REPORT

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SOIL GAS SURVEY

REMEDIAL CLEANUP TREATABILITY STUDY
MILLCREEK SUPERFUND SITE
ERIE, PENNSYLVANIA

U.S. Army Corps of Engineers
Omaha District

August 1988
Project: 0285-23-1

MALCOLM PIRNIE

ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

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MALCOLM PIRNIE, INC.
ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

September 6, 1988

U. S. Army Engineer District, Omaha
215 N. 17th Street
Omaha, Nebraska 68102-4978

Attention: CEMRO-ED-EC (Capt. Christopher J. Young)

Re: Millcreek Remedial Cleanup Treatability Study
(Contract No. DACW45-88-C0010)
Soil Gas Survey Report

Gentlemen:

We are submitting five copies (5) of the Soil Gas Survey Report. This report presents the results of the December 1987 field effort to characterize the extent of contamination at the Millcreek site using an in-situ analysis of soil gas for volatile organic compounds. The report also includes the results of the soil gas resampling conducted in March 1988 to confirm the December 1987 results. In addition, the rationale for the location of soil boring and additional monitoring wells based on a qualitative assessment of the soil gas survey is presented in the report.

Very truly yours,

MALCOLM PIRNIE, INC.

Dharmarajan Iyer

Dharmarajan R. Iyer, Ph.D.
Project Manager

Enclosures

c: Mr. Jeffrey Pike, USEPA (2 copies)
Mr. Richard Brownell, P.E.
Mr. Paul H. Werthman, P.E.
Mr. Douglas Daley

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PROJECT 0285-23-1

AUGUST 1988

MALCOLM PIRNIE, INC.
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Orchard Park, New York 14127

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1.0 INTRODUCTION

1.1 BACKGROUND

The Millcreek Superfund Site is located in the Town of Millcreek, Erie, Pennsylvania. The site is known locally as the former Harper Street dump. This 75-acre former landfill ceased operations in 1981 when it was closed by the Pennsylvania Department of Environmental Resources (PADER). Subsequently, the landfill was added to the National Priority List (NPL) under the jurisdiction of the U.S. Environmental Protection Agency (EPA). In August, 1985, a Remedial Investigation (RI) and Feasibility Study (FS) were completed at the site by the EPA.

Based on the results of the RI, the recommendations of the FS and the EPA's Record of Decision (ROD), the U.S. Army Corps of Engineers (COE) contracted with Malcolm Pirnie, Inc. to perform a remedial cleanup treatability study of the landfill. As part of the initial field investigation, a soil gas survey was to be performed by Malcolm Pirnie and its subcontractor, Tracer Research Corporation (TRC) of Tucson, Arizona, in December, 1987.

The primary objective of this soil gas survey was to qualitatively define the horizontal extent of the volatile organic contamination of the shallow aquifer in and around the landfill. The results of this survey were to be used to select locations for installing new monitoring wells and collecting subsurface soil samples during a detailed soil and ground water investigation scheduled for Spring, 1988.

1.2 SCOPE OF WORK

A Work Plan was prepared by Malcolm Pirnie to determine the level of effort necessary to execute the soil gas investigation. The Work Plan detailed the sampling locations, method of sample collection, analytical methods, QA/QC procedures and sampling handling procedures which would be used for the investigation. The Work Plan was approved by the COE prior to commencing the soil gas survey.

In accordance with the Work Plan, 45 locations were selected for sampling at the site. The locations were selected such that 15 samples were to be

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collected within the limits of the suspected ground water contaminant plume identified in the RI, while 15 were located in suspected contaminant disposal areas on the site. The remaining 15 samples were to be collected from potentially "clean" areas downgradient of the site. The final sampling locations are shown in Figure 1.

Samples were to be collected at each location using a gas extraction technique. A portable gas chromatograph would be available to analyze each sample immediately after collection. This technique would provide a real-time qualitative description of the presence of and extent of contamination of the ground water or soil. The flexibility of this technique would also enable Malcolm Pirnie to modify the sampling plan according to the analytical results.

Split samples were scheduled for collection at every fifth sample location. The split samples would be collected in stainless steel gas cylinders and submitted to an approved offsite laboratory for quantitative analysis. This would also provide a cross-check on the analytical results obtained in the field.

A site-specific Health and Safety Plan (HSP) was also prepared by Malcolm Pirnie for the soil gas investigation. The COE approved the HSP prior to beginning the soil gas investigation. The purpose of the HSP was to ensure that the health and welfare of the investigative personnel and nearby residents were protected during the field investigation. The HSP described the hazards at the site, the levels of personal protection required for specific tasks, emergency response procedures and atmospheric monitoring techniques.

In response to COE concerns regarding the validity of the data obtained from the soil gas survey, Malcolm Pirnie resampled several locations in March, 1988. This sampling was performed to confirm and validate the previously obtained data. All activities were to be performed in accordance with the methods and procedures described in the Work Plan. The results of this resampling are also presented in this report.

2.0 SAMPLING AND ANALYSIS

2.1 SITE CONDITIONS

In response to concern about the effect of high ground water levels on the organic vapor concentrations, the site was inspected by Dr. Dharmarajan R.

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Iyer and Mr. Douglas J. Daley of Malcolm Pirnie on December 11, 1987 to obtain ground water elevations in selected on-site wells. The 45 sampling locations were also staked at this time. Ground water levels were measured with an electronic water level indicator and organics concentrations in the well casings were monitored using a Photovac TIP. In addition, ground conditions in the residential areas were visually observed and property owners were informed of the sampling program with assistance from Mr. Art Dietish, Millcreek Town Supervisor.

The results of this initial screening are presented in Table 1. The wellhead measurements of the total organic vapor concentration indicated the possible presence of organic contamination of the ground water at these wells. The water table ranged from 1.6 to 6.7 feet below the ground surface within the wells measured.

Subsequent phone conversations with the COE and TRC were held concerning the relatively shallow ground water table. According to TRC's experience at other sites, representative soil gas samples could be obtained under conditions where the air-filled soil porosity was as low as 5 percent. The ground water elevations were felt to be typical of the time of year. Also, the average monthly precipitation is uniform throughout the year, based on data in the RI/FS report. As it was likely that the ground water levels would not decline until late spring of 1988, it would not have been feasible to delay the soil gas survey because of the elevated ground water conditions. A delay in the soil gas survey would have delayed the remainder of the field investigation, thereby upsetting the project schedule and the implementation of the remedial actions. Therefore, in the interest of maintaining the project schedule, Malcolm Pirnie decided to proceed with the soil gas sampling program.

2.1.1 Weather

On December 14, the first day of the sampling, there was about 1 to 2 inches of wet snow cover, with a heavy cloud cover but no precipitation. In spite of the snow cover, soil gas samples were obtained at least 2 feet below the ground surface, to a maximum of 6 feet.

On December 15, the weather was stormy, with light occasional rain. The site had received heavy rainfall the previous night. Due to the rainfall and

possible muddy conditions on the site, the sampling on this day was limited to locations north of 12th Street where soil gas samples could be obtained at 3 to 5.5 feet below ground surface. The remaining locations were sampled at depths of 1.5 to 4.5 feet, on December 16 on which day the area received significant snowfall.

2.2 SAMPLING

The soil gas survey was performed by Tracer Research Corporation (TRC) of Tucson, Arizona under the supervision of Malcolm Pirnie's Health and Safety Officer (Mr. Mark Hanna) and Project Engineer (Dr. Dharmarajan R. Iyer). The TRC field team consisted of a field geologist (Mr. Steve Camp) and an analytical chemist (Mr. Scott Cherba). The analytical chemist had been through several TRC training sessions and had several months of on-the-job training as an apprentice chemist prior to being assigned to the chemist position. All analytical work was reviewed by TRC's Senior Analytical Chemist at the completion of the job. The TRC crew obtained samples and operated the analytical equipment. All personnel had been trained in accordance with OSHA requirements for work on a hazardous waste site.

TRC utilized an analytical field van equipped with two gas chromatographs (GC) and two Spectra Physics SP4270 computing integrators. Two built-in generators provided electrical power for operating the GC equipment and field equipment. A specialized hydraulic mechanism consisting of a set of jaws and two hydraulic cylinders was used to drive and withdraw the sampling probes to and from the desired depth. An electric hammer was used for pounding the probe past cobbles and hard soil. Probes were constructed of 7-foot long 3/4" diameter steel pipe fitted with detachable points.

The soil gas samples were collected by driving the hollow steel probe to a depth of between 1.5 and 6 feet below grade. Only locations where the water table was at least 1.5 feet below ground surface were sampled. The aboveground end of the probe was fitted with a steel reducer and attached to a vacuum pump with a polyethylene tube. Approximately 5 to 10 liters of gas was evacuated with the pump prior to collecting the sample. The soil gas sample was collected by using a cleaned syringe to pierce a silicone rubber segment

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of tube in the evacuation line. Ten milliliters of gas was collected for injection into the GC. The samples were duplicated in volumes ranging between 1 ul and 2 ml, depending on the VOC concentration.

2.3 ANALYSIS

Each sample collected was to be analyzed for the following volatile organic compounds:

Trichloroethylene (TCE)
1,1 Dichloroethylene (1,1-DCE)
total (cis and trans) 1,2 Dichloroethylene (1,2-DCE)
1,1,1 Trichloroethane (TCA)
1,1 Dichloroethane (1,1-DCA)
1,2 Dichloroethane (1,2-DCA)
Chloroethane
Vinyl Chloride

Standards were run through the GC for the following compounds:

CH2CL2	TCA	1,1-DCA	1,2-DCA
CHCl3	TCE	1,1-DCE CCl4	PCE

To save analysis time, compounds which were not detected in the investigation were not quantified, therefore no detection limits were calculated. These values were reported as Not Detected (ND). The chemist would have also attempted to identify peaks which were detected but for which no standard had been run.

Split samples from nine locations were scheduled for analysis at an offsite laboratory. However, since the on-site analysis detected relatively low concentrations of organics in samples scheduled for off-site analysis, the COE was advised that this portion of the investigation should be cancelled.

No peaks were observed in the retention time range for cis and trans 1,2-DCE, therefore the total concentration was not quantified. In addition, 1,1-DCE and 1,1-DCA were not detected at the site during the on-site analysis.

The detection limit for these three compounds was approximately 0.01 ug/l.

The gas chromatograph capable of achieving the required sensitivity for vinyl chloride and chloroethane measurements was not available for the study. As an alternative, Malcolm Pirnie planned to collect several soil gas samples in stainless steel gas cylinders for analysis for these compounds in TRC's Tucson laboratory. However, this plan was aborted in the field after a review of the real-time data and discussions with the COE. The vinyl chloride and chloroethane results were not obtained as planned.

Throughout the investigation, only 1,2-DCA, TCA and TCE were detected. TRC indicated that 1,2-DCA and TCA co-eluted, and that both 1,2-DCA and TCA concentrations were calculated from one peak. The concentration reported for each compound indicates the range of concentration for the total concentration of both compounds. That is, the value reported for 1,2-DCA would be the upper limit for the total combined concentration, while the value reported for TCA would be the lower limit. The sum of each individual concentration would be between the two reported values. This analytical limitation was considered acceptable, given that previous analytical results indicated that 1,2-DCA was present at the site in much greater concentration than TCA.

Seven of the nine split samples of soil gas which were originally collected for off-site analysis were analyzed by TRC in their Tucson laboratory to confirm the presence of both 1,2-DCA and TCA in the soil gas. The concentration of 1,2-DCA in the split samples was as much as three orders of magnitude greater than the concentration of TCA. This relative difference in the detected concentrations was reflected by the analytical results obtained in the field. The results of the split sample analysis in Tucson are summarized in Table 2.

3.0 SOIL GAS RESAMPLING

Following the completion of the field investigation in December, 1987, TRC agreed with the COE and Malcolm Pirnie to perform an additional day of sampling at selected locations at the site to determine if the results of the investigation were reproducible. The additional sampling was undertaken to determine if the analytical results had been influenced by:

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- lack of "qualified" analytical chemist,
- precipitation at the time of sampling,
- high ground water levels and saturated soil conditions, or
- lack of system blanks at the required frequency.

The locations which were resampled were SG06, SG09, SG11, SG18, SG19, SG26, and SG35. The resampling was performed under the supervision of Malcolm Pirnie's Project Manager (Mr. Paul H. Werthman), Project Engineer (Dr. Dharmarajan R. Iyer) and Health and Safety Officer (Mr. Douglas J. Daley). Two representatives from the COE, a geologist (Mr. Michael Crain) and chemist (Ms. Connie Biderman), were present for the sampling. The sample team from TRC consisted of an analytical chemist (Mr. Anthony Bode) and geologist (Ms. Randi Rosenthal), each with degrees and training appropriate to their respective responsibilities. The sampling team had been approved in advance by the COE.

The results obtained from the resampling on March 24, 1988 are shown in Table 4. Precipitation during the week prior to sampling had been relatively low. Occasional light rain occurred the day before and during sampling. A total snowfall of 0.72 inches occurred between March 14 and March 21, 1988. All snow had melted by the day of sampling however, as temperatures ranged as high as 60 F on March 23. The sample depths are also shown in Table 4.

4.0 DISCUSSION OF ANALYTICAL RESULTS

The ground water sampling conducted during the RI indicated the presence of a plume of volatile organic compound contamination under the eastern portion of the site. The greatest concentrations of volatile organic compounds were detected in the monitoring wells in this area, while the soils appeared to be heavily contaminated in the central portion of the site. The predominant contaminant of concern was 1,2-DCE.

Based on a preliminary review of the soil gas data in February 1988, it was initially felt that the detected contaminant concentrations were significantly lower than expected at this site. Several factors may have acted in support of each other to cause the relatively low organic vapor concentrations

in the soil gas. Mechanisms which act to decrease concentrations of organic vapors in the vadose zone include high rates of infiltration and dispersion. It is possible that the infiltration of relatively "clean" rain through the vadose zone and water table may cause the contaminated water to "sink" and leave a stratified layer of "clean" water at the top of the water table, thereby reducing the amount of volatilization which may occur from the contaminated ground water. As vertical mixing of the ground water may be rather limited, the effect of infiltration of "clean" precipitation may be reflected over time, rather than be limited to a single storm event.

Alternately, the contaminant concentrations detected in the ground water during the 1985 RI and conditions at the site may be such that the observed soil gas concentrations are what should be expected. Due to the low detection limits achieved by the GC, the reproducibility of the data, and the significantly wide range (four orders of magnitude) of concentrations measured in the soil gas, the data provides for adequate qualitative screening of the extent of contamination at the site and serve as the basis for the selection of soil boring and additional monitoring well locations.

4.1 DECEMBER 14-16 SAMPLING

A total of 39 soil gas samples were collected and analyzed during the investigation at the site. Samples could not be obtained at six locations due to saturated conditions at a depth of less than 1.5 feet or due to the location being inaccessible because of wet ground conditions. The results of the analyses are summarized in Table 3. Soil gas samples collected in the eastern portion of the site area were expected to confirm the presence of the contaminant plume; however, no 1,2-DCE or 1,1-DCE was detected in the soil gas samples, nor did the remainder of the detectable compounds reflect the pattern of ground water contamination as originally anticipated. On-site analysis of soil gas samples indicated only the presence of TCE, 1,2-DCA and TCA. TCE concentrations in the soil gas ranged from less than 0.0001 ug/l to 1 ug/l. 1,2-DCA concentrations ranged from 0.003 ug/l to 4 ug/l, while TCA concentrations ranged from 0.00002 ug/l to 0.03 ug/l.

The greatest TCE concentration was detected at sampling locations SG-11 and SG-21 (1 ug/l). SG-11 is located downgradient of the testpit area, near

the north end of the mounded fill in the central portion of the site. The soil gas at SG-10, located approximately 150 feet north of SG-11, contained TCE at a concentration of 0.6 ug/l. SG-21 is located near MW-11, downgradient of the center of the contaminant plume. This sample was collected in the vicinity of a subsurface soil sample collected by the EPA's Emergency Response Team in November, 1982, which contained TCE at a concentration of 1,670 ppb. A soil gas sample collected at SG-18, near the center of the plume and monitoring well MW-10, contained TCE at a concentration of 0.6 ug/l.

During the RI, ground water sampled from monitoring wells MW23B and MW10, near the center of the suspected contaminant plume, contained TCE at concentrations of 140 and 300 ug/l, respectively. Given the historical soil and ground water data, it is possible that the TCE detected in the soil gas at sampling locations SG-19 and SG-21 could be a result of both soil and ground water contamination. Additional ground water sampling should be performed on the monitoring wells in this area (e.g. MW11, MW23, MW10), while soil boring samples should be collected near the soil gas sample locations SG-21 and SG-18. The elevated soil gas concentrations detected at SG-10 and SG-11 north of the mounded fill in the central portion of the site may indicate the presence of a source to TCE downgradient of MW20, as no TCE was detected in the ground water at MW20 during the RI. The installation of a monitoring well cluster downgradient of the mounded fill in the vicinity of SG10 would help define the extent of ground water contamination and locate a contaminant source, if present. Soil borings in this area would also assist in determining the extent of soil contaminated with TCE.

The maximum concentration of 1,2-DCA was detected offsite at SG-39 (4 ug/l), northwest of the site along the eastern bank of Marshall's Run. Other elevated 1,2-DCA concentrations ranging from 1 to 3 ug/l were scattered across most of the site. 1,2-DCA was also detected at SG-35 (1 ug/l) located north of the site, however, the concentration of 1,2 DCA in nearby soil gas samples was two orders of magnitude less.

Ground water sampled by PADER in 1982 from MW1, MW2 and MW5 contained 1,2-DCA at concentrations of 10 ug/l, 30 ug/l and 42 ug/l, respectively. In 1984, during the RI, ground water samples at wells MW6 and MW9 contained 1,2-DCA at 6.0 and 7.6 ug.l, respectively. All these wells are clustered

along the eastern property line of the site, in the area of the 17th Street extension. Soil gas samples collected in this vicinity contained 1,2-DCA in concentrations of 0.1 ug/l (at SG-17 and SG-07) and 0.2 ug/l (at SG-09 and SG-19. These concentrations are generally one to two orders of magnitude greater than those concentration offsite. 1,2-DCA concentrations in the soil gas at SG-12 and SG-13 were 2 and 3 ug/l, respectively. With respect to ground water flow, these two locations are upgradient of the suspected contaminant plume and downgradient of the mounded fill.

Again, the presence of elevated soil gas concentrations of 1,2-DCA in the central portion of the site indicates the possible presence of a source of 1,2-DCA near or downgradient of the mounded fill. The occurrence of 1,2-DCA in the soil gas in the southeastern corner of the site closely parallels the suspected waste disposal patterns and the occurrence of 1,2-DCA in the ground water, particularly if the contaminant source is to the west of the existing monitoring wells. Soil borings in the southeastern and central portion of the site will determine the extent of soil contamination and possibly locate the contaminant source, while a monitoring well cluster near SG-12 will help to define the extent of ground water contamination between the mounded fill and the eastern property line. The occurrence of the elevated concentrations at the two offsite locations may indicate that the contaminant plume has migrated offsite since the RI in 1984. Installing monitoring wells offsite near these locations will therefore help to define the extent of movement of ground water contamination.

The TCA concentrations in the soil gas decreased by two orders of magnitude progressing easterly from the test pit area through the contaminant plume identified in the 1985 RI to the offsite sample locations. TCA concentrations at sample locations in the western portion of the site were less than or equal to 0.01 ug/l. SG-12 and SG-13, located in the center of the site, downgradient of the mounded fill and the test pit area, contained TCA at 0.02 ug/l. The maximum TCA concentration was detected at SG-39, located offsite along the bank of Marshall's Run. SG-39, with a TCA concentration of 0.03 ug/l, does not appear to fit the general trend of TCA contamination, particularly since the other offsite sample concentrations near SG-39 were less than 0.003 ug/l.

The occurrence of TCA in the ground water was primarily limited to the wells in the eastern portion of the property during an investigation by PADER and during the 1985 RI (MW1, MW3, MW5, MW9 and MW10). The maximum TCA concentrations in these wells include: 5000 ug/l at MW2, 47 ug/l at MW3, 500 ug/l at MW5, 59 ug/l at MW9, and 300 ug/l at MW10. It was initially anticipated that, relative to the remainder of the soil gas sample locations, elevated concentrations of TCA would be detected at the soil gas sample locations within the contaminant plume. However, TCA concentrations in the soil gas at SG-12 and SG-13 were an order of magnitude greater than at the sample locations within the plume. As TCA was not detected in existing wells MW-15A, MW-20A and MW-20B to the west of the mounded fill, it appears that there may be a source of TCA contamination in the vicinity of SG-12 and SG-13.

The installation of monitoring wells near SG-12 would help to define the extent of ground water contamination in the central and eastern portion of the site. Soil sampling should also be carried out in the test pit sample areas, around the mounded fill and in the eastern portion of the site to determine the extent of soil contamination and to aid in locating possible sources of TCA contamination. Soil borings in the western portion of the site should be used to determine if sources of soil contamination are present, as no ground water contamination by volatile organic compounds was detected in that area during the RI.

4.2 MARCH 24 RESAMPLING

The results from the March 24 resampling generally indicate that the December survey was reproducible and that the quality control employed by TRC for both sampling events was sufficient. Except for the sample at SG18, the remainder of the samples were determined by the COE representatives to be acceptable as they were the same order of magnitude as the results obtained in December, 1987. The results obtained at SG18 indicate that greater concentration of VOCs were detected in March than in December.

A more detailed analysis of the data, with respect to the previous RI and the findings of the current soil boring and ground water sampling investigation, will be presented in the final engineering report.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

The quality assurance and quality control (QA/QC) procedures which were to be followed by TRC and Malcolm Pirnie are described in the Work Plan. This discussion will focus primarily on the corrective actions which were taken during the course of the investigation.

The qualifications of the field investigation team from both TRC and Malcolm Pirnie were reviewed by the COE prior to beginning the investigation. However, one member of the TRC team was replaced due to illness. The field operations at the site was staffed by Scott Cherba, B.S. Geological Engineering and Steve Camp, B.S. Chemical Engineering. Due to Mr. Cherba's training by TRC as an analytical chemist, including several months as apprentice chemist with TRC, he operated the GC and performed the analysis. All work performed by Mr. Cherba in the field was reviewed by TRC's Senior Analytical Chemist. Only the sampling equipment was operated by Steve Camp.

The Work Plan indicated that, to obtain representative soil gas samples, saturated soil conditions must have been at least 1.5 feet below ground surface at the time of sampling. However, at sampling locations SG14, SG16, SG26, and SG29, saturated soil was encountered within 1.5 feet of the ground surface. SG16, located on the edge of a large asphalt parking lot, could not be sampled due to runoff from the parking lot. A sample could not be obtained at locations SG20 and SG28 because these locations were inaccessible to the sampling van. SG15, initially abandoned due to its inaccessible location, was relocated to the end of Oregon Avenue at the site limits, where it was successfully sampled. All sampling points which were relocated were surveyed into the site coordinate system; the final sampling locations are shown on Figure 1.

System blanks were to be collected at the beginning of each day and after every ten samples had been collected. However, a conflict in the TRC Field Operations Manual issued to the field crew omitted this requirement and, thus, resulted in system blanks not being taken at the required frequency. System blanks were, however, run at the start of each day. This resulted in omitting one system blank on December 14 and 16 (11 and 9 samples collected, respectively) and two system blanks on December 15, 1987 (19 samples collected).

The results of the analysis of the blanks and ambient air samples are summarized in Table 5.

In response to concern regarding the effect of high ground water elevations on the soil gas concentrations, TRC provided results from previous investigations which indicated that the analytical results of a soil gas survey san be reproducible under a variety of geologic and hydrologic conditions. Results from sites in Denver, CO, northern California and Virginia indicated that results obtained during winter conditions were reproducible during the following spring. To determine if the soil gas survey results obtained at the Millcreek site were reproducible, Malcolm Pirnie and TRC returned to the site in March 1988 to resample several locations.

6.0 HEALTH AND SAFETY

This soil gas survey was implemented in accordance with the approved Health and Safety Plan (HSP) submitted to the COE with the Soil Gas Survey Work Plan. Mr. Mark Hanna provided health and safety surveillance for the initial soil gas survey. Mr. Douglas Daley provided surveillance for the followup sampling.

6.1 INSTRUMENTATION

Air monitoring was performed on a routine basis using a Photovac TIP. The instrument did not detect any sustained organic vapor concentrations in the breathing zone which exceeded background. An HNu PI-101 was utilized during the resampling for air monitoring. Again, no elevated concentrations of volatiles were detected in the breathing zone.

6.2 PROTECTIVE EQUIPMENT

The work on the site was begun at a Level C protection. This ensemble consisted of:

- full face piece air purifying respirator
- organic vapor cartridges
- Tyvek coveralls
- latex gloves
- rubber boots

In addition, TRC personnel routinely wore hearing protection when operating the hydraulic hammer.

Based upon the air monitoring data from the Remedial Investigation and upon the soil gas survey data and air monitoring, the level of respiratory protection was downgraded to a Level D (no respirator). Monitoring of the breathing zone continued using the Photovac TIP, while the respirators were kept available in the event they were required. In addition, the use of Tyvek was discontinued, as there would be no contact with contaminated soil other than at the sole of the work shoes or by handling the probes. The use of latex gloves was continued to prevent hand contact.

6.3 DECONTAMINATION

Personnel exposure to contaminated materials during the soil gas survey was relatively minimal. The sole of the boots and, in the case of the geologist handling the used probes, the gloves were most commonly in contact with potentially contaminated soils. Wash basins were used to scrub boots and gloves prior to leaving the site. The van tires were also scrubbed and rinsed with a spray nozzle before leaving the site.

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TABLES

TABLE 1
GROUND WATER LEVEL MEASUREMENTS
DECEMBER 11, 1987

WELL #	GROUNDWATER DEPTH FROM TOP OF CASING (FT)	TOP OF CASING ELEVATION (FT)	GROUND ELEVATION (FT)	GROUNDWATER ELEVATION (FT)	GROUND WATER DEPTH (FT) BELOW GROUND	PHOTOVAC TIP READING (PPM) **
5	6.3	718.41	716.32	712.11	4.21	18.5
10	5.65	714.75	713.45	709.10	4.35	2.5
11	8.1	714.79	713.42	706.69	6.73	2.8
14	3.2	717.53	715.96	714.33	1.63	9.0
20A	7.5	720.86	719.13	713.36	5.77	3.5
20B	6.25	720.86	718.99	713.93	5.06	7.0
1	*					
2	*					

NOTES: * - Well cap could not be opened because of rust.
** - Reading taken inside of well head.

MILLCREEK TABLE 2: SGSPLIT.WK1

SAMPLE SPLIT RESULTS (ug/l)

SAMPLE LOCATION	1,2-DCA	TCA	TOTAL 1,2-DCA	TOTAL TCA
SG-03	0.8	0.009	2	0.02
SG-06	13	0.008	14	0.1
SG-12	12	0.02	14	0.1
SG-19	20	0.03	24	0.2
SG-22	5	0.005	6	0.04
SG-37	4	0.005	5	0.04
SG-43	4	0.008	4	0.03

NOTE: Total concentrations calculated as if analysis performed on site (e.g. determined from one peak).

