760, ATOMIC ABSORPTION	02/01/91	WATER
2	As	- -GFA-HOU	ARSENIC	EPA SW-846: 7060, GRAPHITE FURNACE	02/01/91	WATER
2	Ba	- -ICP-HOU	BARIUM	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Be	- -ICP-HOU	BERYLLIUM	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Cd	- -ICP-HOU	CADMIUM	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Co	- -ICP-HOU	COBALT	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Cr	- -ICP-HOU	CHROMIUM	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Cu	- -ICP-HOU	COPPER	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Hg	- - -HOU	MERCURY	EPA SW-846: 7470, COLD VAPOR	02/01/91	WATER
2	Ni	- -ICP-HOU	NICKEL	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Pb	- -ICP-HOU	LEAD	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Sb	- -GFA-HOU	ANTIMONY	EPA SW-846: 7041, GRAPHITE FURNACE	02/01/91	WATER
2	Se	- -GFA-HOU	SELENIUM	EPA SW-846: 7740, GRAPHITE FURNACE	02/01/91	WATER
2	Sn	- -ICP-HOU	TIN	EPA SW-846: 6010, ICP	02/01/91	WATER
2	Tl	- -GFA-HOU	THALLIUM	EPA SW-846: 7841, GRAPHITE FURNACE	02/01/91	WATER
2	V	- -ICP-HOU	VANADIUM	EPA SW-846: 6010, ICP	02/01/91	WATER
2	VOA	- - -HOU	VOLATILE ORGANIC ANALYSES	EPA SW-846: 8240, GC/MS	02/01/91	WATER
10	VOA	-S- -HOU	VOLATILE ORGANICS ON SOLID	EPA SW-846: 8240, GC/MS	02/01/91	SOIL
2	Zn	- -ICP-HOU	ZINC	EPA SW-846: 6010, ICP	02/01/91	WATER

Data contained in this report reflect a full quality control review and have met all applicable standards established by AnalytiKEM. AnalytiKEM quality assurance protocols are in accordance with EPA guidelines.

Should you have any questions, do not hesitate to contact me at (713) 520-9900.

LAB NO. A5421 CONT.

BB/lis

Enclosures: Analytical Summary, Analytical Report, Chain of Custody, Sample Receipt Checklist, Quality Control Logs, ENSR ID #A5421-10, ENSR ID #A5421-13, ENSR ID #A5421-14, ENSR ID #A5421-2, ENSR ID #A5421-3, ENSR ID #A5421-4, ENSR ID #A5421-5, ENSR ID #A5421-6, ENSR ID #A5421-7, ENSR ID #A5421-8, ENSR ID #A5421-9, Billing Summary

LAB NO. A5421
PROJECT 2810-018 FMC - Pasadena, TX

AnalytiKEM
An American NuKEM Company
2925 RICHMOND AVENUE HOUSTON, TX 77098 (713) 520-1495 FAX: (713) 523-7107

Analysis Request and Chain of Custody Record

Project no.: 2810-018
Client/Project Name: FMC
Project Location: PASADENA, TX

Lab ID No	Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preser-vative	ANALYSIS REQUESTED	LABORATORY REMARKS
1	B-1B-A 6"	2-1-91 8:58	X		4 oz TAll	soil	4°C	Acrolein, Allyl Alcohol	
2	B-1B-B 5'	9:05							
3	B-1B-C 10'	9:08							
4	B-1B-D 15'	9:55							
5	B-1B-E 20'	10:07							
6	B-2B-A 6"	1153							
7	B-2B-B 5'	1158							
8	B-2B-C 10'	1207							
9	B-2B-D 15'	1217							
10	B-2B-E 20'	1230							

Samplers: (Signature)	Relinquished by: (Signature)	Date: 2-1-91 Time: 1440	Received by: (Signature)	Date: Time:	COC Seal No.
S. Gubanks	S. Gubanks				
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
	Relinquished by: (Signature)	Date: Time:	Received by Laboratory: (Signature)	Date: 2-1-91 Time: 1450	Intact:

REMARKS:

Data Results To:
1.
2.

Laboratory No.: A5421

AnalytiKEM
An American NuKEM Company
2925 RICHMOND AVENUE HOUSTON, TX 77098 (713) 520-1495 FAX: (713) 523-7107

Analysis Request and Chain of Custody Record

Project no.: 2810-018
Client/Project Name: FMC
Project Location: PASADENA, TX

Lab ID No	Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid Sludge, Etc.)	Preser-vative	ANALYSIS REQUESTED	LABORATORY REMARKS
11	RFI-6	2-1-91 1105		X	32 oz PLASTIC	WATER	4°C HNO3	APPENDIX IX METALS	
12	RFI-8	2-1-91 1050		X	"	↓	4°C HNO3	"	
13	EQ-blank	2-1-91 1245	X		40ml VOA	↓	4°C	ACROLIEN, Allyl Alcohol	
14	TRIP-blk	2-1-91			"	↓	4°C		

Samplers: (Signature)	Relinquished by: (Signature)	Date: 2-1-91 Time: 1455	Received by: (Signature)	Date: Time:	COC Seal No.
Affiliation	Relinquished by: (Signature)	Date: Time:	Received by: (Signature)	Date: Time:	
	Relinquished by: (Signature)	Date: Time:	Received by Laboratory: (Signature)	Date: 2-1-91 Time: 1450	Intact:

REMARKS:

Data Results To:
1.
2.

Laboratory No.: A5421

AnalytiKEM Laboratories
SAMPLE RECEIPT CHECKLIST

Client FMC Project Number 2810-018 Laboratory Number A5421

1 ____ Shipped — Notes: ____
X Hand Delivered

2 X COC Present on Receipt — Notes: ____
____ No COC

3 ____ COC Tape on Shipping Container — Notes: ____
X No COC Tape on Shipping Container — Notes: ____

4 ____ Samples Broken/Leaking — Notes: intact
X Sample Intact on Receipt
____ Other (See Notes)

5 ____ Ambient on Receipt — Notes: ____
X Chilled on Receipt

6 X Samples Preserved Correctly — Notes: ____
____ Improper Preservatives
____ N/A (None Recommended)
____ Other (See Notes)

7 X Received Within Holding Time — Notes: ____
____ Not Received Within Holding Time
____ N/A (None Recommended)
____ Other (See Notes)

8 ____ COC Tapes on Samples — Notes: ____
X No COC Tapes on Samples

9 ____ Discrepancies Between COC and Sample Labels — Notes: ____
X No Discrepancies Noted
____ N/A (No COC Received)

Additional Comments: ____

Inspected and Logged in by: Thelma Lane Date/Time 2-19-91/1450

AnalytiKEM-Houston

Analytical Summary
02/12/91 15:21

Lab Number: A5421
Project: 2810-018
FMC - Pasadena, TX

Lab ID	1	2	3	4	5	6	7	8
Field ID	B-1B-A, 6"	B-1B-B, 5'	B-1B-C, 10'	B-1B-D, 15'	B-1B-E, 20'	B-2B-A, 6"	B-2B-B, 5'	B-2B-C, 10'
Test /Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
VOA -S- -HOU	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED
	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
(MDL)	()*	()*	()*	()*	()*	()*	()*	()*

* Please see attached Analytical Report for remarks.

Signatures of approval indicate quality assurance-quality control verification of analytical results, billing and enclosed documentation.

Approvals: Joann Hood Date: 2/13/91 Brenda P. Faisle Date: 2/19/91

***** CONTINUED *****

AnalytiKEM-Houston

Analytical Summary
02/12/91 15:22

Lab Number: A5421
Project: 2810-018
FMC - Pasadena, TX

Lab ID / *Field ID* / *Test /Matrix*	9 B-2B-D, 15' SOIL	10 B-2B-E, 20' SOIL	11 RFI-6 WATER	12 RFI-8 WATER	13 EQ-BLANK WATER	14 TRIP BLANK WATER
Ag - - -HOU *(MDL)*	--	--	<0.01 MG/L *(0.01)*	<0.01 MG/L *(0.01)*	--	--
As - -GFA-HOU *(MDL)*	--	--	0.006 MG/L *(0.005)*	<0.005 MG/L *(0.005)*	--	--
Ba - -ICP-HOU *(MDL)*	--	--	0.1 MG/L *(0.02)*	0.02 MG/L *(0.02)*	--	--
Be - -ICP-HOU *(MDL)*	--	--	<0.02 MG/L *(0.02)*	<0.02 MG/L *(0.02)*	--	--
Cd - -ICP-HOU *(MDL)*	--	--	<0.010 MG/L *(0.010)*	<0.010 MG/L *(0.010)*	--	--
Co - -ICP-HOU *(MDL)*	--	--	<0.025 MG/L *(0.025)*	<0.025 MG/L *(0.025)*	--	--
Cr - -ICP-HOU *(MDL)*	--	--	0.02 MG/L *(0.02)*	<0.02 MG/L *(0.02)*	--	--
Cu - -ICP-HOU *(MDL)*	--	--	0.03 MG/L *(0.02)*	<0.02 MG/L *(0.02)*	--	--
Hg - - -HOU *(MDL)*	--	--	<0.001 MG/L *(0.001)*	0.06 MG/L *(0.01)*	--	--

Signatures of approval indicate quality assurance-quality control verification of analytical results, billing and enclosed documentation.

Approvals: Joann Ward Date: 2/13/91 Brenda P. Basile Date: 2/19/91

***** CONTINUED *****

AnalytiKEM-Houston

Analytical Summary
02/12/91 15:22

Lab Number: A5421
Project: 2810-018
FMC - Pasadena, TX

Lab ID *Field ID* *Test /Matrix*	9 B-2B-D, 15' SOIL	10 B-2B-E, 20' SOIL	11 RFI-6 WATER	12 RFI-8 WATER	13 EQ-BLANK WATER	14 TRIP BLANK WATER
Ni - -ICP-HOU *(MDL)*	--	--	<0.02 MG/L *(0.02)*	<0.02 MG/L *(0.02)*	--	--
Pb - -ICP-HOU *(MDL)*	--	--	<0.025 MG/L *(0.025)*	<0.025 MG/L *(0.025)*	--	--
Sb - -GFA-HOU *(MDL)*	--	--	<0.005 MG/L *(0.005)*	<0.005 MG/L *(0.005)*	--	--
Se - -GFA-HOU *(MDL)*	--	--	<0.005 MG/L *(0.005)*	<0.005 MG/L *(0.005)*	--	--
Sn - -ICP-HOU *(MDL)*	--	--	11 MG/L *(0.05)*	0.1 MG/L *(0.05)*	--	--
Tl - -GFA-HOU *(MDL)*	--	--	<0.01 MG/L *(0.01)*	<0.01 MG/L *(0.01)*	--	--
V - -ICP-HOU *(MDL)*	--	--	<0.025 MG/L *(0.025)*	<0.025 MG/L *(0.025)*	--	--
VOA - - -HOU *(MDL)*	--	--	--	--	ATTACHED UG/L *()**	ATTACHED UG/L *()**
VOA -S- -HOU *(MDL)*	ATTACHED UG/KG *()**	ATTACHED UG/KG *()**	--	--	--	--

* Please see attached Analytical Report for remarks.

Signatures of approval indicate quality assurance-quality control verification of analytical results, billing and enclosed documentation.

Approvals: Joann M. Hasl Date: 2/13/91 Brenda P. Lasile Date: 2/19/91

***** CONTINUED *****

AnalytiKEM-Houston

Analytical Summary
02/12/91 15:22

Lab Number: A5421
Project: 2810-018
FMC - Pasadena, TX

Lab ID	9	10	11	12	13	14
Field ID	B-2B-D, 15'	B-2B-E, 20'	RFI-6	RFI-8	EQ-BLANK	TRIP BLANK
Test /Matrix	SOIL	SOIL	WATER	WATER	WATER	WATER
Zn - -ICP-HOU	--	--	0.4 MG/L	0.1 MG/L	--	--
(MDL)			*(0.02)*	*(0.02)*		

Signatures of approval indicate quality assurance-quality control verification of analytical results, billing and enclosed documentation.

Approvals: Joann M. Hoad Date: 2/13/91 Brenda P. Basile Date: 2/19/91

AnalytiKEM—Houston

Analytical Report
02/12/91 15:20

MC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-1B-A, 6" Lab ID: 1 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 858 Date Received: 02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/05/91

*1 SEE ENSR ID #A5421-1

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-1B-B, 5' Lab ID: 2 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 905 Date Received: 02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-2

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX	Field ID: B-1B-C, 10'	Date Sampled: 02/01/91
Proj. No.: 2810-018	Lab ID: 3	Time Sampled: 908
Lab No.: A5421	Matrix: SOIL (GRAB)	Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-3

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-1B-D, 15' Lab ID: 4 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 955 Date Received: 02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-4

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-1B-E, 20' Lab ID: 5 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 1007 Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-5

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-2B-A, 6" Lab ID: 6 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 1153 Date Received: 02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-6

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-2B-B, 5' Lab ID: 7 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 1158 Date Received: 02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-7

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-2B-C, 10' Lab ID: 8 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 1207 Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-8

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-2B-D, 15' Lab ID: 9 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 1217 Date Received: 02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-9

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: B-2B-E, 20' Lab ID: 10 Matrix: SOIL (GRAB)	Date Sampled: 02/01/91 Time Sampled: 1230 Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA -S- -HOU VOLATILE ORGANICS ON SOLID EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/KG		02/04/91

*1 SEE ENSR ID #A5421-10

AnalytiKEM-Houston

Analytical Report
02/12/91 15:20

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: RFI-6 Lab ID: 11 Matrix: WATER (COMPOSITE)	Date Sampled: 02/01/91 Time Sampled: 1105 Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
Ag - - -HOU SILVER EPA SW-846: 7760, ATOMIC ABSORPTION	<0.01	MG/L	0.01	02/05/91 1130
As - -GFA-HOU ARSENIC EPA SW-846: 7060, GRAPHITE FURNACE	0.006	MG/L	0.005	02/05/91 945
Ba - -ICP-HOU BARIUM EPA SW-846: 6010, ICP	0.1	MG/L	0.02	02/04/91 804
Be - -ICP-HOU BERYLLIUM EPA SW-846: 6010, ICP	<0.02	MG/L	0.02	02/04/91 804
Cd - -ICP-HOU CADMIUM EPA SW-846: 6010, ICP	<0.010	MG/L	0.010	02/04/91 804
Co - -ICP-HOU COBALT EPA SW-846: 6010, ICP	<0.025	MG/L	0.025	02/06/91 900
Cr - -ICP-HOU CHROMIUM EPA SW-846: 6010, ICP	0.02	MG/L	0.02	02/04/91 804
Cu - -ICP-HOU COPPER EPA SW-846: 6010, ICP	0.03	MG/L	0.02	02/04/91 804
Hg - - -HOU MERCURY EPA SW-846: 7470, COLD VAPOR	<0.001	MG/L	0.001	02/05/91 650

***** CONTINUED *****

AnalytiKEM-Houston

Analytical Report
02/12/91 15:21

FMC - Pasadena, TX	Field ID: RFI-6	Date Sampled: 02/01/91
Proj. No.: 2810-018	Lab ID: 11	Time Sampled: 1105
Lab No.: A5421	Matrix: WATER (COMPOSITE)	Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
Ni - -ICP-HOU NICKEL EPA SW-846: 6010, ICP	<0.02	MG/L	0.02	02/04/91 804
Pb - -ICP-HOU LEAD EPA SW-846: 6010, ICP	<0.025	MG/L	0.025	02/04/91 804
Sb - -GFA-HOU ANTIMONY EPA SW-846: 7041, GRAPHITE FURNACE	<0.005	MG/L	0.005	02/06/91 1400
Se - -GFA-HOU SELENIUM EPA SW-846: 7740, GRAPHITE FURNACE	<0.005	MG/L	0.005	02/04/91 650
n - -ICP-HOU TIN EPA SW-846: 6010, ICP	11	MG/L	0.05	02/06/91 900
Tl - -GFA-HOU THALLIUM EPA SW-846: 7841, GRAPHITE FURNACE	<0.01	MG/L	0.01	02/07/91 658
V - -ICP-HOU VANADIUM EPA SW-846: 6010, ICP	<0.025	MG/L	0.025	02/06/91 900
Zn - -ICP-HOU ZINC EPA SW-846: 6010, ICP	0.4	MG/L	0.02	02/04/91 804

AnalytiKEM-Houston

Analytical Report
02/12/91 15:21

FMC - Pasadena, TX	Field ID: RFI-8	Date Sampled: 02/01/91
Proj. No.: 2810-018	Lab ID: 12	Time Sampled: 1050
Lab No.: A5421	Matrix: WATER (COMPOSITE)	Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
Ag - - -HOU SILVER EPA SW-846: 7760, ATOMIC ABSORPTION	<0.01	MG/L	0.01	02/05/91 1130
As - -GFA-HOU ARSENIC EPA SW-846: 7060, GRAPHITE FURNACE	<0.005	MG/L	0.005	02/05/91 945
Ba - -ICP-HOU BARIUM EPA SW-846: 6010, ICP	0.02	MG/L	0.02	02/04/91 804
Be - -ICP-HOU BERYLLIUM EPA SW-846: 6010, ICP	<0.02	MG/L	0.02	02/04/91 804
d - -ICP-HOU CADMIUM EPA SW-846: 6010, ICP	<0.010	MG/L	0.010	02/04/91 804
Co - -ICP-HOU COBALT EPA SW-846: 6010, ICP	<0.025	MG/L	0.025	02/06/91 900
Cr - -ICP-HOU CHROMIUM EPA SW-846: 6010, ICP	<0.02	MG/L	0.02	02/04/91 804
Cu - -ICP-HOU COPPER EPA SW-846: 6010, ICP	<0.02	MG/L	0.02	02/04/91 804
Hg - - -HOU MERCURY EPA SW-846: 7470, COLD VAPOR	0.06	MG/L	0.01	02/05/91 650

***** CONTINUED *****

AnalytiKEM-Houston

Analytical Report
02/12/91 15:21

FMC - Pasadena, TX	Field ID: RFI-8	Date Sampled: 02/01/91
Proj. No.: 2810-018	Lab ID: 12	Time Sampled: 1050
Lab No.: A5421	Matrix: WATER (COMPOSITE)	Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
Ni - -ICP-HOU NICKEL EPA SW-846: 6010, ICP	<0.02	MG/L	0.02	02/04/91 804
Pb - -ICP-HOU LEAD EPA SW-846: 6010, ICP	<0.025	MG/L	0.025	02/04/91 804
Sb - -GFA-HOU ANTIMONY EPA SW-846: 7041, GRAPHITE FURNACE	<0.005	MG/L	0.005	02/06/91 1400
Se - -GFA-HOU SELENIUM EPA SW-846: 7740, GRAPHITE FURNACE	<0.005	MG/L	0.005	02/04/91 650
Sn - -ICP-HOU TIN EPA SW-846: 6010, ICP	0.1	MG/L	0.05	02/06/91 900
Tl - -GFA-HOU THALLIUM EPA SW-846: 7841, GRAPHITE FURNACE	<0.01	MG/L	0.01	02/07/91 658
V - -ICP-HOU VANADIUM EPA SW-846: 6010, ICP	<0.025	MG/L	0.025	02/06/91 900
Zn - -ICP-HOU ZINC EPA SW-846: 6010, ICP	0.1	MG/L	0.02	02/04/91 804

AnalytiKEM-Houston

Analytical Report
02/12/91 15:21

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: EQ-BLANK Lab ID: 13 Matrix: WATER (GRAB)	Date Sampled: 02/01/91 Time Sampled: 1245 Date Received: 02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA - - -HOU VOLATILE ORGANIC ANALYSES EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/L		02/04/91

*1 SEE ENSR ID #A5421-13

AnalytiKEM-Houston

Analytical Report
02/12/91 15:21

FMC - Pasadena, TX Proj. No.: 2810-018 Lab No.: A5421	Field ID: TRIP BLANK Lab ID: 14 Matrix: WATER	Date Sampled: 02/01/91 Time Sampled: Date Received:02/01/91

Parameter (Test Code) (Test Name) (Test Method)	Concen-tration	Units	Method Detection Limit	Date/Time Analysis Performed
VOA - - -HOU VOLATILE ORGANIC ANALYSES EPA SW-846: 8240, GC/MS	ATTACHED *1	UG/L		02/04/91