SOIL GAS SURVEY RESULTS
DECEMBER 14 - 16, 1987

SAMPLE #	DATE	TIME	DEPTH (ft)	LOCATION	AIR TEMP. (F)	WEATHER CONDITIONS	GROUNDWATER ENCOUNTERED
SG-01	12/14/87	12:24 pm	3	Between MW 17A&B and MW 18A&B	35	overcast	no
SG-02	12/14/87	11:23 am	2	East of MW 17 A&B	35	overcast	yes
SG-03	12/14/87	2:44 pm	3	West of MW 16 A&B	35	overcast	no
SG-04	12/14/87	12:48 pm	3.5	Northwest of MW 14	35	overcast	no
SG-05	12/14/87	1:10 pm	2	Between TP 12 and TP 14	35	overcast	yes
SG-06	12/14/87	3:16 pm	3.5	West of MW 20 A&B	35	overcast	no
SG-07	12/15/87	8:36 am	5	SE portion of site, W of MW 4	40	rain	no
SG-08	12/15/87	8:00 am	6	South of MW 15A	40	light rain	no
SG-09	12/15/87	9:30 am	4	Southwest of MW 1	35	windy, rain	no
SG-10	12/14/87	3:28 pm	3	Center of site, NW of TP 15	35	overcast	no
SG-11	12/14/87	4:30 pm	5	Northeast of MW 20 A&B	35	overcast	yes
SG-12	12/14/87	4:06 pm	5	East of TP 1	35	overcast	no
SG-13	12/14/87	5:03 pm	4	Center of site	35	overcast	yes
SG-14	12/15/87	1:00 pm		(Groundwater level high)			yes
SG-15	12/16/87	12:11 pm	4.5	South of MW 12	30	snow	no
SG-16	12/16/87	10:15 am	4	South thru parking lot, W side	30	snow	yes
SG-17	12/15/87	9:02 am	6	Northwest of MW 5	40	windy, rain	no
SG-18	12/15/87	10:15 am	5	Southwest of MW 10	35	overcast	no
SG-19	12/15/87	9:56 am	6	Southeast of MW 10	35	windy	no
SG-20	12/15/87			(Groundwater level high)			yes
SG-21	12/14/87	9:42 am	4	N portion of site, SE of MW 11	35	overcast	no
SG-22	12/15/87	10:43 am	5	Northern portion of site	35	overcast	no
SG-23	12/15/87	11:34 am	5	Northern portion of site	35	windy, overcast	no
SG-24	12/15/87	4:59 pm	4	Bel-Aire Motel South	35	windy	no
SG-25	12/15/87	3:55 pm	3	15th St. and Harper Dr.	35	windy	no
SG-26	12/16/87	9:25 am		SE of Bel-Aire, by Harper Dr.	30	snow	yes
SG-27	12/16/87	2:10 pm	2	1326 Harper Dr.	30	overcast	yes
SG-28	12/16/87	10:15 am		15th St. ext. @ Marshall's Run	30	snow	yes
SG-29	12/16/87	10:15 am		17th St. ext. @ Marshall's Run	30	snow	yes
SG-30	12/16/87	9:45 am	2.5	SE corner of parking lot	30	snow	no
SG-31	12/16/87	10:45 am	4	17th St & Harper Dr, NE corner	30	snow	yes
SG-32	12/16/87	11:59 am	4	15th @ trailer park, NE corner	30	snow	yes
SG-33	12/16/87	2:35 pm	1.5	Trailer park road @ turn	30	overcast	yes
SG-34	12/16/87	11:42 am	3	Behind paint store	30	snow	yes
SG-35	12/15/87	4:15 pm	5	S of 12th St. @ Snaptite	35	windy	no
SG-36	12/15/87	4:27 pm	4	Near #9 trailer	35	windy	no
SG-37	12/15/87	3:41 pm	5.5	3034 West 12th St.	35	very windy	no
SG-38	12/15/87	4:47 pm	6	Behind Animal Ark Hospital	35	windy	no
SG-39	12/15/87	2:10 pm	5	Next to 12th St. Tavern	35	cloudy	no
SG-40	12/15/87	3:26 pm	5.5	11th and Sill, Appletree Apt.	35	windy	no
SG-41	12/15/87	1:46 pm	5	Front of vacant lot	35	windy	no
SG-42	12/15/87	3:15 pm	5.5	11th & Michigan, opp.#1103	35	windy	no
SG-43	12/15/87	1:26 pm	5	Between 3142 & 3144 12th St.	35		no
SG-44	12/16/87	12:00 pm	4	13th & Oregon, NE corner	30	snow	no
SG-45	12/16/87	12:20 pm	2	3123 13th St.	30	snow	yes

SAMPLE #	DATE	TIME	DEPTH (ft)	PROBE NUMBER	ADAPTER NUMBER	VACUUM GAUGE (" Hg)	ORGANICS CONCENTRATIONS (ug/l) 1,2-DCA	TCA	TCE
SG-01	12/14/87	12:24 pm	3	4	3	4	1	0.01	0.0003
SG-02	12/14/87	11:23 am	2	3	2	4	0.4	0.004	<0.0003
SG-03	12/14/87	2:44 pm	3	7	6	2.5	1	0.01	0.0004
SG-04	12/14/87	12:48 pm	3.5	5	4	2.5	0.2	0.002	0.01
SG-05	12/14/87	1:10 pm	2	6	5	4	0.4	0.003	0.004
SG-06	12/14/87	3:16 pm	3.5	8	7	2	1	0.008	0.0004
SG-07	12/15/87	8:36 am	5	2	2	2	0.1	0.0008	0.0007
SG-08	12/15/87	8:00 am	6	1	1	5.5	0.6	0.004	0.006
SG-09	12/15/87	9:30 am	4	4	4	5	0.2	0.001	0.0008
SG-10	12/14/87	3:28 pm	3	9	8	5	0.7	0.006	0.6
SG-11	12/14/87	4:30 pm	5	11	10	3	0.8	0.007	1
SG-12	12/14/87	4:06 pm	5	10	9	3	2	0.02	0.002
SG-13	12/14/87	5:03 pm	4	12	11	3	3	0.02	0.007
SG-14	12/15/87	1:00 pm							
SG-15	12/16/87	12:11 pm	4.5	8	8	5	0.07	0.0006	0.0002
SG-16	12/16/87	10:15 am	4	3	3				
SG-17	12/15/87	9:02 am	6	3	3	2	0.1	0.0007	0.0002
SG-18	12/15/87	10:15 am	5	6	6	8	0.08	0.0006	0.6
SG-19	12/15/87	9:56 am	6	5	5	5.5	0.2	0.002	0.002
SG-20	12/15/87								
SG-21	12/14/87	9:42 am	4	1	1	5	0.1	0.001	1
SG-22	12/15/87	10:43 am	5	7	7	5	0.03	0.0002	0.0002
SG-23	12/15/87	11:34 am	5	8	8	3	0.02	0.0001	0.0005
SG-24	12/15/87	4:59 pm	4	20	19	3.5	0.02	0.0001	0.0001
SG-25	12/15/87	3:55 pm	3	16	15	5	0.03	0.0002	<0.0001
SG-26	12/16/87	9:25 am		1	1				
SG-27	12/16/87	2:10 pm	2	10	10	6	0.06	0.0003	0.0002
SG-28	12/16/87	10:15 am							
SG-29	12/16/87	10:15 am							
SG-30	12/16/87	9:45 am	2.5	2	2	4	0.01	0.00008	0.02
SG-31	12/16/87	10:45 am	4	4	4	4	0.02	0.0001	0.0006
SG-32	12/16/87	11:59 am	4	5	5	5	0.003	0.00002	0.001
SG-33	12/16/87	2:35 pm	1.5	11	11	7	0.06	0.0004	0.01
SG-34	12/16/87	11:42 am	3	6	6	5	0.05	0.0004	0.0001
SG-35	12/15/87	4:15 pm	5	17	16	5	1	0.008	0.08
SG-36	12/15/87	4:27 pm	4	18	17	5	0.09	0.0007	0.0001
SG-37	12/15/87	3:41 pm	5.5	15	14	6	0.02	0.0002	0.0001
SG-38	12/15/87	4:47 pm	6	19	18	3.5	0.04	0.0004	<0.0001
SG-39	12/15/87	2:10 pm	5	12	11	5	4	0.03	0.001
SG-40	12/15/87	3:26 pm	5.5	14	13	3	0.2	0.002	<0.0001
SG-41	12/15/87	1:46 pm	5	11	10	6	0.2	0.001	0.0002
SG-42	12/15/87	3:15 pm	5.5	13	12	3	0.4	0.003	0.0006
SG-43	12/15/87	1:26 pm	5	10	9	5	0.02	0.0002	<0.0001
SG-44	12/16/87	12:00 pm	4	7	7	5	0.06	0.0005	0.1
SG-45	12/16/87	12:20 pm	2	9	9	7	0.08	0.0006	0.0006

ORGANICS CONCENTRATIONS (ug/l)

Sample #	Date	Depth (ft)	1,2 DCA	TCA	TCE	1,1 DCE	1,1 DCA	PCE	CH2Cl2	CHCl3	CCl4
SG-06	3/24/88	4	0.1	0.003	0.003	<0.006	<0.02	0.003	<0.03	<0.0007	<0.00009
SG-09	3/24/88	3	0.3	0.006	0.002	<0.006	<0.02	0.01	<0.03	0.006	<0.00009
SG-11	3/24/88	5	0.2	0.004	0.1	<0.006	<0.02	0.01	<0.03	0.003	0.0007
SG-18	3/24/88	3	4	0.08	0.1	<0.006	<0.02	0.04	<0.03	0.01	<0.00009
SG-19	3/24/88	2.5	0.1	0.002	0.004	<0.006	<0.02	0.002	<0.03	<0.0007	<0.00009
SG-26	3/24/88	2	0.8	0.02	<0.0005	<0.006	<0.02	0.007	2	0.01	<0.00009
SG-35	3/24/88	5	0.6	0.01	0.1	<0.006	<0.02	0.007	<0.03	<0.0007	<0.00009

TABLE 5: QUALITY CONTROL RESULTS

Analysis Date:	12/14/87			12/15/87			12/16/87		
Parameter:	DCA	TCA	TCE	DCA	TCA	TCE	DCA	TCA	TCE
Blank (N2)	<0.01	<0.0001	<0.003	<0.005	0.00004	<0.0001	<0.0006	<0.00004	<0.0001
Air Sample 1	0.2	0.002	0.003	0.08	0.0005	<0.0001	0.06	0.0005	<0.0001
Blank (system)	0.2	0.002	0.003	0.09	0.0006	0.0001	0.06	0.0005	0.0001
Air Sample 2	0.08	0.0007	0.004	0.07	0.0005	<0.0001	----	----	----

NOTE: All concentrations given in ug/l.
Blank (N2): Nitrogen carrier gas
Air Sample 1: Collected at beginning of each day
Air Sample 2: Collected at end of each day

ORIGINAL
(Red)

FIGURES

EPA REGION III
SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOC ID 115835
PAGE # Ar000964

IMAGERY COVER SHEET
UNSCANNABLE ITEM

SITE NAME Millcreek Dump

OPERABLE UNIT

ADMINISTRATIVE RECORDS- SECTION II **VOLUME** uao

REPORT OR DOCUMENT TITLE Soil Gas survey

DATE OF DOCUMENT 8-1-88

DESCRIPTON OF IMAGERY Soil gas sample locations + Results

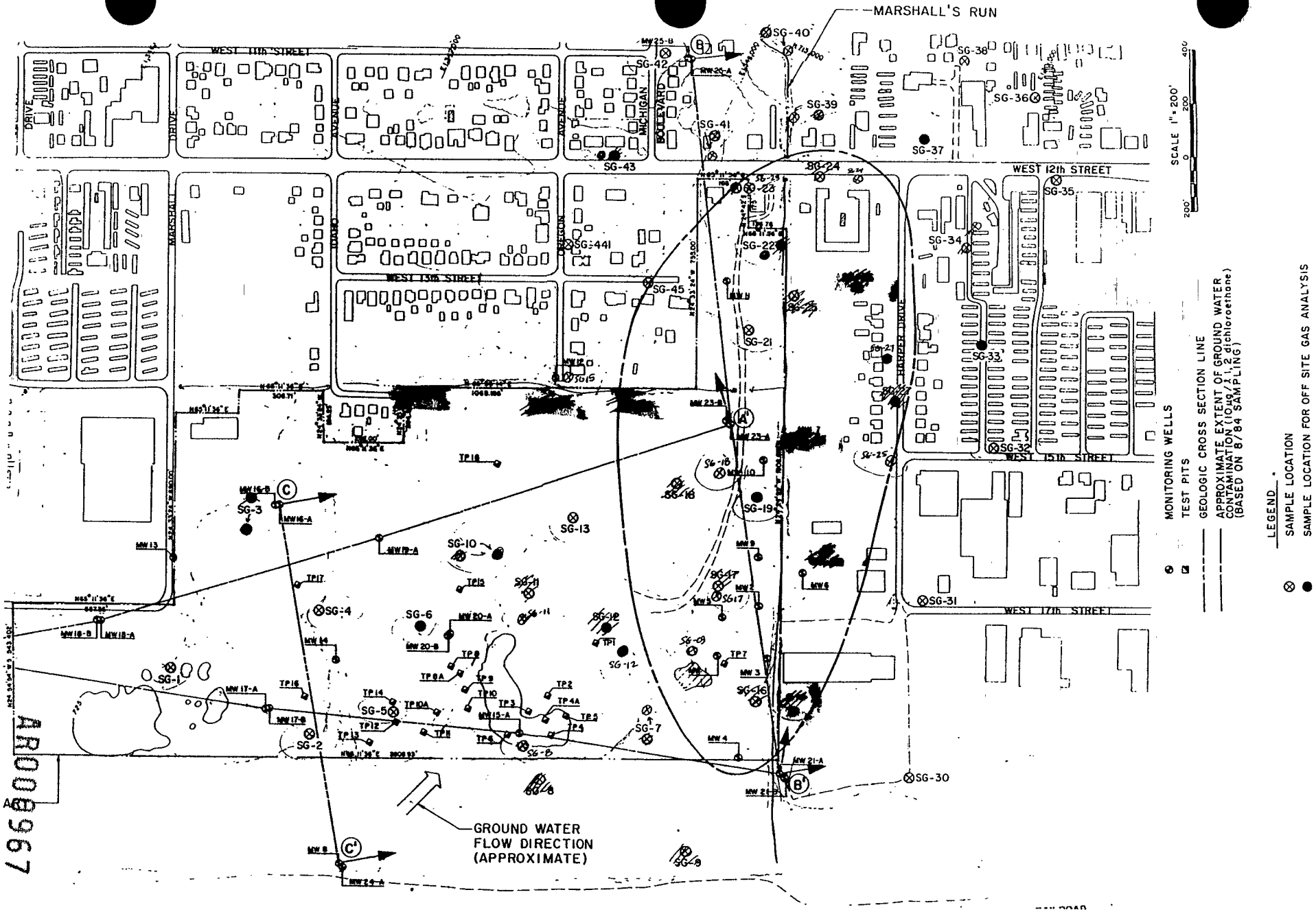
NUMBER AND TYPE OF IMAGERY ITEM(S) 1 oversized Map

ORIGINAL (Red)

APPENDIX I

ORIGINAL
(Red)

DATA SHEETS
DECEMBER 14 - 16, 1987



AR009967

ORIGINAL (Red)

MALCOLM PIRNIE MILLCREEK PA

DCA & TCA CO ELUTED; CONCENTRATIONS REFLECT AMOUNT OF 1,2-DCA OR TCA, WHICHEVER ONE WAS ACTUALLY PRESENT

TRACER RESEARCH CORPORATION

Date 12-18-87

SG 06 – SPLIT SAMPLES ~~SENT TO REGRA~~ COLLECTED

standard conc.					µg/l			µg/l			µg/l			µg/l
response from			1		area	1		area	1		area	1		area
ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet					g/area			g/area			g/area			g/area
sample	~~time~~	amt inj	~~area~~	~~µg/l~~	~~mean~~	area	µg/l	~~mean~~	~~area~~	~~µg/l~~	~~mean~~	~~area~~	µg/l	mean
	DEPTH		1,2-DCA	TCA	TCE			SAMPLE	DEPTH	1,2-DCA	TCA	TCE		
SG01	3'		~~0.1~~ 1	0.01	0.0003			SG18	5'	0.08	0.0006	0.6		
SG02	2'		~~0.04~~ .4	0.004	<0.0003			SG19	6'	~~0.2~~ 3	0.002	0.002		
SG03	3'		~~0.1~~ 1	0.01	0.0004			SG20	WATER – NO SAMPLE					
SG04	3½'		~~0.02~~ .2	0.002	0.01			SG21	4'	~~0.01~~ .1	0.001	1		
SG05	2'		~~0.04~~ .4	0.003	0.004			SG22	5'	0.03	0.0002	0.0002		
SG06	3½'		~~0.1~~ 1	0.009	0.0004			SG23	5'	0.02	0.0001	0.0005		
SG07	5'		0.1	0.0008	0.0007			SG24	4'	0.02	0.0001	0.0001		
SG08	6'		0.6	0.004	0.006			SG25	3'	0.03	0.0002	<0.0001		
SG09	4'		0.2	0.001	0.0008			SG26	WATER – NO SAMPLE					
SG10	3'		~~0.07~~ .7	0.006	0.6			SG27	2' ~~WATER – NO SAMPLE~~ 0.06		0.0005	0.0002		
SG11	5'		~~0.08~~ .8	0.007	1			SG28	WATER – NO SAMPLE					
SG12	5'		~~0.2~~ 2	0.02	0.002			SG29	WATER – NO SAMPLE					
SG13	4'		~~0.3~~ 3	0.02	0.007			SG30	2½'	0.01	0.00008	0.02		
SG14	WATER – NO SAMPLE							SG31	4' ~~0.02~~	0.02 ~~0.0001~~	0.0001	0.0006		
SG15	4½' ~~WATER – NO SAMPLE~~		0.07	0.0006	0.0002			SG32	4' ~~0.003~~	0.003 ~~0.00002~~	0.00002	0.001		
SG16	WATER – NO SAMPLE						NO SPLIT	SG33	~~0.06~~ 1½'	0.06	0.0004	0.01		
SG17	6'		0.1	0.0007	0.0002			SG34	3'	0.05	0.0004	0.0001		

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by S. CHERBA

Checked by S. Chang

ORIGINAL (Red)

AR000968

Job MALCOLM DIRNIE ERIE PA

1,[illegible]A & TCA CO-ELUTED
C[illegible]TRATIONS REFLECT
AMOUNT OF 1,2-DCA OR TCA,
WHICHEVER ONE WAS PRESENT

TRACER RESEARCH CORPORATION

Date 12-14-87 Page 1 of 2

	1,2-DCA (1.36)			TCA (1.4)			TCE (1.95)					
standard conc.	200		µg/l	5		µg/l	10		µg/l			µg/l
response from 5 ul injection	1 152 989		area	1 389 244		area	1 400 539		area	1		area
	2 130 070		area	2 375 978		area	2 382 668		area	2		area
	3 140 223		area	3 378 548		area	3 380 834		area	3		area
RFs for this sheet	7.09×10^{-15}		g/area	6.56×10^{-17}		g/area	1.38×10^{-16}		g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N2 BLANK	913	1000	<2000	<0.001 (<0.01)		<2000	<0.0001		<2000	<0.0003				
AIR SAMPLE	927	1000	25 075	0.02 (0.2)		25 075	0.002		2000 E	0.0003				
SYSTEM BLANK	1004	1000	26 549	0.02 (0.2)		26 549	0.002		2000 E	0.0003				
SB21-4'	1014	200	4000 E	0.01 (0.1)	0.01	4000 E	0.001	0.001	1483017	1	1			
SB21-4'	1020	200	4000 E	0.01 (0.1)		4000 E	0.001		1465884	0.9				
SB02-2'	1219	1000	52677	0.04 (0.4)	0.04	52677	0.003	0.004	<2000	<0.0003	<0.0003			
SB02-2'	1221	1000	55314	0.04 (0.4)		55314	0.004		<2000	<0.0003				
SB41-3'	1238	1000	168082	0.1 (1.2)	0.1	168082	0.01	0.01	2000 E	0.0003	0.0003			
SB41-3'	1242	1000	204097	0.1 (1.4)		204097	0.01		2000 E	0.0003				
SB44-3½'	1258	1000	31922	0.02 (0.2)	0.02	31922	0.002	0.002	74823	0.01	0.01			
SB44-3½'	1301	1000	28537	0.02 (0.2)		28537	0.002		67372	0.0009 (.009)				
SB05-2'	1326	1000	50000 E	0.04 (0.4)	0.04	50000 E	0.003	0.003	31688	0.004	0.004			
SB05-2'	1331	1000	50000 E	0.04 (0.4)		50000 E	0.003		39812	0.004				
STD	1339/1343	5	176 301	—		369 913	—		393462	—				
SB03-3'	1504	1000	153 734	0.1 (1)	0.1	153 734	0.01	0.01	3000 E	0.0004	0.0004			
SB03-3'	1510	1000	170 000	0.1 (1.2)		170 000	0.01		3000 E	0.0004				
SB06-3½'	1535	1000	142 620	0.1 (1)	0.1	142 620	0.009	0.009	3000 E	0.0004	0.0004			
SB06-3½'	1542	1000	133 043	0.09 (0.9)		133 043	0.009		4000 E	0.0005 (.0005)				

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by F. Clarke

Checked by S. Camp

ORIGINAL (Red)

AR000969

JOB MALCOLM PIRNIE HILLCREEK PA

TRACER RESEARCH CORPORATION

Date 12-14-87 Page 2 of 2

standard conc.					µg/l			µg/l			µg/l			µg/l
response from			1		area	1		area	1		area	1		area
ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet					g/area			g/area			g/area			g/area
sample	~~time~~	amt inj	~~area~~	~~µg/l~~	~~mean~~	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
	DEPTH		1,2-DCA	TCA	TCE									
5635	5'		1	0.008	0.08									
5636	4'		0.08	0.0007	0.0001									
✓ 5637	5½'		0.02	0.0002	0.0001									
5638	6'		0.04	0.0004	<0.0001									
5639	5'		4	0.03	0.001									
5640	5½'		0.2	0.002	<0.0001									
5641	5'		0.2	0.001	0.0002									
5642	5½'		0.4	0.003	0.0006									
✓ 5643	5'		0.02 (Q3)	0.0002	<0.0001									
5644	4'		0.06	0.0005	0.1									
5645	2'		0.08	0.0006	0.0026									

AR000970

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by S. CHERBA

Checked by S. Camp

ORIGINAL (Red)

MALCOLM PIRNIE ERIE PA

TRACER RESEARCH CORPORATION

Date 12-14-87 Page 2 of 2

			1,2-DCA			TCA			TCE					
standard conc.			200		µg/l	5		µg/l	10		µg/l			µg/l
response from			1		area	1		area	1		area	1		area
5 ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet			7.09×10^{-15}		g/area	6.56×10^{-17}		g/area	1.29×10^{-16}		g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG10-3'	1555	1000	100 088	0.07 (0.7)	0.07	100088	0.006 (.007)	0.006	5000000 E	0.6	0.6			
SG10-3'	1559	1000	96 383	0.07 (0.7)		96 383	0.006		5 517 099	0.7				
SG12-5'	1625	1000	311 331	0.2 (2.2)	0.2	311 331	0.02	0.02	16 479	0.002	0.002			
SG12-5'	1636	1000	295 824 ~~[illegible]~~	0.2 (2.1)		295 824	0.02		20 594	0.003				
SG11-5'	1657	1000	115 003	0.08 (0.8)	0.08	115 003	0.008	0.007	9 319 116	1	1			
SG11-5'	1701	200	22 746	0.08 (0.8)		22 746	0.007		2 262 830	1				
SG13-4'	1720	1000	434 000	0.3 (3.1)	0.3	434 000	0.03	0.02	62 688	0.008	0.007			
SG13-4'	1726	1000	370 000	0.3 (2.6)		370 000	0.02		49 506	0.006				
STD	1720 ~~1704~~	5	150 000 ~~[illegible]~~	—	—	400 000 ~~709 551~~	—	—	439 974 ~~3000~~ E	—	—			
AIR SAMPLE	1714	1000	10 931	0.008 (0.08)		10 931	0.0007		3000 E	0.0004				

AR000971

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by S. Cherba

Checked by S. Camp

ORIGINAL (Red)

SSD MALCOLM PIRNIE MILLCREEK PA

∴ 1,2-DCA & TCA CO-ELUTE CONCENTRATIONS REFLECT AMOUNT OF 1,2-DCA OR TCA WHICHEVER ONE WAS ACTUALLY PRESENT

TRACER RESEARCH CORPORATION

Date 12-15-87 Page 1 OF 3

			1,2-DCA (1.3)			TCA (1.3)			TCE					
standard conc.			200		µg/l	5		µg/l	10		µg/l			µg/l
response from			1 191 589		area	1 673 850		area	1 481 039		area	1		area
5 ul injection			2 190 231		area	2 675 864		area	2 500 108		area	2		area
			3 177 563		area	3 709 822		area	3 506 912		area	3		area
RFs for this sheet			5.36×10^{-15} 186 461		g/area	3.64×10^{-17} 686 512		g/area	1.01×10^{-16} 496 020		g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BLANK	748	1000	<1000	<0.005		<1000	<0.00004		<1000	<0.0001				
AIR SAMPLE	758	1000	14 562	0.08		14 562	0.0005		<1000	<0.0001				
SYSTEM BLANK	833	1000	16 963	0.09		16 963	0.0006		1000 E	0.0001				
SG08-6'	839	1000	110 331	0.6	0.6	110 331	0.004	0.004	65 462	0.007	0.006			
SG08-6'	844	1000	90 243	0.5		90 243	0.003		64 129	0.006				
SG07-5'	900	1000	21 123	0.1	0.1	21 123	0.0008	0.0008	8 000 E	0.0008	0.0007			
SG07-5'	903	1000	20 550	0.1		20 550	0.0008		7000 E	0.0007				
SG17-6'	918	1000	19 317	0.1	0.1	19 317	0.0007	0.0007	1500 E	0.0002	0.0002			
SG17-6'	923	1000	19 384	0.1		19 384	0.0007		1500 E	0.0002				
SG09-4'	942	1000	30 000 E	0.2	0.2	30 000 E	0.001	0.001	8000 E	0.0008	0.0008			
SG09-4'	947	1000	26 640	0.1		26 640	0.001		6640	0.0007				
SG19-6'	1005	1000	50 288	0.3	0.2	50 288	0.002	0.002	22 576	0.002	0.002			
SG19-6'	1012	1000	48 075	0.2 (0.2)		48 075	0.002		22 594	0.002				
STD	1017	5	177 702	—	—	660 673	—	—	476 232	—	—			
SG18-5'	1034	1000	15 15 378	0.08	0.08	15 378	0.0006	0.0006	100µl 615 367	0.6	0.6			
SG18-5'	1036	1000	13 136	0.07		13 136	0.0005		100µl 636 324	0.6				
SG22-5'	1057	1000	6 373	0.03	0.03	6 373	0.0002	0.0002	2000 E	0.0002	0.0002			
SG22-5'	1100	1000	6 266	0.03		6 266	0.0002		2000 E	0.0002				

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by S. Cherba

Checked by S Camp

ORIGINAL (Red)

AR000972

300 MALCOLM ARNIE MILLCREEK PA

TRACER RESEARCH CORPORATION

Date 12-15-87 Page 2 of 3

	1,2-DCA			TCA			TCE					
standard conc.	200		µg/l	5		µg/l	10		µg/l			µg/l
response from 5 ul injection	1		area	1		area	1		area	1		area
	2		area	2		area	2		area	2		area
	3		area	3		area	3		area	3		area
RFs for this sheet	5.36×10^{-15}		g/area	3.64×10^{-17}		g/area	1.01×10^{-16}		g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
5623-5'	1141	1000	3777	0.02	0.02	3777	0.0001	0.0001	5933	0.0006	0.0005			
5623-5'	1143	1000	3245	0.02		3245	0.0001		5000 E	0.0005				
5643-5'	1336	1000	5000 E	0.03	0.02	5000 E	0.0002	0.0002	<1000	<0.0001	<0.0001			
5643-5'	1340	1000	4845	0.02		4845	0.0002		<1000	<0.0001				
5641-5'	1353	1000	32035	0.2	0.2	32035	0.001	0.001	2500 E	0.0002	0.0002			
5641-5'	1356	1000	35000	0.2		35000	0.001		2000 E	0.0002				
STD	1405	5	183051	—	—	683891	—	—	498478	—	—			
5639-5'	1421	1000	784860	4	4	784860	0.03	0.03	10663	0.001	0.001			
5639-5'	1425	1000	808239	4		808239	0.03		4993	0.001				
5642-5½'	1520	1000	73841	0.4	0.4	73841	0.003	0.003	5000 E	0.0005	0.0006			
5642-5½'	1523	1000	74079	0.4		74079	0.003		7000 E	0.0007				
5640-5½'	1531	1000	39501	0.2	0.2	39501	0.001	0.002	<1000	<0.0001	<0.0001			
5640-5½'	1534	1000	50000 E	0.3		50000 E	0.002		<1000	<0.0001				
5637-5½	1547	1000	4348	0.02	0.02	4348	0.0002	0.0002	1000 E	0.0001	0.0001			
5637-5½	1557	1000	3445	0.02		3445	0.0001		1000 E	0.0001				
5635-8'3'	1608	1000	5000	0.03	0.03	5000	0.0002	0.0002	<1000	<0.0001	<0.0001			
5635-8'3'	1611	1000	5000 E	0.03		5000 E	0.0002		<1000	<0.0001				
STD	1630	5	200000 E	—	—	716420	—	—	498002	—	—			

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by S. Clarke

Checked by S. Camp

ORIGINAL (Red)

AR000973

SCS MALCOLM PIRNIE MILLCREEK PA

TRACER RESEARCH CORPORATION

Date 12-15-87 Page 3 of 3

			1,2-DCA			TCA			TCE					
standard conc.			200		µg/l	5		µg/l	10		µg/l			µg/l
response from			1		area	1		area	1		area	1		area
5 ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet			5.36×10^{-15}		g/area	3.64×10^{-17}		g/area	1.01×10^{-16}		g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG35-5'	1624	1000	210948	1	1	210 948	0.008	0.008	796 621	0.08	0.08			
SG35-5'	1627	1000	250 000 E	1		250 000 E	0.009		850 098	0.08 (.09)				
SG36-4'	1637	1000	20 649	0.1	0.09	20 649	0.0008	0.0007	1000 E	0.0001	0.0001			
SG36-4'	1640	1000	15 875	0.08		15 875	0.0006		1000 E	0.0001				
SG38-6'	1652	1000	7909	0.04	0.04	7909	0.0005	0.0004	<1000	<0.0001	<0.0001			
SG38 6'	1704	1000	9820	0.05		9820	0.0004		<1000	<0.0001				
SG24-4'	1718	1000	3000 E	0.02	0.02	3000 E	0.0001	0.0001	1000 E	0.0001	0.0001			
SG24-4'	1720	1000	3000 E	0.02		3000 E	0.0001		1000 E	0.0001				
AIR SAMPLE	1724	1000	~~185~~ 13327	0.07		13327	0.0005		<1000	<0.0001				
STD	1731	~~100~~ 5	183 341	—	—	709 373	—	—	502 559	—	—			

AR000974

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by S. Cherba

Checked by S. Camp

ORIGINAL

6

Job MACOLM PIRNIE MILLCREEK PA

1,2-[illegible]TCA CO-ELUTED; CONC[illegible]ATIONS REFLECT AMOUNT OF 1,2-DCA OR TCA WHICHEVER ONE WAS ACTUALLY PRESENT

TRACER RESEARCH CORPORATION

Date 12-16-87 Page 1 OF 2

	1,2-DCA (1.26)			TCA (1.26)			TCE (1.77)					
standard conc.	200		µg/l	5		µg/l	10		µg/l			µg/l
response from 5 ul injection	1 169 050		area	1 562 793		area	1 407 573		area	1		area
	2 176 048		area	2 550 068		area	2 390 638		area	2		area
	3 178 940		area	3 622 127		area	3 438 877		area	3		area
RFs for this sheet	5.72×10^{-15} 174 679		g/area	4.32×10^{-17} 578 329		g/area	1.21×10^{-16} 412 364		g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
NC BLANK	802	1000	<1000	< 0.006		<100	<0.00004		<1000	<0.0001				
AIR SAMPLE	924	1000	11 169	0.06		11 169	0.0005		<1000	<0.0001				
SYSTEM BLANK	956	1000	11 160	0.06		11 160	0.0005		1000	0.0001				
5630-2½'	959	1000	2000E	0.01	0.01	2 000E	0.00009	0.00008	224 153	0.03	0.02			
5630-2½'	1007	1000	1937	0.01		1 937	0.00008		211 156	0.02				
5631-4'	1056	1000	3000E	0.02	0.02	3000E	0.0001	0.0001	5000E	0.0006	0.0006			
5631-4'	1105	1000	3000E	0.02		3000E	0.0001		5000E	0.0006				
5632-4'	1110	1000	645	0.004	0.003	645	0.00003	0.00002	10680	0.001	0.001			
5632-4'	1114	1000	430	0.002		430	0.00002		11801	0.001				
5634-3'	1150	1000	8664	0.05	0.05	8664	0.0004	0.0004	1000E	0.0001	0.0001			
-3'	RAN TO SUDDEN STOP AS NEEDLE PULLED OFF & SYRINGE PURGE WITH AIR: CLIENT CHOSE TO USE 1 ANALYSIS													
5644-4'	1204	1000	11044	0.06	0.06	11044	0.0005	0.0005	402 666	0.1	0.1			
5644-4'	1208	1000	11475	0.06 (.07)		11475	0.0005		969 636	0.1				
5645-4½'	1215	1000	12888	0.07	0.07	12888	0.0006	0.0006	3000E	0.0002	0.0002			
5645-4½'	1220	1000	11880	0.07		11880	0.0005		3000E	0.0002				
STD	1241	1000	180526	—		657 019	—		464 616	—				
5645-2'	1246	1000	13770	0.08	0.08	13 770	0.0006	0.0006	5917	0.0007	0.0006			
5645-2'	1251	1000	12771	0.07		12 771	0.0006		5193	0.0006				

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by S. Cherba

Checked by S. Camp

ORIGINAL (Red)

AR000975

MALCOLM PIRNIE MILLCREEK PA

TRACER RESEARCH CORPORATION

Date 12-16-87 Page 2 of 2

			1,2-DCA			TCA			TCE					
standard conc.			200		µg/l	5		µg/l	10		µg/l			µg/l
response from ul injection			1		area	1		area	1		area	1		area
			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet			5.72×10^{-15}		g/area	4.32×10^{-17}		g/area	1.21×10^{-16}		g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG27-2'	1427	1000	13047	0.07	0.06	13047	0.0006 ~~0.0009~~	0.0005	2000*	0.0002	0.0002			
SG27-2'	1432	1000	10454	0.06		10454	0.0004		2000*	0.0002				
SG33-2½'	1450	1000	10151	0.06	0.06	10151	0.0004	0.0004	94197	0.01	0.01			
SG33-2½'	1454	1000	10937	0.06		10937	0.0005		98217	0.01				

AR000976

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by S. Cherba

Checked by S. Camp

ORIGINAL (Red)

ORIGINAL
(Red)

CHROMATOGRAMS
DECEMBER 14, 1987

MALCOLM PIRNIE
12-14
ECD

ORIGINAL (Red)

00:15:56 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 2 INDEX 2

PEAK#	AREA%	RT	AREA	BC
1	82.907	0.44	9905409	02
2	3.84	0.65	458798	02
3	1.6	0.76	191217	03
4	11.652	1.18	1392179	01
TOTAL	100.		11947603	

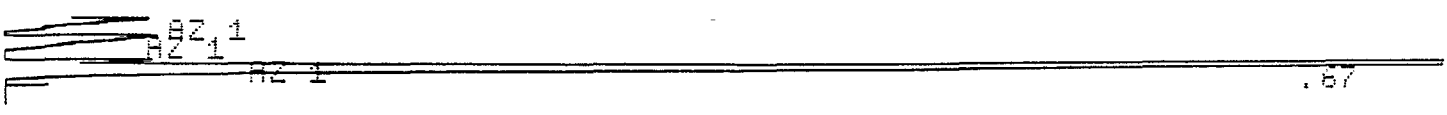
Column	OV101	Detector	ECD
Length	6'	Voltage	10 mv
Dia.	1/8"	Sensit.	
Liquid Phase		Flow Rates, ml/min	
Wt. %		Hydrogen	Air
Support	Chromosolb W	Scavenge	
Mesh	80/100	Split	
Carrier Gas	N2	Temperature, °C	50°
Rotameter		Det. 350°C	Inj. 200°
Inlet Press	60 psig	Column Initial	50°
Rate	30 ml/min	Final	
CHART SPEED		Rate	
SAMPLE		Solvent	
Size		Concn.	
Operator	[illegible]	Date	12-14-87

READY
DATE "
READY
DATE " 12/14/87
TIME " 7:25
FI= 1. FE= 1. MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
.E NAME=" MALCOLM PIRNIE ERIE PA
ME FUNCTION VALUE
TT= .01 TF=" AZ TV= 1
TT= .01 TF=" PM TV= 1
TT=

METHOD NUMBER:MN=

END OF DIALOG
AT=16
OF=10
PT=1000

CHANNEL A INJECT 12/14/87 07:42:43



INPUT OVERRANGE AT RT= 2.44

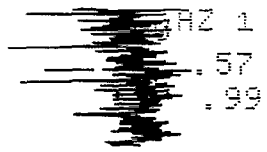
MALCOLM PIRNIE ERIE PA 12/14/87 07:42:43 CH= "A" PS= 1.

.LE 1. METHOD 0. RUN 1 INDEX 1

PEAK#	AREA%	RT	AREA	BC
1	100.	0.67	337880	01
TOTAL	100.		337880	

AR000978

CHANNEL A INJECT 12/14/87 07:57:46



ORIGINAL (Red)

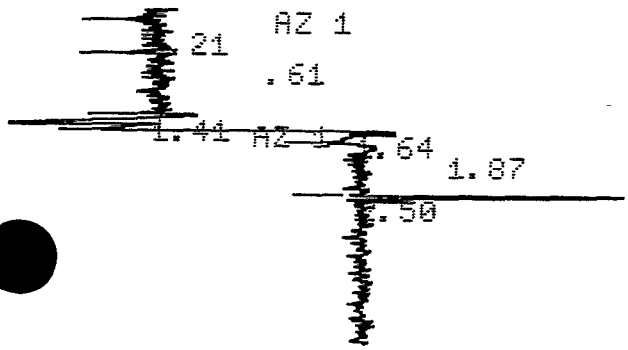
MALCOLM PIRNIE ERIE PA 12/14/87 07:57:46 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 2 INDEX 2

PEAK#	AREA%	RT	AREA	BC
1	27.003	0.1	34712	02
2	22.676	0.57	29150	02
3	12.357	0.85	15885	02
4	37.963	0.99	48801	03
TOTAL	100.		128548	

AT=32

CHANNEL A INJECT 12/14/87 07:59:58



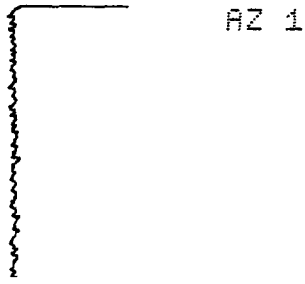
MALCOLM PIRNIE ERIE PA 12/14/87 07:59:58 CH= "A" PS= 1.

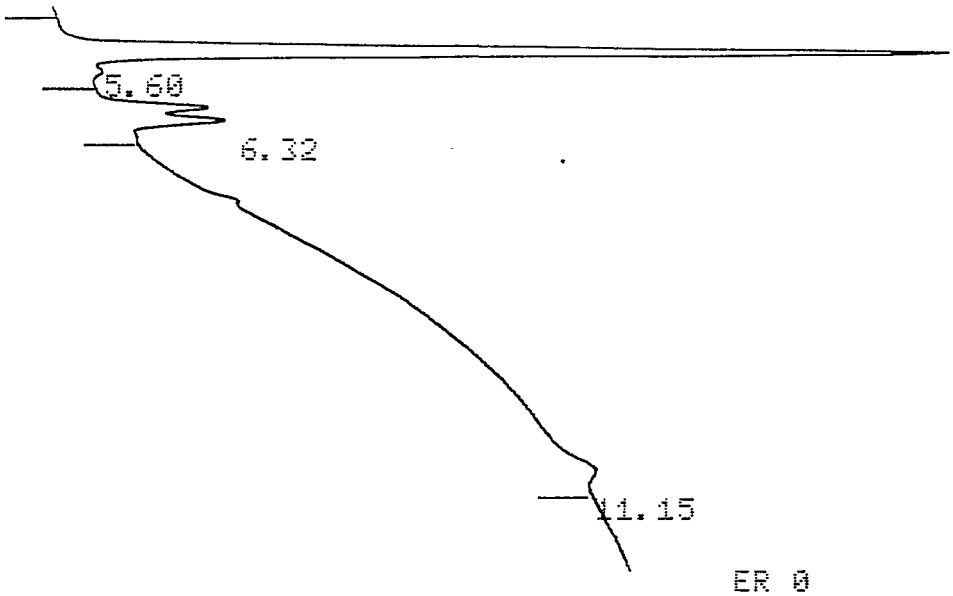
FILE 1. METHOD 0. RUN 3 INDEX 3

PEAK#	AREA%	RT	AREA	BC
1	12.691	0.21	70100	02
2	60.527	0.61	334315	02
3	11.59	1.41	64019	02
4	3.135	1.64	17318	03
5	7.581	1.87	41872	02
6	4.475	2.5	24720	03
TOTAL	100.		552344	

AT=64

CHANNEL A INJECT 12/14/87 08:04:47





ORIGINAL (Red)

ER 0

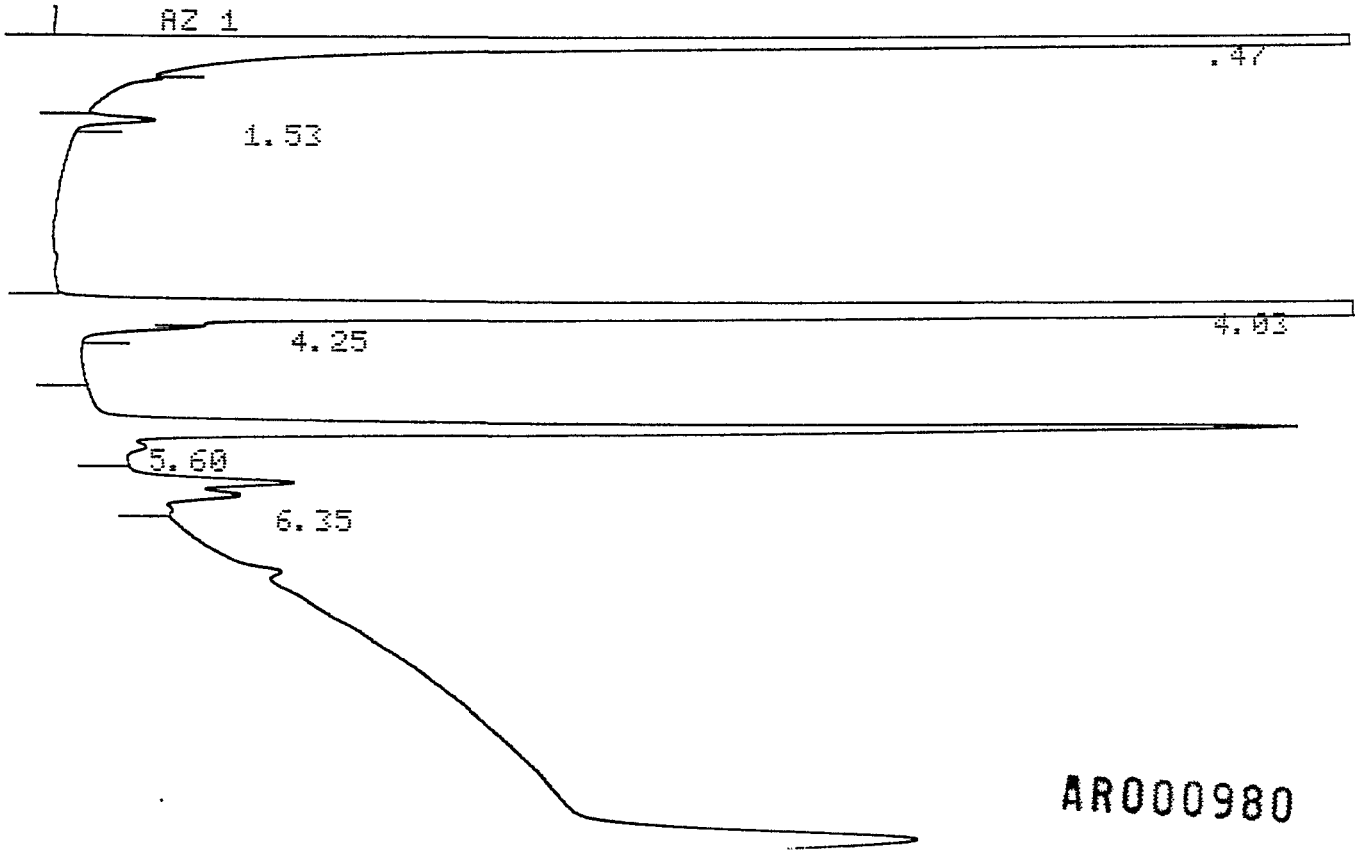
MALCOLM PIRNIE MILLCRK PA 12/20/87 11:17:33 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 66 INDEX 66

PEAK#	AREA%	RT	AREA	BC
1	90.86	0.47	11304213	01
2	0.087	1.52	10829	01
3	1.647	4.02	204964	02
4	0.149	4.24	18587	03
5	2.594	5.6	322781	02
6	0.565	6.32	70290	02
7	4.096	11.15	509630	03
TOTAL	100.		12441294	

5G22-5R 1080µ

CHANNEL A INJECT 12/20/87 11:38:02



AR000980

ER 0

MALCOLM PIRNIE MILLCRK PA 12/20/87 11:38:02 CH= "A" PS= 1.

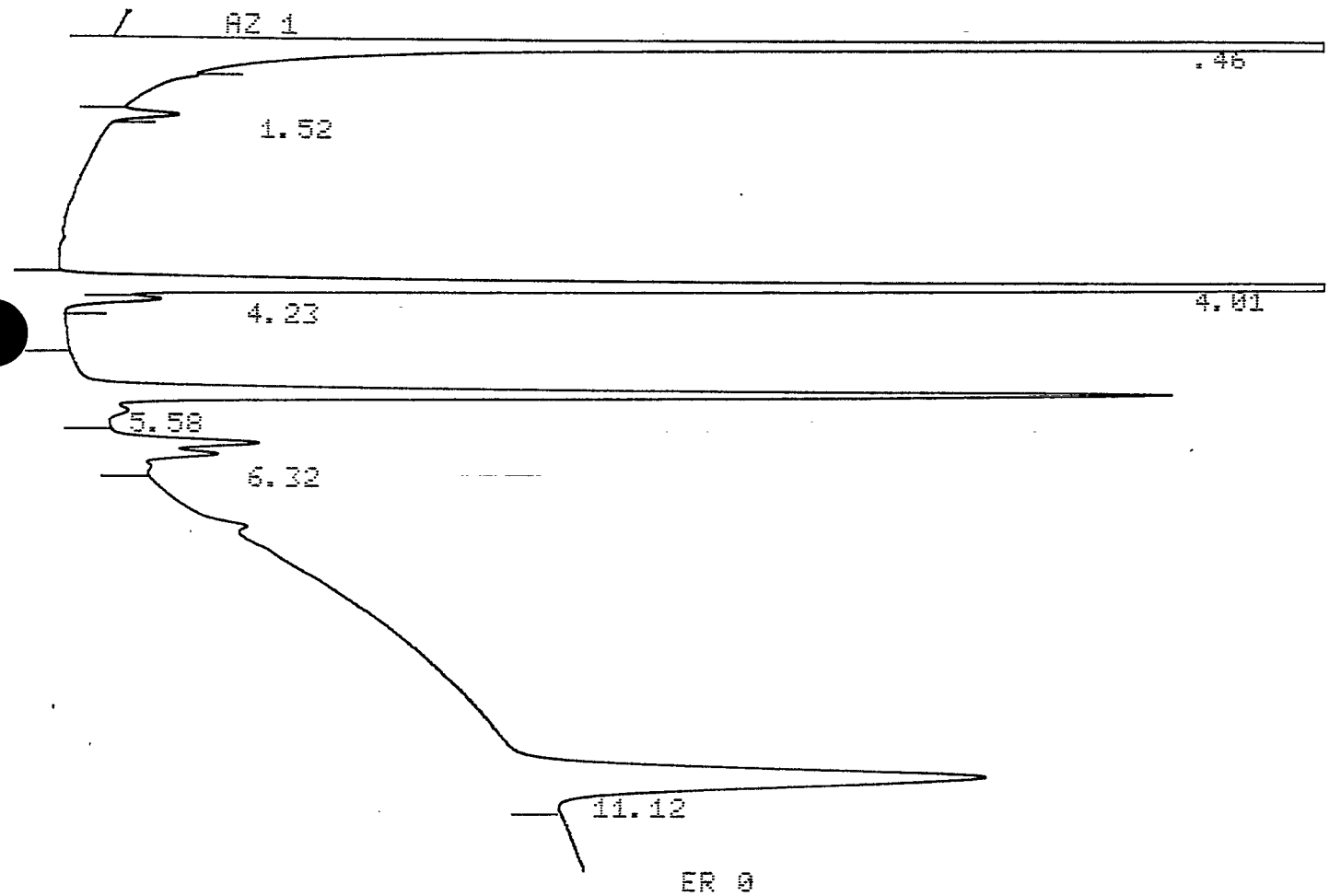
ORIGINAL (Red)

FILE 1. METHOD 0. RUN 67 INDEX 67

PEAK#	AREA%	RT	AREA	BC
1	72.772	0.47	10364266	01
2	0.118	1.53	16871	01
3	18.384	4.03	2618210	02
4	0.216	4.25	30825	03
5	3.096	5.6	440908	02
6	0.578	6.35	82309	02
7	4.835	11.15	688630	03
TOTAL	100.		14242019	

5622-5R 1000 gal

CHANNEL A INJECT 12/20/87 11:53:01



ER 0

MALCOLM PIRNIE MILLCRK PA 12/20/87 11:53:01 CH= "A" PS= 1.

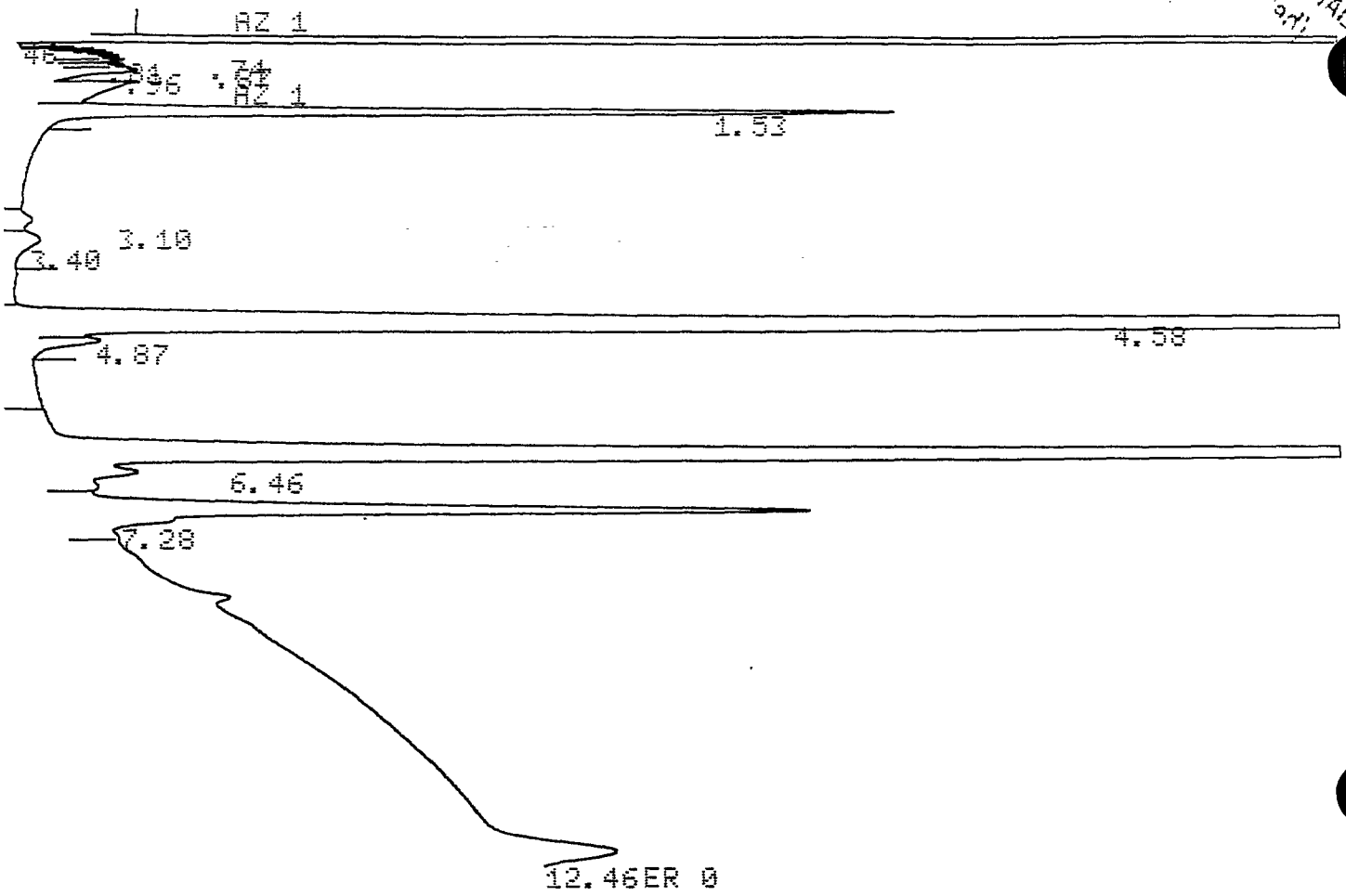
FILE 1. METHOD 0. RUN 68 INDEX 68

PEAK#	AREA%	RT	AREA	BC
1	79.41	0.46	8440145	01
2	0.138	1.52	14656	01
3	7.798	4.01	828846	02
4	0.303	4.23	32164	03
5	4.071	5.58	432666	02
6	0.771	6.32	81953	02

AR000981

TOTAL 100. 10628593

CHANNEL A INJECT 12/20/87 12:16:09



INPUT OVERRANGE AT RT= 0.58

MALCOLM PIRNIE MILLCRK PA 12/20/87 12:16:09 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 69 INDEX 69

PEAK#	AREA%	RT	AREA	BC
1	68.965	0.46	9064579	01
2	1.508	0.74	198237	02
3	0.397	0.81	52238	02
4	0.481	0.87	63258	02
5	2.291	0.96	301169	02
6	2.2	1.53	289198	03
7	0.045	3.1	5947	02
8	0.112	3.4	14680	03
9	11.816	4.58	1553069	02
10	0.251	4.87	32936	03
11	9.597	6.46	1261415	02
12	2.336	7.28	307009	03

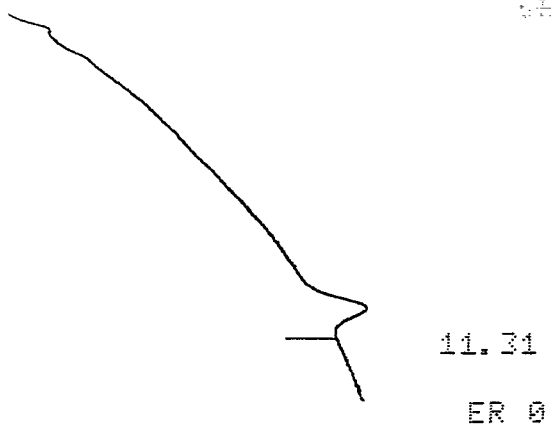
TOTAL 100. 13143735

5606-3R 1000µl

CHANNEL A INJECT 12/20/87 12:32:44

AZ 1

AR000982



ER 0

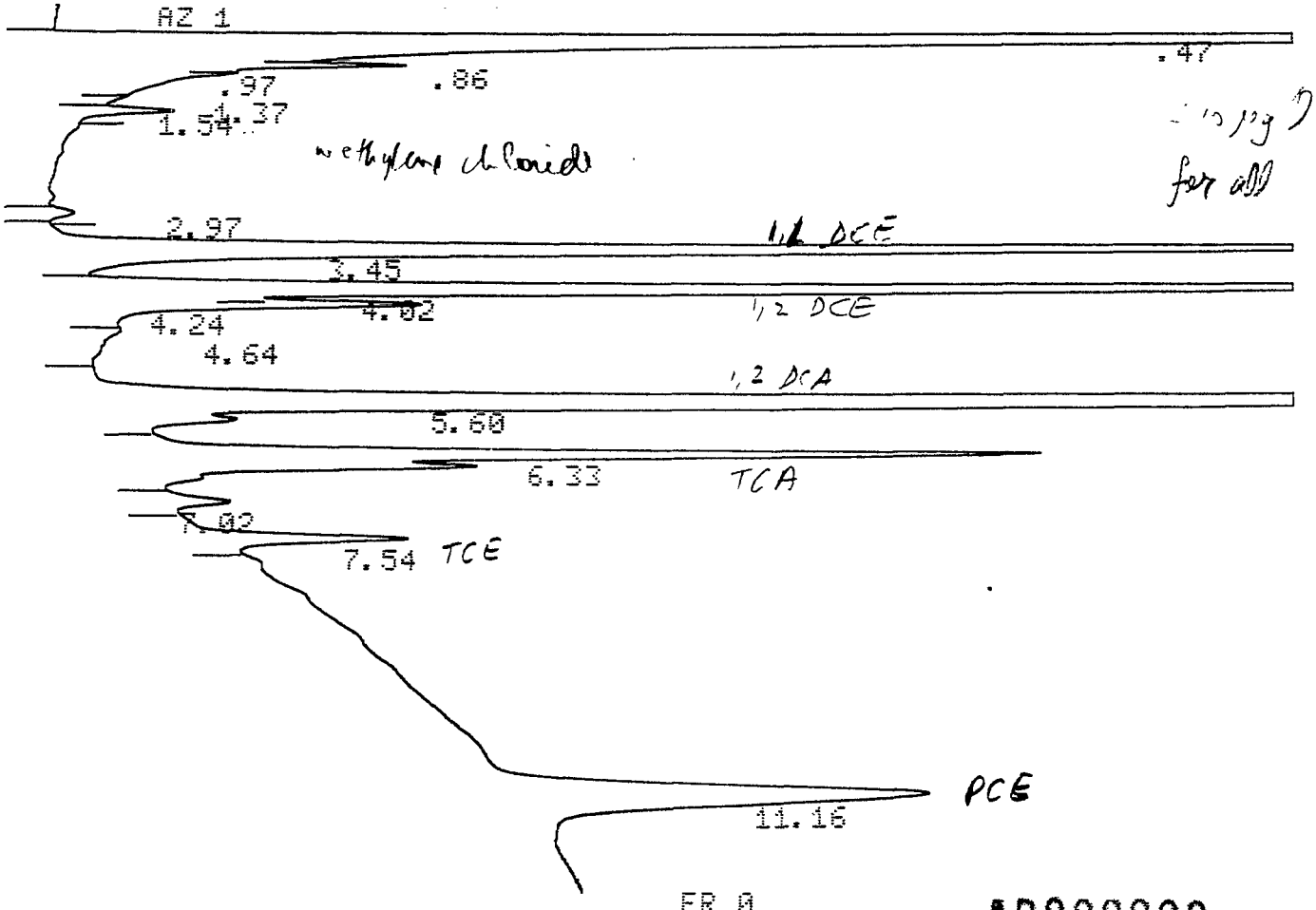
MALCOLM PIRNIE MILLCRK PA 12/20/87 12:51:27 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 71 INDEX 71

PEAK#	AREA%	RT	AREA	BC
1	80.572	0.47	11752552	02
2	1.462	1.53	213248	03
3	0.131	3.16	19039	01
4	7.065	4.05	1030561	02
5	0.082	4.29	11992	03
6	7.222	5.63	1053373	02
7	0.58	6.38	84571	02
8	2.887	11.31	421084	03
TOTAL	100.		14586420	

SG19-6R 1000µl

CHANNEL A INJECT 12/20/87 13:12:34



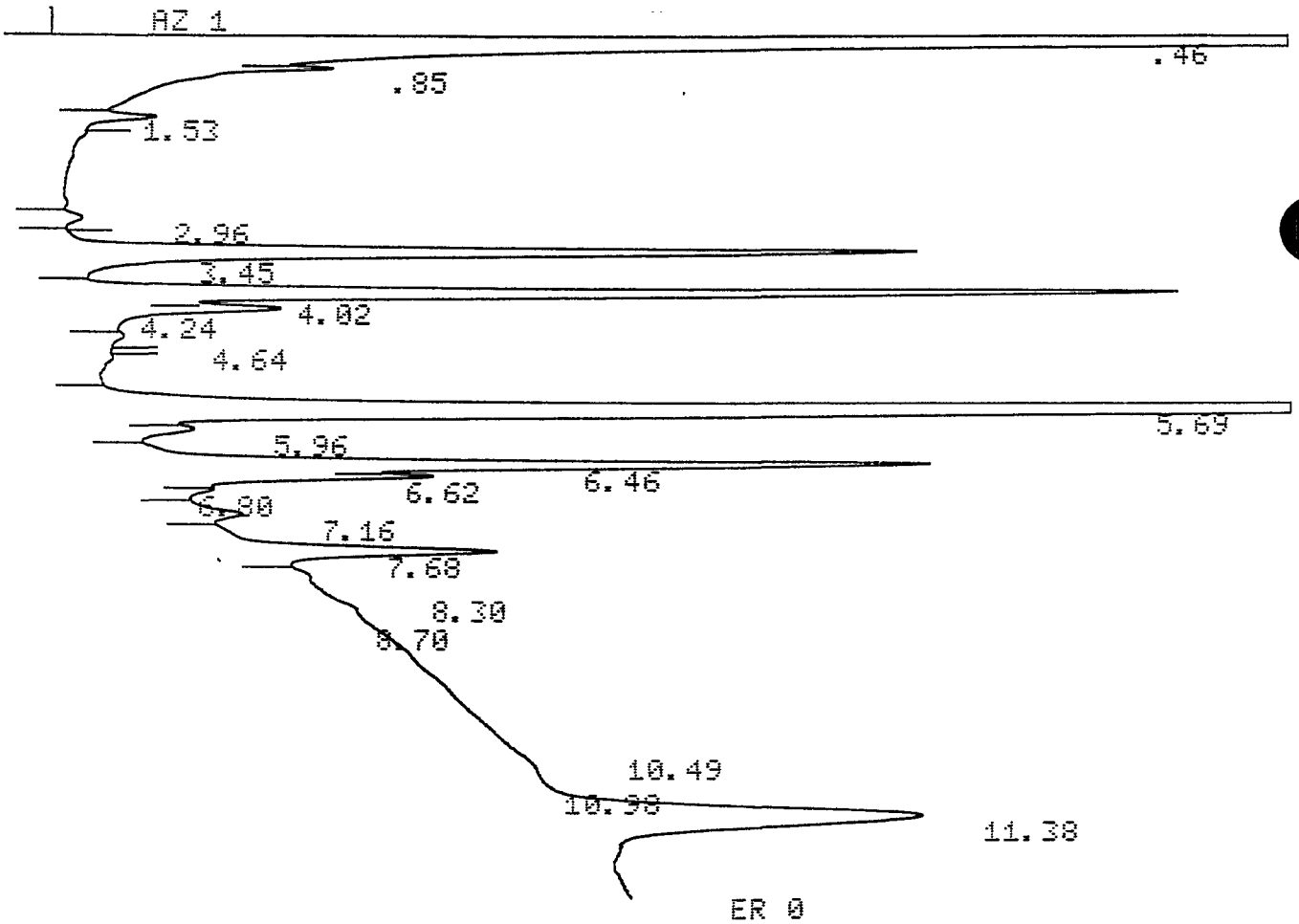
ER 0

AR000983

FILE 1. METHOD 0. RUN 72 INDEX 72

PEAK#	AREA%	RT	AREA	BC
1	64.868	0.47	9257097	02
2	0.712	0.86	101585	02
3	0.709	0.97	101195	02
4	0.114	1.37	16224	02
5	0.211	1.54	30170	03
6	0.046	2.97	6537	01
7	4.967	3.45	708785	02
8	5.21	4.02	743458	02
9	0.973	4.24	138855	02
10	0.192	4.64	27456	02
11	11.992	5.6	1711403	02
12	3.356	6.33	478995	02
13	0.145	7.02	20698	02
14	0.607	7.54	86599	02
15	5.898	11.16	841644	03
TOTAL	100.		14270701	

CHANNEL A INJECT 12/20/87 13:45:00 SG19-6R 1000µl



MALCOLM PIRNIE MILLCRK PA 12/20/87 13:45:00 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 73 INDEX 73

PEAK#	AREA%	RT	AREA	BC
1	75.813	0.46	10800469	02
2	1.309	0.85	186412	02
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