*1 SEE ENSR ID #A5421-14

AnalytiKEM-Houston

QUALITY CONTROL LOG

Page: 1 of 1

Parameter: SILVER Ag

Matrix: WATER

Method of Analysis: EPA SW-846 : 7760 AA

Date/Time: 05 FEB91 / 1130

Lab Numbers	Detection Limits
A5421-11,12	0.01 mg/L
A5417-1,2	0.005 mg/L

Calibration Stds./Blk	Absorbance/Conc.
BLANK	0.000 Abs / 0.000 ppm
0.500 ppm	0.013 Abs / 0.500 ppm
1.000 ppm	0.026 Abs / 0.999 ppm
2.000 ppm	0.052 Abs / 2.016 ppm

Correlation Coefficient:

Comments:

Check Standards	Concentration Found/True
~~Sample Blank~~	ppm
~~Method Blank~~	ppm
~~P.E. Std.~~ ERA #2	1.007 / 1.000 ppm
~~Internal Std.~~ CCVS	0.749 / 0.750 ppm
	0.040 / 0.040 ppm
	0.020 / 0.020 ppm

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
A5421-Blk	<0.01	—	—	—	0.241	*	50% of 0.5	96
A5421-12	<0.01	<0.01	*	*	0.252	*	50% of 0.5	101
A5417-Blk	<0.005	—	—	—	0.085	*	0.1	85
A5417-2	<0.005	<0.005	*	*	0.082	*	0.1	82

Analyst: Michael A. Avila

QA/QC Approval: DeAnna M. Senegal

AnalytiKEM-Houston

QUALITY CONTROL LOG

Page: 1 of 2

Parameter: Arsenic As

Matrix: WATER, Soil

Method of Analysis: EPA SW846-7041 GFAA

Date/Time: 05 Feb 91/0945

Lab Numbers	Detection Limits
A5421-11,12	0.005 mg/l
A5417-1,2	↓
A5322-1	1 mg/kg
A5322-2→4	1.2 mg/kg
A5335-1,2	↓

Calibration Stds./Blk	Absorbance/Conc.
BLANK	-0.001 ABS / -0.0002
0.0200 ppm	0.099 ABS / 0.0198
0.0500 ppm	0.239 ABS / 0.0487
0.1000 ppm	0.466 ABS / 0.0983
Correlation Coefficient:	

Comments:

Check Standards	Concentration Found/True
~~Sample Blank~~	ppm
~~Method Blank~~	ppm
P.E. Std. ICAP 19 @ 1/40	0.0255 / 0.0250 ppm
CCVS ~~Internal Std.~~	0.0728 / 0.0750 ppm
0.0050 ppm	0.0048 / 0.0050 ppm

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
A5421-BLK	<0.005	—	—		0.0381	*	0.04	95
A5421-11	0.0056	0.0057	0.0001	1.77	0.0363	0.0056	0.04	77
A5417-BLK	<0.005	—	—	—	0.0351	*	0.04	88
A5417-1	↓	<0.005	*	*	0.0357	*	0.04	89
A5322-BLK	<0.25	—	—	—	0.0336	*	0.04	84
A5322-3	0.0161	0.0162	0.0001	0.62	0.0544	0.00805	50% of 0.10	93

Analyst: James Matthews

QA/QC Approval: DeAnna M. Senegal

AnalytiKEM-Houston
QUALITY CONTROL LOG

PARAMETER: Arsenic As DATE/TIME: 05 Feb 91/0945 PAGE 2 OF 2

INTERNAL QUALITY CONTROL DUPLICATES AND SPIKES

* BELOW MDL

LAB NO.-SAMPLE	SAMPLE CONC.	DUPLICATE CONC.	RANGE	PERCENT RPD	SPIKED RESULT	SAMPLE RESULT	SPIKE ADDED	PERCENT RECOVERY
A5335-1	0.0074	0.0074	0	0	0.0490	0.0037	50% of 0.10	91

ANALYST: James Mathews QA/QC APPROVAL: DeAnna M. Senegal

AnalytiKEM-Houston

QUALITY CONTROL LOG

Page: 1 of 1

Parameter: MERCURY Hg

Matrix: WATER

Method of Analysis: EPA SW-846: 7470 AA (COLD VAPOR) -CONTINUOUS FLOW

Date/Time: 05 FEB 91 / 0650

Lab Numbers	Detection Limits
A5417-1, 2	0.001 mg/L
A5421-11	↓
-12	0.01 mg/L

Calibration Stds./Blk	Absorbance/Conc.
BLANK	0.000 Abs / 0.0000 PPM
0.0020 PPM	0.014 Abs / 0.0021 PPM
0.0050 PPM	0.038 Abs / 0.0051 PPM
0.0100 PPM	0.077 Abs / 0.0100 PPM

Correlation Coefficient:

Comments:

Check Standards	Concentration Found/True
~~Sample Blank~~	
~~Method Blank~~	~~Abs.~~
~~P.E. Std.~~ EPA WP1085-1	0.0103 / 0.0100 PPM
~~Internal Std.~~ CCVS	0.0074 / 0.0075 PPM
0.0010 PPM	0.0010 / 0.0010 PPM

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
BLK spk	<0.001	—	—	—	0.0051	*	0.005	102
A5417-2	<0.001	<0.001	*	*	0.0053	*	0.005	106
A5421-12	0.06	0.06	0	0	0.0088	0.00305	50% of 0.010	115

Analyst: Michael A. Avila

QA/QC Approval: DeAnna M. Senega

AnalytiKEM-Houston

QUALITY CONTROL LOG

Page: 1 of 1

Parameter: Antimony - Sb

Matrix: water

Method of Analysis: EPA SW-846; 7041 GFAA

Date/Time: 6FEB91/1400

Lab Numbers	Detection Limits
A5421-11,12	0.005 mg/l
A5417-1,2	↓

Calibration Stds./Blk	Absorbance/Conc.
BLANK	0.002 / 0.0002
0.02 ppm	0.042 / 0.0217
0.05 ppm	0.105 / 0.0536
0.10 ppm	0.189 / 0.0996

Correlation Coefficient:

Comments:

Check Standards	Concentration Found/True
Sample Blank	____ ppm
Method Blank	____ ppm
P.E. Std. EPA 186	0.0200 / 0.020 ppm
~~Internal~~ CCV Std.	0.0781 / 0.075 ppm

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
A5421-BLK	<0.02	—	—	—	0.1179	0.0139	0.10	104
A5421-12	↓	<0.02	*	*	0.1047	*	↓	105
A5417-BLK	↓	—	—	—	0.1032	↓	↓	103
A5417-2	↓	<0.02	*	*	0.0952	↓	↓	95

Analyst: Ted R. McKelvey / TM MAA QA/QC Approval: DeAnna M. Senegal

AnalytiKEM—Houston

QUALITY CONTROL LOG

Page: 1 of 2

Parameter: SELENIUM Se

Matrix: WATER, SOIL, TCLP

Method of Analysis: EPA SW-846: 7740 GFAA

Date/Time: 04 FEB 91 / 0650

Lab Numbers	Detection Limits
A5316-3'-5	0.005 mg/L
A5319-1→6	↓
A5322-1→4	0.25 mg/kg
A5421-11,12	<0.005 mg/L
A5417-1,2	↓
A5335-1,2	0.25 mg/kg
A5342-1T,2T	0.005 mg/L
A5316-2	0.01 mg/L

Calibration Stds./Blk	Absorbance/Conc.
BLANK	0.002 Abs / -0.0019 PPM
0.0100 PPM	0.024 Abs / 0.0092 PPM
0.0200 PPM	0.054 Abs / 0.0205 PPM
0.0500 PPM	0.121 Abs / 0.0497 PPM
Correlation Coefficient:	

Comments:

Check Standards	Concentration Found/True
~~Sample Blank~~	
~~Method Blank~~	~~Abs.~~
~~P.E. Std.~~ ICAP-19 @ 1/40	0.0253 / 0.0250 PPM
~~Internal Std.~~ CCVS	0.0247 / 0.0250 PPM
MDL= 0.0050 PPM	0.0049 / 0.0050 PPM

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result (mg)	Sample Result (mg)	Spike Added (mg)	Percent Recovery (mg)
A5322-BLK	<0.25	—	—	—	0.0200	*	0.02	100
A5322-3	↓	<0.25	*	*	0.0216	*	50% of 0.05	86
A5421-BLK	<0.005	—	—	—	0.0202	*	0.02	101
A5421-11	↓	<0.005	*	*	0.0227	*	50% of 0.05	91
A5417-BLK	↓	—	—	—	0.0182	*	0.02	91
A5417-1	↓	<0.005	*	*	0.0156	*	0.02	78

Analyst: Michael A. Avila

QA/QC Approval: DeAnna M. Senegal

AnalytiKEM-Houston

QUALITY CONTROL LOG

PARAMETER: SELENIUM Se DATE/TIME: 04FEB91/0650 PAGE 2 OF 2

INTERNAL QUALITY CONTROL DUPLICATES AND SPIKES

* BELOW MDL

LAB NO.-SAMPLE	SAMPLE CONC.	DUPLICATE CONC.	RANGE	PERCENT RPD	SPIKED RESULT	SAMPLE RESULT	SPIKE ADDED	PERCENT RECOVERY
A5335-1	<0.25	<0.25	*	*	0.0188	*	50% of 0.05	75

ANALYST: Michael A. Avila

QA/QC APPROVAL: DeAnna M. Senegal

AnalytiKEM-Houston

QUALITY CONTROL LOG

Page: 1 of 1

Parameter: Thallium - Tl

Matrix: WATER

Method of Analysis: EPA-SW-846: 7841, GFAA

Date/Time: 07FEB91/0658

Lab Numbers	Detection Limits
A5421-11,12	0.01mg/l
A5417-1,2	↓

Calibration Stds./Blk	Absorbance/Conc.
BLANK	0.001 / -0.0002
0.01ppm	0.026 / 0.0102
0.02 ppm	0.053 / 0.0196
0.05 ppm	0.121 / 0.0498
Correlation Coefficient:	

Check Standards	Concentration Found/True
Sample Blank	— ppm
Method Blank	— ppm
P.E. Std. EPA 186	0.0186 / 0.020 ppm
~~Internal~~ Std. CCV	0.0247 / 0.0250 ppm

Comments:

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
A5421-BLK	<0.01	—	—	—	0.0386	*	0.04	96
A5421-11	<0.01	<0.01	*	*	0.0208	↓	50% of 0.05	83
A5417-BLK	↓	—	—	—	0.0369	↓	0.04	92
A5417-1	↓	<0.01	*	*	0.0329	↓	↓	82

Analyst: Fred R. McKelvey /MAA QA/QC Approval: DeAnna M. Senegal

Date: 04 Feb 91

Time: 0804

AnalytiKEM-Houston

Page 1 of 4

ICAP Quality Control Logs
Method EPA SW-846:6010, 3rd Ed.
Calibration, Standard and Blank Information

	Parameter / MDL 100→25	Zn 0.02	Pb 0.025	Cd 0.01	Ni 0.02	Mn 0.02	Fe 0.02	Cr 0.02	Be 0.02	Cu 0.02	Ba 0.02
CALIBRATION STD/BLK	BLANK	0.000	0.002	-0.002	0.002	0.000	0.000	0.003	0.000	-0.002	-0.000
	5.00 ppm	4.83	5.01	4.99	5.02	4.87	4.95	5.12	5.21	5.29	5.23
	1.00 ppm	0.933	0.911	0.977	0.990	0.955	1.00	1.02	1.02	1.05	1.06
	0.10 ppm	—	0.106	—	—	—	—	—	—	—	—
	0.08 ppm	0.079	—	—	0.076	0.075	0.072	0.081	0.076	0.079	0.081
	0.04 ppm	0.037	—	0.040	0.039	0.036	0.036	0.043	0.038	0.036	0.039
CHECK STD	ICAP 19	0.960/1.00	0.967/1.00	0.970/1.00	0.925/1.00	0.944/1.00	0.973/1.00	1.00/1.00	0.976/1.00	1.03/1.00	—
	ERA-3	—	—	—	—	—	—	—	—	—	1.03/1.00
SAMPLE BLANKS											

Analyst: James Matthews

QA/QC Approval: DeAnna M. Senegal

Date: 04 Feb 91

Time 0804

AnalytiKEM—Houston

ICAP Quality Control Logs
Method SW-846-3rd Ed., #6010
Duplicate and Spike Information

* Below MDL

Parameter / 100→25 MDL	Cr / 0.02									
A5400-BLK	0.018									
Duplicate	—									
% RPD	—									
Spike	0.206									
% Recovery	103									
A5400-6	0.235									
Duplicate	0.229									
% RPD	2.59									
Spike	0.426									
% Recovery	96									
A5 [illegible]-12	0.238									
Duplicate	0.227									
% RPD	4.73									
Spike	0.416									
% Recovery	89									
A5386-BLK	0.009									
Duplicate	—									
% RPD	—									
Spike	0.206									
% Recovery	102									
A5386-8	0.185									
Duplicate	0.196									
% RPD	5.77									
Sp[illegible]	0.363									
% Recovery	89									

Analyst: James Matthews

QAQC Approval: DeAnna M. Senegal

ate: 04 Feb 91

ime: 0809

AnalytiKEM-Houston

ICAP Quality Control Logs
Method SW-846-3rd Ed., #6010
Duplicate and Spike Information

* Below MDL

Parameter / 100->25 MDL	Zn 0.02	Pb 0.025	Cd 0.01	Ni 0.02	Mn 0.02	Cr 0.02	Be 0.02	Cu 0.02	Fe 0.02	Ba 0.02
A5386-16	—	—	—	—	—	0.032	—	—	—	—
Duplicate						0.038				
% RPD						*				
Spike						0.210				
% Recovery						89				
A5386-25						0.262				
Duplicate						0.285				
% RPD						8.41				
Spike						0.431				
% Recovery	—	—	—	—	—	84	—	—	—	—
VA: 7-BIK	0.016	-0.001	0.000	0.000	0.000	0.002	0.000	0.007	0.033	0.001
Duplicate	—	—	—	—	—	—	—	—	—	—
% RPD	—	—	—	—	—	—	—	—	—	—
Spike	0.952	0.955	0.112	1.09	1.02	0.205	0.097	0.224	1.05	2.12
% Recovery	89	96	112	109	102	102	97	112	105	106
A5421-12	0.122	0.002	0.000	0.008	0.225	0.007	0.000	0.018	1.877	0.024
Duplicate	0.126	0.14	0.000	0.005	0.241	0.007	0.000	0.018	1.877	0.026
% RPD	3.22	*	*	*	6.87	*	*	*	0	8.00
Spike	1.416	0.937	0.121	0.994	1.94	0.217	0.095	0.252	8.378	2.05
% Recovery	93	94	121	99	98	108	95	90	87	98
A5417-BIK	0.015	-0.009	0.000	0.001	—	0.002	0.000	0.000	—	—
Duplicate	—	—	—	—		—	—	—		
% RPD	—	—	—	—		—	—	—		
Sp	0.856	0.830	0.087	0.973		0.166	0.082	0.174		
% Recovery	80	83	87	97		83	82	87		

Analyst: James R Mathis

QAQC Approval: DeAnna M. Senegal

ate: 04 Feb 91

ime 0804

AnalytiKEM-Houston

ICAP Quality Control Logs
Method SW-846-3rd Ed., #6010
Duplicate and Spike Information

* Below MDL

Parameter / 100->25 MDL	Zn / 0.02	Pb / 0.025	Cd / 0.01	Ni / 0.02	Cr / 0.02	Be / 0.02	Cu / 0.02			
A5417-2	0.013	-0.003	0.000	0.001	0.001	0.000	0.000			
Duplicate	0.017	-0.004	0.000	0.000	0.003	0.000	0.001			
% RPD	*	*	*	*	*	*	*			
Spike	0.838	0.831	0.094	0.891	0.182	0.085	0.178			
% Recovery	84	83	94	89	91	85	89			
Duplicate										
% RPD										
Spike										
% Recovery										
Duplicate										
% RPD										
Spike										
% Recovery										
Duplicate										
% RPD										
Spike										
% Recovery										
Duplicate										
% RPD										
Spike										
% Recovery										

Analyst: Janet Mathis

QAQC Approval: DeAnna M. Senegal

AnalytiKEM-Houston

QUALITY CONTROL LOG

Page: 1 of 1

Parameter: POTASSIUM K

Matrix: WATER

Method of Analysis: EPA 600: 258.1 AA

Date/Time: 06 Feb 91/1425

Lab Numbers	Detection Limits
A5361-15	250 µg/L
A5421-11,12	1 mg/L
A5361-16	0.05 percent

Calibration Stds./Blk	Absorbance/Conc.
Blank	0.000 ABS / 0.002
0.500 ppm	0.045 ABS / 0.501
1.000 ppm	0.092 ABS / 1.001
2.000 ppm	0.182 ABS / 2.007
Correlation Coefficient:	

Check Standards	Concentration Found/True
Sample Blank	ppm
Method Blank	ppm
P.E. Std. ERA-4 @ 1/100	0.954 / 1.000 ppm
~~Internal Std.~~ CCVS	0.748 / 0.750 ppm
0.050 ppm	0.048 / 0.050 ppm
0.100 ppm	0.105 / 0.100 ppm

Comments:

Internal Quality Control Duplicates and Spikes

* Below MDL

Lab No. - Sample ID	Sample Conc.	Duplicate Conc.	Range	Percent RPD	Spiked Result	Sample Result	Spike Added	Percent Recovery
A5361-15	1.708	1.712	0.004	0.23	1.881	0.854	50% of 2.00	103
A5361-16	1.172	1.179	0.007	0.60	1.644	0.586	↓	106
A5421-11	1.230	1.240	0.010	0.82	1.616	0.615	↓	100

Analyst: Jamie Matthews

QA/QC Approval: DeAnna M. Senegal

Date: 06 Feb 91

Time: 0900

Page 1 of 2

AnalytiKEM-Houston

ICAP Quality Control Logs
Method EPA SW-846:6010, 3rd Ed.
Calibration, Standard and Blank Information

	Parameter / MDL (100→25)	Os 0.05	Co 0.025	Sn 0.05	V 0.025	Al 0.025					
CALIBRATION STD/BLK	BLANK	-0.006	-0.002	0.002	0.000	-0.001					
	5.00 ppm	5.42	4.87	5.00	4.98	5.01					
	1.00 ppm	0.906	0.920	0.980	0.975	1.02					
	0.200 ppm	0.193	0.192	0.214	0.184	0.181					
	0.100 ppm	—	0.092	—	0.0091	0.100					
	50.0 ppm	50.6	—	47.9	—	—					
CHECK STD	ERA-3	—	0.992/1.00	—	0.969/1.00	10.0/10.00	Found/True				
SAMPLE BLANK											

Analyst: Lauren Matthews

QA/QC Approval: DeAnna M. Senegal

Date: 06 Feb 91

Time 0900

AnalytiKEM—Houston

ICAP Quality Control Logs
Method SW-846-3rd Ed., #6010
Duplicate and Spike Information

* Below MDL

Parameter / 100→25 MDL	Be 0.05	Co 0.025	Sn 0.05	V 0.025	Al 0.025					
A5421-BLK	—	0.000	—	0.000	0.007					
Duplicate	—	—	—	—	—					
% RPD	—	—	—	—	—					
Spike	—	1.72	—	0.896	1.97					
% Recovery	—	86	—	90	98					
A5421-11	-0.010	0.004	10.8	0.018	4.20					
Duplicate	-0.025	0.003	10.8	0.017	4.29					
% RPD	*	*	0	*	2.12					
Spike	1.84	1.55	23.7	0.851	10.5					
% Recovery	74	78	84	85	84					
Duplicate										
% RPD										
Spike										
% Recovery										
Duplicate										
% RPD										
Spike										
% Recovery										
Duplicate										
% RPD										
Spike										
% Recovery										

Analyst: James Mathews

QAQC Approval: DeAnna M. Senegal

Date: 5FEB91 **AnalytiKEM-Houston** Page 1 of 2

Time: 0911

ICAP Quality Control Logs
Method EPA SW-846:6010, 3rd Ed.
Calibration, Standard and Blank Information