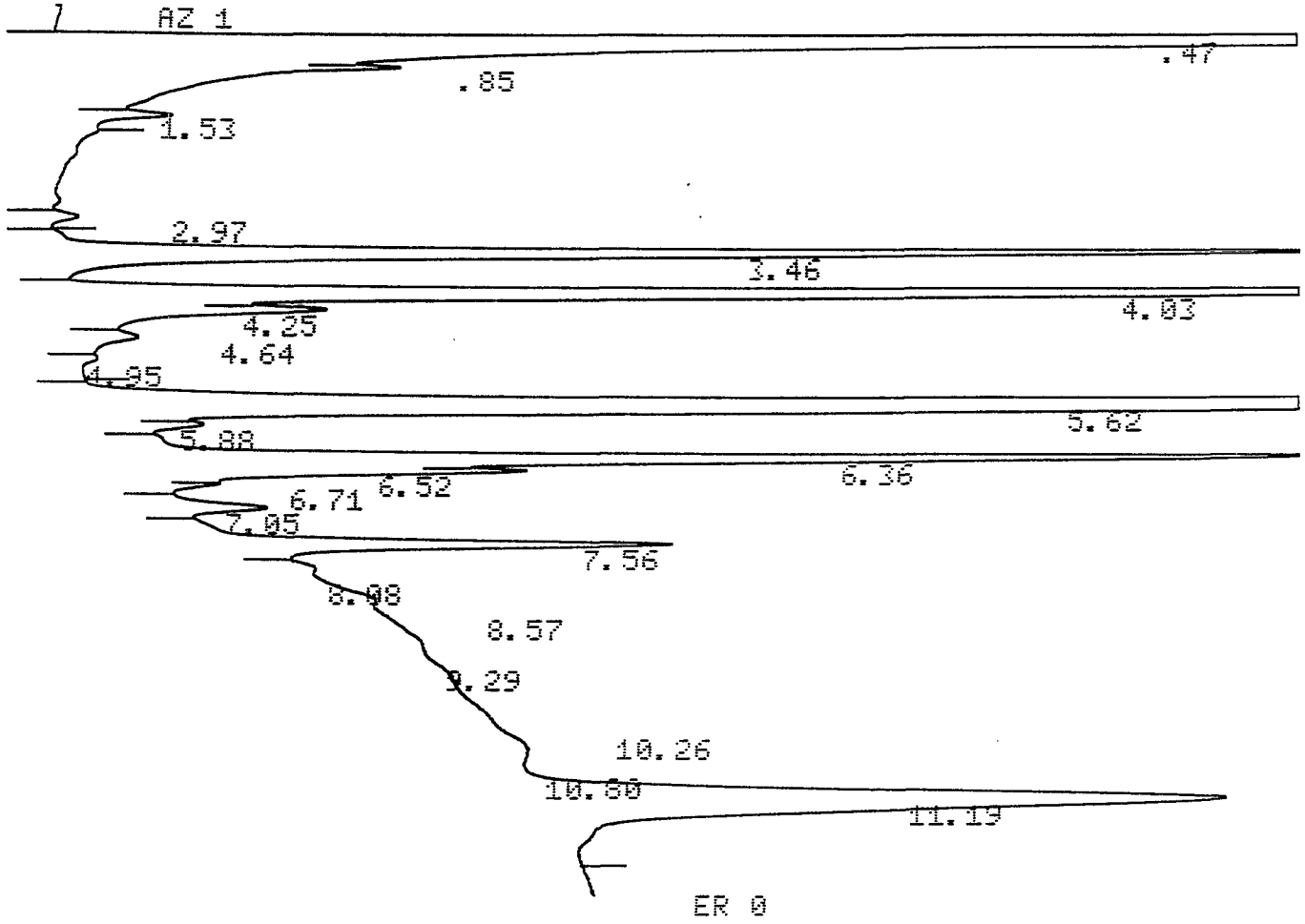
AR000984

5	2.314	3.45	329706	02
6	2.828	4.02	402891	02
7	0.556	4.24	79138	08
8	0.017	4.64	2382	05
9	7.539	5.69	1073972	02
10	0.151	5.96	21517	02
11	2.122	6.46	302317	02
12	0.581	6.62	82751	02
13	0.058	6.8	8207	02
14	0.085	7.16	12103	02
15	0.759	7.68	108064	02
16	0.25	8.3	35546	02
17	0.316	8.7	44975	02
18	1.702	10.49	242493	02
19	0.463	10.98	66017	02
20	2.931	11.38	417526	03
TOTAL	100.		14246141	

ORIGINAL (Red)

SG-19-6R 1000µl

CHANNEL A INJECT 12/20/87 14:01:38



MALCOLM PIRNIE MILLCRK PA 12/20/87 14:01:38 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 74 INDEX 74

PEAK#	AREA%	RT	AREA	BC
1	66.33	0.47	11385230	02
2	1.381	0.85	237005	02
3	0.152	1.53	26167	03
4	0.042	2.97	7256	01
5	3.011	3.46	516905	02
6	4.328	4.03	742827	02

AR000985

8	0.205	4.64	35244	02
9	0.037	4.95	6292	03
10	10.996	5.62	1887361	02
11	0.169	5.88	29025	02
12	2.798	6.36	480285	02
13	0.698	6.52	119827	02
14	0.068	6.71	11586	02
15	0.157	7.05	26962	02
16	1.128	7.56	193580	02
17	0.28	8.08	48030	02
18	0.621	8.57	106565	02
19	0.977	9.29	167708	02
20	1.186	10.26	203506	02
21	0.597	10.8	102458	02
22	4.106	11.19	704836	03
TOTAL	100.		17164413	

NO DATA, CHANNEL A

A=32
AT=32

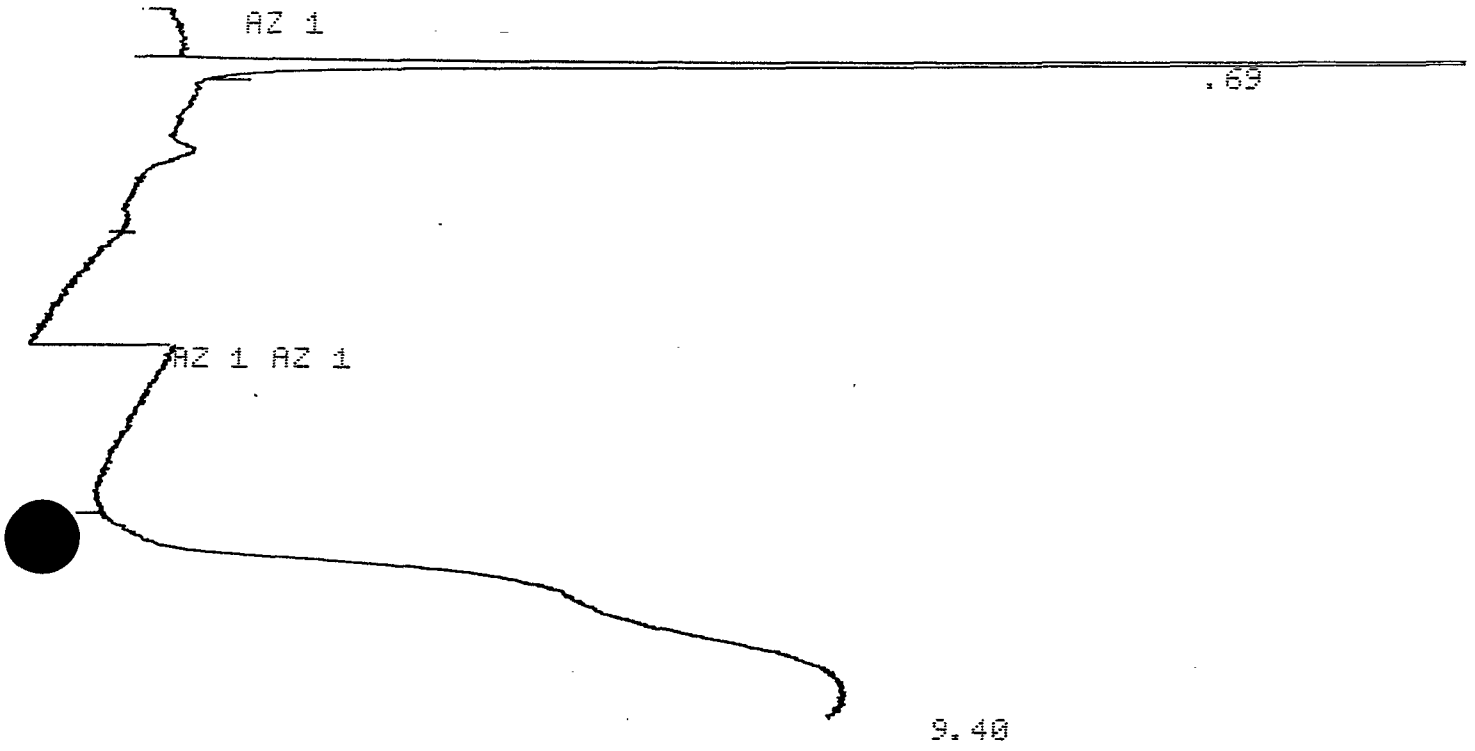
ORIGINAL (Red)

ANNEL A INJECT 12/14/87 08:08:47
AZ 1

STD 5µl
TCA 5µg/l
TCE 10
PCE 5

NO DATA, CHANNEL A

CHANNEL A INJECT 12/14/87 08:09:33

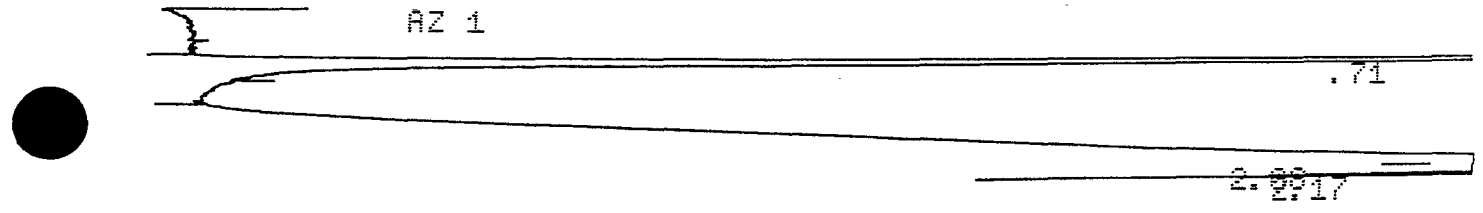


MALCOLM PIRNIE ERIE PA 12/14/87 08:09:33 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 6 INDEX 6

PEAK#	AREA%	RT	AREA	BC
1	42.4	0.69	358786	01
2	57.6	9.4	487399	01
TOTAL	100.		846185	

CHANNEL A INJECT 12/14/87 08:20:11

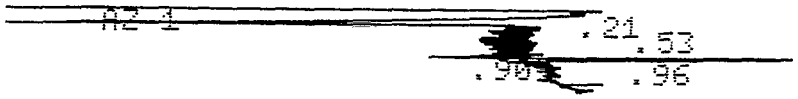


MALCOLM PIRNIE ERIE PA 12/14/87 08:20:11 CH= "A" PS= 1.

PEAK#	AREA%	RT	AREA	BC
1	58.872	0.71	432289	01
2	20.669	2.08	151771	02
3	20.459	2.17	150228	03
TAL	100.		734288	

ORIGINAL (Red)

CHANNEL A INJECT 12/14/87 08:26:11



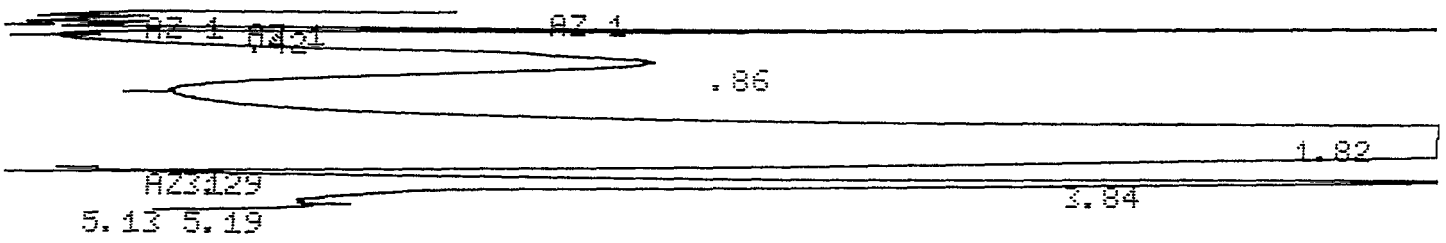
INPUT OVERRANGE AT RT= 0.49

MALCOLM PIRNIE ERIE PA 12/14/87 08:26:11 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 8 INDEX 8

PEAK#	AREA%	RT	AREA	BC
1	31.005	0.21	182603	01
2	50.337	0.53	296452	02
3	1.774	0.9	10449	02
4	16.884	0.96	99434	03
TAL	100.		588938	

CHANNEL A INJECT 12/14/87 08:27:54



INPUT OVERRANGE AT RT= 5.52

MALCOLM PIRNIE ERIE PA 12/14/87 08:27:54 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 9 INDEX 9

PEAK#	AREA%	RT	AREA	BC
1	3.201	0.42	142210	01
2	13.712	0.86	609255	02
3	73.27	1.82	3255541	03
4	9.818	3.84	436225	01
TOTAL	100.		4443231	

AR000988

CHANNEL A INJECT 12/14/87 08:34:04

A2 1

INPUT OVERRANGE AT RT= 0.09

ORIGINAL (Red)

NO DATA, CHANNEL A

CHANNEL A INJECT 12/14/87 08:34:14
AZ 1

INPUT OVERRANGE AT RT= 1.07

NO DATA, CHANNEL A

CHANNEL A INJECT 12/14/87 08:35:26
AZ 1

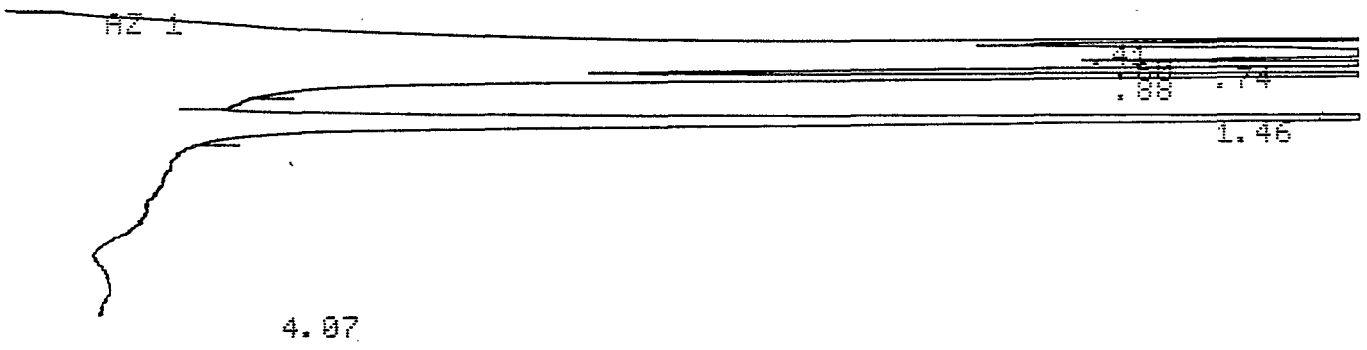
INPUT OVERRANGE AT RT= 0.05

NO DATA, CHANNEL A

CHANNEL A INJECT 12/14/87 08:35:49
AZ 1

NO DATA, CHANNEL A

CHANNEL A INJECT 12/14/87 08:35:57



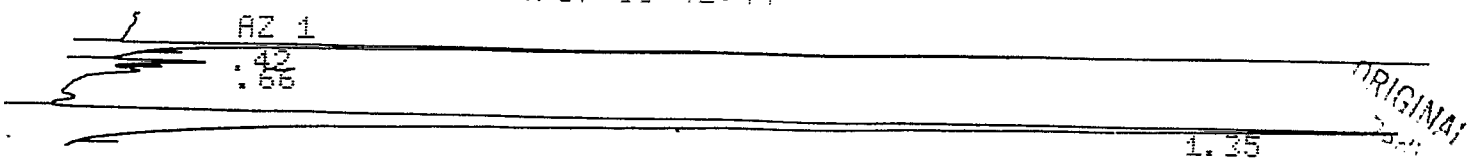
MALCOLM PIRNIE ERIE PA 12/14/87 08:35:57 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 14 INDEX 14

PEAK#	AREA%	RT	AREA	BC
1	17.351	0.41	455399	02
2	26.307	0.6	690445	02
3	18.845	0.74	494597	02
4	15.94	0.88	418355	03
5	21.557	1.46	565782	01
TOTAL	100.		2624578	

AR000989 Spl 1-2 oct 200µg/l

CHANNEL A INJECT 12/14/87 08:41:44



ORIGINAL

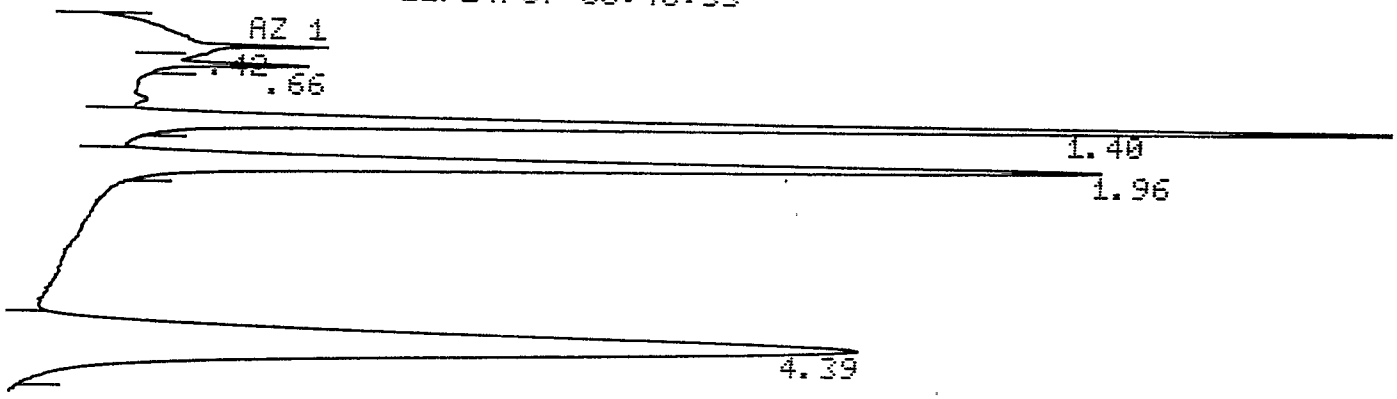
MALCOLM PIRNIE ERIE PA 12/14/87 08:41:44 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 15 INDEX 15

PEAK#	AREA%	RT	AREA	BC
1	16.525	0.42	96373	01
2	1.518	0.66	8855	01
3	81.956	1.35	477955	01
TOTAL	100.		583183	

STD 5µl
TCA 5
TCE 10 µg/l
PCE 5

CHANNEL A INJECT 12/14/87 08:45:33



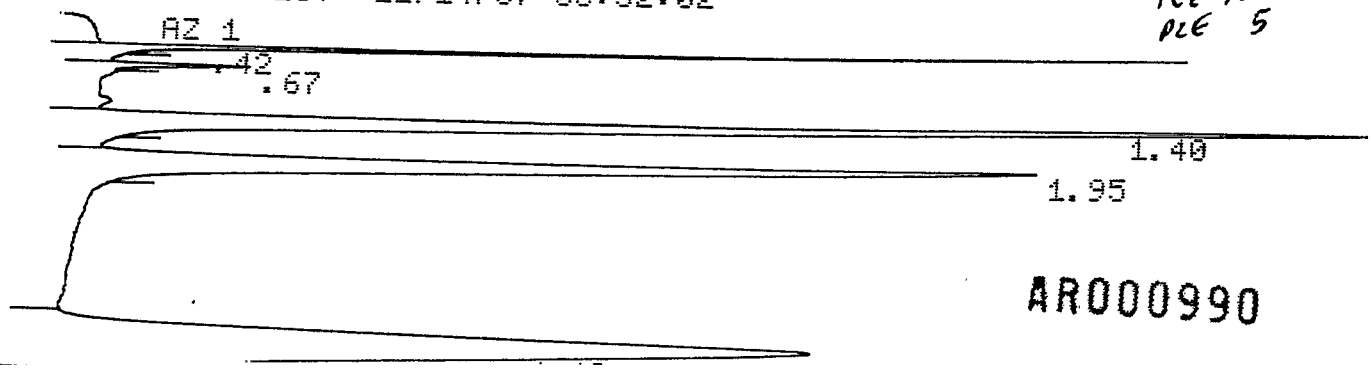
MALCOLM PIRNIE ERIE PA 12/14/87 08:45:33 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 16 INDEX 16

PEAK#	AREA%	RT	AREA	BC
1	4.677	0.42	78959	02
2	2.423	0.66	40901	03
3	23.058	1.4	389244	01
4	23.727	1.96	400539	01
5	46.116	4.39	778496	01
TOTAL	100.		1688139	

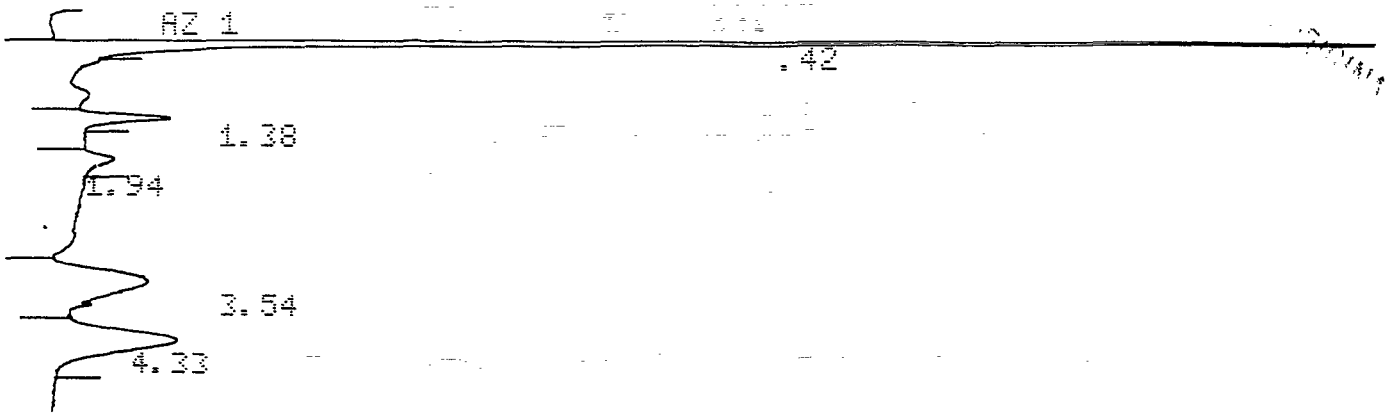
STD 5µl
TCA 5 µg/l
TCE 10
PCE 5

CHANNEL A INJECT 12/14/87 08:52:02



AR000990

CHANNEL A INJECT 12/14/87 09:13:54

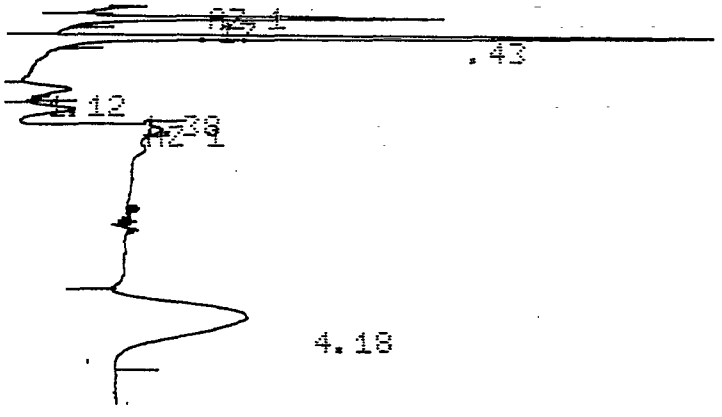


MALCOLM PIRNIE ERIE PA 12/14/87 09:13:54 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 23 INDEX 23

PEAK#	AREA%	RT	AREA	BC
1	51.275	0.42	252164	01
2	5.087	1.38	25016	01
3	2.319	1.94	11404	01
4	19.236	3.54	94602	02
5	22.083	4.33	108601	03
TOTAL	100.		491787	

CHANNEL A INJECT 12/14/87 09:21:37



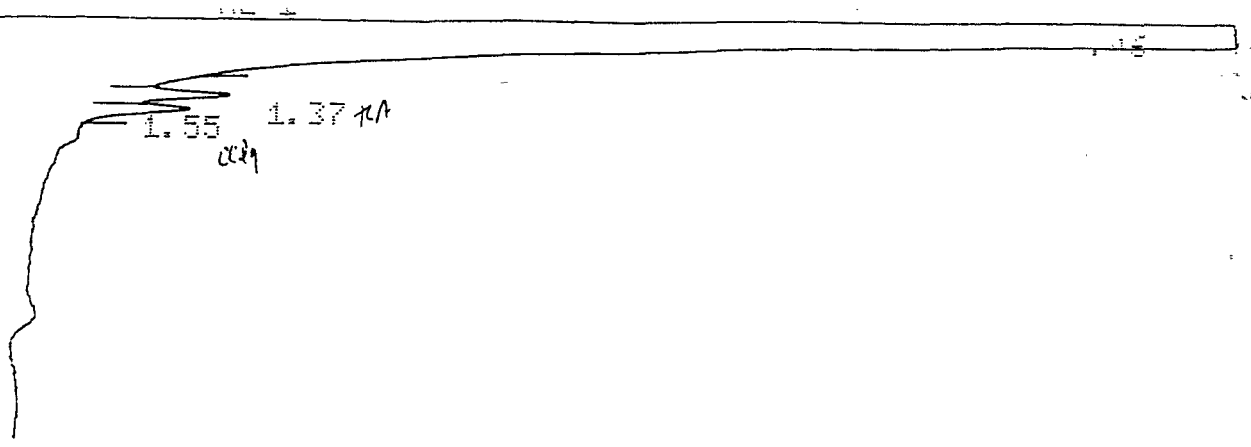
MALCOLM PIRNIE ERIE PA 12/14/87 09:21:37 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 24 INDEX 24

PEAK#	AREA%	RT	AREA	BC
1	14.224	0.17	45606	01
2	29.618	0.43	94964	01
3	4.155	1.12	13321	01
4	3.898	1.38	12499	01
5	48.106	4.18	154243	01
TOTAL	100.		320633	

AR000991 AIR SAMPLE 1000 µl

CHANNEL B INJECT 12/14/87 09:27:44



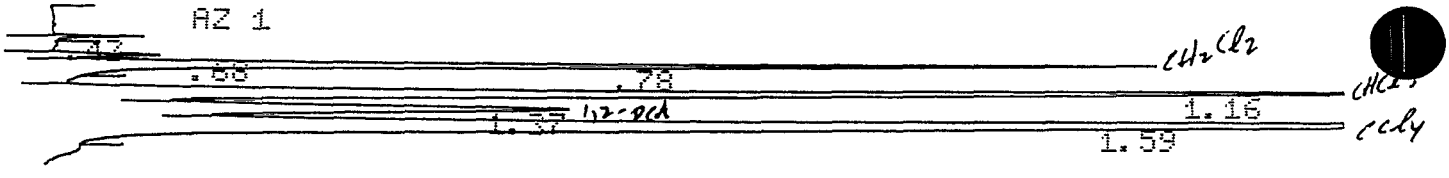
MALCOLM PIRNIE ERIE PA 12/14/87 09:27:11 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 25 INDEX 25

PEAK#	AREA%	RT	AREA	BC
1	99.668	0.46	14802989	01
2	0.169	1.37	25075	02
3	0.163	1.55	24189	03
TOTAL	100.		14852253	

STD 5 µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl4 2

CHANNEL A INJECT 12/14/87 09:37:23
AZ 1

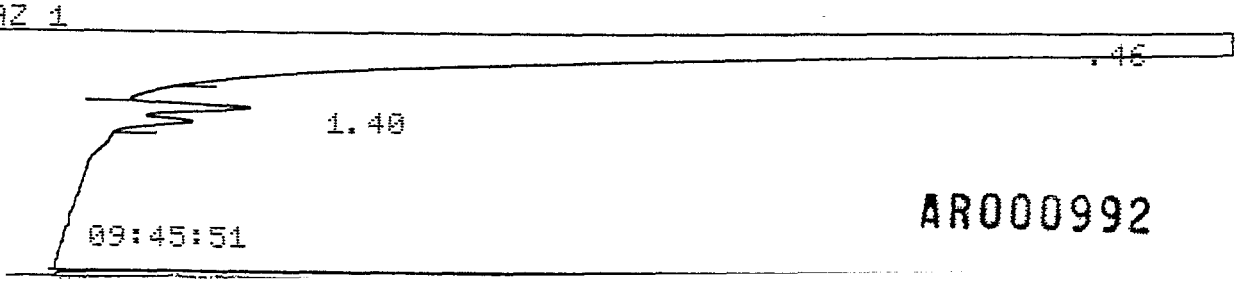


MALCOLM PIRNIE ERIE PA 12/14/87 09:37:23 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 26 INDEX 26

PEAK#	AREA%	RT	AREA	BC
1	0.485	0.43	5922	01
2	0.954	0.68	11642	02
3	14.239	0.78	173856	03
4	26.845	1.16	327771	02
5	12.784	1.37	156093	02
6	44.693	1.59	545686	03
TOTAL	100.		1220970	

CHANNEL A INJECT 12/14/87 09:42:52
AZ 1



INPUT OVERRANGE AT RT= 3.7

ORIGINAL

ALCOLM PIRNIE ERIE PA 12/14/87 09:42:52 CH= "A" PS= 1.

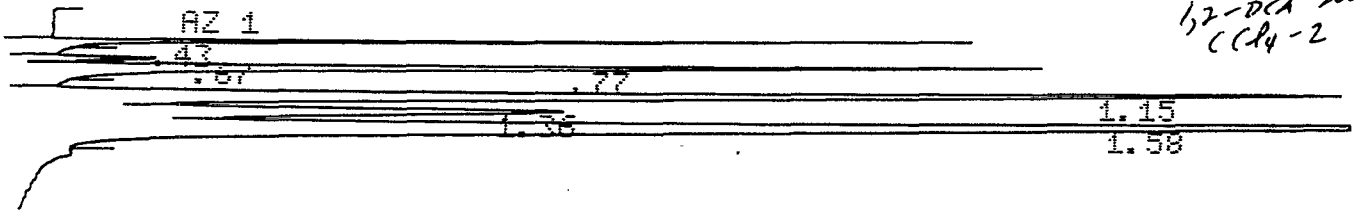
FILE 1. METHOD 0. RUN 27 INDEX 27

PEAK#	AREA%	RT	AREA	BC
1	91.767	0.46	14645342	01
2	0.353	1.4	56302	01
3	3.883	3.61	619702	02
4	3.997	3.71	637883	03
TOTAL	100.		15959229	

STD 5µl

CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 - 2

CHANNEL A INJECT 12/14/87 09:48:35



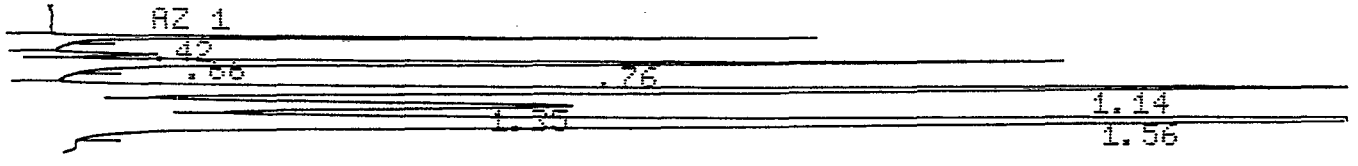
ALCOLM PIRNIE ERIE PA 12/14/87 09:48:35 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 28 INDEX 28

PEAK#	AREA%	RT	AREA	BC
1	5.195	0.43	62692	01
2	0.905	0.67	10919	02
3	13.441	0.77	162218	03
4	24.976	1.15	301425	02
5	13.29	1.36	160394	02
6	42.193	1.58	509216	03
TOTAL	100.		1206864	

STD 5µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 - 2

CHANNEL A INJECT 12/14/87 09:58:03



ALCOLM PIRNIE ERIE PA 12/14/87 09:58:03 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 29 INDEX 29

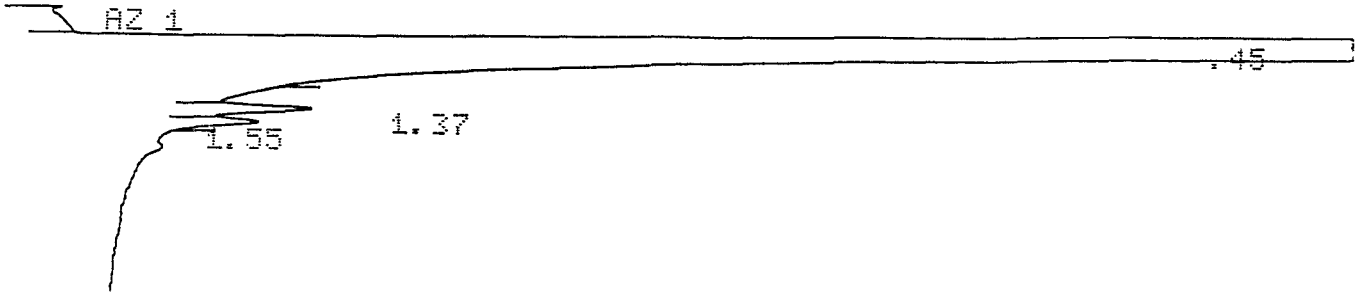
PEAK#	AREA%	RT	AREA	BC
1	4.573	0.42	53535	01
2	0.923	0.66	10806	02

AR000993

4	25.437	1.14	297813	02
5	13.317	1.35	155910	02
6	42.429	1.56	496756	03
TOTAL	100.		1170794	

SYSTEM BLANK 1000µl

CHANNEL A INJECT 12/14/87 10:04:01



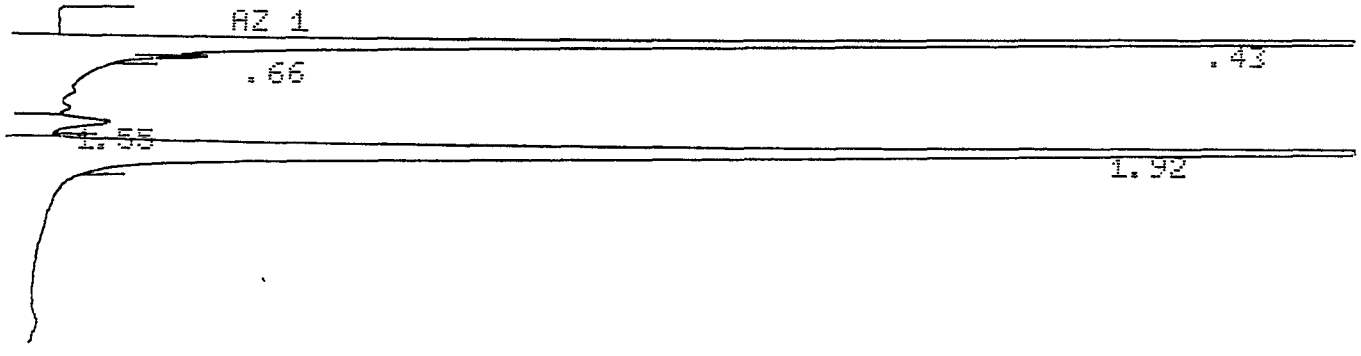
MALCOLM PIRNIE ERIE PA 12/14/87 10:04:01 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 30 INDEX 30

PEAK#	AREA%	RT	AREA	BC
1	99.639	0.45	13038054	01
2	0.203	1.37	26549	02
3	0.159	1.55	20747	03
TOTAL	100.		13085350	

5621
~~5601~~ - 4' 100µl

CHANNEL A INJECT 12/14/87 10:08:39



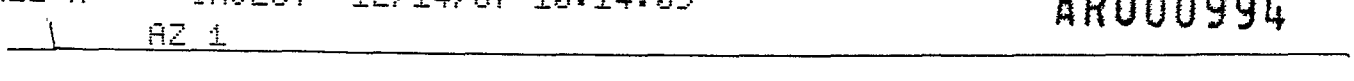
MALCOLM PIRNIE ERIE PA 12/14/87 10:08:39 CH= "A" PS= 1.

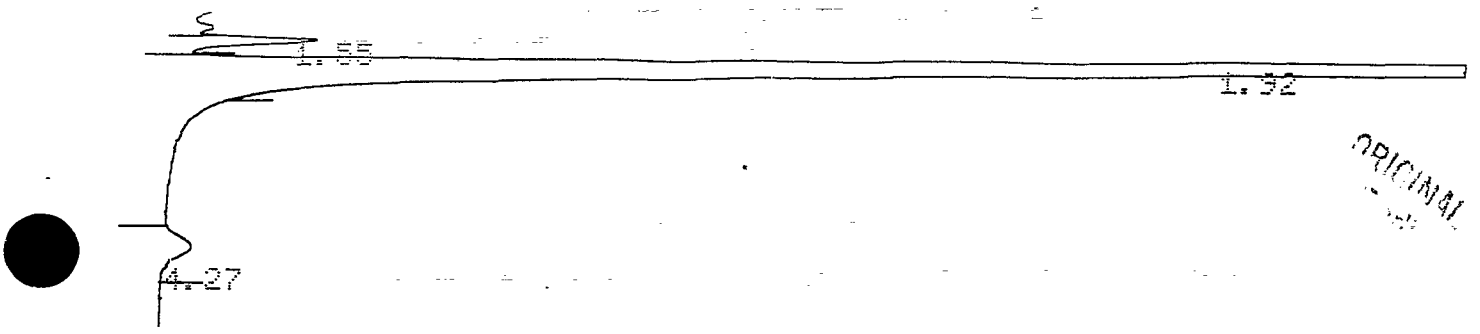
FILE 1. METHOD 0. RUN 31 INDEX 31

PEAK#	AREA%	RT	AREA	BC
1	77.034	0.43	2321327	02
2	0.575	0.66	17318	03
3	0.507	1.55	15289	01
4	21.884	1.92	659433	01
TOTAL	100.		3013367	

~~5621~~ 5621
~~5601~~ @ 4' 200 µl

CHANNEL A INJECT 12/14/87 10:14:09





ORIGINAL

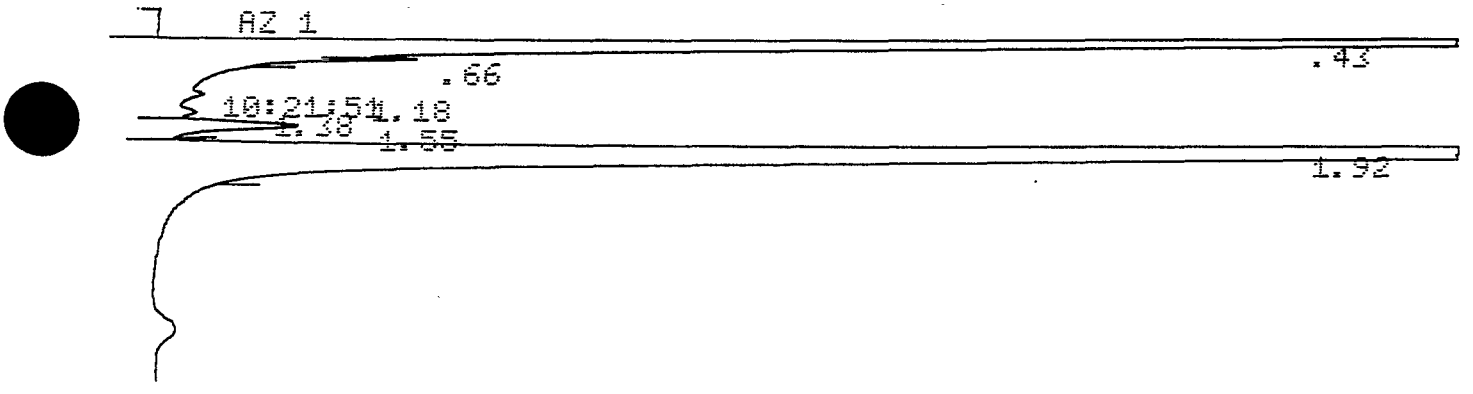
MALCOLM PIRNIE ERIE PA 12/14/87 10:14:09 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 32 INDEX 32

PEAK#	AREA%	RT	AREA	BC
1	73.959	0.43	4479678	02
2	0.668	0.66	40443	03
3	0.513	1.55	31071	01
4	24.484	1.92	1483017	01
5	0.376	4.27	22791	01
TOTAL	100.		6057000	

5621-4' 200µl

CHANNEL A INJECT 12/14/87 10:20:43



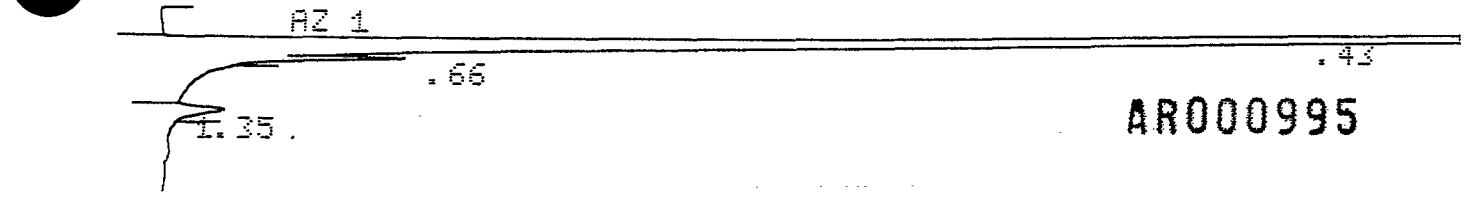
MALCOLM PIRNIE ERIE PA 12/14/87 10:20:43 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 33 INDEX 33

PEAK#	AREA%	RT	AREA	BC
1	73.74	0.43	4296178	02
2	0.517	0.66	30114	03
3	0.583	1.55	33969	01
4	25.16	1.92	1465884	01
TOTAL	100.		5826145	

5602-2' 200µl

NNEL A INJECT 12/14/87 12:15:56



AR000995

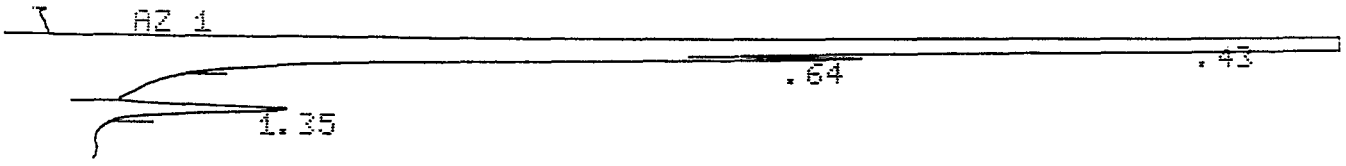
MALCOLM PIRNIE ERIE PA 12/14/87 12:15:56 CH= "A" PS=ORIGINAL (Red)

FILE 1. METHOD 0. RUN 34 INDEX 34

PK#	AREA%	RT	AREA	BC
1	98.326	0.43	2683042	02
2	1.182	0.66	32254	03
3	0.492	1.35	13438	01
TOTAL	100.		2728734	

SG62 – 2' 1000µl

CHANNEL A INJECT 12/14/87 12:19:07



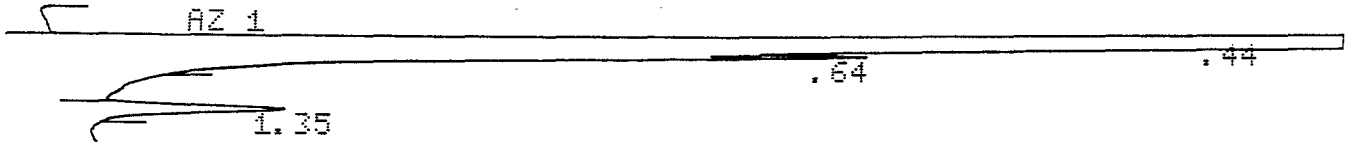
MALCOLM PIRNIE ERIE PA 12/14/87 12:19:07 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 35 INDEX 35

PEAK#	AREA%	RT	AREA	BC
1	97.513	0.43	9027534	02
2	1.918	0.64	177537	03
3	0.569	1.35	52677	01
TOTAL	100.		9257748	

SG62 – 2' 1000µl

CHANNEL A INJECT 12/14/87 12:21:27



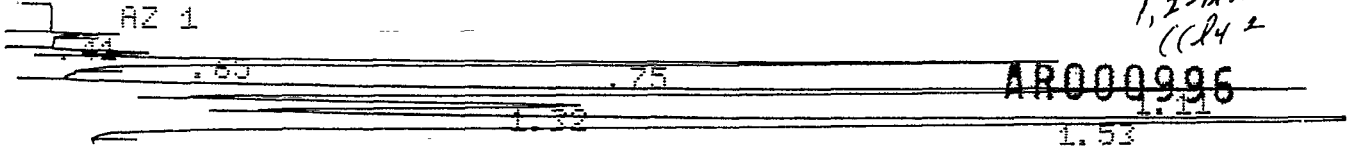
MALCOLM PIRNIE ERIE PA 12/14/87 12:21:27 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 36 INDEX 36

PEAK#	AREA%	RT	AREA	BC
1	97.488	0.44	9258617	02
2	1.93	0.64	183281	03
3	0.582	1.35	55314	01
TOTAL	100.		9497212	

STD
CH_2Cl_2 200µg/ml 5
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

CHANNEL A INJECT 12/14/87 12:23:35



AR000996

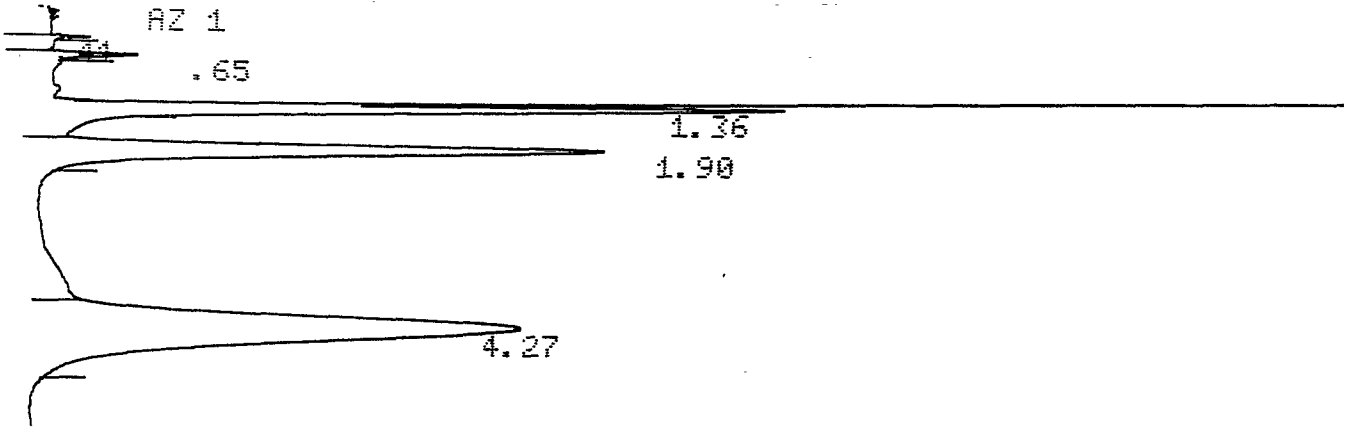
MALCOLM PIRNIE ERIE PA 12/14/87 12:23:35 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 37 INDEX 37

PEAK#	AREA%	RT	AREA	BC
1	0.396	0.41	4545	01
2	0.965	0.65	11083	02
3	14.429	0.75	165755	03
4	26.665	1.11	306312	02
5	13.863	1.32	159251	02
6	43.683	1.53	501803	03
TOTAL	100.		1148749	

STD 3µl
TCA 5µg/l
TCE 10
PCE 5

CHANNEL A INJECT 12/14/87 12:26:11



INPUT OVERRANGE AT RT= 1.27

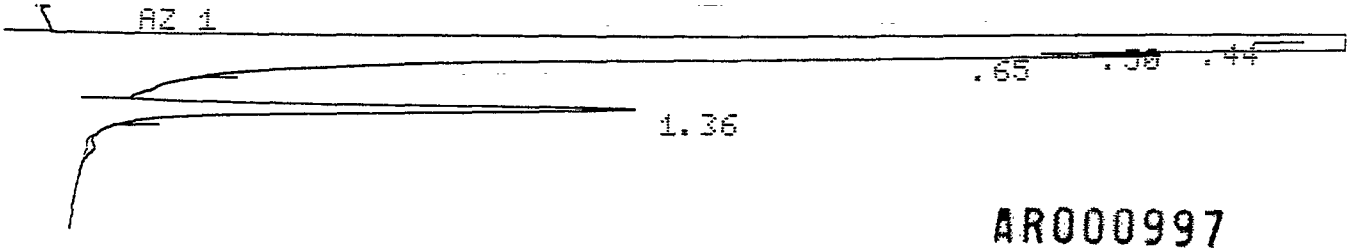
MALCOLM PIRNIE ERIE PA 12/14/87 12:26:11 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 38 INDEX 38

PEAK#	AREA%	RT	AREA	BC
1	0.387	0.41	3152	01
2	1.226	0.65	9980	01
3	12.633	1.36	102827	01
4	28.681	1.9	233451	01
5	57.073	4.27	464555	01
TOTAL	100.		813965	

SG91-3' 1000µl

CHANNEL A INJECT 12/14/87 12:38:25



FILE 1. METHOD 0. RUN 39 INDEX 39

PEAK#	AREA%	RT	AREA	BC
1	82.682	0.44	10049601	02
2	13.641	0.5	1657945	02
3	2.294	0.65	278855	03
4	1.383	1.36	168082	01
TOTAL	100.		12154483	

SG01 - 3' 1000

CHANNEL A INJECT 12/14/87 12:42:07

AZ 1

.42

1.36

1.93

MALCOLM PIRNIE ERIE PA 12/14/87 12:42:07 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 40 INDEX 40

PEAK#	AREA%	RT	AREA	BC
1	98.147	0.42	10809795	02
2	1.853	1.36	204097	03
TAL	100.		11013892	

8.06 12:50:13

SG04 - 3½' 1000µl

CHANNEL A INJECT 12/14/87 12:58:48

AZ 1

.43

.66

1.37

1.92

MALCOLM PIRNIE ERIE PA 12/14/87 12:58:48 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 41 INDEX 41

PEAK#	AREA%	RT	AREA	BC
1	96.129	0.43	3354157	02
2	0.812	0.66	28320	03
3	0.915	1.37	31922	01
4	2.144	1.92	74823	01
TOTAL	100.		3489222	

SG04 - 3½' 1000µl

CHANNEL A INJECT 12/14/87 13:01:58

AZ 1

.43

.66

1.12 1.37

AR000998

MALCOLM PIRNIE ERIE PA 12/14/87 13:01:58 CH= "A" PS= 1.

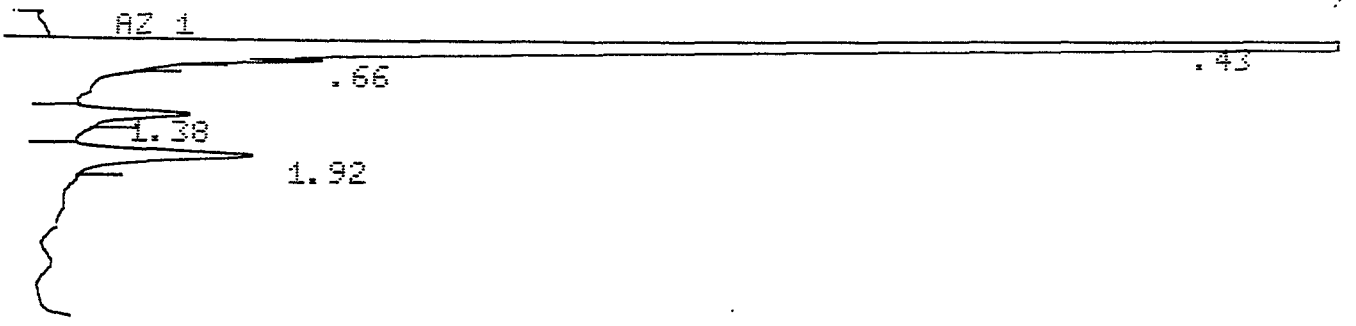
ORIGINAL

FILE 1. METHOD 0. RUN 42 INDEX 42

PEAK#	AREA%	RT	AREA	BC
1	93.914	0.43	2884178	02
2	0.887	0.66	27240	03
3	2.076	1.12	63752	02
4	0.929	1.37	28537	03
5	2.194	1.93	67372	01
TOTAL	100.		3071079	

CHANNEL A INJECT 12/14/87 13:09:52

SG04 - 3½' 1000µl



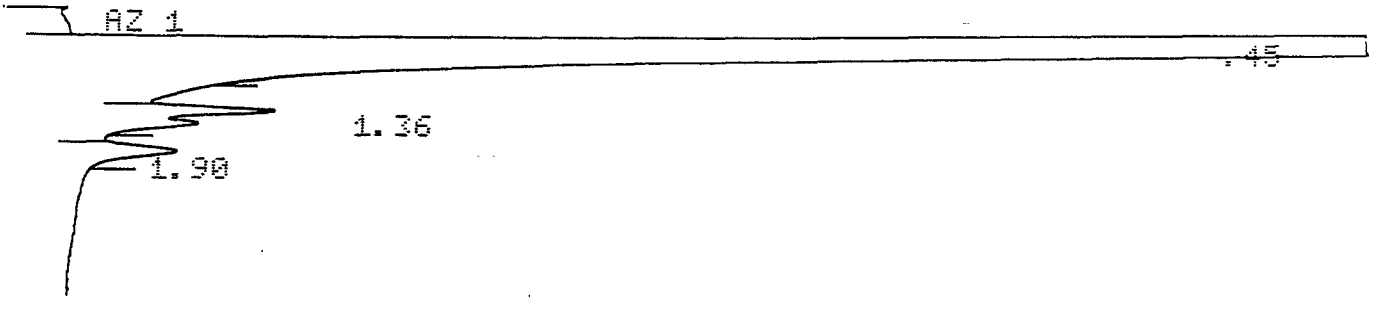
MALCOLM PIRNIE ERIE PA 12/14/87 13:09:52 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 43 INDEX 43

PEAK#	AREA%	RT	AREA	BC
1	97.423	0.43	4370110	08
2	0.155	0.66	6931	05
3	0.742	1.38	33303	01
4	1.68	1.92	75345	01
TOTAL	100.		4485689	

SG05 - 2' 1000µl

CHANNEL A INJECT 12/14/87 13:26:53



MALCOLM PIRNIE ERIE PA 12/14/87 13:26:53 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 44 INDEX 44

PEAK#	AREA%	RT	AREA	BC
1	99.227	0.45	12260831	01

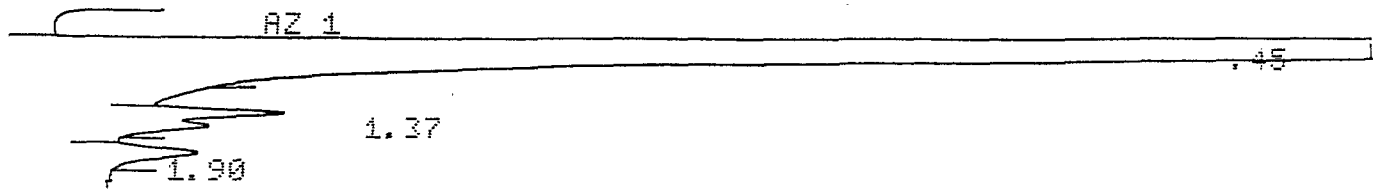
AR000999

[illegible]	[illegible]	1.9	31688	01

TOTAL 100. 12356285

SCØ5-2' 1000µl

CHANNEL A INJECT 12/14/87 13:31:19



MALCOLM PIRNIE ERIE PA 12/14/87 13:31:19 CH= "A" PS= 1.

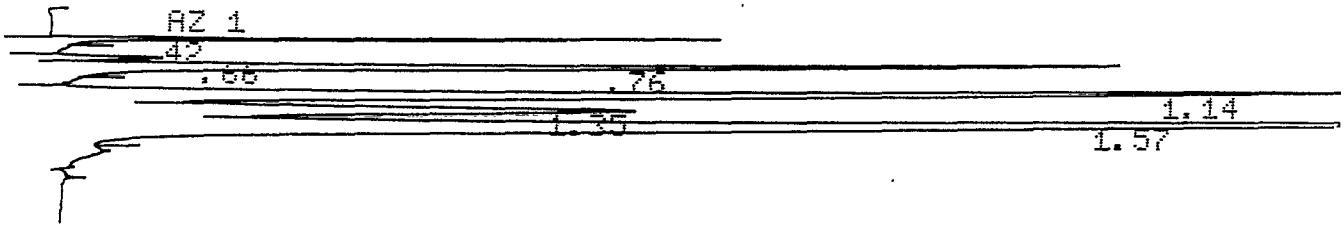
FILE 1. METHOD 0. RUN 45 INDEX 45

PEAK#	AREA%	RT	AREA	BC
1	99.246	0.45	13255321	01
2	0.493	1.37	65883	01
3	0.261	1.9	34812	01

TOTAL 100. 13356016

STD 5µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

CHANNEL A INJECT 12/14/87 13:39:35



MALCOLM PIRNIE ERIE PA 12/14/87 13:39:35 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 46 INDEX 46

PEAK#	AREA%	RT	AREA	BC
1	3.728	0.42	46617	01
2	0.945	0.66	11817	02
3	14.004	0.76	175102	03
4	25.698	1.14	321320	02
5	14.1	1.35	176301	02
6	41.525	1.57	519211	03

TOTAL 100. 1250368

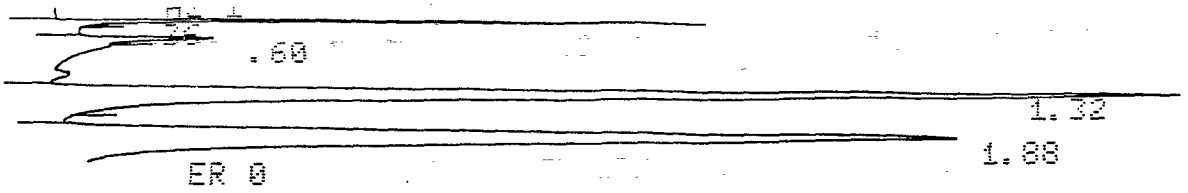
FI= 1. FE= 1. MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
FILE NAME="
ME FUNCTION VALUE
= 2.2 TF=" ER TV= 1
IT=

METHOD NUMBER:MN= ##

END OF DIALOG

STD 5µl
TCA 5
TCE 10

AR001000



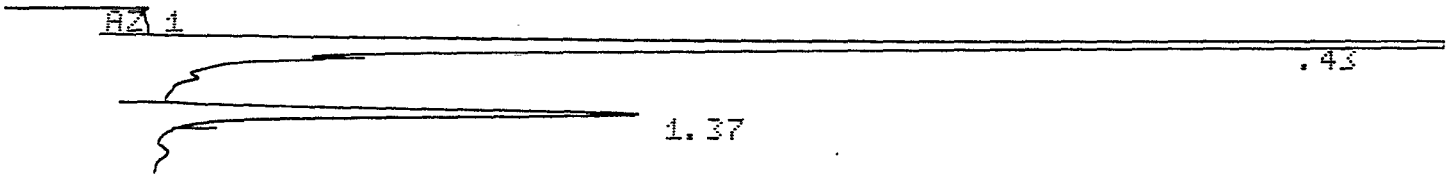
MALCOLM PIRNIE ERIE PA 12/14/87 13:43:16 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 47 INDEX 47

PEAK#	AREA%	RT	AREA	BC
1	5.491	0.36	45273	01
2	1.914	0.6	15779	01
3	44.869	1.32	369913	01
4	47.726	1.88	393462	01
TOTAL	100.		824427	

5603 - 3' 1000µl

CHANNEL A INJECT 12/14/87 15:04:05



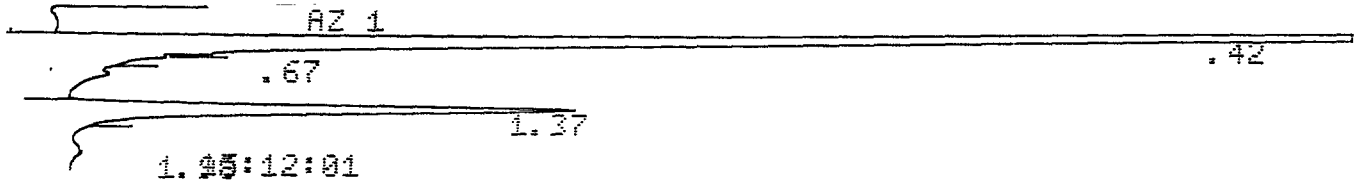
MALCOLM PIRNIE ERIE PA 12/14/87 15:04:05 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 48 INDEX 48

PEAK#	AREA%	RT	AREA	BC
1	93.311	0.43	2144541	01
2	6.689	1.37	153734	01
TOTAL	100.		2298275	

15:09:21
CHANNEL A INJECT 12/14/87 15:10:04

5603 - 3' 1000µl

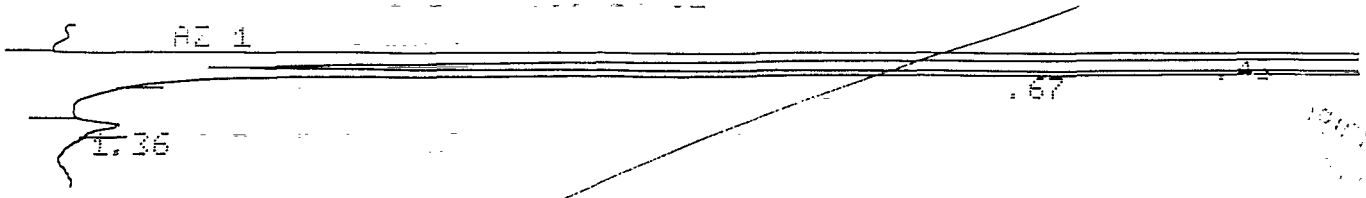


MALCOLM PIRNIE ERIE PA 12/14/87 15:10:04 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 49 INDEX 49

PEAK#	AREA%	RT	AREA	BC
1	92.412	0.42	2081308	08
2	0.039	0.67	888	05
3	7.549	1.37	170010	01
TOTAL	100.		2252206	

AR001001



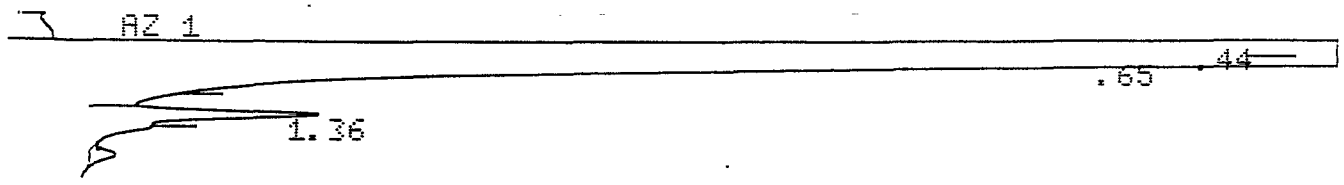
MALCOLM PIRNIE ERIE PA 12/14/87 15:27:51 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 50 INDEX 50

PEAK#	AREA%	RT	AREA	BC
1	87.985	0.43	2967142	02
2	11.649	0.67	392839	03
3	0.367	1.36	12361	01
TOTAL	100.		3372342	

SG06 - 3½' 1000µl

CHANNEL A INJECT 12/14/87 15:32:41



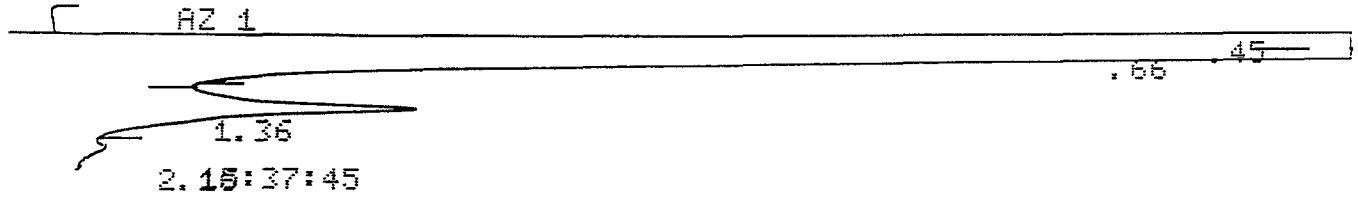
MALCOLM PIRNIE ERIE PA 12/14/87 15:32:41 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 51 INDEX 51