	Parameter / MDL @ 100 → 25	Mg 0.05	Ca 0.05	Na 0.05							
CALIBRATION STD/BLK	BLANK	-0.000	-0.003	0.001							
	10.0 ppm	9.66	9.92	9.55							
	5.00 ppm	5.04	5.11	4.87							
	100 ppm	93.4	96.1	95.6							
	200 ppm	—	—	181							
CHECK STD	ERA-4	92.3/100	94.8/100	92.2/100	FOUND/TRUE						
SAMPLE BLANKS											

Analyst: Leo R. McKelvey QA/QC Approval: DeAnna M. Senezal

Date: 5FEB91

Time 0911

AnalytiKEM—Houston

ICAP Quality Control Logs
Method SW-846-3rd Ed., #6010
Duplicate and Spike Information

*/ Below MDL

Parameter / MDL	Mg 0.05	Ca 0.05	Na 0.05							
A5421-BLK	0.006	0.039	0.062							
Duplicate	—	—	—							
% RPD	—	—	—							
Spike	1.84	2.02	2.06							
% Recovery	92	93	91							
A5421-11	4.87	63.8	57.1							
Duplicate	4.73	64.6	63.8							
% RPD	2.92	1.25	11.1							
Spike	15.0	171	157							
% Recovery	105	87	86							
A5231/A5245-BLANK	—	—	0.128							
Duplicate			—							
% RPD			—							
Spike			2.10							
% Recovery			79							
A5245-4			131							
Duplicate			125							
% RPD			4.69							
Spike			111							
% Recovery			91							
A5231-6			103							
Duplicate			97.6							
% RPD			5.38							
Spike			106							
% Recovery	—	—	109							

Analyst: J. R. McKinney

QAQC Approval: DeAnna M. Senegal

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Sample ID: A5421-1
Client Sample ID: B-1B-1-6

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 15.4

Date Extracted: 02/05/91
Date Analyzed: 02/05/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

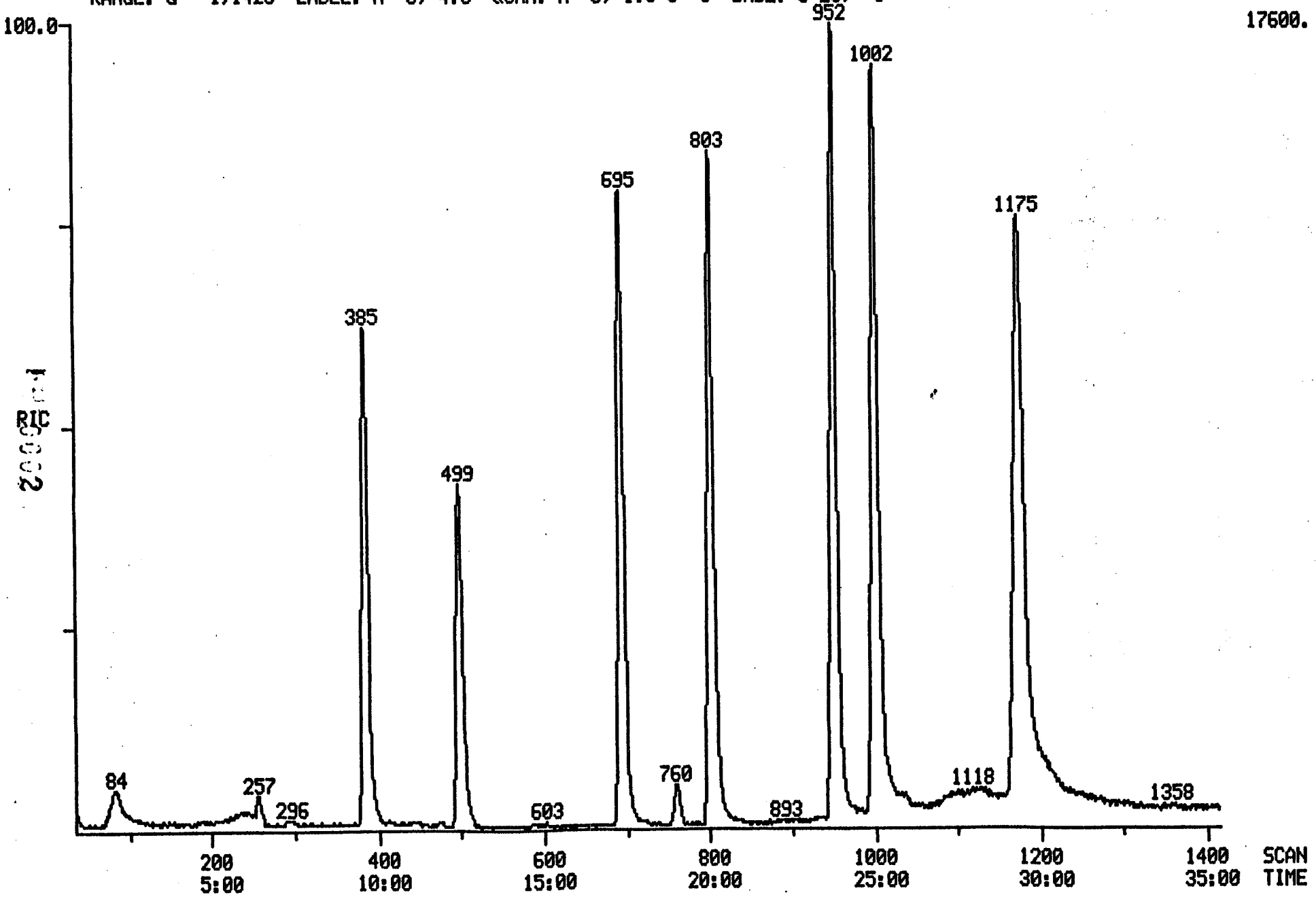
CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	59 <	107-18-6	Allyl Alcohol	590 <

The Lab ID for data on this page is A54211A.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/05/91 9:55:00
SAMPLE: B-1B-1,6"
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54211A #1
CALI: A54211A #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/04/91
Lab Sample ID:	A5421-2	Sample Matrix:	SOIL	Date Analyzed:	02/04/91
Client Sample ID:	B-1B-B-5	Percent Moisture:	24.2	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	66 <	107-18-6	Allyl Alcohol	660 <

The Lab ID for data on this page is A54212.

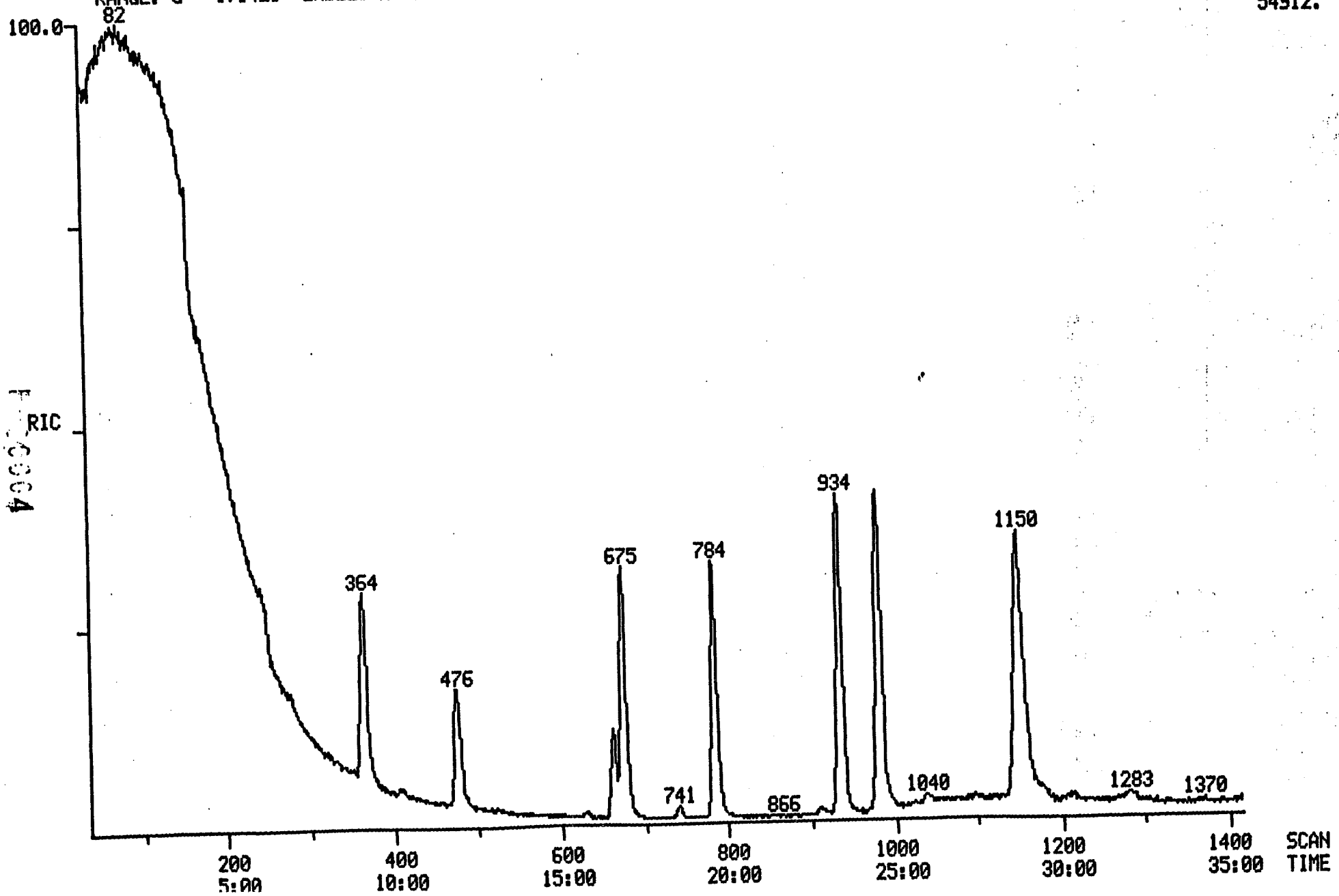
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 10:01:00
SAMPLE: B-1B-B,5'
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54212 #1
CALI: A54212 #3

SCANS 35 TO 1415

54912.



F 2004

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/04/91
Sample ID:	A5421-3	Sample Matrix:	SOIL	Date Analyzed:	02/04/91
Client Sample ID:	B-1B-C-10	Percent Moisture:	18.3	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

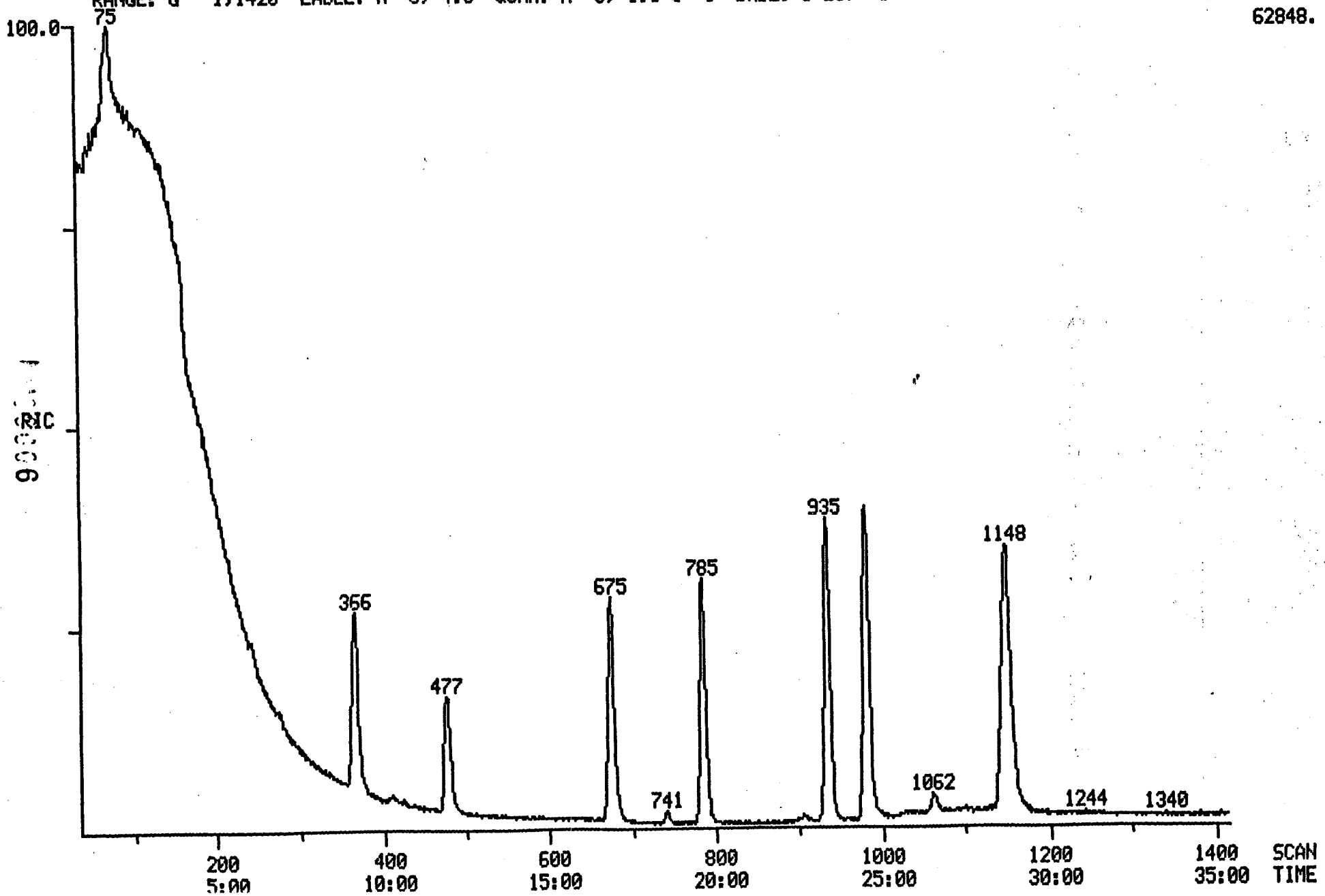
CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	61 <	107-18-6	Allyl Alcohol	610 <

The Lab ID for data on this page is A54213.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 10:44:00
SAMPLE: B-1B-C,10'
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54213 #1
CALI: A54213 #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Sample ID: A5421-4
Client Sample ID: B-1B-D-15

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 20.4

Date Extracted: 02/04/91
Date Analyzed: 02/04/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

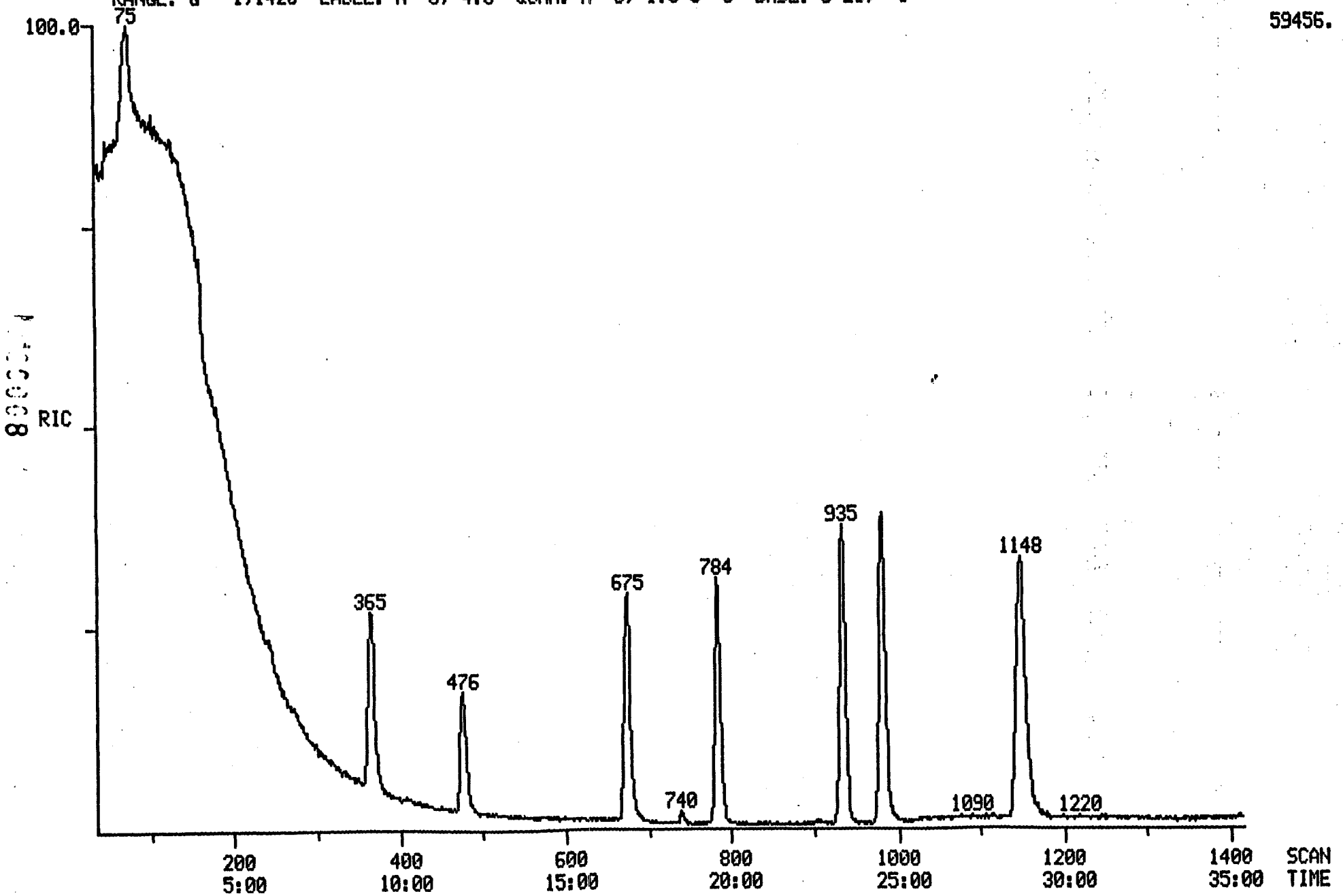
CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	63 <	107-18-6	Allyl Alcohol	630 <

The Lab ID for data on this page is A54214.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 11:26:00
SAMPLE: B-1B-D,15'
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54214 #1
CALI: A54214 #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/04/91
Sample ID:	A5421-5	Sample Matrix:	SOIL	Date Analyzed:	02/04/91
Client Sample ID:	B-1B-E-20	Percent Moisture:	22.4	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	64 <	107-18-6	Allyl Alcohol	640 <

The Lab ID for data on this page is A54215.

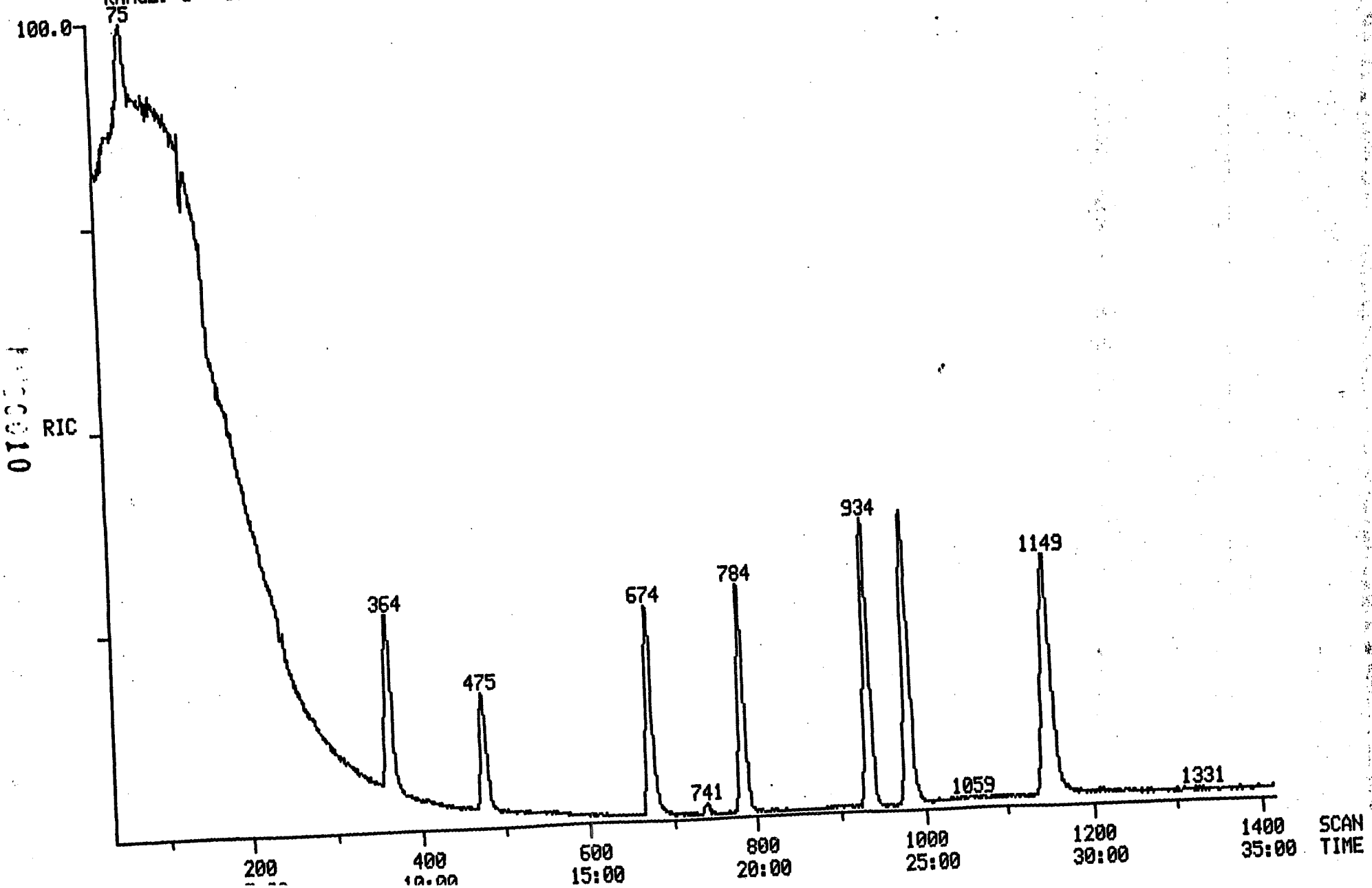
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 12:09:00
SAMPLE: B-1B-E,20'
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54215 #1
CALI: A54215 #3

SCANS 35 TO 1415

59648.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/04/91
b Sample ID:	A5421-6	Sample Matrix:	SOIL	Date Analyzed:	02/04/91
ient Sample ID:	B-2B-A-6	Percent Moisture:	8.1	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

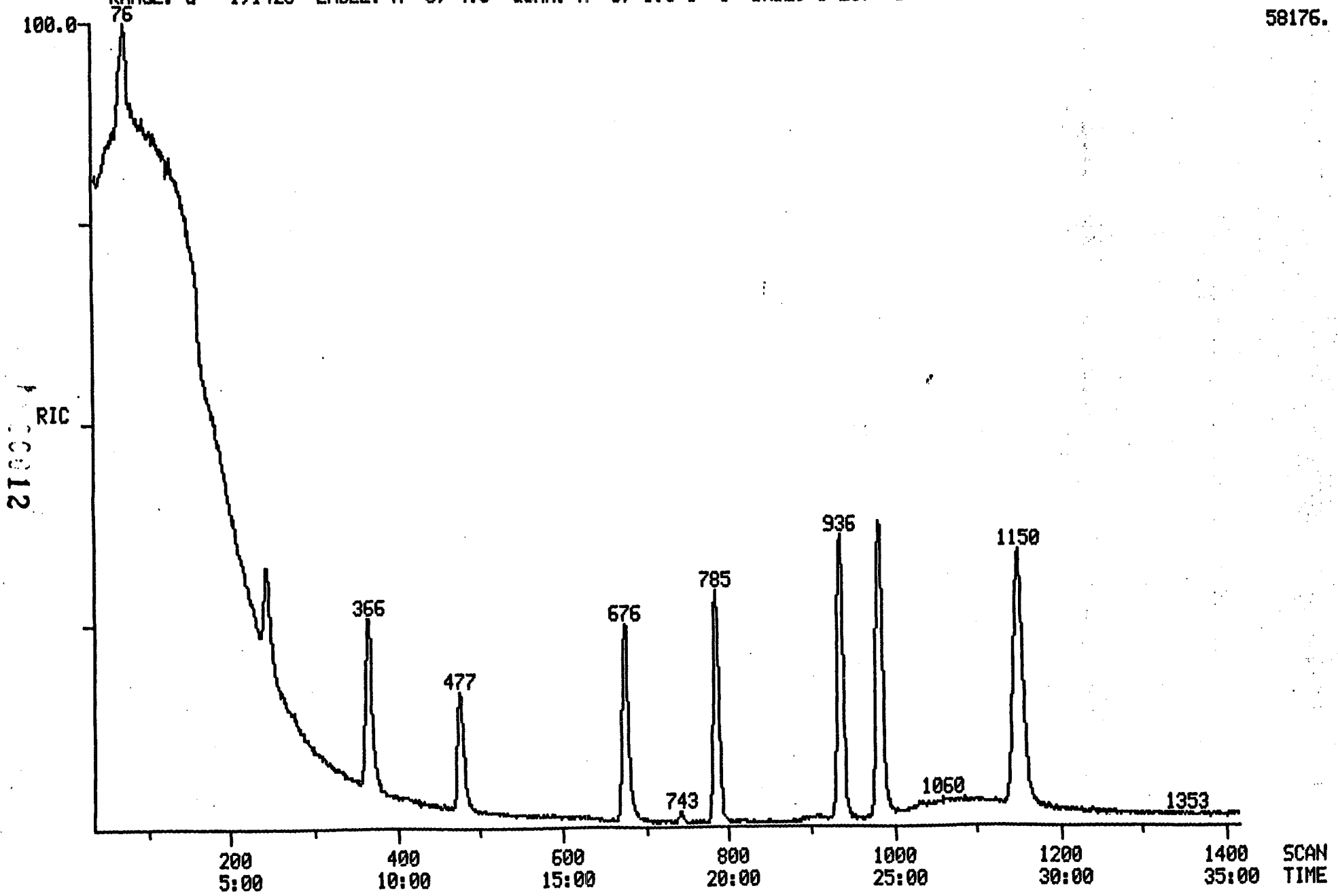
CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	54 <	107-18-6	Allyl Alcohol	540 <

The Lab ID for data on this page is A54216.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 12:52:00
SAMPLE: B-2B-A,6"
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54216 #1
CALI: A54216 #3

SCANS 35 TO 1415



21 C3012

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Sample ID: A5421-7
Client Sample ID: B-2B-B-5

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 28.0

Date Extracted: 02/04/91
Date Analyzed: 02/04/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	69 <	107-18-6	Allyl Alcohol	690 <

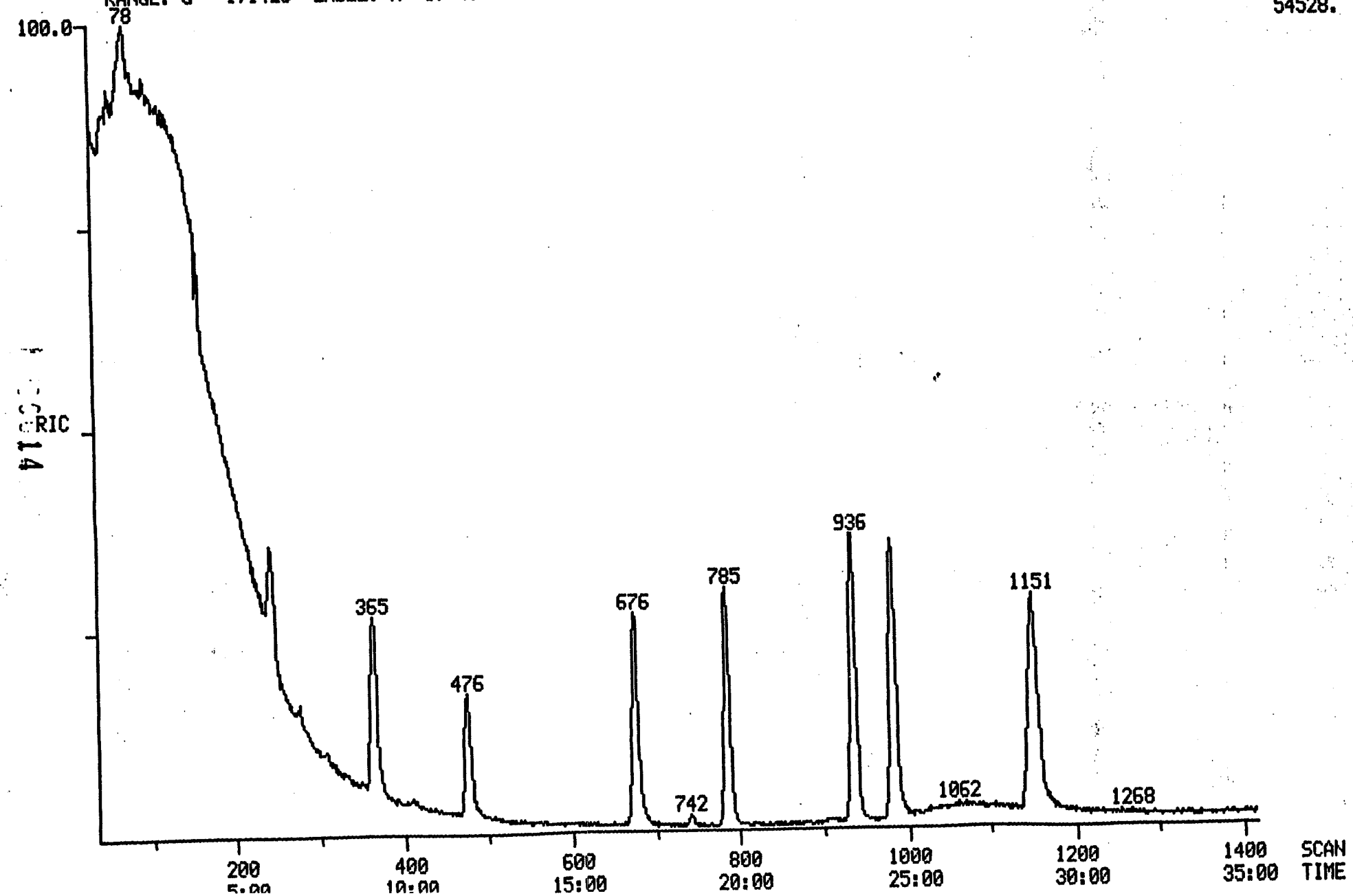
The Lab ID for data on this page is A54217.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 13:34:00
SAMPLE: B-2B-B,5'
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54217 #1
CALI: A54217 #3

SCANS 35 TO 1415

54528.



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Sample ID: A5421-8
Client Sample ID: B-2B-C-10

Concentration: LOW
Sample Matrix: SOIL
Percent Moisture: 17.6

Date Extracted: 02/04/91
Date Analyzed: 02/04/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

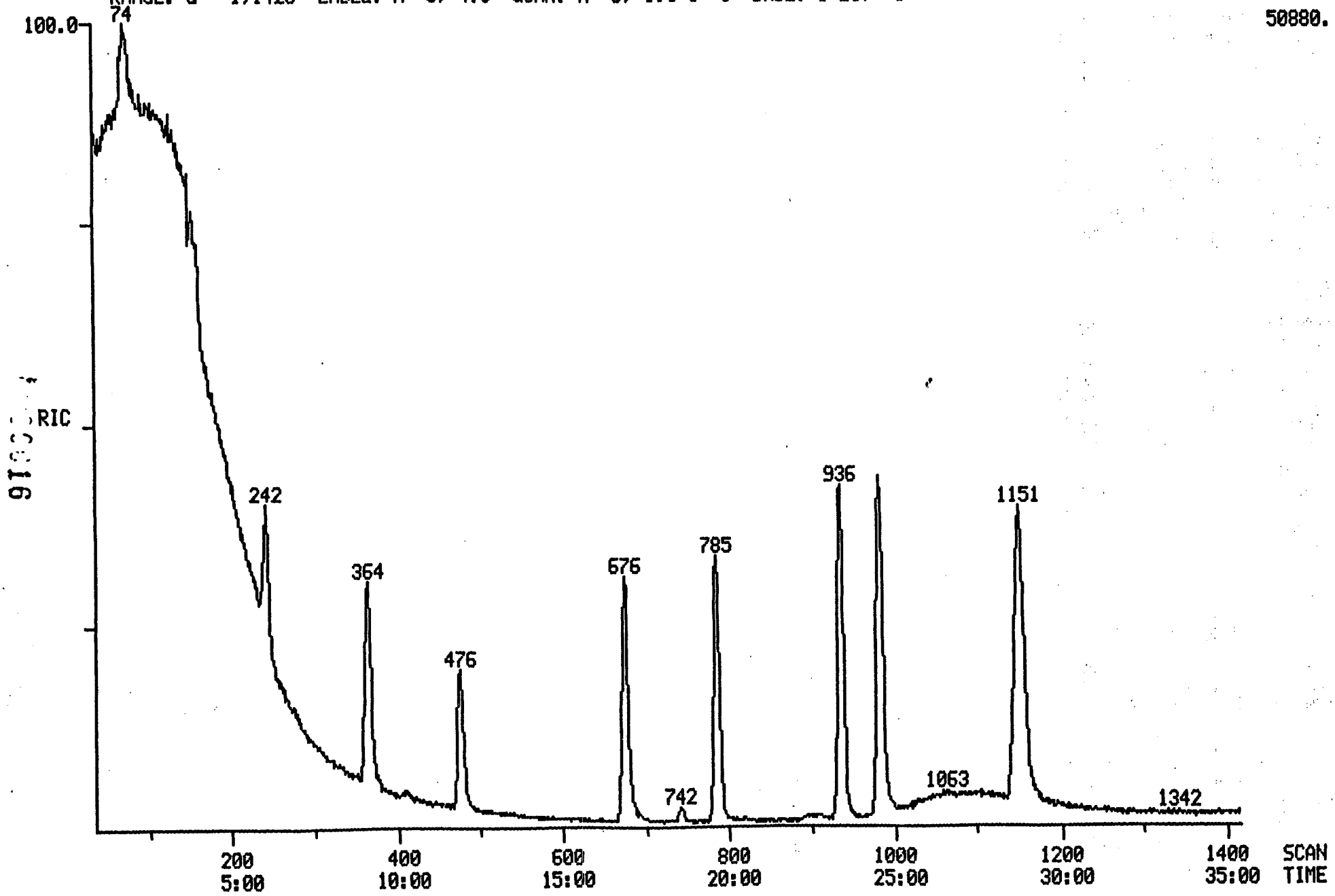
CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	61 <	107-18-6	Allyl Alcohol	610 <

The Lab ID for data on this page is A54218.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 14:17:00
SAMPLE: B-2B-C,10'
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54218 #1
CALI: A54218 #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/04/91
Lab Sample ID:	A5421-9	Sample Matrix:	SOIL	Date Analyzed:	02/04/91
Client Sample ID:	B-2B-D-15	Percent Moisture:	16.3	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	60 <	107-18-6	Allyl Alcohol	600 <

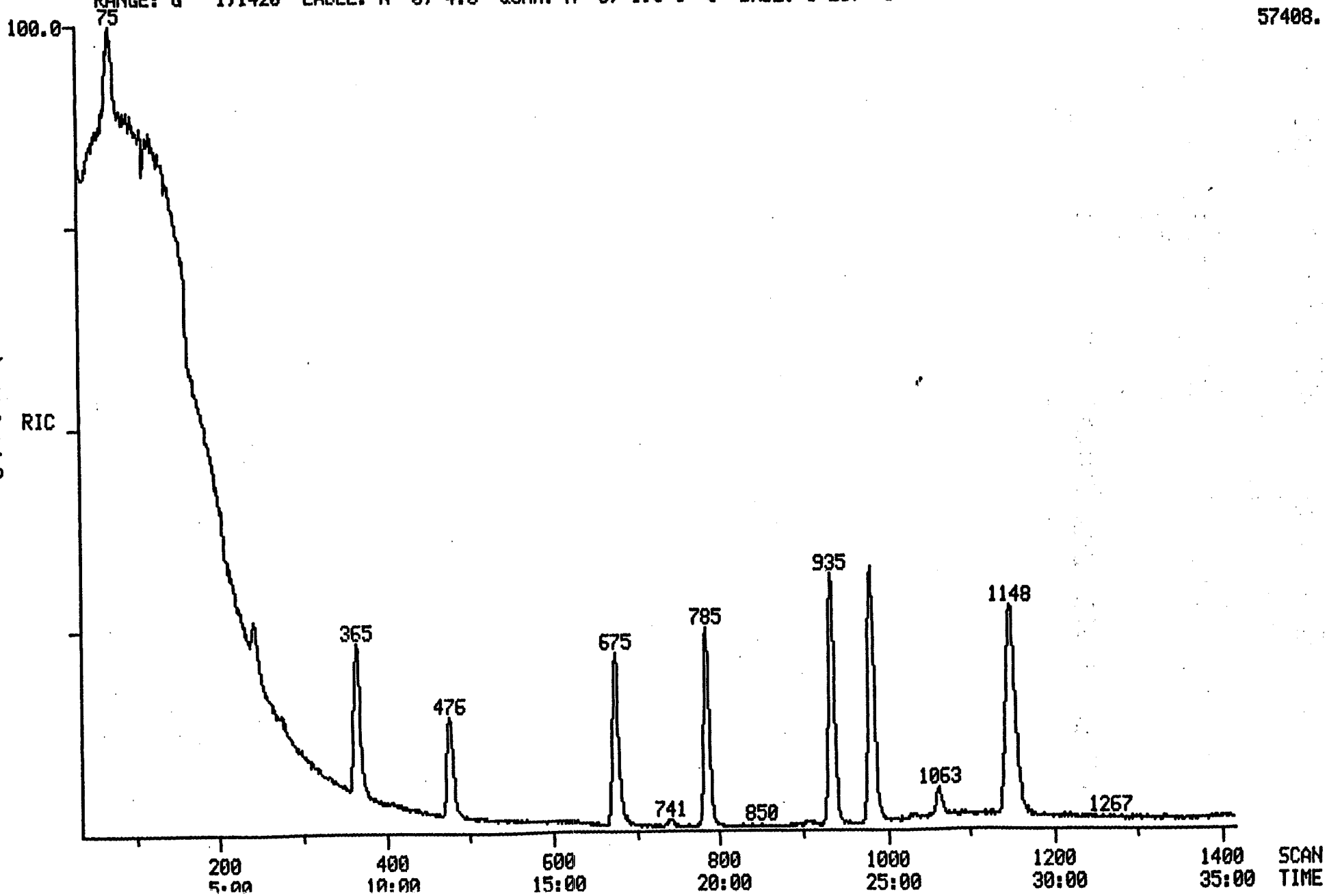
The Lab ID for data on this page is A54219.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 15:00:00
SAMPLE: B-2B-D,15'
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A54219 #1
CALI: A54219 #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/04/91
b Sample ID:	A5421-10	Sample Matrix:	SOIL	Date Analyzed:	02/04/91
ient Sample ID:	B-2B-E-20	Percent Moisture:	19.0	Dilution Factor:	1.0

ALLYL ALCOHOL & ACROLEIN

CAS Number		UG/KG	CAS Number		UG/KG
107-02-8	Acrolein	62 <	107-18-6	Allyl Alcohol	620 <