PEAK#	AREA%	RT	AREA	BC
1	81.642	0.44	11002717	02
2	17.991	0.65	2424599	03
3	0.367	1.36	49403	01
TOTAL	100.		13476719	

SG06 - 3½' 1000µl

CHANNEL A INJECT 12/14/87 15:35:37



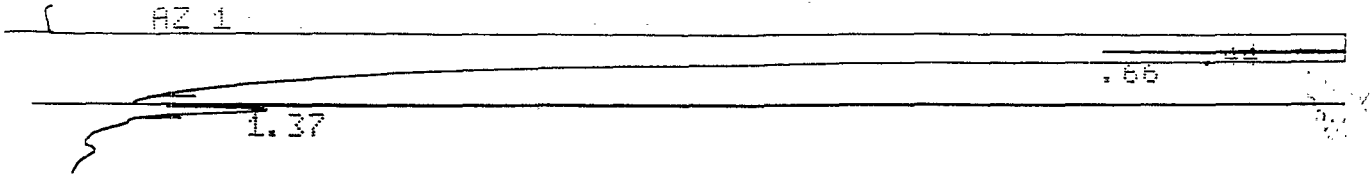
MALCOLM PIRNIE ERIE PA 12/14/87 15:35:37 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 52 INDEX 52

PEAK#	AREA%	RT	AREA	BC
1	81.799	0.45	10515386	02
2	17.091	0.66	2197082	03
3	1.109	1.36	142620	01
TOTAL	100.		12855088	

SG06 - 3½' 1000µl

CHANNEL A INJECT 12/14/87 15:38:59



INPUT OVERRANGE AT RT= 1.28

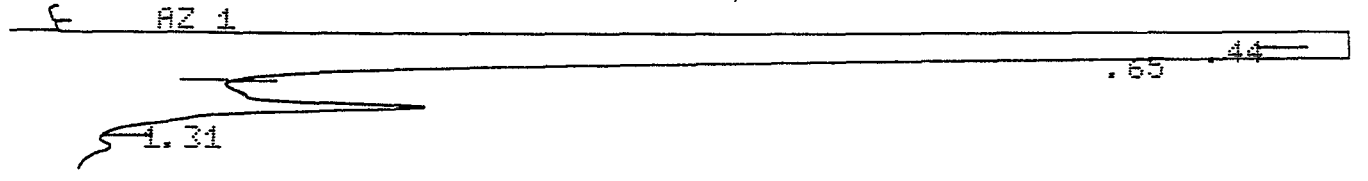
MALCOLM PIRNIE ERIE PA 12/14/87 15:38:59 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 53 INDEX 53

PEAK#	AREA%	RT	AREA	BC
1	83.362	0.44	9723328	02
2	16.495	0.66	1924026	03
3	0.142	1.37	16603	01
TOTAL	100.		11663957	

SG06 - 3½' 1000µl

CHANNEL A INJECT 12/14/87 15:42:00



MALCOLM PIRNIE ERIE PA 12/14/87 15:42:00 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 54 INDEX 54

PEAK#	AREA%	RT	AREA	BC
1	81.961	0.44	11138532	02
2	17.06	0.65	2318395	03
3	0.979	1.31	133043	01
TOTAL	100.		13589970	

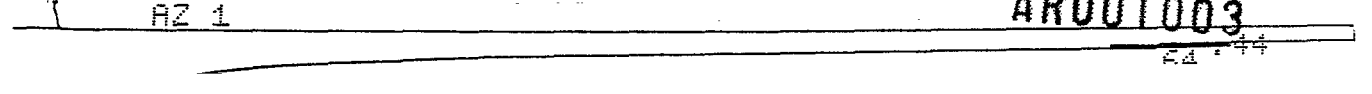
SG00 - 3' 1000µl

CHANNEL A INJECT 12/14/87 15:52:53

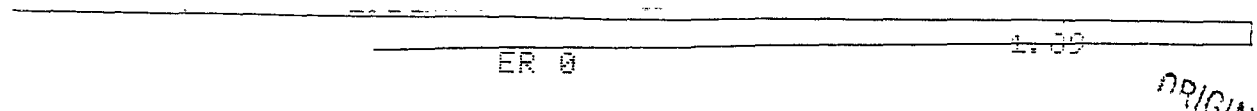
SG10 - 3' 1000µl

DATA, CHANNEL A

CHANNEL A INJECT 12/14/87 15:55:48



AR001003



ORIGINAL

MALCOLM PIRNIE ERIE PA 12/14/87 15:55:48 CH= "A" PS= 1.

.E 1. METHOD 0. RUN 56 INDEX 56

PEAK#	AREA%	RT	AREA	BC
1	66.854	0.44	10226982	02
2	1.953	0.64	298810	03
3	0.654	1.35	100088	01
4	30.539	1.89	4671642	01
TOTAL	100.		15297522	

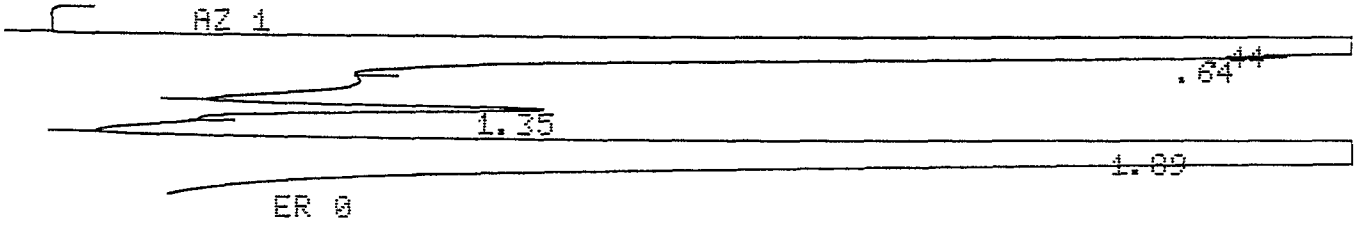
FI= 1. FE= 1. MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
FILE NAME="
TIME FUNCTION VALUE
TT= -2.5 TF=" ER TV= 1
NOT FOUND
TT= -2.2 TF=" ER TV= 1
TT= 2.5 TF=" ER TV= 1
TT=

METHOD NUMBER:MN=

SG10-3' 1000µl

END OF DIALOG

'ANNEL A INJECT 12/14/87 15:59:00



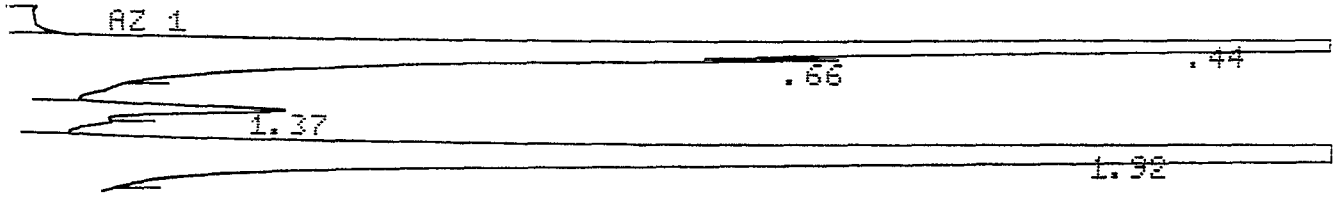
MALCOLM PIRNIE ERIE PA 12/14/87 15:59:00 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 57 INDEX 57

PEAK#	AREA%	RT	AREA	BC
1	65.786	0.44	11222087	02
2	1.307	0.64	222928	03
3	0.565	1.35	96383	01
4	32.342	1.89	5517099	01
TOTAL	100.		17058497	

FG10-3' 500µl

CHANNEL A INJECT 12/14/87 16:02:37



AR001004

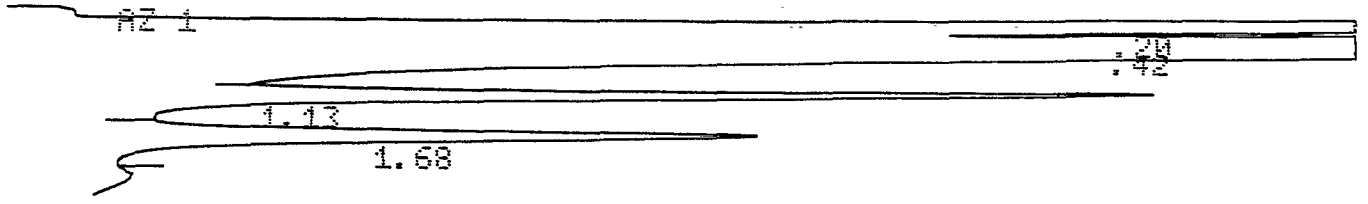
ORIGINAL (Red)

FILE 1. METHOD 0. RUN 58 INDEX 58

PEAK#	AREA%	RT	AREA	BC
1	70.398	0.44	7086246	02
2	2.459	0.66	247521	03
3	0.518	1.37	52138	01
4	26.626	1.92	2680133	01
TOTAL	100.		10066038	

CHANNEL A INJECT 12/14/87 16:16:54

6612-5' 1000µl



MALCOLM PIRNIE ERIE PA 12/14/87 16:16:54 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 59 INDEX 59

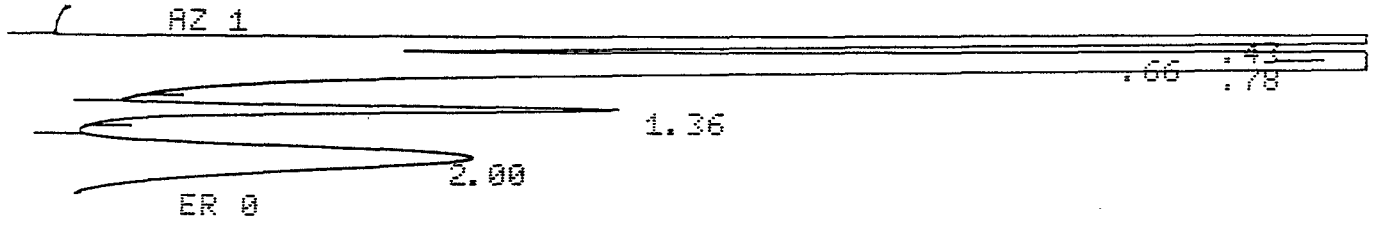
PEAK#	AREA%	RT	AREA	BC
1	40.758	0.2	9177333	02
2	55.889	0.42	12584412	02
3	1.948	1.13	438594	02
4	1.405	1.68	316367	03
TOTAL	100.		22516706	

CHANNEL A INJECT 12/14/87 16:19:43

5612-5' 500µl

NO DATA, CHANNEL A

CHANNEL A INJECT 12/14/87 16:21:56



MALCOLM PIRNIE ERIE PA 12/14/87 16:21:56 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 61 INDEX 61

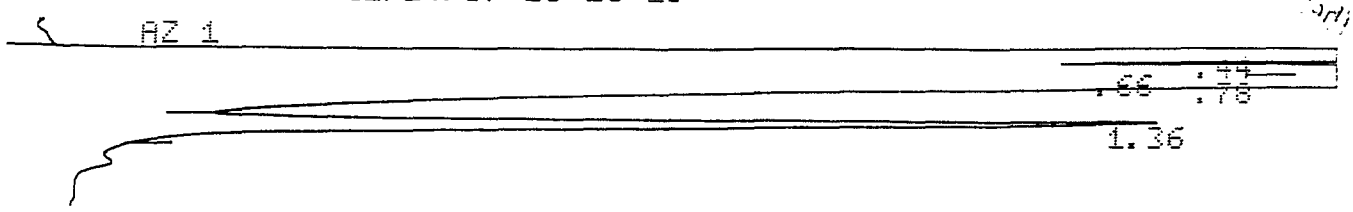
PEAK#	AREA%	RT	AREA	BC
1	45.048	0.43	6035119	02
2	35.56	0.66	4764016	02
3	15.403	0.78	2063528	03
4	1.187	1.36	158988	01

AR001005

TOTAL 100. 12397092

ORIGINAL

CHANNEL A INJECT 12/14/87 16:25:29



MALCOLM PIRNIE ERIE PA 12/14/87 16:25:29 CH= "A" PS= 1.

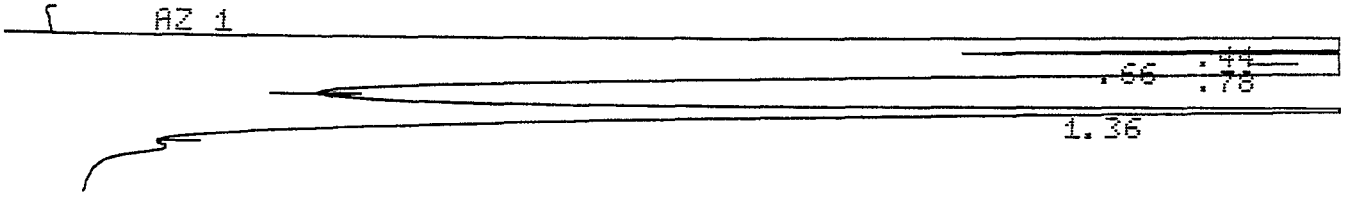
FILE 1. METHOD 0. RUN 62 INDEX 62

PEAK#	AREA%	RT	AREA	BC
1	41.618	0.44	9491615	02
2	38.604	0.66	8804286	02
3	18.413	0.78	4199336	08
4	1.365	1.36	311331	05

TOTAL 100. 22806568

SG12-5' 1000 µl

CHANNEL A INJECT 12/14/87 16:28:22



MALCOLM PIRNIE ERIE PA 12/14/87 16:28:22 CH= "A" PS= 1.

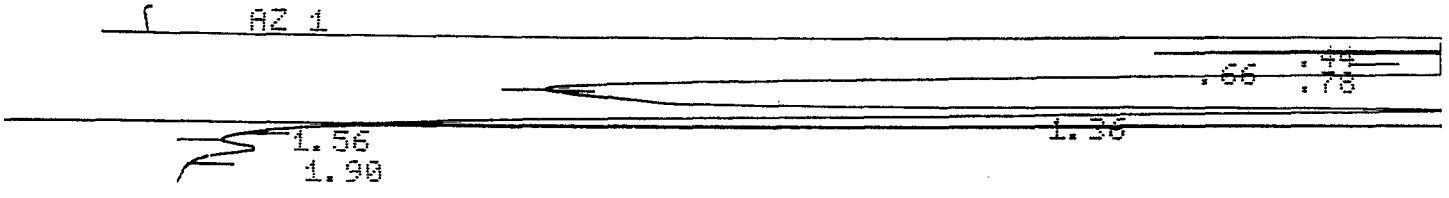
FILE 1. METHOD 0. RUN 63 INDEX 63

PEAK#	AREA%	RT	AREA	BC
1	42.14	0.44	9234469	02
2	38.467	0.66	8429668	02
3	16.854	0.78	3693277	03
4	2.54	1.36	556509	01

TOTAL 100. 21913923

SG12-5' 1000 µl

CHANNEL A INJECT 12/14/87 16:31:21



INPUT OVERRANGE AT RT= 1.55

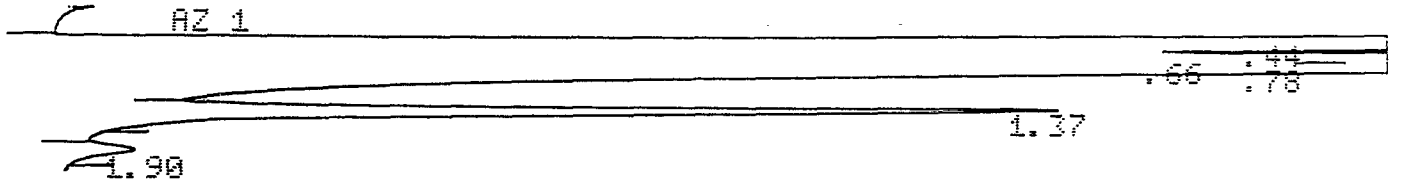
AR001006

FILE 1. METHOD 0. RUN 64 INDEX 64

PEAK#	AREA%	RT	AREA	BC
1	44.008	0.44	9541279	02
2	35.75	0.66	7750952	02
3	15.241	0.78	3304389	03
4	2.025	1.36	439139	02
5	2.9	1.56	628660	03
6	0.076	1.9	16479	01
TOTAL	100.		21680898	

Soil-5' 1000 µl

CHANNEL A INJECT 12/14/87 16:36:01



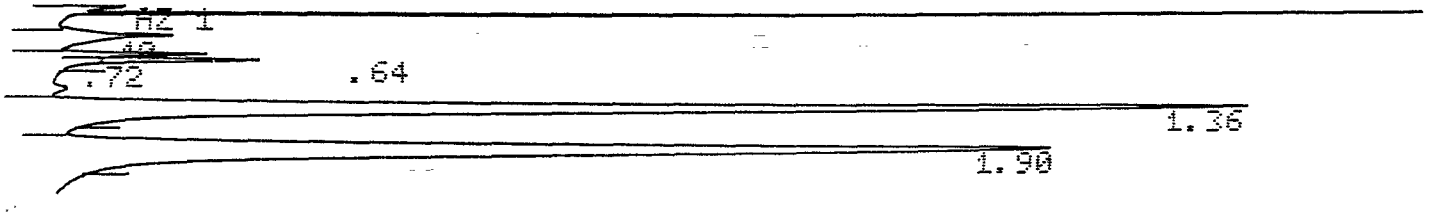
MALCOLM PIRNIE ERIE PA 12/14/87 16:36:01 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 65 INDEX 65

PEAK#	AREA%	RT	AREA	BC
1	47.375	0.44	9873001	02
2	34.938	0.66	7281172	02
3	16.169	0.78	3369563	08
4	1.419	1.37	295824	05
5	0.099	1.9	20594	01
TOTAL	100.		20840154	

STD Spl
1,1-DCA 250 µg/l
TCA-5
TCE-10
PCE-5

CHANNEL A INJECT 12/14/87 16:45:37



INPUT OVERRANGE AT RT= 0.08

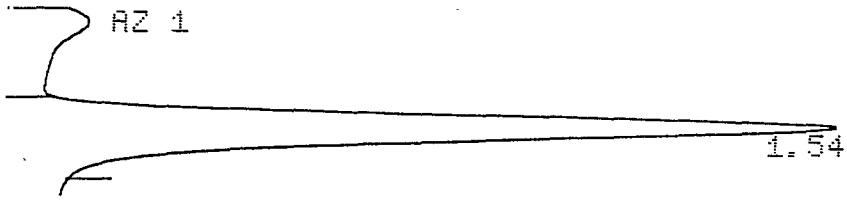
MALCOLM PIRNIE ERIE PA 12/14/87 16:45:37 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 66 INDEX 66

PEAK#	AREA%	RT	AREA	BC
1	2.885	0.4	25620	02
2	1.988	0.64	17657	02
3	3.619	0.72	32140	03
4	42.641	1.36	378682	01
5	48.867	1.9	433975	01

CHANNEL A INJECT 12/14/87 16:48:20

cont.



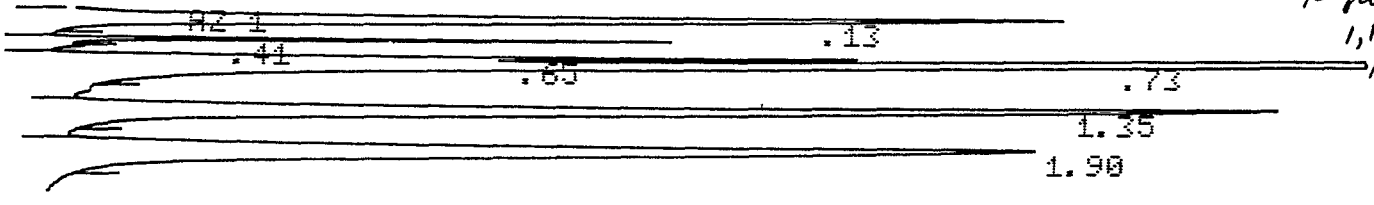
MALCOLM PIRNIE ERIE PA 12/14/87 16:48:20 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 67 INDEX 67

PEAK#	AREA%	RT	AREA	BC
1	100.	1.54	798937	01
TOTAL	100.		798937	

STD Std
1,1-DACA 200µg/L
TCA 5
TCE 10
PCE 5
1,1-DCA
1,1-DCA

CHANNEL A INJECT 12/14/87 16:51:41



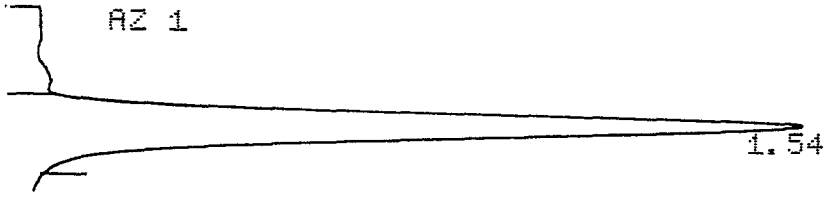
MALCOLM PIRNIE ERIE PA 12/14/87 16:51:41 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 68 INDEX 68

PEAK#	AREA%	RT	AREA	BC
1	11.51	0.13	260757	01
2	1.894	0.41	42910	01
3	3.855	0.65	87331	02
4	47.305	0.73	1071674	03
5	16.767	1.35	379841	01
6	18.669	1.9	422929	01
TOTAL	100.		2265442	

cont.

CHANNEL A INJECT 12/14/87 16:54:24



MALCOLM PIRNIE ERIE PA 12/14/87 16:54:24 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 69 INDEX 69

AR001008

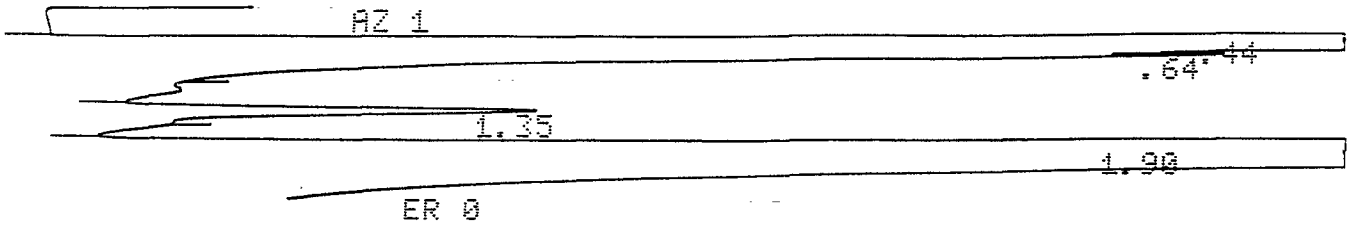
PEAK#	AREA%	RT	AREA	BC

TOTAL 100. 749681

SG11 -5'

ORIGINAL (Red)

CHANNEL A INJECT 12/14/87 16:57:59



MALCOLM PIRNIE ERIE PA 12/14/87 16:57:59 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 70 INDEX 70

PEAK#	AREA%	RT	AREA	BC
1	51.998	0.44	10542645	02
2	1.471	0.64	298208	03
3	0.567	1.35	115003	01
4	45.964	1.9	9319116	01

TOTAL 100. 20274972

FI= 1. FE= 1. MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
FILE NAME="

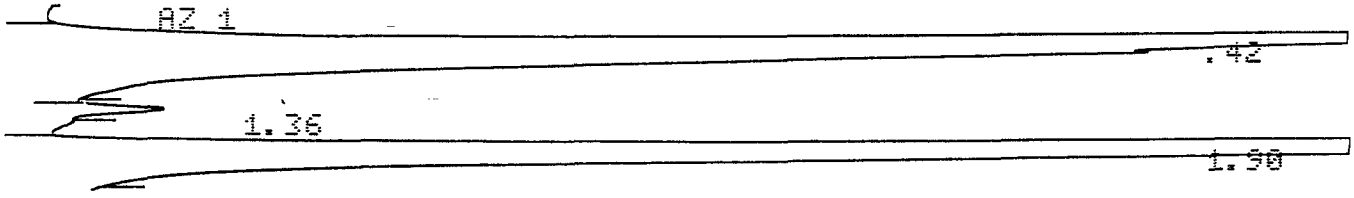
TIME	FUNCTION	VALUE
TF= -2.5	TF=" ER	TV= 1
TF= 3	TF=" ER	TV= 1
TF=		

METHOD NUMBER:MN=

SG11 - 5' 200 µl

END OF DIALOG

CHANNEL A INJECT 12/14/87 17:01:38



MALCOLM PIRNIE ERIE PA 12/14/87 17:01:38 CH= "A" PS= 1.

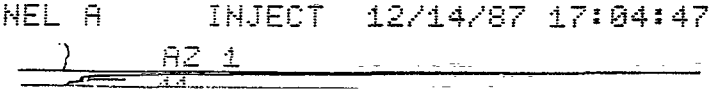
FILE 1. METHOD 0. RUN 71 INDEX 71

PEAK#	AREA%	RT	AREA	BC
1	65.378	0.42	4316003	01
2	0.345	1.36	22746	01
3	34.277	1.9	2262830	01

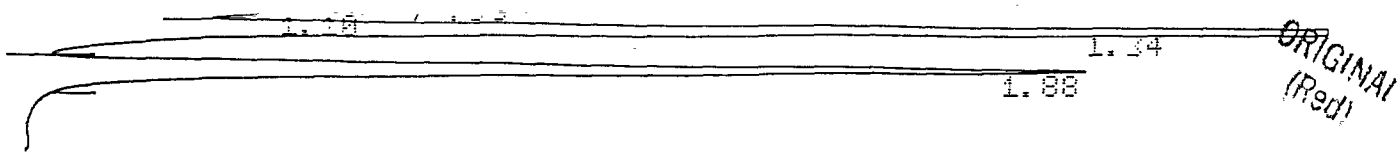
TOTAL 100. 6601579

STD 5 µl
1,1-DCE 200 µg/l
1,1-DCA 200
TCA 5
TCE 10
PCE 5

CHANNEL A INJECT 12/14/87 17:04:47



AR001009



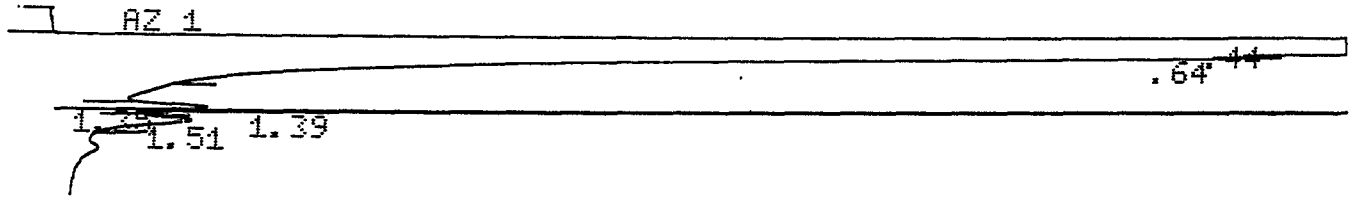
MALCOLM PIRNIE ERIE PA 12/14/87 17:04:47 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 72 INDEX 72

PEAK#	AREA%	RT	AREA	BC
1	1.831	0.41	42875	01
2	3.454	0.64	80870	02
3	35.014	0.72	819911	02
4	4.537	0.9	106243	02
5	5.831	1.1	136545	02
6	30.3	1.34	709531	03
7	19.033	1.88	445675	01
TOTAL	100.		2341650	

AIR SAMPLE 1000 µl

CHANNEL A INJECT 12/14/87 17:14:31



INPUT OVERRANGE AT RT= 1.38

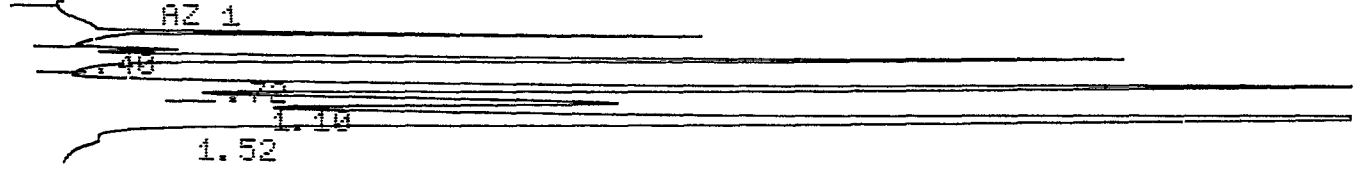
MALCOLM PIRNIE ERIE PA 12/14/87 17:14:31 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 73 INDEX 73

PEAK#	AREA%	RT	AREA	BC
1	91.798	0.44	10930966	02
2	2.729	0.64	325007	03
3	0.092	1.35	10931	02
4	5.226	1.39	622332	03
5	0.154	1.51	18396	01
TOTAL	100.		11907632	

STD 5µl
1,2-DCA 200µg/l
CH_2Cl_2 200
$CHCl_3$ 10
CCl_4 2

CHANNEL A INJECT 12/14/87 17:18:21



MALCOLM PIRNIE ERIE PA 12/14/87 17:18:21 CH= "A

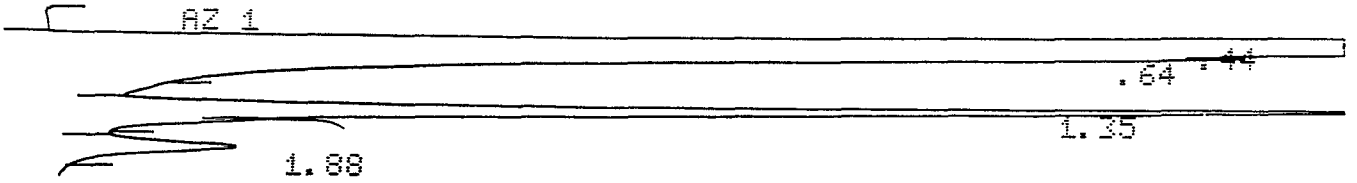
AR001010

PEAK#	AREA%	RT	AREA BC
1	5.561	0.4	74983 02
2	14.996	0.72	202212 02
3	29.908	1.1	403274 02
4	49.535	1.52	667929 03
TOTAL	100.		1348398

ORIGINAL

5G13-5' 1000µl

CHANNEL A INJECT 12/14/87 17:20:44



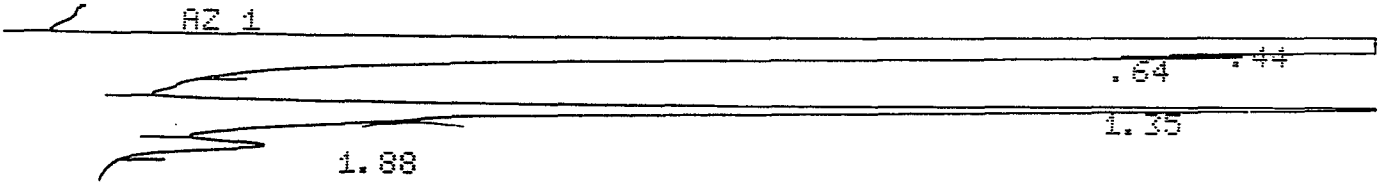
MALCOLM PIRNIE ERIE PA 12/14/87 17:20:44 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 75 INDEX 75