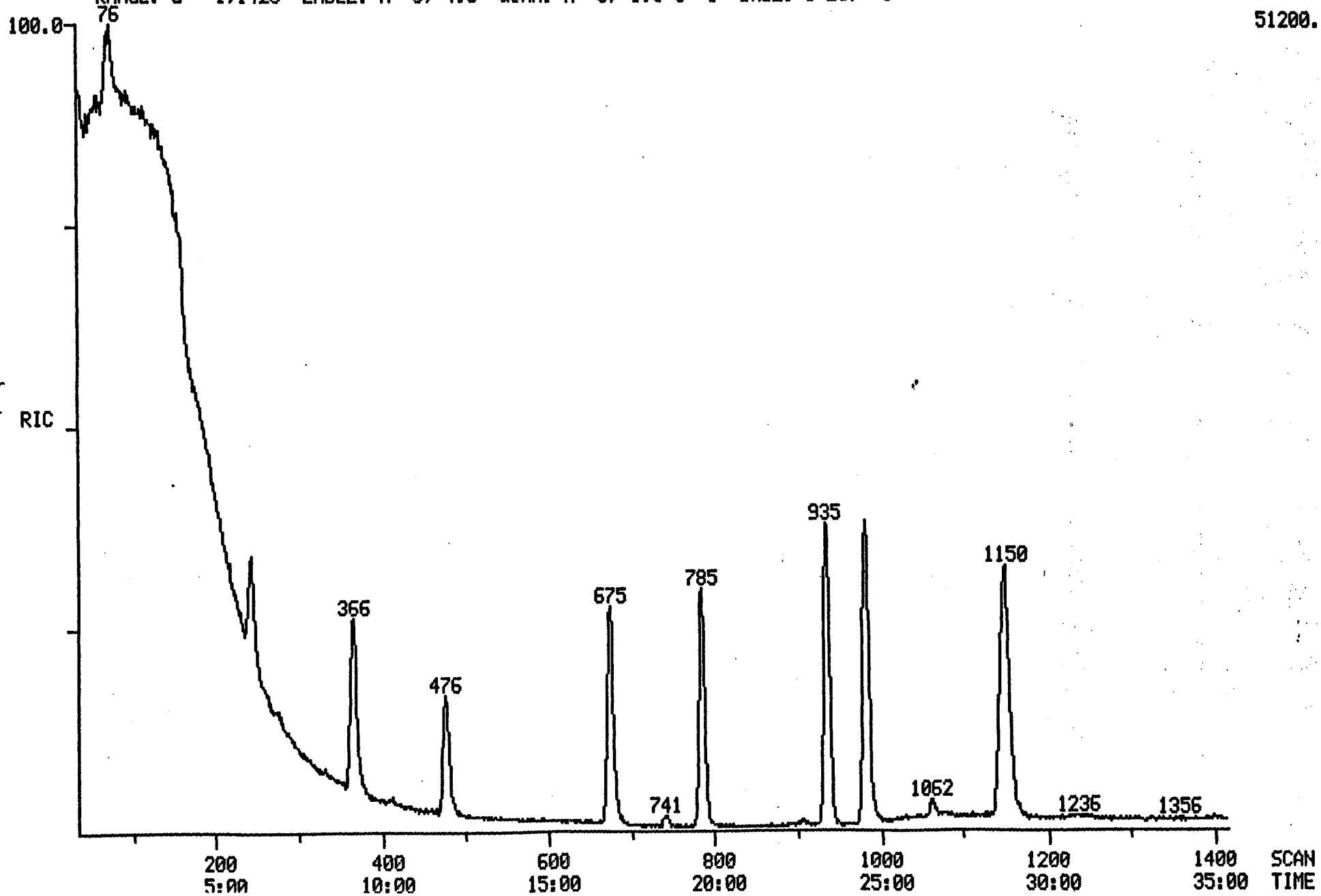
The Lab ID for data on this page is A542110.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 15:43:00
SAMPLE: B-2B-E,20'
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A542110 #1
CALI: A542110 #3

SCANS 35 TO 1415



020

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Sample ID: A5421-13
Client Sample ID: EQ-BLANK

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: 100.0

Date Extracted: 02/04/91
Date Analyzed: 02/04/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

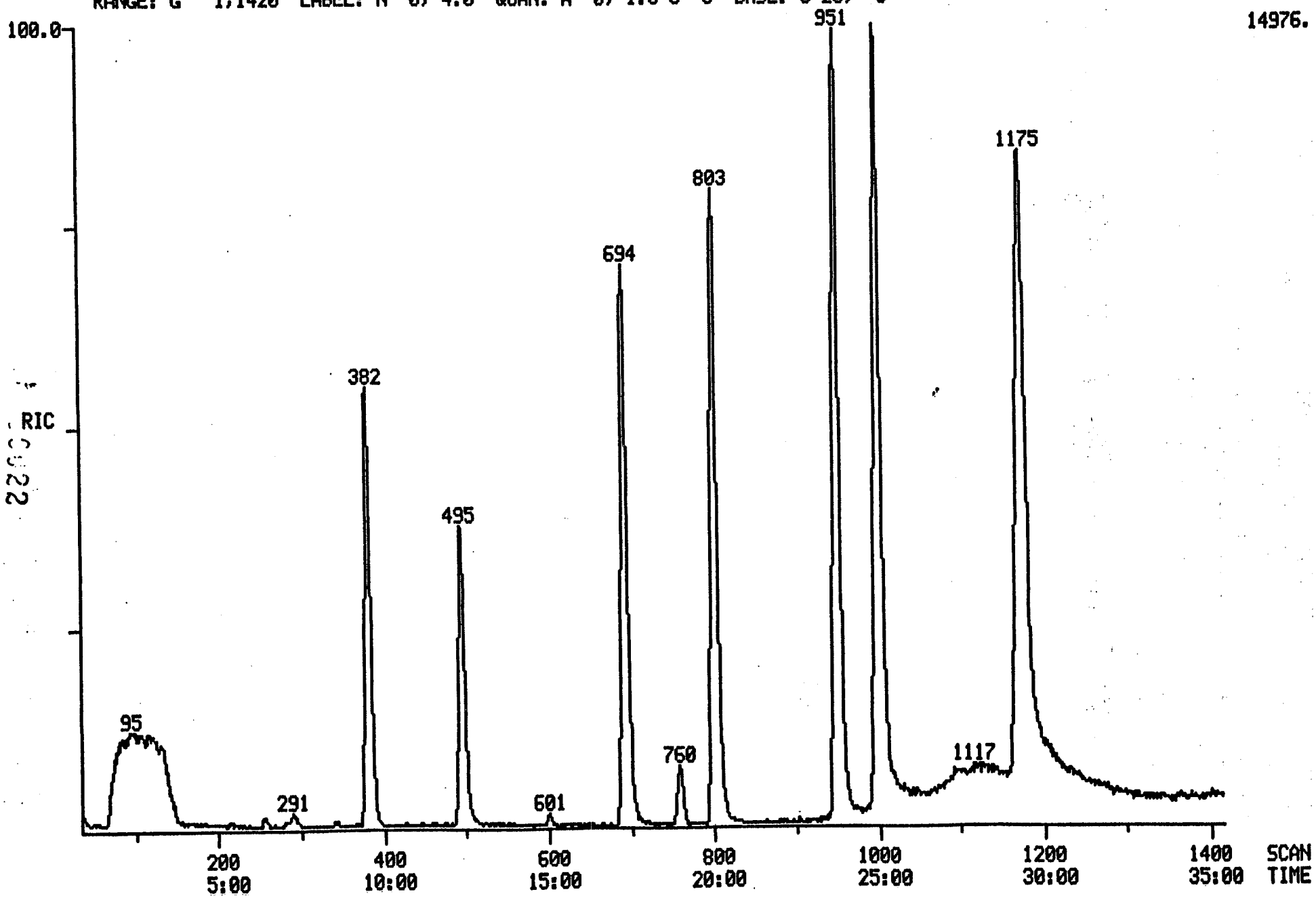
CAS Number		UG/L	CAS Number		UG/L
107-02-8	Acrolein	50 <	107-18-6	Allyl Alcohol	500 <

The Lab ID for data on this page is A542113.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 11:27:00
SAMPLE: EQ BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A542113 #1
CALI: A542113 #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: A5421-14
Client Sample ID: TRIP-BLANK

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: 100.0

Date Extracted: 02/04/91
Date Analyzed: 02/04/91
Dilution Factor: 1.0

ALLYL ALCOHOL & ACROLEIN

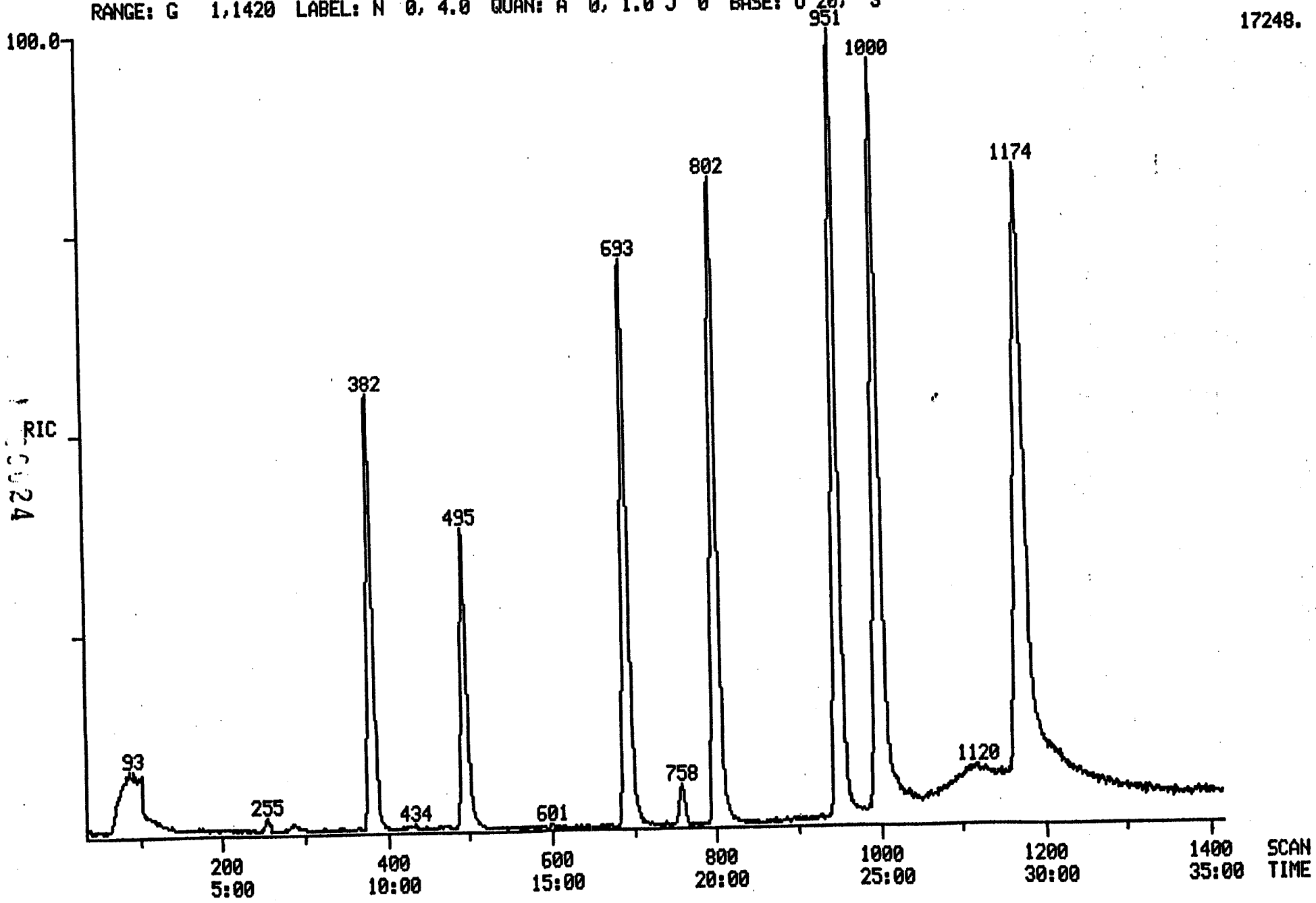
CAS Number		UG/L
107-02-8	Acrolein	50 <
107-18-6	Allyl Alcohol	500 <

The Lab ID for data on this page is A542114.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 12:06:00
SAMPLE: TRIP BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: A542114 #1
CALI: A542114 #3

SCANS 35 TO 1415



24

BROMOFLUOROBENZENE

Tuning Report
02/04/91 6:22:00 + 7:36
Instrument: I50C
#297 to #312 averaged - #316
Case Number:

Data: BF020491C1 # 304
Cali: BF020491C1 # 3
Analyst: BPB
Laboratory:

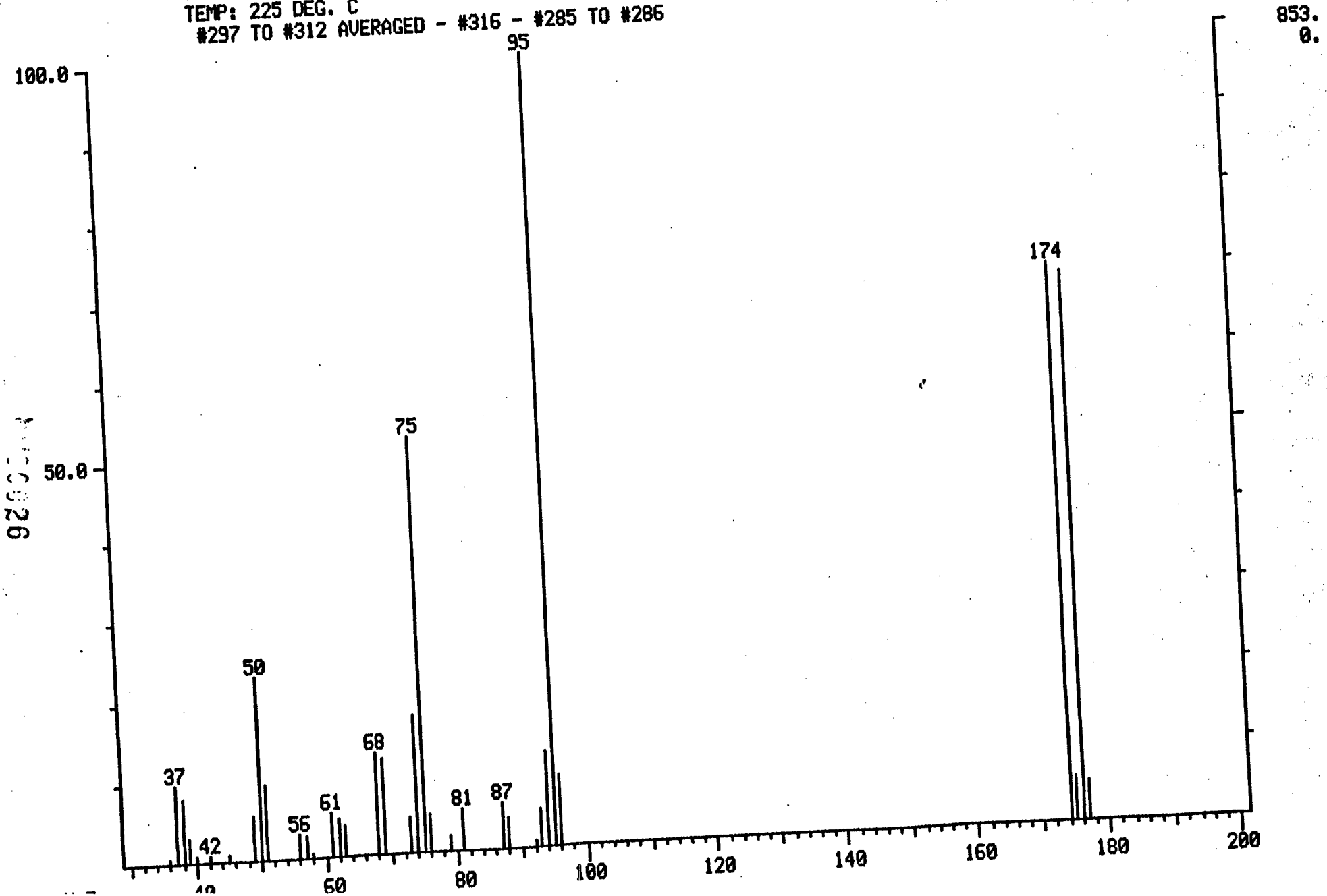
Base m/z: 95
RIC: 4088.
Acct. No.: 8506-090
Contract:

m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	196.	23.0	15.0	40.0	95	23.0	PASS
75	445.	52.2	30.0	60.0	95	52.2	PASS
95	853.	100.0	100.0	---	---	100.0	PASS
96	75.	8.8	5.0	9.0	95	8.8	PASS
173	0.	0.0	---	2.0	174	0.0	PASS
174	599.	70.2	50.0	---	95	70.2	PASS
175	47.	5.5	5.0	9.0	174	7.8	PASS
176	589.	69.1	95.0	101.0	174	98.3	PASS
177	43.	5.0	5.0	9.0	176	7.3	PASS

MASS SPECTRUM
02/04/91 6:22:00 + 7:36
SAMPLE: BFB CALIBRATION
CONDS.: I50C
TEMP: 225 DEG. C
#297 TO #312 AVERAGED - #316 - #285 TO #286

DATA: BF020491C1 #304
CALI: BF020491C1 #3

BASE M/Z: 95
RIC: 4088.



Mass List
02/04/91 6:22:00 + 7:36
Sample: BFB CALIBRATION
Conds.: I50C
#297 to #312 averaged - #316

Data: BF020491C1 # 304
Cali: BF020491C1 # 3

Base m/z: 95
RIC: 4088.

36 0.00 0. Minima Min Inten: 0.
177 Maxima # 0

Mass		% RA	Inten.
36?	S	0.59	5.
37?	S	9.73	83.
38?	S	7.97	68.
39?	S	3.05	26.
40?	S	0.70	6.
42?	S	0.94	8.
45?	S	0.82	7.
49?	S	5.51	47.
50?	S	22.98	196.
51?	S	9.26	79.
55?	S	0.12	1.
56?	S	3.05	26.
57?	S	2.70	23.
58?	S	0.47	4.
61?	S	5.51	47.
62?	S	4.57	39.
63?	S	3.87	33.
68?	S	12.78	109.
69	S	11.84	101.
70	S	0.12	1.
73	S	4.45	38.
74	S	17.23	147.
75	S	52.17	445.
76	S	4.81	41.
79	S	1.99	17.
81	S	5.16	44.
87	S	5.86	50.
88	S	3.75	32.
92	S	0.94	8.
93	S	4.81	41.
94	S	11.84	101.
95	S	100.00	853.
96	S	8.79	75.
174	S	70.22	599.
175	S	5.51	47.
176	S	69.05	589.
177	S	5.04	43.

BROMOFLUOROBENZENE

Tuning Report
02/04/91 7:02:00 + 7:10
Instrument: I50D
#278 to #297 summed - #299
Case Number:

Data: BF020491D3 # 287
Cali: BF020491D3 # 3
Analyst: BPB

Laboratory:

Base m/z: 95
RIC: 79104.
Acct. No.: 8506-091

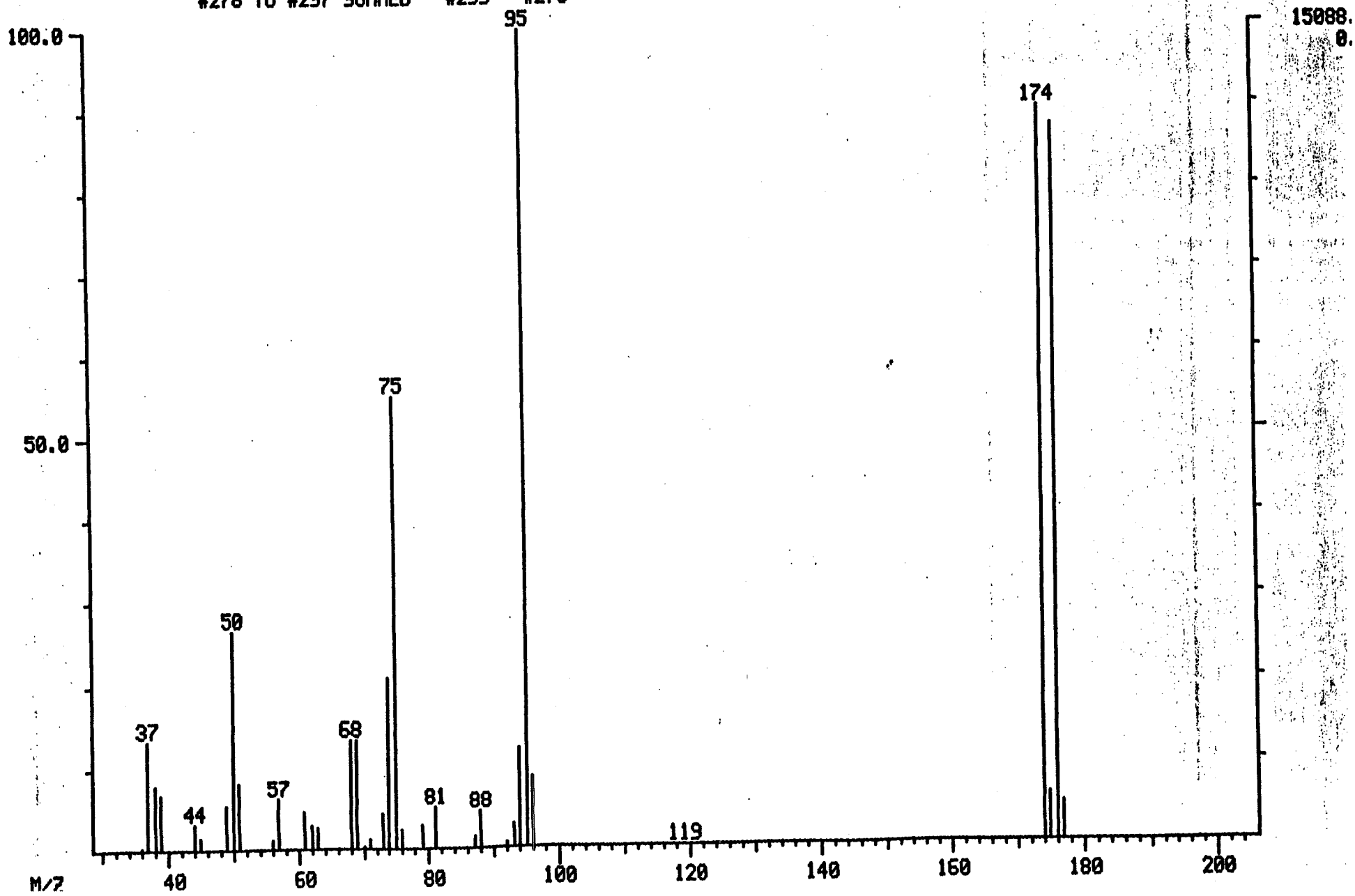
Contract:

m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	3996.	26.5	15.0	40.0	95	26.5	PASS
75	8288.	54.9	30.0	60.0	95	54.9	PASS
95	15088.	100.0	100.0	---	---	100.0	PASS
96	1286.	8.5	5.0	9.0	95	8.5	PASS
173	0.	0.0	---	2.0	174	0.0	PASS
174	13536.	89.7	50.0	---	95	89.7	PASS
175	877.	5.8	5.0	9.0	174	6.5	PASS
176	13216.	87.6	95.0	101.0	174	97.6	PASS
177	705.	4.7	5.0	9.0	176	5.3	PASS

MASS SPECTRUM
02/04/91 7:02:00 + 7:10
SAMPLE: BFB CALIBRATION
CONDS.: I50D
TEMP: 225 DEG. C
#278 TO #297 SUMMED - #299 - #276

DATA: BF020491D3 #287
CALI: BF020491D3 #3

BASE M/Z: 95
RIC: 79104.



Mass List
02/04/91 7:02:00 + 7:10
Sample: BFB CALIBRATION
Conds.: I50D
#278 to #297 summed - #299

Data: BF020491D3 # 287
Cali: BF020491D3 # 3

Base m/z: 95
RIC: 79104.

36 0.00 0.
177

Minima Min Inten: 0.
Maxima # 0

Mass		% RA	Inten.
36?		0.27	40.
37?		13.16	1986.
38?	S	7.71	1164.
39?		6.70	1011.
44?	S	2.92	440.
45?	S	1.46	220.
49?		5.24	791.
50?	S	26.48	3996.
51?		7.95	1200.
56?		1.05	159.
57?	S	5.99	904.
61?		4.31	650.
62?		2.88	434.
63?		2.39	361.
68?		13.35	2014.
69	S	13.20	1992.
70		0.29	44.
71		1.08	163.
73	S	4.04	609.
74	S	20.84	3144.
75	S	54.93	8288.
76		2.29	346.
79		2.70	408.
81		4.90	739.
82		0.10	15.
83		0.10	15.
87		1.35	203.
88	S	4.41	666.
91		0.11	16.
92		0.44	67.
93		2.75	415.
94		12.16	1834.
95	S	100.00	15088.
96	S	8.52	1286.
119		0.11	16.
174	S	89.71	13536.
175		5.81	877.
176	S	87.59	13216.
177		4.67	705.

BROMOFLUOROBENZENE

Tuning Report
02/05/91 7:31:00 + 7:28
Instrument: I50C

Data: BF020591C1 # 299
Cali: BF020591C1 # 3
Analyst: BPB

Base m/z: 95
RIC: 3304.
Acct. No.: 8506-090

#290 to #308 averaged - #320 to #321 - #280 to #281

Case Number:

Laboratory:

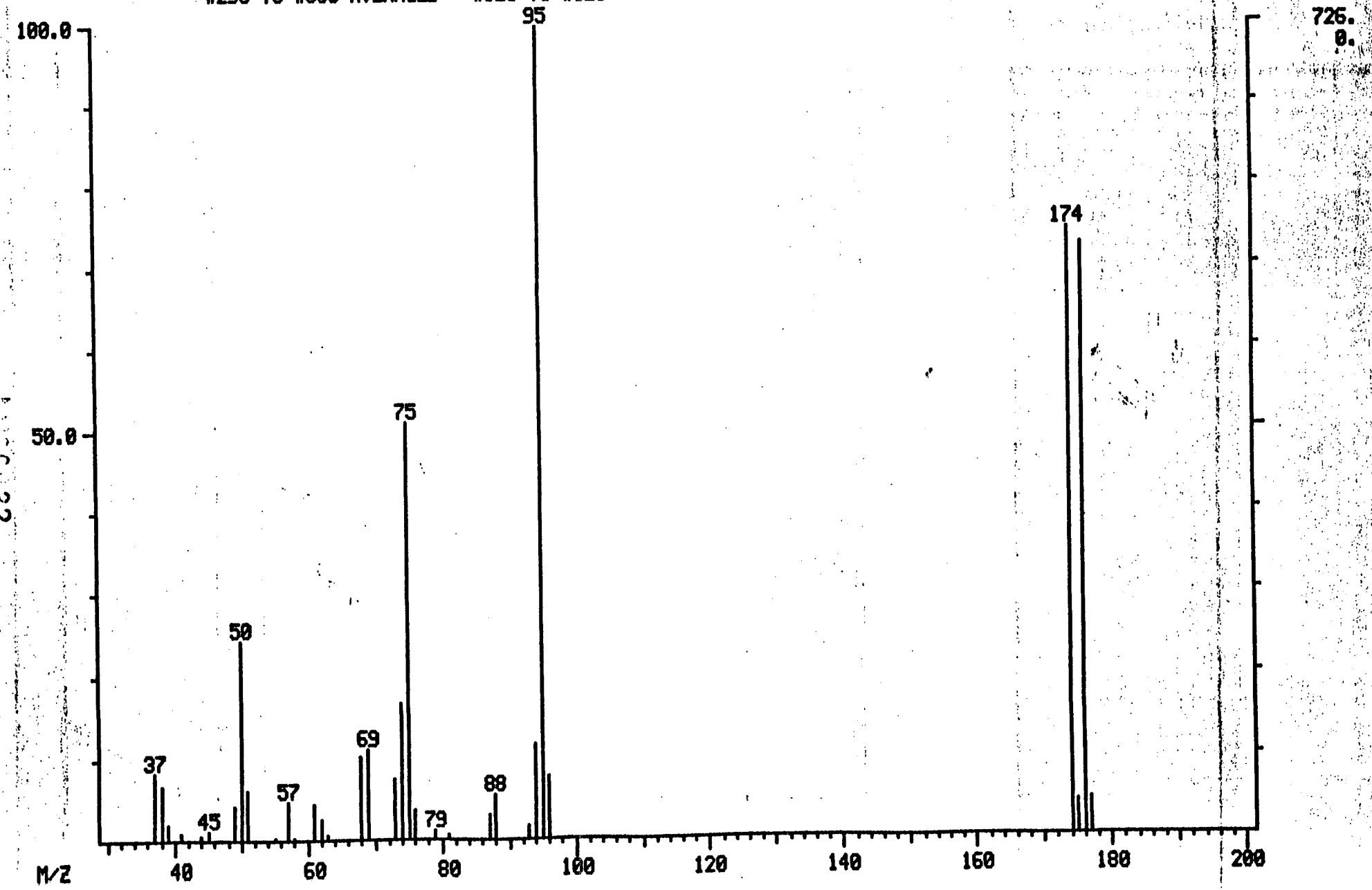
Contract:

m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	177.	24.4	15.0	40.0	95	24.4	PASS
75	372.	51.2	30.0	60.0	95	51.2	PASS
95	726.	100.0	100.0	—	—	100.0	PASS
96	57.	7.9	5.0	9.0	95	7.9	PASS
173	0.	0.0	—	2.0	174	0.0	PASS
174	540.	74.4	50.0	—	95	74.4	PASS
175	31.	4.3	5.0	9.0	174	5.7	PASS
176	525.	72.3	95.0	101.0	174	97.2	PASS
177	32.	4.4	5.0	9.0	176	6.1	PASS

MASS SPECTRUM
02/05/91 7:31:00 + 7:28
SAMPLE: BFB CALIBRATION
CONDS.: I50C
TEMP: 225 DEG. C
#290 TO #308 AVERAGED - #320 TO #321 - #280 TO #281

DATA: BF020591C1 #299
CALI: BF020591C1 #3

BASE M/Z: 95
RIC: 3304.



Mass List Data: BF020591C1 # 299 Base m/z: 95
02/05/91 7:31:00 + 7:28 Cali: BF020591C1 # 3 RIC: 3304.
Sample: BFB CALIBRATION
Conds.: I50C
#290 to #308 averaged - #320 to #321 - #280 to #281

37 0.00 0. Minima Min Inten: 0.
177 Maxima # 0

Mass		% RA	Inten.
37?	S	8.40	61.
38?	S	6.61	48.
39?	S	2.07	15.
41?	S	0.96	7.
44?	S	0.55	4.
45?	S	1.10	8.
49?	S	4.13	30.
50?	S	24.38	177.
51?	S	6.06	44.
55?	S	0.28	2.
57?	S	4.68	34.
58?	S	0.28	2.
61?	S	4.41	32.
62?	S	2.48	18.
63?	S	0.69	5.
68?	S	10.19	74.
69	S	11.16	81.
73	S	7.58	55.
74	S	16.53	120.
75	S	51.24	372.
76	S	3.72	27.
79	S	1.10	8.
81	S	0.69	5.
87	S	3.03	22.
88	S	5.51	40.
93	S	1.79	13.
94	S	11.71	85.
95	S	100.00	726.
96	S	7.85	57.
174	S	74.38	540.
175	S	4.27	31.
176	S	72.31	525.
177	S	4.41	32.

CONTINUING CALIBRATION CHECK
VOLATILE HSL COMPOUNDS

Case No: CALIB Region: Calibration Date: 02/04/91
Contractor: AnalytiKEM-Hou Time: 06:40
Contract No: Laboratory ID: CC020491C1
Instrument ID: I50C Initial Cali. Date: 01/14/91

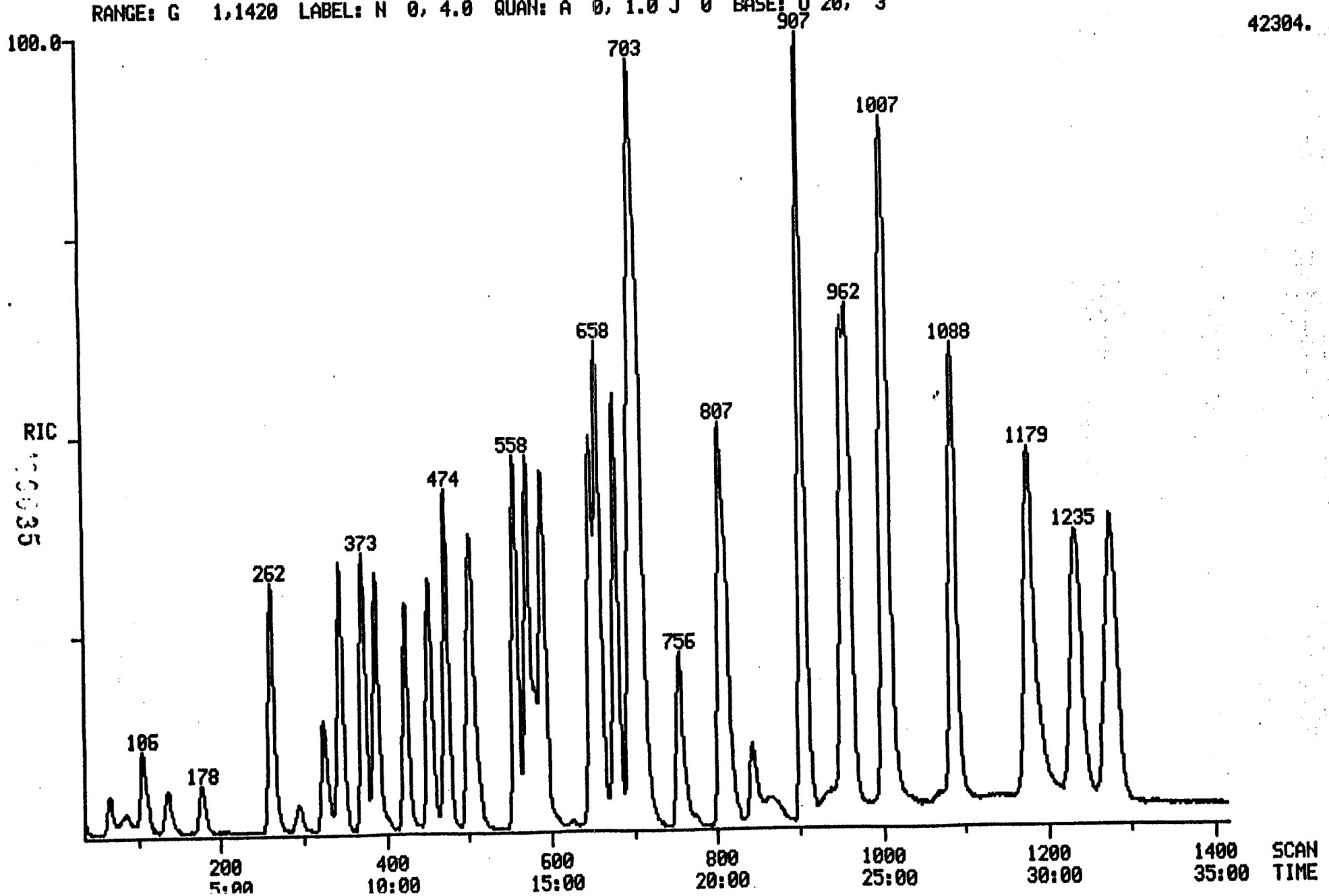
Minimum RF for SPCC is 0.300 (1) Maximum %D for CCC is 25%

Compound	AVE RF	RF(50)	% D	CCC	SPCC
Chloromethane	1.103	0.701	36.4		* *
Bromomethane	1.054	1.021	3.1		
Vinyl Chloride	1.025	0.859	16.2	*	
Chloroethane	0.677	0.705	-4.1		
Methylene Chloride	1.157	1.488	-28.6		
Acetone	0.514	0.583	-13.4		
Carbon Disulfide	2.278	2.690	-18.1		
1,1-Dichloroethene	1.207	1.357	-12.4	*	
1,1-Dichloroethane	2.687	3.142	-16.9		* *
trans-1,2-Dichloroethene	1.313	1.379	-5.0		
Chloroform	3.006	3.440	-14.4	*	
1,2-Dichloroethane	2.230	2.402	-7.7		
2-Butanone	0.044	0.034	22.7		
1,1,1-Trichloroethane	0.585	0.688	-17.6		
Carbon Tetrachloride	0.530	0.629	-18.7		
Vinyl Acetate	0.650	0.547	15.8		
Bromodichloromethane	0.656	0.716	-9.1		
1,2-Dichloropropane	0.387	0.417	-7.8	*	
cis-1,3-Dichloropropene	0.544	0.517	5.0		
Trichloroethene	0.475	0.461	2.9		
Dibromochloromethane	0.677	0.591	12.7		
1,1,2-Trichloroethane	0.399	0.345	13.5		
Benzene	1.020	0.930	8.8		
Trans-1,3-Dichloropropene	0.545	0.486	10.8		
2-Chloroethylvinylether	0.302	0.256	15.2		
Bromoform	0.591	0.448	24.2		* *
4-Methyl-2-Pentanone	0.528	0.334	36.7		
2-Hexanone	0.215	0.276	-28.4		
Tetrachloroethene	0.493	0.490	0.6		
1,1,2,2-Tetrachloroethane	0.681	0.627	7.9		* *
Toluene	0.779	0.754	3.2	*	
Chlorobenzene	1.076	1.022	5.0		* *
Ethylbenzene	0.534	0.524	1.9	*	
Styrene	0.912	0.839	8.0		
Xylene (total)	0.607	0.540	11.0		

RF(50) - Response Factor from daily standard file at 50 ug/l
AVE RF - Average Response Factor from initial calibration Form VI
%D - - - Percent Difference
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Mininum RF for Bromoform is 0.250

RIC
02/04/91 6:40:00
SAMPLE: CONTINUING CALIBRATION
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: CC020491C1 #1 SCANS 35 TO 1415
CALI: CC020491C1 #3



CONTINUING CALIBRATION CHECK
VOLATILE HSL COMPOUNDS

Case No: CALIB Region:
Contractor: AnalytiKEM-Hou
Contract No:
Instrument ID: I50D

Calibration Date: 02/04/91
Time: 07:18
Laboratory ID: CC020491D1
Initial Cali. Date: 01/14/91

Minimum RF for SPCC is 0.300 (1) Maximum %D for CCC is 25%

Compound	AVE RF	RF(50)	% D	CCC	SPCC
Chloromethane	1.400	0.459	67.2		* *
Bromomethane	3.171	1.067	66.4		
Vinyl Chloride	2.055	0.808	60.7	*	
Chloroethane	1.145	0.646	43.6		
Methylene Chloride	1.880	1.384	26.4		
Acetone	1.228	0.591	51.9		
Carbon Disulfide	2.905	2.822	2.9		
1,1-Dichloroethene	1.153	1.407	-22.0	*	
1,1-Dichloroethane	2.371	2.849	-20.2		* *
trans-1,2-Dichloroethene	1.286	1.523	-18.4		
Chloroform	3.045	3.397	-11.6	*	
1,2-Dichloroethane	2.207	2.124	3.8		
2-Butanone	0.052	0.040	23.1		
1,1,1-Trichloroethane	0.638	0.526	17.6		
Carbon Tetrachloride	0.643	0.527	18.0		
Vinyl Acetate	0.436	0.265	39.2		
Bromodichloromethane	0.788	0.659	16.4		
1,2-Dichloropropane	0.305	0.374	-22.6	*	
cis-1,3-Dichloropropene	0.416	0.408	1.9		
Trichloroethene	0.445	0.540	-21.3		
Dibromochloromethane	0.636	0.606	4.7		
1,1,2-Trichloroethane	0.419	0.393	6.2		
Benzene	0.948	0.979	-3.3		
Trans-1,3-Dichloropropene	0.384	0.307	20.1		
2-Chloroethylvinylether	0.191	0.176	7.9		
Bromoform	0.628	0.357	43.2		* *
4-Methyl-2-Pentanone	0.644	0.458	28.9		
2-Hexanone	0.487	0.332	31.8		
Tetrachloroethene	0.527	0.532	-0.9		
1,1,2,2-Tetrachloroethane	0.624	0.619	0.8		* *
Toluene	0.696	0.752	-8.0	*	
Chlorobenzene	1.061	1.073	-1.1		* *
Ethylbenzene	0.526	0.523	0.6	*	
Styrene	0.908	0.697	23.2		
Xylene (total)	0.640	0.521	18.6		