PEAK#	AREA%	RT	AREA BC
1	93.118	0.44	11280002 02
2	2.615	0.64	316789 03
3	3.75	1.35	~~454209~~ 01 434 000
4	0.517	1.88	62688 01
TOTAL	100.		12113687

5G13-5' 1000µl

CHANNEL A INJECT 12/14/87 17:23:25



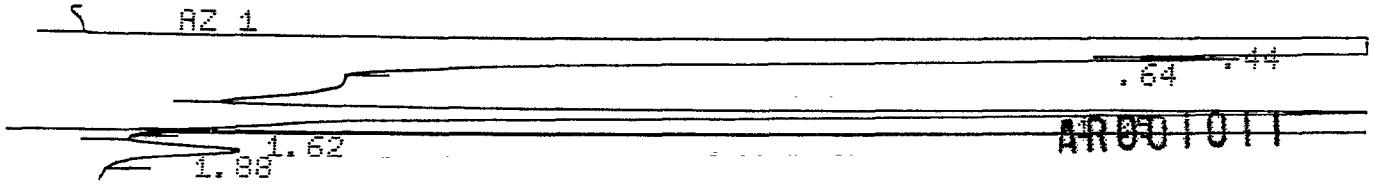
MALCOLM PIRNIE ERIE PA 12/14/87 17:23:25 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 76 INDEX 76

PEAK#	AREA%	RT	AREA BC
1	91.771	0.44	10308905 02
2	2.722	0.64	305724 03
3	5.18	1.35	~~581065~~ 08 540 000
4	0.328	1.88	36853 05
TOTAL	100.		11233347

5G13-5' 1000µl

CHANNEL A INJECT 12/14/87 17:26:37



AR001011

INPUT OVERRANGE AT RT= 1.61

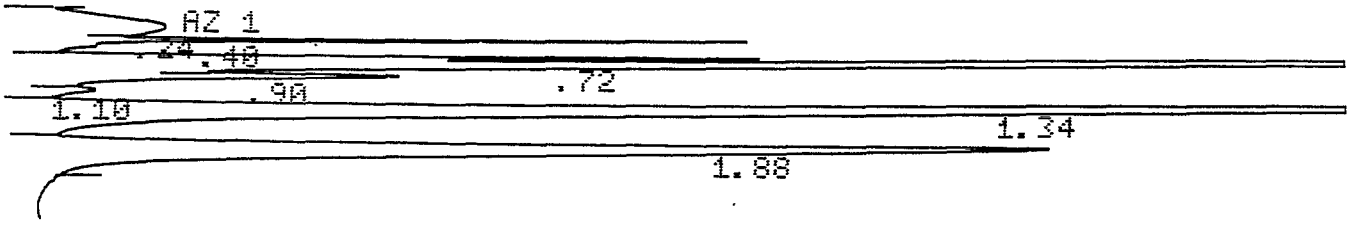
MALCOLM PIRNIE ERIE PA 12/14/87 17:26:37 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 77 INDEX 77

PEAK#	AREA%	RT	AREA	BC
1	88.549	0.44	9979240	02
2	1.906	0.64	214828	03
3	3.568	1.35	~~402123~~	~~02~~ 370000
4	5.538	1.62	624085	03
5	0.439	1.88	49506	01
TOTAL	100.		11269782	

STD 1,1-Dpt-200
1,1-DCA 200 pg/l
TCA 5
TCE 10
PCE 5

CHANNEL A INJECT 12/14/87 17:30:36



MALCOLM PIRNIE ERIE PA 12/14/87 17:30:36 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 78 INDEX 78

PEAK#	AREA%	RT	AREA	BC
1	3.372	0.24	74641	02
2	3.201	0.4	70845	02
3	40.061	0.72	886674	02
4	3.936	0.9	87119	08
5	0.249	1.1	5511	06
6	29.302	1.34	648547	02
7	19.879	1.88	439974	03
TOTAL	100.		2213311	

ORIGINAL
(Red)

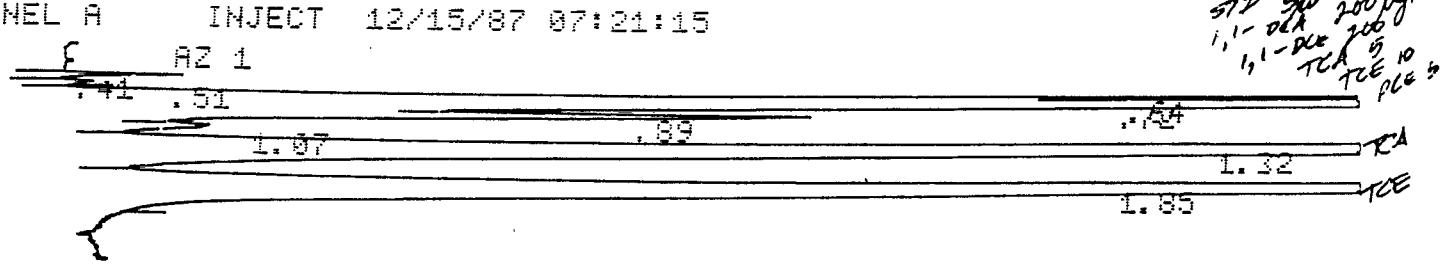
CHROMATOGRAMS
DECEMBER 15, 1987

MALCOLM PIRNIE
MILLCREEK PA
12-15-87
ECD

Column	OV101	Detector	ECD
Length	6'	Voltage	7
Dia.	1/8"	Sensit.	
Liquid Phase		Flow Rates, ml/min	
Wt. %		Hydrogen	Air
Support	Chromosorb W	Scavenge	
Mesh	80/100	Split	
Carrier Gas	N2	Temperature, °C	50
Rotameter		Det. 350	Inj. 250
Inlet Press.	60	Column Initial	50
Rate	30	Final	
CHART SPEED		Rate	
SAMPLE		Solvent	
Size		Concn.	
Operator	J. Clark	Date	12-15-87

ORIGINAL (Red)

```
 17:41:23
  READY
DATE "
  READY
DATE " 12/15/87
TIME " 7:16
    1.      FE= 1.      MN= 0.
 .ESS 'ENTER' TO SKIP ENTRY
FILE NAME=" MALCOLM PIRNIE MILLCRK PA
TIME        FUNCTION  VALUE
TT= .01     TF=" AZ   TV= 1
TT= .01     TF=" PM   TV= 1
TT= 3       TF=" ER   TV= 1
TT=

METHOD NUMBER:MN=

END OF DIALOG
AT=16
OF=10
PT=500

CHANNEL A      INJECT  12/15/87 07:21:15
```



STD Soln
1,1-DCA 200 µg/l
1,1-DCE 200
TCA 5
TCE 10
PCE 5

```
MALCOLM PIRNIE MILLCRK PA     12/15/87 07:21:15     CH= "A"  PS=  1.

FILE  1.     METHOD  0.     RUN   1     INDEX   1

PEAK#     AREA%        RT       AREA BC
```

AR001014

L

ORIGINAL (Red)

3	3.496	0.64	77459 02
4	39.149	0.72	867440 02
5	4.134	0.89	91595 02
6	0.811	1.07	17959 02
7	30.412	1.32	673850 02
8	21.71	1.85	481039 03
TAL	100.		2215727

FI= 1. FE= 1. MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
FILE NAME="

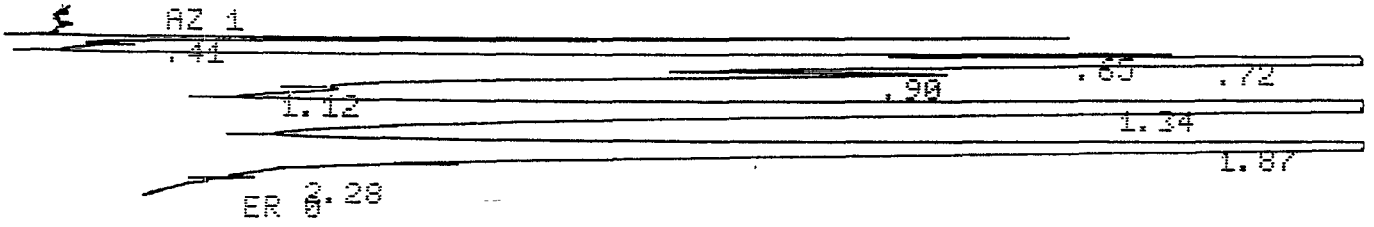
TIME	FUNCTION	VALUE
TT= -3	TF=" ER	TV= 1
TT= 2.5	TF=" ER	TV= 1
TT=		

METHOD NUMBER:MN=

END OF DIALOG

STD Spl
1,1-DCA 200 µg/l
1,1-DCE 200
TCA 5
TCE 10
PCE 5

CHANNEL A INJECT 12/15/87 07:26:28



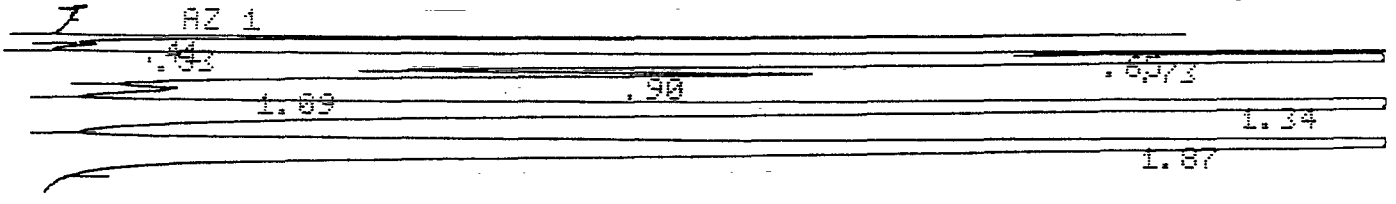
MALCOLM PIRNIE MILLCRK PA 12/15/87 07:26:28 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 2 INDEX 2

PEAK#	AREA%	RT	AREA BC
1	1.61	0.41	36011 01
2	2.691	0.65	60199 02
3	34.666	0.72	775399 02
4	6.151	0.9	137585 02
5	1.915	1.12	42827 02
6	30.216	1.34	675864 02
7	22.358	1.87	500108 02
8	0.394	2.28	8809 03
TOTAL	100.		2236802

STD Spl
1,1-DCA 200 µg/l
1,1-DCE 200
TCA 5
TCE 10
PCE 5

CHANNEL A INJECT 12/15/87 07:31:43



MALCOLM PIRNIE MILLCRK PA 12/15/87 07:31:43 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 3 INDEX 3

AR001015

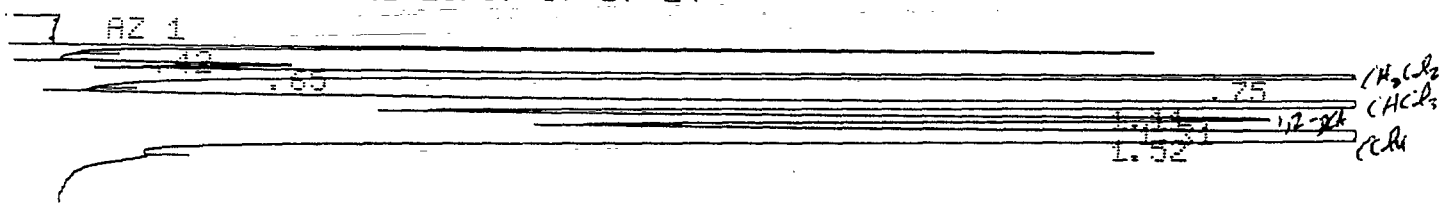
PEAK# AREA% RT AREA BC

2	0.114	0.53	2663	02
3	3.65	0.65	85592	02
4	37.876	0.73	888270	02
5	3.959	0.9	92837	02
6	0.727	1.09	17039	02
7	30.267	1.34	709822	02
8	21.615	1.87	506912	03
TOTAL	100.		2345186	

ORIGINAL (Red)

STD 5µl
1,2-DCA 200 µg/l
CH_2Cl_2 200
$CHCl_3$ 10
CCl_4 2

CHANNEL A INJECT 12/15/87 07:37:14



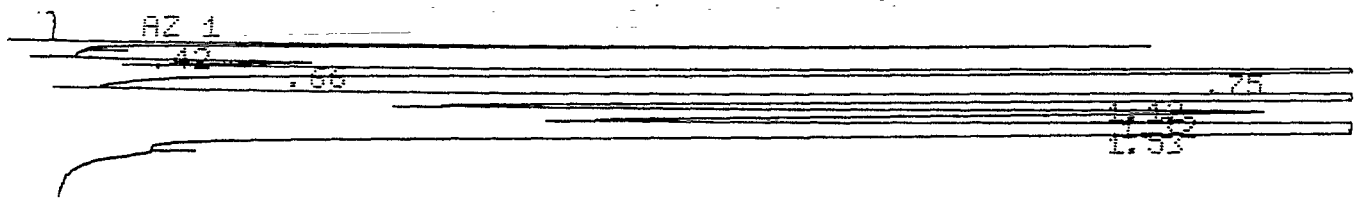
MALCOLM PIRNIE MILLCRK PA 12/15/87 07:37:14 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 4 INDEX 4

PEAK#	AREA%	RT	AREA	BC
1	2.905	0.42	40206	01
2	1.018	0.65	14094	02
3	14.57	0.75	201668	03
4	25.731	1.11	356160	02
5	13.841	1.31	191589	02
6	41.935	1.52	580452	03
TOTAL	100.		1384169	

STD 5µl
1,2-DCA 200 µg/l
CH_2Cl_2 200
$CHCl_3$ 10
CCl_4 2

CHANNEL A INJECT 12/15/87 07:40:41



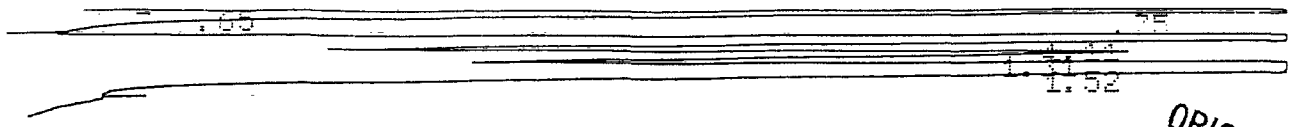
MALCOLM PIRNIE MILLCRK PA 12/15/87 07:40:41 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 5 INDEX 5

PEAK#	AREA%	RT	AREA	BC
1	2.774	0.42	38284	01
2	1.072	0.66	14788	02
3	15.106	0.75	208464	02
4	25.715	1.12	354857	02
5	13.785	1.32	190231	02
6	41.548	1.53	573350	03
TOTAL	100.		1379974	

STD 5µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

CHANNEL A INJECT 12/15/87 07:43:59



ORIGINAL (Red)

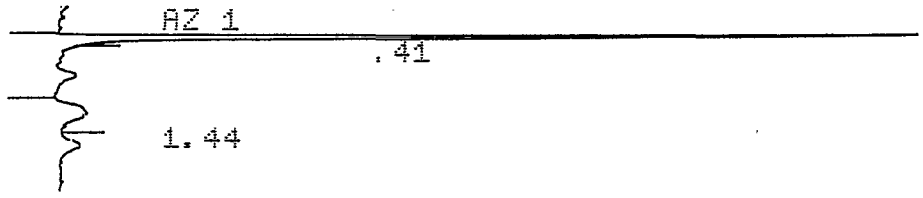
.COLM PIRNIE MILLCRK PA 12/15/87 07:43:59 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 6 INDEX 6

PEAK#	AREA%	RT	AREA	BC
1	2.867	0.41	38066	01
2	1.024	0.65	13602	02
3	15.171	0.75	201443	02
4	25.613	1.11	340086	02
5	13.373	1.31	177563	02
6	41.951	1.52	557016	03
TOTAL	100.		1327776	

N_2 BLANK 1000

CHANNEL A INJECT 12/15/87 07:48:56



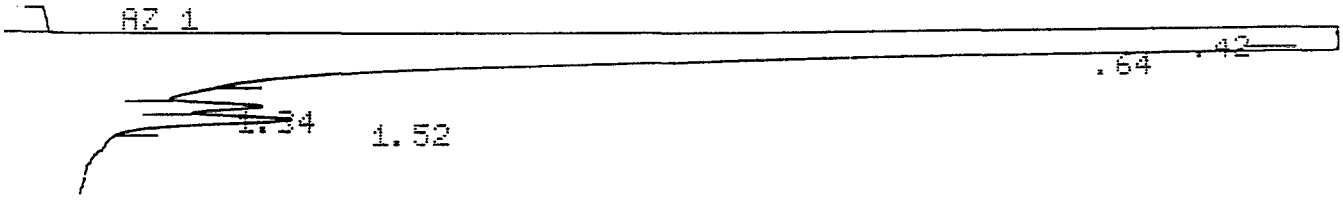
.COLM PIRNIE MILLCRK PA 12/15/87 07:48:56 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 7 INDEX 7

PEAK#	AREA%	RT	AREA	BC
1	85.368	0.41	51402	01
2	14.632	1.44	8810	01
TOTAL	100.		60212	

AIR SAMPLE 1000µl

CHANNEL A INJECT 12/15/87 07:58:27



MALCOLM PIRNIE MILLCRK PA 12/15/87 07:58:27 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 8 INDEX 8

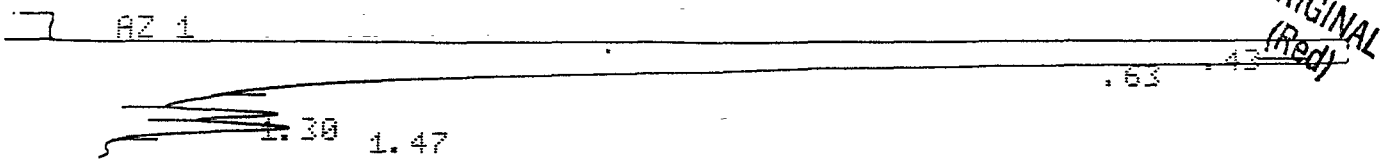
PEAK#	AREA%	RT	AREA	BC
1	96.496	0.42	9634534	02
2	3.095	0.64	309006	03
3	0.146	1.34	14562	02
4	0.263	1.52	26279	03

AR001017

SYSTEM BLANK 1000µl

CHANNEL A INJECT 12/15/87 08:33:52

ORIGINAL (Red)



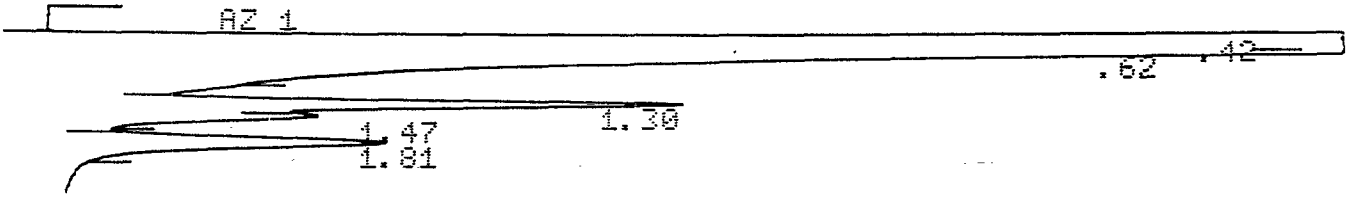
MALCOLM PIRNIE MILLCRK PA 12/15/87 08:33:52 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 9 INDEX 9

PEAK#	AREA%	RT	AREA	BC
1	96.134	0.43	9225183	02
2	3.423	0.63	328451	03
3	0.177	1.3	16963	02
4	0.267	1.47	25616	03
TOTAL	100.		9596213	

5608 – 6' 1000µl

CHANNEL A INJECT 12/15/87 08:37:01



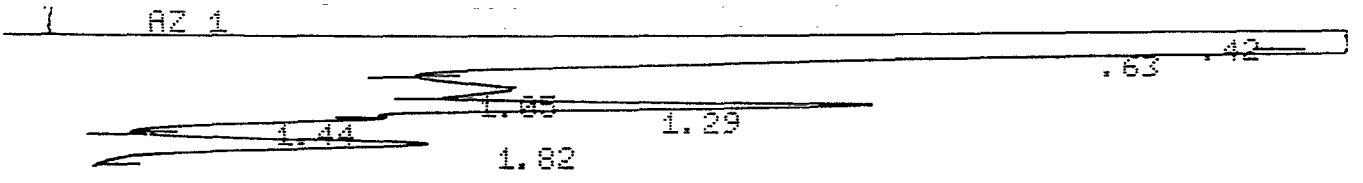
MALCOLM PIRNIE MILLCRK PA 12/15/87 08:37:01 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 10 INDEX 10

PEAK#	AREA%	RT	AREA	BC	
1	94.742	0.42	8837506	02	
2	3.426	0.62	319589	03	
3	0.881	1.3	82191	02	1,2-DCA/TCA
4	0.305	1.47	28444	03	
5	0.645	1.81	60199	01	TCE
TOTAL	100.		9327929		

5608-6' 1000µl

CHANNEL A INJECT 12/15/87 08:39:58



MALCOLM PIRNIE MILLCRK PA 12/15/87 08:39:58 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 11 INDEX 11

AR001018

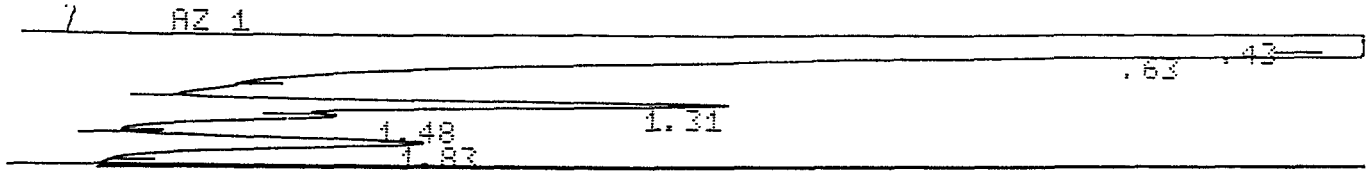
PEAK#	AREA%	RT	AREA	BC

2	[illegible]	[illegible]	[illegible]	[illegible]
3	0.453	1.05	43821	02
4	1.162	1.29	110331	02 1,2-DCA/TCA
5	0.233	1.44	22089	03
6	0.689	1.82	65462	01 TCE
TOTAL	100.		9497019	

ORIGINAL (Red)

SG08-6' 1000 µl

CHANNEL A INJECT 12/15/87 08:44:45



INPUT OVERRANGE AT RT= 2.13

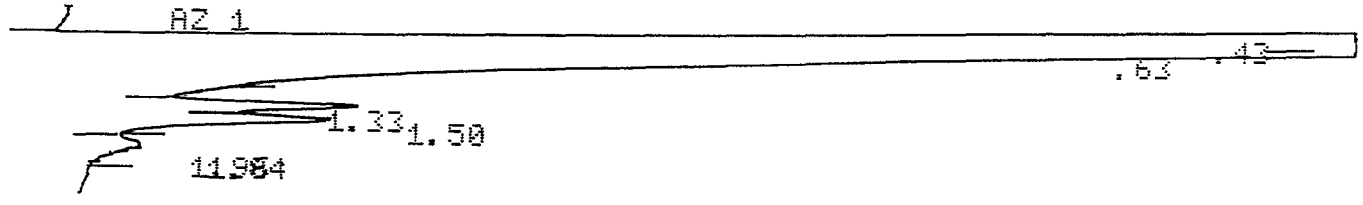
MALCOLM PIRNIE MILLCRK PA 12/15/87 08:44:45 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 12 INDEX 12

PEAK#	AREA%	RT	AREA	BC
1	94.706	0.43	9044788	02
2	3.361	0.63	320979	03
3	0.945	1.31	90243	02
4	0.317	1.48	30272	03
5	0.671	1.83	64129	01
TOTAL	100.		9550411	

SG07-5' 1000 µl

CHANNEL A INJECT 12/15/87 08:52:50



MALCOLM PIRNIE MILLCRK PA 12/15/87 08:52:50 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 13 INDEX 13

PEAK#	AREA%	RT	AREA	BC
1	95.883	0.43	10189762	02
2	3.452	0.63	366804	03
3	0.284	1.33	30223	02
4	0.316	1.5	33541	03
5	0.066	1.84	6968	01
TOTAL	100.		10627298	

SG07-5' 1000 µl

CHANNEL A INJECT 12/15/87 08:55:41

AR001019

1.49 1.32

(Red)

.COLM PIRNIE MILLCRK PA 12/15/87 08:55:41 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 14 INDEX 14

PEAK#	AREA%	RT	AREA	BC
1	95.58	0.43	9705286	02
2	3.339	0.63	339042	03
3	0.694	1.32	70474	02
4	0.387	1.49	39264	03
TOTAL	100.		10154066	

CHANNEL A INJECT 12/15/87 08:58:25
AZ 1

5607-5' 1000 µl

NO DATA, CHANNEL A

CHANNEL A INJECT 12/15/87 09:00:01
AZ 1

.64 .43

1.33 1.51

MALCOLM PIRNIE MILLCRK PA 12/15/87 09:00:01 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 16 INDEX 16

PEAK#	AREA%	RT	AREA	BC
1	96.013	0.43	9468492	02
2	3.453	0.64	340534	03
3	0.214	1.33	21123	02
4	0.32	1.51	31575	03
TOTAL	100.		9861724	

5607-5' 1000 µl

CHANNEL A INJECT 12/15/87 09:03:34
AZ 1

.64 .43

1.33 1.51

MALCOLM PIRNIE MILLCRK PA 12/15/87 09:03:34 CH= "A" PS= 1.

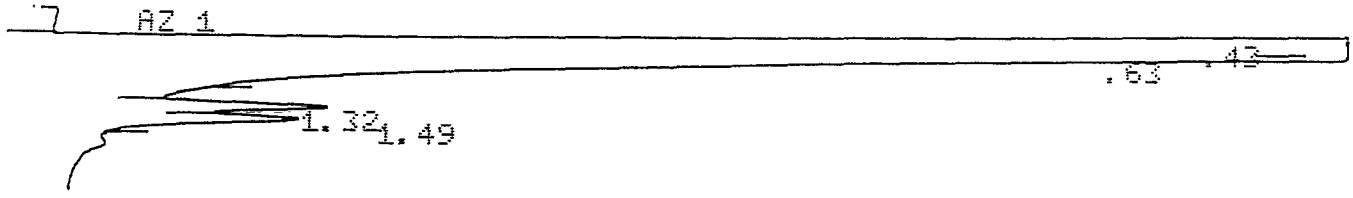
AR001020

FILE 1. METHOD 0. RUN 17 INDEX 17

1	95.359	0.43	9486399	02
2	4.121	0.64	409936	03
3	0.207	1.33	20550	02
4	0.313	1.51	31180	03
TAL	100.		9948065	

SG17-6' 1000µl

CHANNEL A INJECT 12/15/87 09:15:18



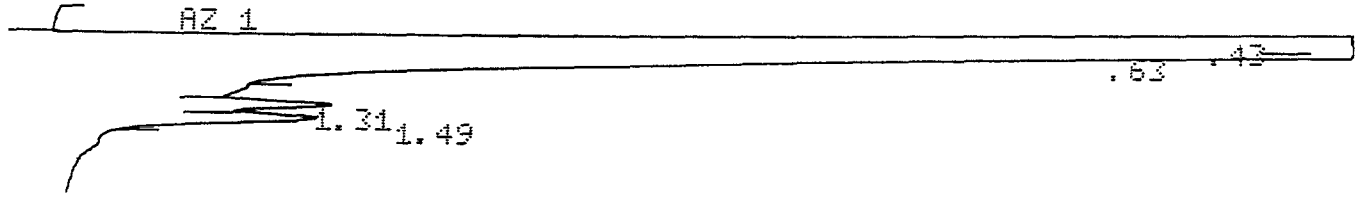
MALCOLM PIRNIE MILLCRK PA 12/15/87 09:15:18 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 18 INDEX 18

PEAK#	AREA%	RT	AREA	BC
1	95.913	0.43	9112878	02
2	3.49	0.63	331552	03
3	0.28	1.32	26574	02
4	0.318	1.49	30225	03
TOTAL	100.		9501229	

SG17-6' 1000µl

CHANNEL A INJECT 12/15/87 09:18:14



MALCOLM PIRNIE MILLCRK PA 12/15/87 09:18:14 CH= "A" PS= 1.