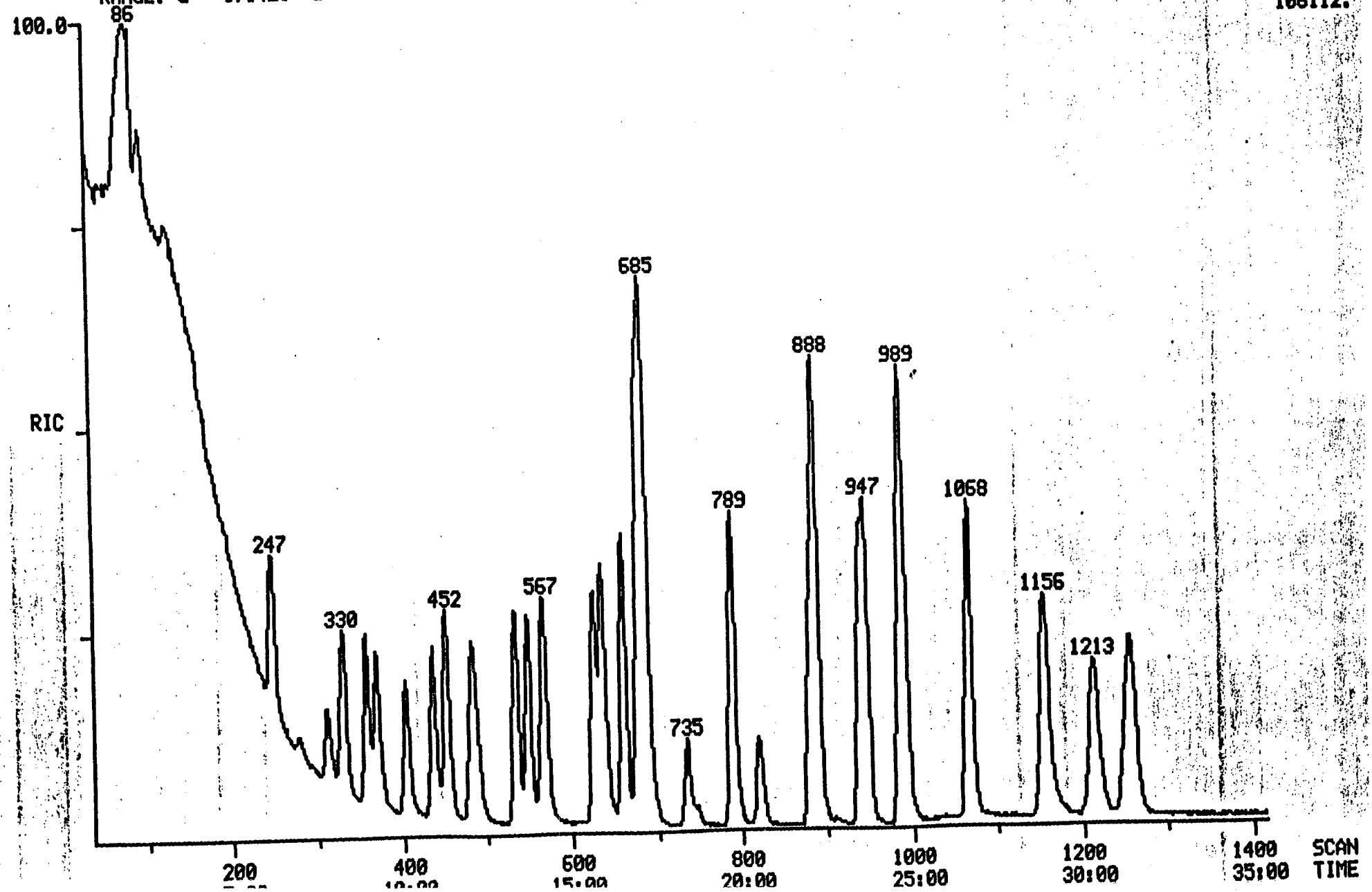
RF(50) - Response Factor from daily standard file at 50 ug/l
AVE RF - Average Response Factor from initial calibration Form VI
%D - - - Percent Difference
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Mininum RF for Bromoform is 0.250

Form VII

RIC
02/04/91 7:18:00
SAMPLE: CONTINUING CALIBRATION
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: CC020491D1 #1 SCANS 35 TO 1415
CALI: CC020491D1 #3

106112.



CONTINUING CALIBRATION CHECK
VOLATILE HSL COMPOUNDS

Case No: CALIB Region:
Contractor: AnalytiKEM-Hou
Contract No:
Instrument ID: I50C

Calibration Date: 02/05/91
Time: 07:46
Laboratory ID: CC020591C1
Initial Cali. Date: 01/14/91

Minimum RF for SPCC is 0.300 (1) Maximum %D for CCC is 25%

Compound	AVE RF	RF(50)	% D	CCC	SPCC
Chloromethane	1.103	1.326	-20.2		* *
Bromomethane	1.054	1.416	-34.3		
Vinyl Chloride	1.025	1.214	-18.4	*	
Chloroethane	0.677	0.915	-35.2		
Methylene Chloride	1.157	1.439	-24.4		
Acetone	0.514	0.586	-14.0		
Carbon Disulfide	2.278	2.165	5.0		
1,1-Dichloroethene	1.207	1.246	-3.2	*	
1,1-Dichloroethane	2.687	2.845	-5.9		* *
trans-1,2-Dichloroethene	1.313	1.275	2.9		
Chloroform	3.006	3.101	-3.2	*	
1,2-Dichloroethane	2.230	2.366	-6.1		
2-Butanone	0.044	0.040	9.1		
1,1,1-Trichloroethane	0.585	0.613	-4.8		
arbon Tetrachloride	0.530	0.553	-4.3		
inyl Acetate	0.650	0.446	31.4		
Bromodichloromethane	0.656	0.641	2.3		
1,2-Dichloropropane	0.387	0.380	1.8	*	
cis-1,3-Dichloropropene	0.544	0.481	11.6		
Trichloroethene	0.475	0.421	11.4		
Dibromochloromethane	0.677	0.543	19.8		
1,1,2-Trichloroethane	0.399	0.328	17.8		
Benzene	1.020	0.847	17.0		
Trans-1,3-Dichloropropene	0.545	0.438	19.6		
2-Chloroethylvinylether	0.302	0.241	20.2		
Bromoform	0.591	0.416	29.6		* *
4-Methyl-2-Pentanone	0.528	0.324	38.6		
2-Hexanone	0.215	0.164	23.7		
Tetrachloroethene	0.493	0.459	6.9		
1,1,2,2-Tetrachloroethane	0.681	0.597	12.3		* *
Toluene	0.779	0.689	11.6	*	
Chlorobenzene	1.076	0.957	11.1		* *
Ethylbenzene	0.534	0.474	11.2	*	
Styrene	0.912	0.693	24.0		
Xylene (total)	0.607	0.447	26.4		

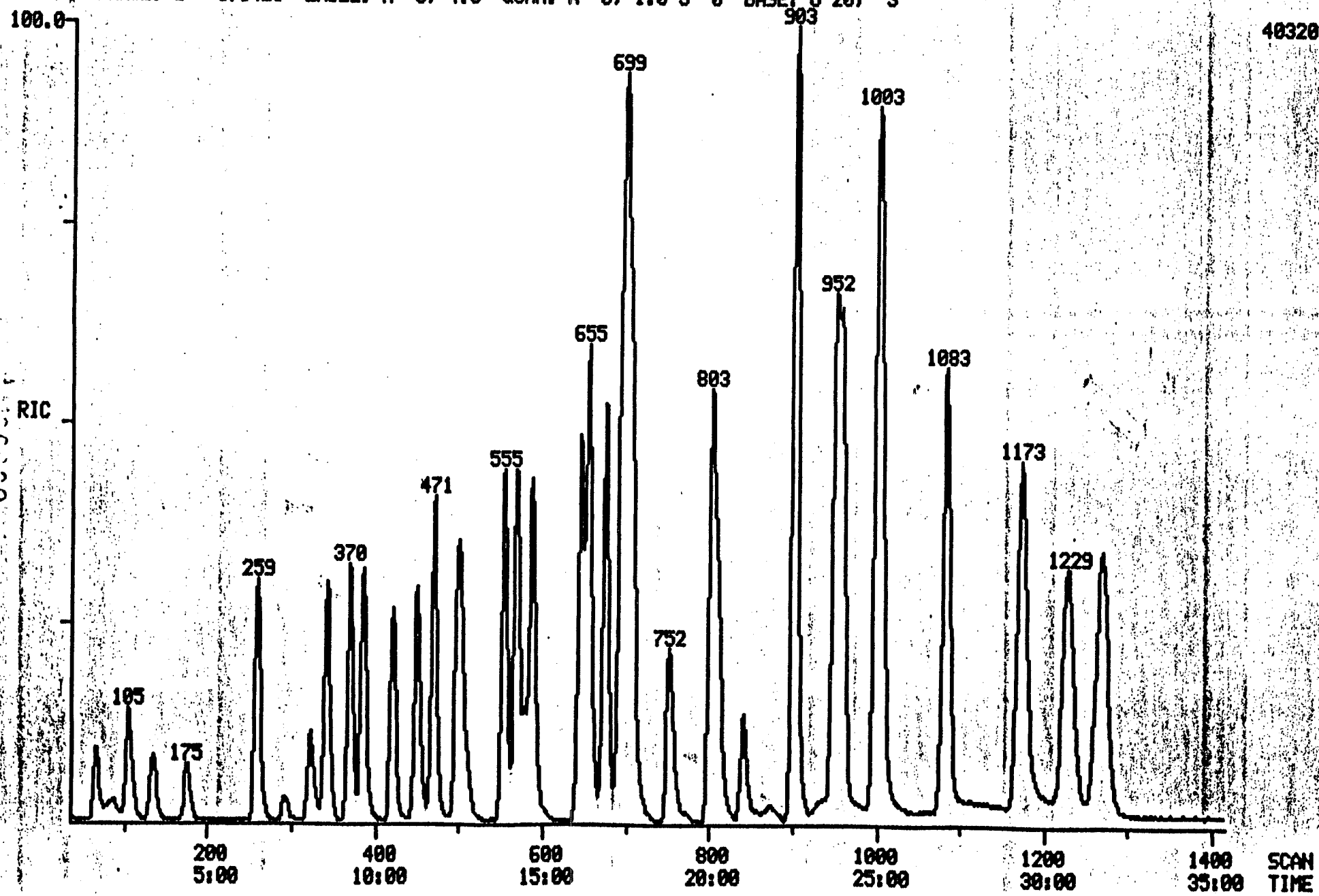
RF(50) - Response Factor from daily standard file at 50 ug/l
AVE RF - Average Response Factor from initial calibration Form VI
%D - - - Percent Difference
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Mininum RF for Bromoform is 0.250

Form VII

RIC
02/05/91 7:46:00
SAMPLE: CONTINUING CALIBRATION
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: CC020591C1 #1
CALI: CC020591C1 #3

SCANS 35 TO 1415



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: MB020491C1
Client Sample ID: MB020491C1

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: 100.0

Date Extracted: 02/04/91
Date Analyzed: 02/04/91
Dilution Factor: 1.0

VOLATILE COMPOUNDS

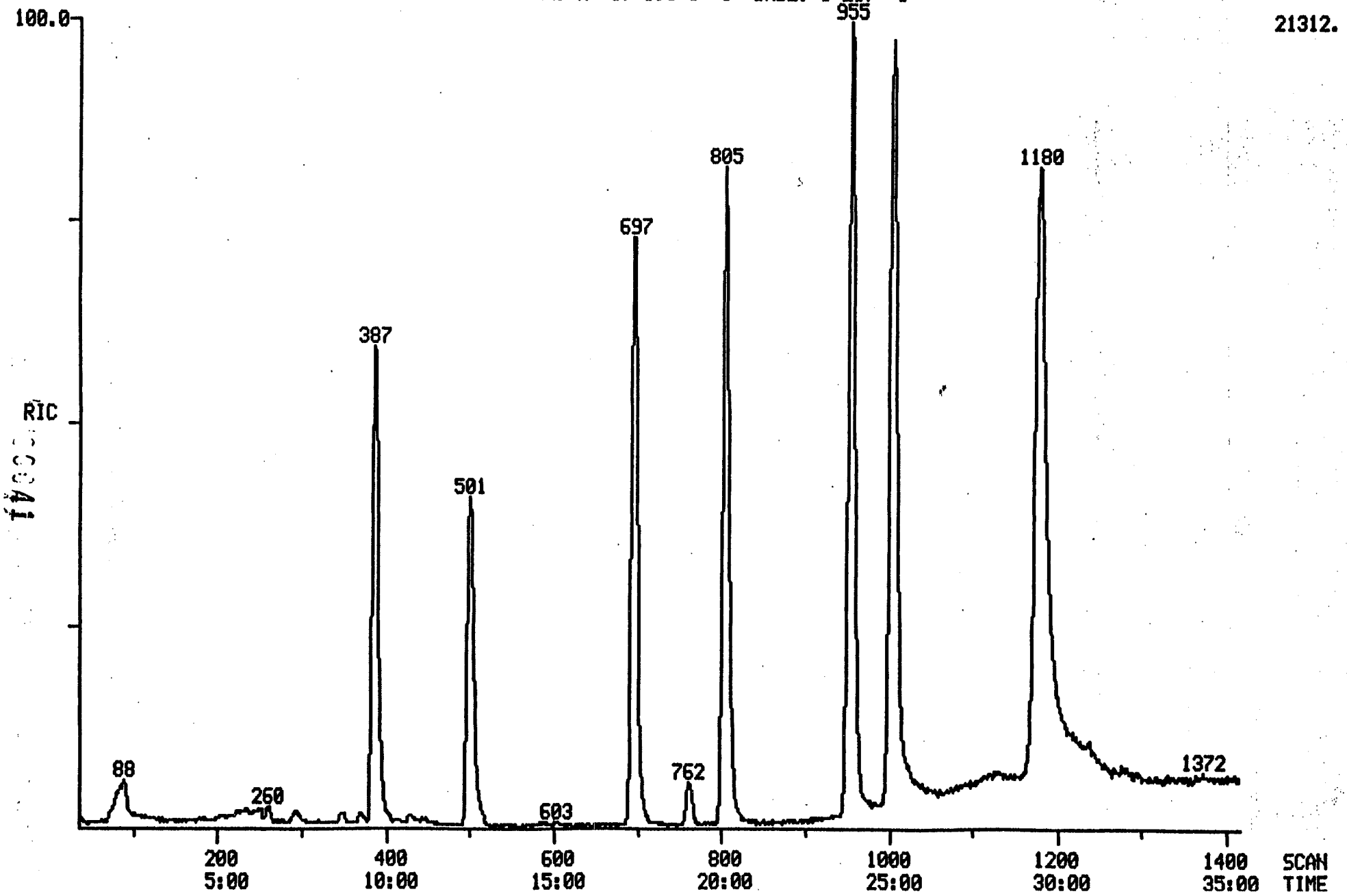
CAS Number		UG/L	
74-87-3	Chloromethane	10	<
74-83-9	Bromomethane	10	<
75-01-4	Vinyl Chloride	10	<
75-00-3	Chloroethane	10	<
75-09-2	Methylene Chloride	5	<
67-64-1	Acetone	18	
75-15-0	Carbon Disulfide	5	<
75-35-4	1,1-Dichloroethene	5	<
75-34-3	1,1-Dichloroethane	5	<
156-60-5	trans-1,2-Dichloroethene	5	<
67-66-3	Chloroform	5	<
107-06-2	1,2-Dichloroethane	5	<
78-93-3	2-Butanone	10	<
71-55-6	1,1,1-Trichloroethane	5	<
56-23-5	Carbon Tetrachloride	5	<
108-05-4	Vinyl Acetate	5	<
[illegible]-27-4	Bromodichloromethane	5	<

CAS Number		UG/L	
78-87-5	1,2-Dichloropropane	5	<
10061-01-5	cis-1,3-Dichloropropene	5	<
79-01-6	Trichloroethene	5	<
124-48-1	Dibromochloromethane	5	<
79-00-5	1,1,2-Trichloroethane	5	<
71-43-2	Benzene	5	<
10061-02-6	Trans-1,3-Dichloropropene	5	<
110-75-8	2-Chloroethylvinylether	10	<
75-25-2	Bromoform	5	<
108-10-1	4-Methyl-2-Pentanone	10	<
591-78-6	2-Hexanone	10	<
127-18-4	Tetrachloroethene	5	<
79-34-5	1,1,2,2-Tetrachloroethane	5	<
108-88-3	Toluene	5	<
108-90-7	Chlorobenzene	5	<
100-41-4	Ethylbenzene	5	<
100-42-5	Styrene	5	<
1330-20-7	Xylene (total)	5	<

The Lab ID for data on this page is MB020491C1.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 7:33:00
SAMPLE: METHOD BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: MB020491C1 #1 SCANS 35 TO 1415
CALI: MB020491C1 #3



ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	AnalytiKEM-Hou	Concentration:	LOW	Date Extracted:	02/04/91
Lab Sample ID:	MB020491D1	Sample Matrix:	SOIL	Date Analyzed:	02/04/91
Client Sample ID:	MB020491D1	Percent Moisture:	100.0	Dilution Factor:	1.0

VOLATILE COMPOUNDS

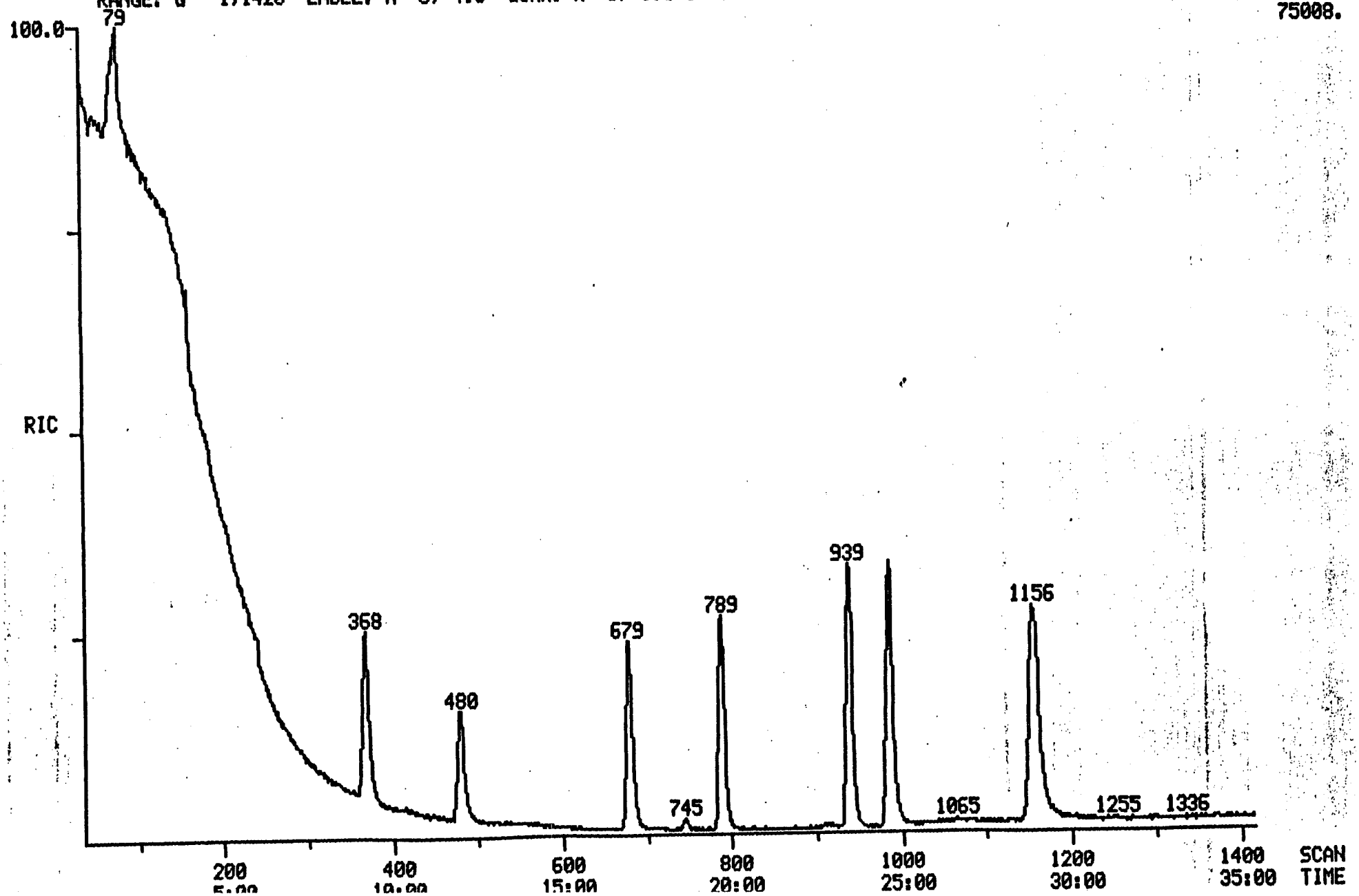
CAS Number		UG/KG		CAS Number		UG/KG	
74-87-3	Chloromethane	10	<	78-87-5	1,2-Dichloropropane	5	<
74-83-9	Bromomethane	10	<	10061-01-5	cis-1,3-Dichloropropene	5	<
75-01-4	Vinyl Chloride	10	<	79-01-6	Trichloroethene	5	<
75-00-3	Chloroethane	10	<	124-48-1	Dibromochloromethane	5	<
75-09-2	Methylene Chloride	5	<	79-00-5	1,1,2-Trichloroethane	5	<
67-64-1	Acetone	10	<	71-43-2	Benzene	5	<
75-15-0	Carbon Disulfide	5	<	10061-02-6	Trans-1,3-Dichloropropene	5	<
75-35-4	1,1-Dichloroethene	5	<	110-75-8	2-Chloroethylvinylether	10	<
75-34-3	1,1-Dichloroethane	5	<	75-25-2	Bromoform	5	<
156-60-5	trans-1,2-Dichloroethene	5	<	108-10-1	4-Methyl-2-Pentanone	10	<
67-66-3	Chloroform	5	<	591-78-6	2-Hexanone	10	<
107-06-2	1,2-Dichloroethane	5	<	127-18-4	Tetrachloroethene	5	<
78-93-3	2-Butanone	10	<	79-34-5	1,1,2,2-Tetrachloroethane	5	<
71-55-6	1,1,1-Trichloroethane	5	<	108-88-3	Toluene	5	<
56-23-5	Carbon Tetrachloride	5	<	108-90-7	Chlorobenzene	5	<
108-05-4	Vinyl Acetate	10	<	100-41-4	Ethylbenzene	5	<
75-27-4	Bromodichloromethane	5	<	100-42-5	Styrene	5	<
				1330-20-7	Xylene (total)	5	<

The Lab ID for data on this page is MB020491D1.

< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/04/91 8:29:00
SAMPLE: METHOD BLANK
CONDS.: I50D
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: MB020491D1 #1 SCANS 35 TO 1415
CALI: MB020491D1 #3



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: AnalytiKEM-Hou
Lab Sample ID: MB020591C1
Client Sample ID: MB020591C1

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: 100.0

Date Extracted: 02/05/91
Date Analyzed: 02/05/91
Dilution Factor: 1.0

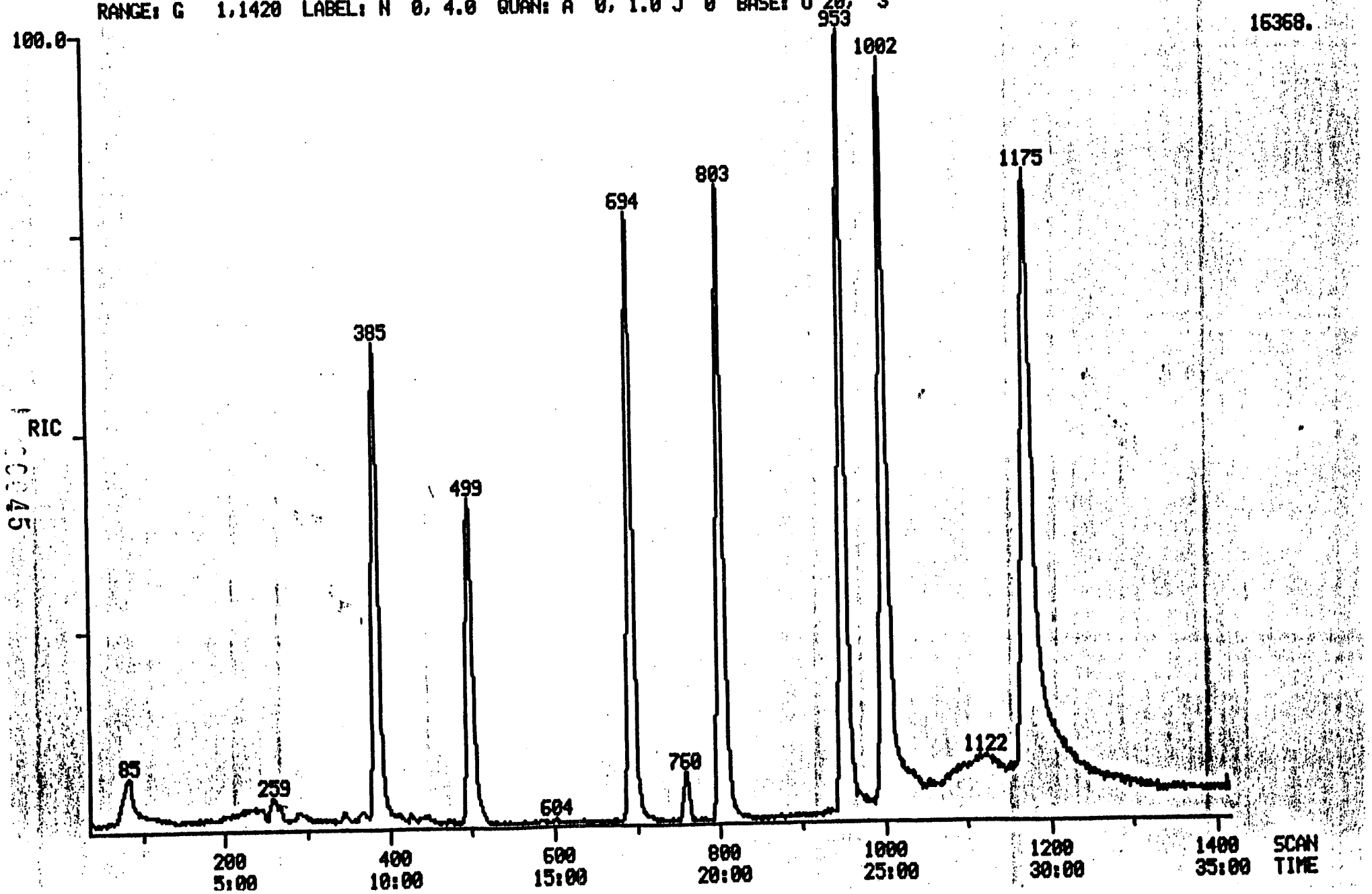
VOLATILE COMPOUNDS

CAS Number		UG/L		CAS Number		UG/L	
74-87-3	Chloromethane	10	<	78-87-5	1,2-Dichloropropane	5	<
74-83-9	Bromomethane	10	<	10061-01-5	cis-1,3-Dichloropropene	5	<
75-01-4	Vinyl Chloride	10	<	79-01-6	Trichloroethene	5	<
75-00-3	Chloroethane	10	<	124-48-1	Dibromochloromethane	5	<
75-09-2	Methylene Chloride	5	<	79-00-5	1,1,2-Trichloroethane	5	<
67-64-1	Acetone	17		71-43-2	Benzene	5	<
75-15-0	Carbon Disulfide	5	<	10061-02-6	Trans-1,3-Dichloropropene	5	<
75-35-4	1,1-Dichloroethene	5	<	110-75-8	2-Chloroethylvinylether	10	<
75-34-3	1,1-Dichloroethane	5	<	75-25-2	Bromoform	5	<
156-60-5	trans-1,2-Dichloroethene	5	<	108-10-1	4-Methyl-2-Pentanone	10	<
67-66-3	Chloroform	5	<	591-78-6	2-Hexanone	10	<
107-06-2	1,2-Dichloroethane	5	<	127-18-4	Tetrachloroethene	5	<
78-93-3	2-Butanone	10	<	79-34-5	1,1,2,2-Tetrachloroethane	5	<
71-55-6	1,1,1-Trichloroethane	5	<	108-88-3	Toluene	5	<
56-23-5	Carbon Tetrachloride	5	<	108-90-7	Chlorobenzene	5	<
108-05-4	Vinyl Acetate	5	<	100-41-4	Ethylbenzene	5	<
75-27-4	Bromodichloromethane	5	<	100-42-5	Styrene	5	<
				1330-20-7	Xylene (total)	5	<

The Lab ID for data on this page is MB020591C1.
< - Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

RIC
02/05/91 8:54:00
SAMPLE: METHOD BLANK
CONDS.: I50C
RANGE: G 1,1420 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: MB020591C1 #1 SCANS 35 TO 1415
CALI: MB020591C1 #3



SOIL SURROGATE PERCENT RECOVERY SUMMARY
(Page 1)

Case No. A5421 Contract Laboratory AnalytiKEM-Hou Contract No.
Low XXX Medium

	VOLATILE				SEMI-VOLATILE							PEST
	Toluene-d8	Bromofluorobenzene	1,2-Dichloroethane-d4	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14	Benzene-d6		Phenol-d5	2-Fluorophenol	2,4,6-Tribromophenol	Dibutylchlorendat*
SMO TRAFFIC NO.	81 117	74 121	70 121	20 140	20 140	20 150	75 125		20 122	24 133	10 114	20 150
B-2B-E-20	117	87	99				97					
B-2B-E-20-M	114	88	97				102					
B-2B-E-20-M	114	85	99				100					
B-1B-1-6	102	97	109				110					
B-1B-B-5	114	80	81				99					
B-1B-C-10	110	86	93				104					
B-1B-D-15	111	89	86				107					
B-1B-E-20	115	79	88				99					
B-2B-A-6	110	90	94				98					
B-2B-B-5	116	83	100				98					
B-2B-C-10	110	96	93				98					
-2B-D-15	112	85	95				93					

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS
** ADVISORY LIMITS ONLY

Volatiles: 0 out of 48; outside of QC limi
Semi-Volatiles: out of 72; outside of QC limi
Pesticides: out of 12; outside of QC limi

Comments:

FORM II

WATER SURROGATE PERCENT RECOVERY SUMMARY
(Page 1)

Case No. A5421 Contract Laboratory AnalytiKEM-Hou Contract No.

	VOLATILE				SEMI-VOLATILE							PEST
	Toluene-d8	Bromofluorobenzene	1,2-Dichloroethane-d4	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14	Benzene-d6		Phenol-d5	2-Fluorophenol	2,4,6-Tribromophenol	Dibutylchlorendat*
SMO TRAFFIC NO.	86	85	77	41	44	38	75		15	23	10	48
	119	121	120	120	119	128	125		103	121	130	136
EQ-BLANK	98	102	112				103					
TRIP-BLANK	104	103	106				103					

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS
** ADVISORY LIMITS ONLY

Volatiles: 0 out of 8; outside of QC limi
Semi-Volatiles: out of 12; outside of QC limi
Pesticides: out of 2; outside of QC limi

Comments:

FORM II

INITIAL CALIBRATION DATA
VOLATILE HSL COMPOUNDS

Case No: CAL Region: Instrument ID: I50C
Contractor: ENSR LAB-HOU Calibration Date: 01/14/91
Contract No:

Min AVE RF for SPCC is 0.300 (1) Max %RSD for CCC is 30%

Laboratory ID	IC0114020C1	IC0114050C1	IC0114100C1	IC0114150C1	IC0114200C1			CCC*
Compound	RF(20)	RF(50)	RF(100)	RF(150)	RF(200)	AVE RF	% RSD	SPCC**
Chloromethane	1.207	1.126	1.025	1.036	1.119	1.103	6.8	* *
Bromomethane	1.368	1.066	1.096	0.957	0.785	1.054	20.2	
Vinyl Chloride	1.166	0.987	1.026	0.995	0.950	1.025	8.1	*
Chloroethane	0.730	0.676	0.688	0.643	0.649	0.677	5.2	
Methylene Chloride	1.336	1.132	0.983	1.132	1.203	1.157	11.1	
Acetone	0.717	0.484	0.378	0.523	0.469	0.514	24.4	
Carbon Disulfide	2.166	2.015	2.044	2.544	2.621	2.278	12.5	
1,1-Dichloroethene	1.155	1.277	1.223	1.179	1.201	1.207	3.9	*
1,1-Dichloroethane	2.508	2.788	2.808	2.611	2.722	2.687	4.7	* *
trans-1,2-Dichloroethene	1.221	1.380	1.341	1.268	1.353	1.313	5.0	
Chloroform	2.854	3.147	3.135	2.900	2.995	3.006	4.4	*
1,2-Dichloroethane	2.009	2.299	2.366	2.231	2.245	2.230	6.0	
2-Butanone	0.034	0.047	0.048	0.048	0.042	0.044	13.7	
1,1,1-Trichloroethane	0.583	0.610	0.649	0.537	0.548	0.585	7.8	
Carbon Tetrachloride	0.493	0.563	0.589	0.499	0.508	0.530	8.1	
Vinyl Acetate	0.536	0.719	0.769	0.398	0.827	0.650	27.4	
Bromodichloromethane	0.581	0.676	0.707	0.631	0.685	0.656	7.7	
1,2-Dichloropropane	0.331	0.401	0.400	0.374	0.427	0.387	9.4	*
cis-1,3-Dichloropropene	0.418	0.540	0.597	0.555	0.612	0.544	14.1	
Trichloroethene	0.414	0.486	0.498	0.489	0.488	0.475	7.2	
Dibromochloromethane	0.583	0.693	0.726	0.681	0.700	0.677	8.1	
1,1,2-Trichloroethane	0.343	0.425	0.422	0.395	0.411	0.399	8.4	
Benzene	0.937	1.075	1.089	0.985	1.015	1.020	6.2	
Trans-1,3-Dichloropropene	0.500	0.528	0.579	0.540	0.576	0.545	6.1	
2-Chloroethylvinylether	0.219	0.300	0.317	0.323	0.351	0.302	16.5	
Bromoform	0.444	0.552	0.659	0.648	0.654	0.591	15.8	* *
4-Methyl-2-Pentanone	0.257	0.386	0.569	0.694	0.736	0.528	38.6	
2-Hexanone	0.054	0.096	0.245	0.365	0.313	0.215	63.0	
Tetrachloroethene	0.456	0.502	0.514	0.498	0.496	0.493	4.4	
1,1,2,2-Tetrachloroethane	0.536	0.684	0.702	0.708	0.773	0.681	12.9	* *
Toluene	0.714	0.724	0.844	0.788	0.824	0.779	7.5	*
Chlorobenzene	1.006	1.089	1.145	1.068	1.074	1.076	4.6	* *
Ethylbenzene	0.502	0.541	0.569	0.524	0.535	0.534	4.6	*
Styrene	0.775	0.957	0.980	0.906	0.941	0.912	8.9	
Xylene (total)	0.584	0.643	0.626	0.571	0.610	0.607	4.9	

Response Factor (number is the amount of ug/L)
AVE RF - Average Response Factor
%RSD - - Percent Relative Standard Deviation
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Minimum AVE RF for Bromoform is 0.250

Form VI

INITIAL CALIBRATION DATA
VOLATILE HSL COMPOUNDS

Case No: CAL
Contractor: ENSR LAB-HOU
Contract No:

Region:

Instrument ID: I50D
Calibration Date: 01/14/91

Min AVE RF for SPCC is 0.300 (1) Max %RSD for CCC is 30%

Laboratory ID	IC0114020D1	IC0114050D1	IC0114100D1	IC0114150D1	IC0114200D1			CCC*
Compound	RF(20)	RF(50)	RF(100)	RF(150)	RF(200)	AVE RF	% RSD	SPCC**
Chloromethane	1.596	1.499	1.342	1.322	1.241	1.400	10.3	* *
Bromomethane	2.802	3.165	3.677	3.036	3.176	3.171	10.1	
Vinyl Chloride	1.941	2.210	2.231	2.035	1.857	2.055	8.0	*
Chloroethane	1.091	1.181	1.213	1.125	1.113	1.145	4.4	
Methylene Chloride	1.577	2.473	1.525	2.317	1.510	1.880	25.2	
Acetone	1.034	3.002	0.745	0.696	0.661	1.228	81.7	
Carbon Disulfide	3.211	3.027	2.790	2.754	2.742	2.905	7.1	
1,1-Dichloroethene	1.076	1.116	1.140	1.190	1.244	1.153	5.7	*
1,1-Dichloroethane	2.325	2.382	2.350	2.282	2.518	2.371	3.8	* *
trans-1,2-Dichloroethene	1.201	1.282	1.338	1.284	1.324	1.286	4.2	
Chloroform	3.164	3.131	2.916	2.865	3.150	3.045	4.7	*
1,2-Dichloroethane	2.196	2.316	2.068	2.132	2.322	2.207	5.1	
2-Butanone	0.017	0.122	0.042	0.038	0.039	0.052	78.7	
1,1,1-Trichloroethane	0.715	0.617	0.627	0.499	0.734	0.638	14.7	
Carbon Tetrachloride	0.725	0.585	0.662	0.498	0.747	0.643	16.0	
Vinyl Acetate	0.363	0.923	0.317	0.274	0.303	0.436	62.9	
Bromodichloromethane	0.844	0.630	0.847	0.667	0.951	0.788	17.1	
1,2-Dichloropropane	0.244	0.284	0.296	0.287	0.415	0.305	21.2	*
cis-1,3-Dichloropropene	0.262	0.364	0.414	0.422	0.618	0.416	31.2	
Trichloroethene	0.391	0.429	0.446	0.410	0.547	0.445	13.7	
Dibromochloromethane	0.454	0.609	0.665	0.644	0.807	0.636	19.9	
1,1,2-Trichloroethane	0.431	0.452	0.402	0.365	0.445	0.419	8.5	
Benzene	1.021	0.956	0.946	0.830	0.987	0.948	7.6	
Trans-1,3-Dichloropropene	0.209	0.349	0.419	0.431	0.511	0.384	29.5	
2-Chloroethylvinylether	0.083	0.203	0.211	0.215	0.242	0.191	32.5	
Bromoform	0.369	0.646	0.638	0.672	0.813	0.628	25.7	* *
4-Methyl-2-Pentanone	0.477	0.958	0.581	0.601	0.603	0.644	28.4	
2-Hexanone	0.334	0.773	0.435	0.426	0.466	0.487	34.4	
Tetrachloroethene	0.489	0.520	0.531	0.522	0.573	0.527	5.7	
1,1,2,2-Tetrachloroethane	0.421	0.625	0.643	0.681	0.751	0.624	19.8	* *
Toluene	0.699	0.706	0.693	0.666	0.713	0.696	2.5	*
Chlorobenzene	1.107	1.041	1.034	1.003	1.119	1.061	4.7	* *
Ethylbenzene	0.453	0.525	0.537	0.533	0.582	0.526	8.8	*
Styrene	0.806	0.923	0.851	0.915	1.043	0.908	9.9	
Xylene (total)	0.556	0.697	0.616	0.625	0.707	0.640	9.8	

Response Factor (number is the amount of ug/L)
AVE RF - Average Response Factor
%RSD - - Percent Relative Standard Deviation
CCC - - Calibration Check Compounds (*)
SPCC - - System Performance Check Compounds (**)
(1) - - Minimum AVE RF for Bromoform is 0.250

Form VI