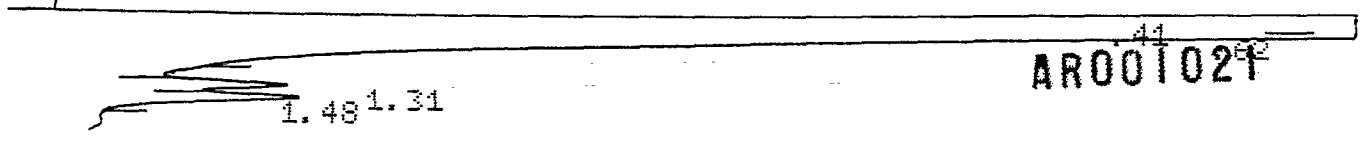
FILE 1. METHOD 0. RUN 19 INDEX 19

PEAK#	AREA%	RT	AREA	BC
1	96.193	0.43	9294619	02
2	3.332	0.63	321923	03
3	0.2	1.31	19317	02
4	0.275	1.49	26575	03
TOTAL	100.		9662434	

FAULT 40: AT 2600

CHANNEL A INJECT 12/15/87 09:23:41

SG17-6' 1000µl



AR001021

ORIGINAL (Red)

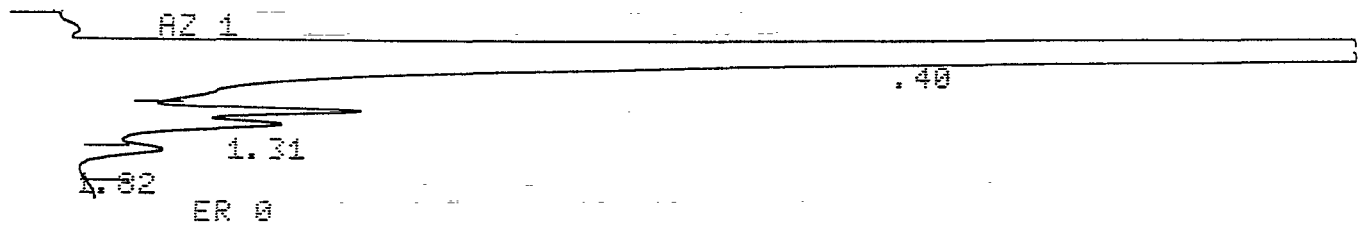
MALCOLM PIRNIE MILLCRK PA 12/15/87 09:23:41 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 20 INDEX 20

PEAK#	AREA%	RT	AREA	BC
1	95.959	0.41	9278793	02
2	3.526	0.62	340939	03
3	0.2	1.31	19384	02
4	0.315	1.48	30412	03
TOTAL	100.		9669528	

SG09-4' 1000 µl

CHANNEL A INJECT 12/15/87 09:42:10



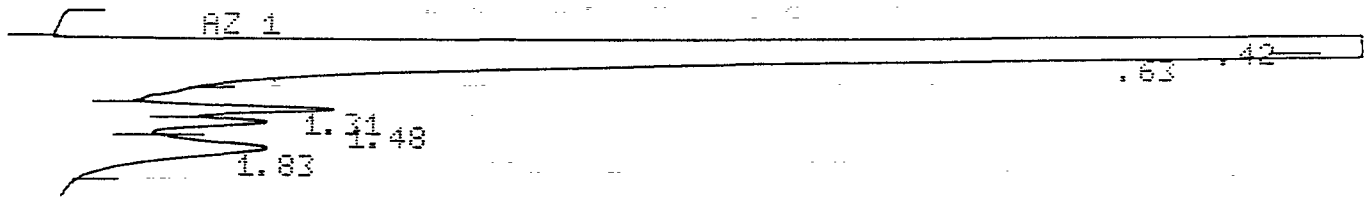
MALCOLM PIRNIE MILLCRK PA 12/15/87 09:42:10 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 21 INDEX 21

PEAK#	AREA%	RT	AREA	BC
1	98.56	0.4	8366987	02
2	1.245	1.31	105704	02
3	0.195	1.82	16551	03
TOTAL	100.		8489242	

SG-09-4' 1000 µl

CHANNEL A INJECT 12/15/87 09:47:56



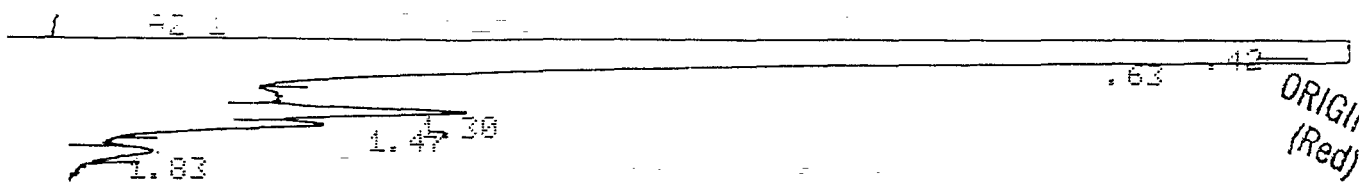
MALCOLM PIRNIE MILLCRK PA 12/15/87 09:47:56 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 22 INDEX 22

PEAK#	AREA%	RT	AREA	BC
1	95.735	0.42	7984347	02
2	3.244	0.63	270576	03
3	0.319	1.31	26640	02
4	0.196	1.48	16356	03
5	0.505	1.83	42141	01
TOTAL	100.		8340060	

AR001022

SG09-4 1000µl



ORIGINAL (Red)

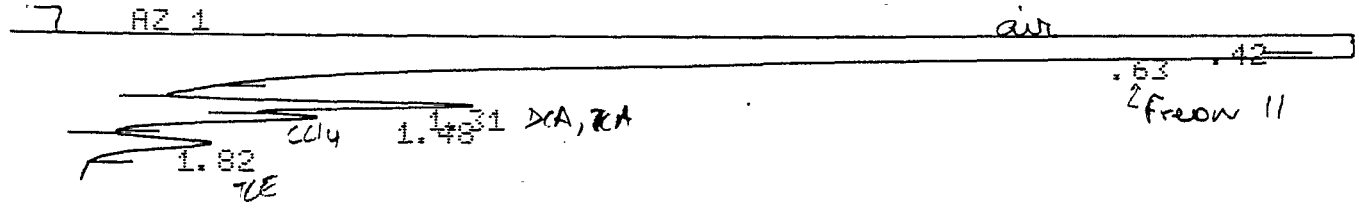
MALCOLM PIRNIE MILLCRK PA 12/15/87 09:50:50 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 23 INDEX 23

PEAK#	AREA%	RT	AREA	BC
1	96.428	0.42	9302345	02
2	2.88	0.63	277794	03
3	0.373	1.3	35949	02
4	0.251	1.47	24169	03
5	0.069	1.83	6640	01
TOTAL	100.		9646897	

SG19 - 6' 1000µl

CHANNEL A INJECT 12/15/87 10:05:31



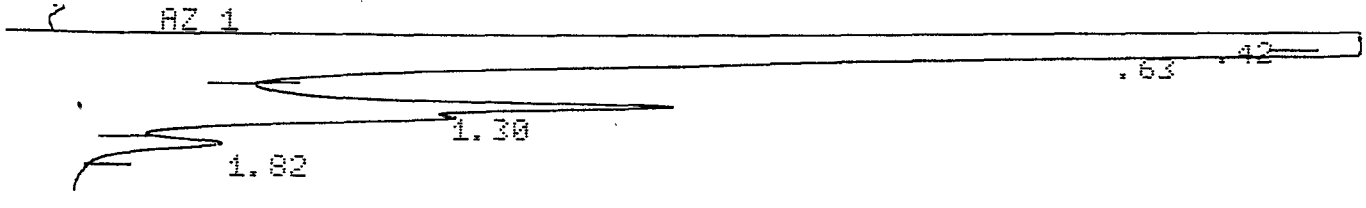
...LCOLM PIRNIE MILLCRK PA 12/15/87 10:05:31 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 24 INDEX 24

PEAK#	AREA%	RT	AREA	BC
1	95.388	0.42	8967048	02
2	3.512	0.63	330176	03
3	0.535	1.31	50288	02
4	0.325	1.48	30555	03
5	0.24	1.82	22576	01
TOTAL	100.		9400643	

SG19 - 6' 1000µl

CHANNEL A INJECT 12/15/87 10:08:19



_COLM PIRNIE MILLCRK PA 12/15/87 10:08:19 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 25 INDEX 25

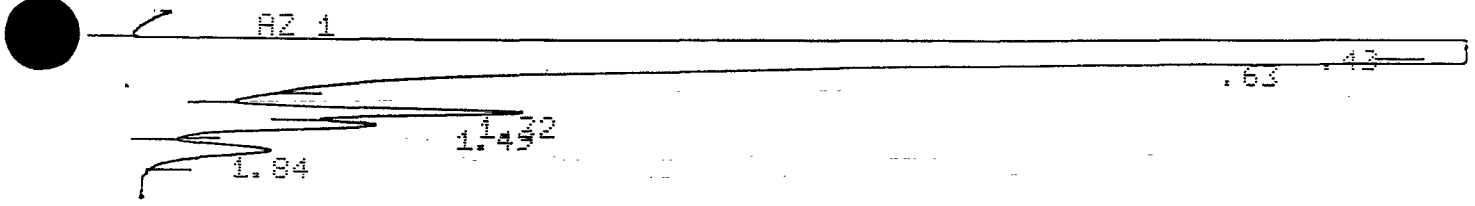
PEAK#	AREA%	RT	AREA	BC
1	95.132	0.42	9506688	02

AR001023

4	0.187	1.82	18735 03
TOTAL	100.		9993144

SG19-C ORIGINAL (Red)

10:11:25
CHANNEL A INJECT 12/15/87 10:12:50



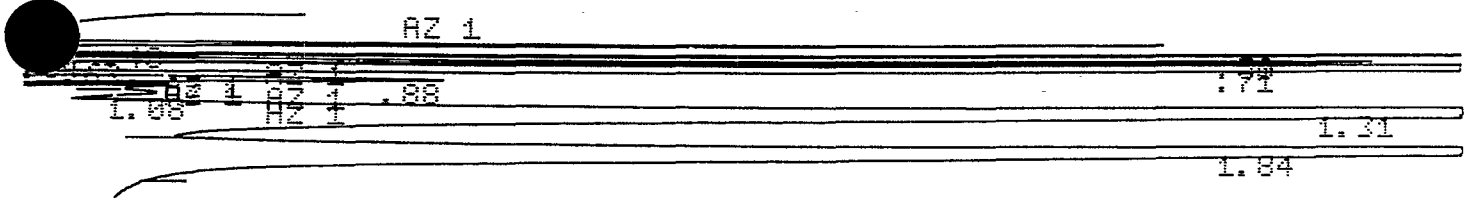
MALCOLM PIRNIE MILLCRK PA 12/15/87 10:12:50 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 26 INDEX 26

PEAK#	AREA%	RT	AREA BC
1	95.647	0.43	9602904 02
2	3.347	0.63	336074 03
3	0.479	1.32	48075 02
4	0.302	1.49	30288 03
5	0.225	1.84	22594 01
TOTAL	100.		10039935

STD 5µl
1,1-DCA 200µg/l
TCA 5
TCE 10
PCE 5

CHANNEL A INJECT 12/15/87 10:17:11



INPUT OVERRANGE AT RT= 0.53

MALCOLM PIRNIE MILLCRK PA 12/15/87 10:17:11 CH= "A" PS= 1.

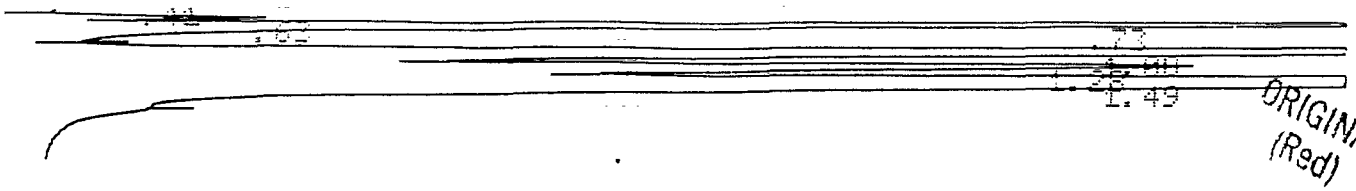
FILE 1. METHOD 0. RUN 27 INDEX 27

PEAK#	AREA%	RT	AREA BC
1	1.466	0.4	42075 02
2	0.057	0.5	1640 02
3	23.228	0.54	666703 02
4	2.608	0.63	74852 02
5	28.933	0.71	830451 02
6	3.385	0.88	97166 02
7	0.714	1.08	20489 02
8	23.018	1.31	660673 02
9	16.592	1.84	476232 03
TOTAL	100.		2870281

STD 5µl
CH_2Cl_2 200µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

AR001024

CHANNEL A INJECT 12/15/87 10:22:46



ORIGINAL (Red)

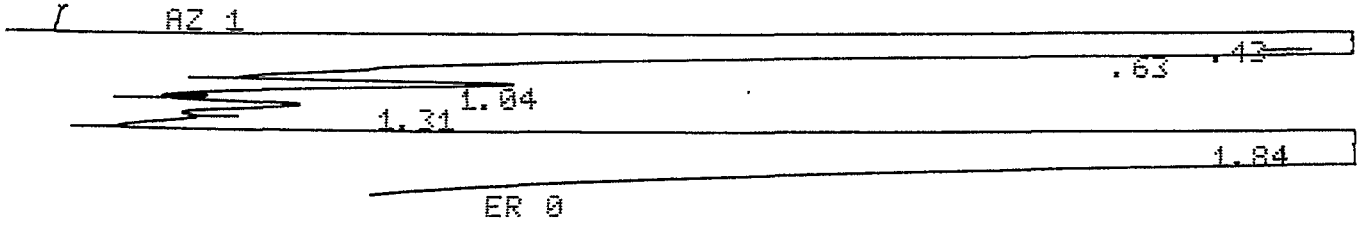
MALCOLM PIRNIE MILLCRK PA 12/15/87 10:22:46 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 28 INDEX 28

PEAK#	AREA%	RT	AREA	BC
1	3.017	0.41	39863	01
2	0.968	0.63	12792	02
3	14.448	0.73	190884	03
4	25.677	1.08	339243	02
5	13.45	1.28	177702	02
6	42.44	1.49	560721	03
TOTAL	100.		1321205	

SG18-5' 1000 µl

CHANNEL A INJECT 12/15/87 10:31:00



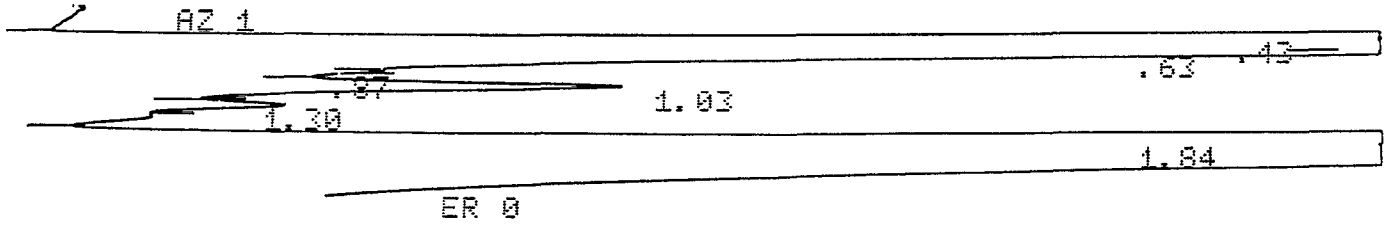
MALCOLM PIRNIE MILLCRK PA 12/15/87 10:31:00 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 29 INDEX 29

PEAK#	AREA%	RT	AREA	BC
1	56.524	0.43	10378272	02
2	1.805	0.63	331322	08
3	0.224	1.04	41219	05
4	0.084	1.31	15378	01
5	41.363	1.84	7594483	01
TOTAL	100.		18360674	

SG18-5' 1000 µl

CHANNEL A INJECT 12/15/87 10:34:04



MALCOLM PIRNIE MILLCRK PA 12/15/87 10:34:04 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 30 INDEX 30

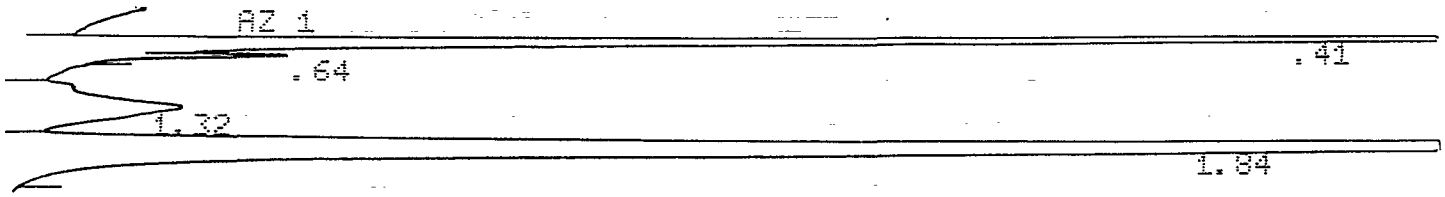
PEAK#	AREA%	RT	AREA	BC

AR001025

3	0.004	0.87	838	05
4	0.274	1.03	51559	05
5	0.07	1.3	13136	01
6	42.682	1.84	8016962	01
TOTAL	100.		18783047	

SG18-5' ORIGINAL (RED)

CHANNEL A INJECT 12/15/87 10:36:52



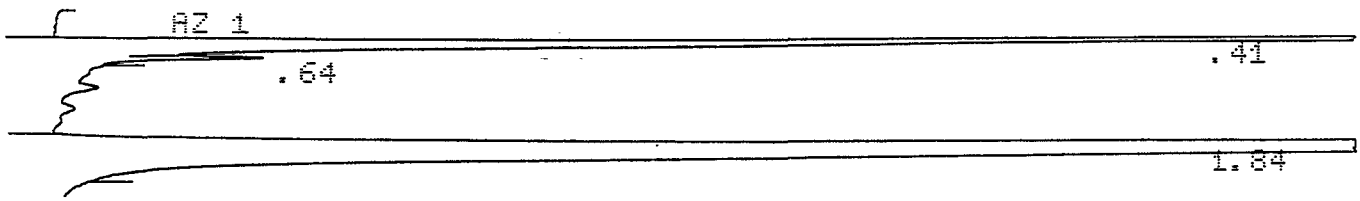
MALCOLM PIRNIE MILLCRK PA 12/15/87 10:36:52 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 31 INDEX 31

PEAK#	AREA%	RT	AREA	BC
1	64.549	0.41	1262141	02
2	0.85	0.64	16623	03
3	3.129	1.32	61178	02
4	31.472	1.84	615367	03
TOTAL	100.		1955309	

SG18-5' 100 µl

CHANNEL A INJECT 12/15/87 10:40:05



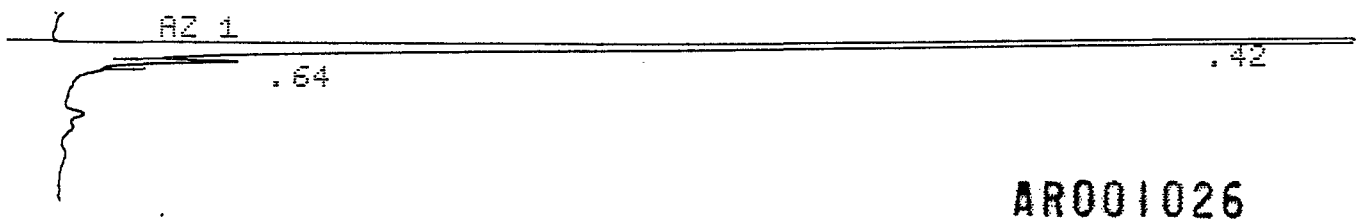
MALCOLM PIRNIE MILLCRK PA 12/15/87 10:40:05 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 32 INDEX 32

PEAK#	AREA%	RT	AREA	BC
1	62.299	0.41	1074623	02
2	0.811	0.64	13984	03
3	36.89	1.84	636324	01
TOTAL	100.		1724931	

SG22-5' 200 µl

CHANNEL A INJECT 12/15/87 10:52:12



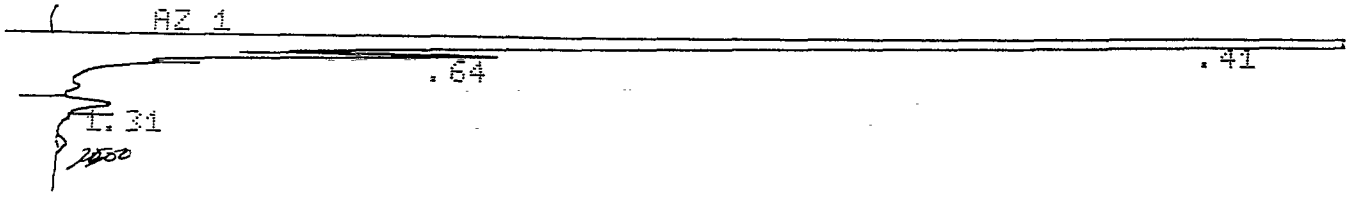
FILE 1. METHOD 0. RUN 33 INDEX 33

ORIGINAL (Red)

PEAK#	AREA%	RT	AREA	BC
1	99.044	0.42	1268812	02
2	0.956	0.64	12249	03
TOTAL	100.		1281061	

SG22-5' 1000µl

10:55:00
CHANNEL A INJECT 12/15/87 10:57:50



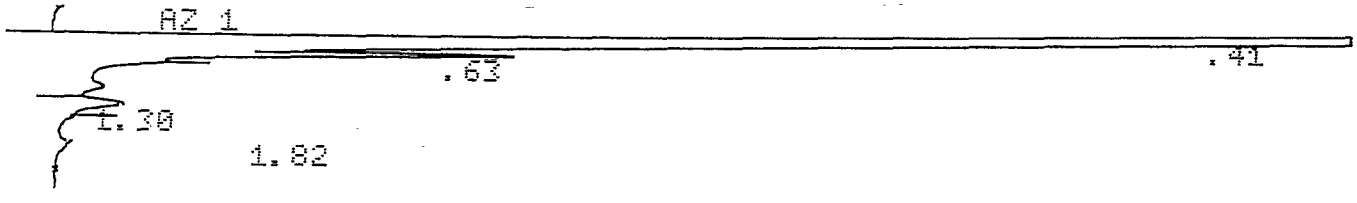
MALCOLM PIRNIE MILLCRK PA 12/15/87 10:57:50 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 34 INDEX 34

PEAK#	AREA%	RT	AREA	BC
1	99.295	0.41	5223963	02
2	0.584	0.64	30717	03
3	0.121	1.31	6373	01
TAL	100.		5261053	

SG22-5' 1000µl

CHANNEL A INJECT 12/15/87 11:00:54



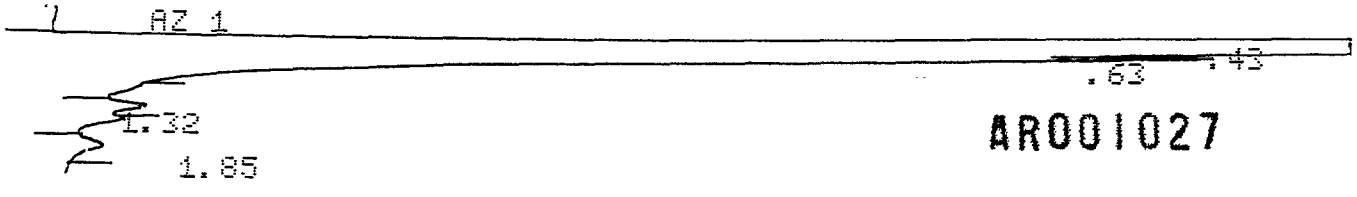
MALCOLM PIRNIE MILLCRK PA 12/15/87 11:00:54 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 35 INDEX 35

PEAK#	AREA%	RT	AREA	BC
1	99.293	0.41	5482066	02
2	0.594	0.63	32778	03
3	0.113	1.3	6266	01
TOTAL	100.		5521110	

SG23-5' 1000µl

ANNEL A INJECT 12/15/87 11:41:14



AR001027

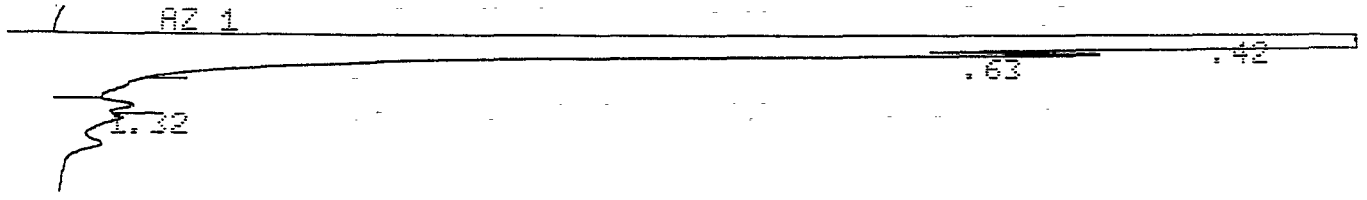
MALCOLM PIRNIE MILLCRK PA 12/15/87 11:41:14 CH= "A" PS=

FILE 1. METHOD 0. RUN 36 INDEX 36

PEAK#	AREA%	RT	AREA	BC
1	97.999	0.43	8597658	02
2	1.89	0.63	165833	03
3	0.043	1.32	3777	01
4	0.068	1.85	5933	01
TOTAL	100.		8773201	

SG23-5' 1000 µl

CHANNEL A INJECT 12/15/87 11:43:50



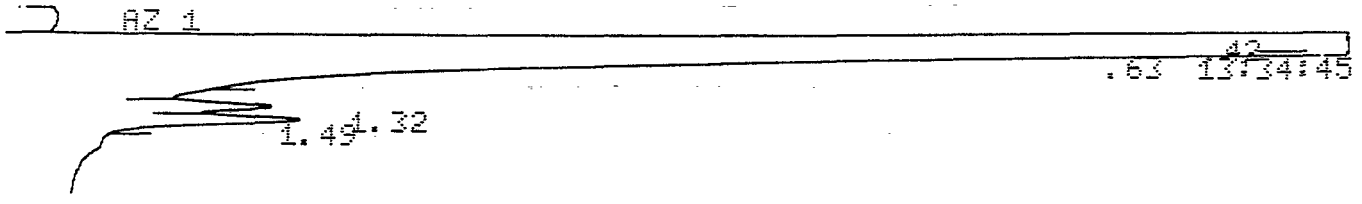
MALCOLM PIRNIE MILLCRK PA 12/15/87 11:43:50 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 37 INDEX 37

PEAK#	AREA%	RT	AREA	BC
1	98.213	0.42	8074661	02
2	1.747	0.63	143669	03
3	0.039	1.32	3245	01
TOTAL	100.		8221575	

SG43-5' 1000 µl

CHANNEL A INJECT 12/15/87 13:34:05



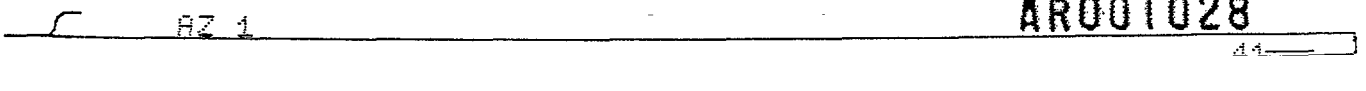
MALCOLM PIRNIE MILLCRK PA 12/15/87 13:34:05 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 38 INDEX 38

PEAK#	AREA%	RT	AREA	BC
1	96.067	0.42	9391950	02
2	3.466	0.63	338845	03
3	0.165	1.32	16178	02
4	0.302	1.49	29520	03
TOTAL	100.		9776493	

SG43-5' 1000 µl

CHANNEL A INJECT 12/15/87 13:36:47



AR001028

1.46 1.30

ORIGINAL (Red)

COLM PIRNIE MILLCRK PA 12/15/87 13:36:47 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 39 INDEX 39

PEAK#	AREA%	RT	AREA	BC
1	96.311	0.41	9951765	02
2	3.341	0.61	345211	08
3	0.069	1.07	7154	05
4	0.134	1.3	13886	02
5	0.144	1.46	14921	03
TOTAL	100.		10332937	

5643 – 5' 1000 µl

CHANNEL A INJECT 12/15/87 13:40:02

AZ 1

.63 .43

1.09 1.32

MALCOLM PIRNIE MILLCRK PA 12/15/87 13:40:02 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 40 INDEX 40

PEAK#	AREA%	RT	AREA	BC
1	96.238	0.43	9727871	02
2	3.636	0.63	367518	08
3	0.078	1.09	7916	05
4	0.048	1.32	4845	01
TOTAL	100.		10108150	

5641 – 5' 1000 µl

CHANNEL A INJECT 12/15/87 13:53:54

AZ 1

.74 .62 .42

1.31

MALCOLM PIRNIE MILLCRK PA 12/15/87 13:53:54 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 41 INDEX 41

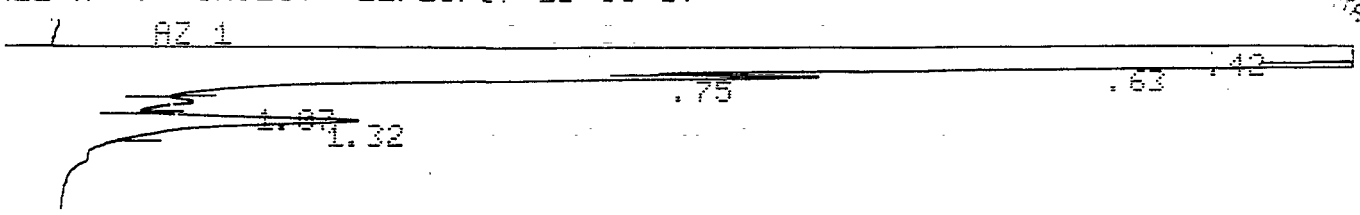
PEAK#	AREA%	RT	AREA	BC
1	96.57	0.42	9680897	02
2	2.099	0.62	210458	02
3	1.011	0.74	101381	03
4	0.32	1.31	~~32035~~	~~01~~

AR001029

ORIGINAL (Red)

CHANNEL A INJECT 12/15/87 13:56:37

AZ 1



MALCOLM PIRNIE MILLCRK PA 12/15/87 13:56:37 CH= "A" PS= 1.

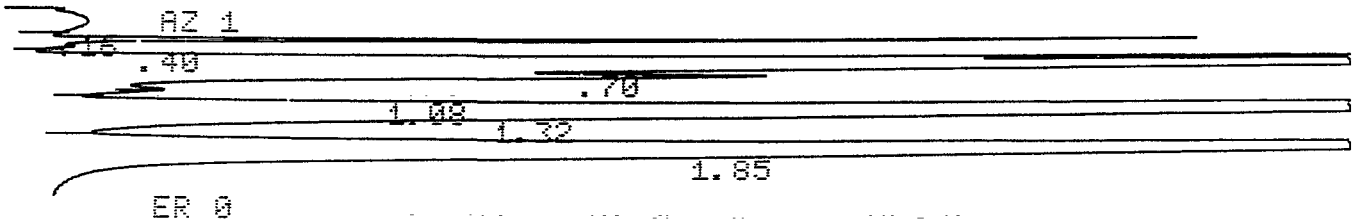
FILE 1. METHOD 0. RUN 42 INDEX 42

PEAK#	AREA%	RT	AREA	BC
1	96.331	0.42	8603124	02
2	2.132	0.63	190388	02
3	1.037	0.75	92652	03
4	0.043	1.07	3824	01
5	0.457	1.32	~~40845~~	01 35000
TOTAL	100.		8930833	

STD 5 µl
1,1-DCA 200 µg/l
TCA 5
TCE 10
PCE 5

CHANNEL A INJECT 12/15/87 14:00:36

AZ 1



ER 0

MALCOLM PIRNIE MILLCRK PA 12/15/87 14:00:36 CH= "A" PS= 1.

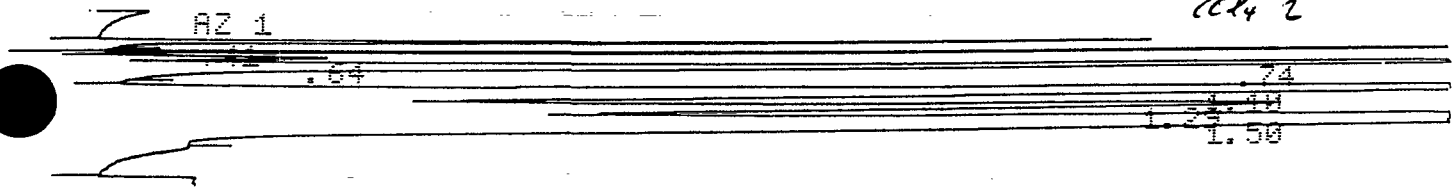
FILE 1. METHOD 0. RUN 43 INDEX 43

PEAK#	AREA%	RT	AREA	BC
1	0.46	0.16	10475	02
2	1.872	0.4	42611	02
3	45.324	0.7	1031450	02
4	0.388	1.08	8819	02
5	30.052	1.32	683891	02
6	21.904	1.85	498478	03
TOTAL	100.		2275724	

STD 5 µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

CHANNEL A INJECT 12/15/87 14:05:19

AZ 1



AR001030

INPUT OVERRANGE AT RT= 0.54

MALCOLM PIRNIE MILLCRK PA 12/15/87 14:05:19 CH= "A" PS= 1.

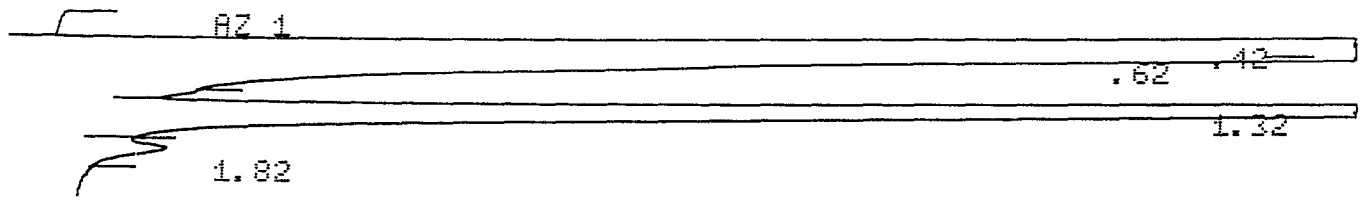
ORIGINAL

FILE 1. METHOD 0. RUN 44 INDEX 44

PEAK#	AREA%	RT	AREA	BC
1	2.869	0.41	38233	01
2	0.942	0.64	12556	02
3	14.371	0.74	191495	03
4	25.91	1.1	345252	02
5	13.737	1.29	183051	02
6	42.171	1.5	561943	03
TOTAL	100.		1332530	

SG38-5' 1000µl

CHANNEL A INJECT 12/15/87 14:21:46



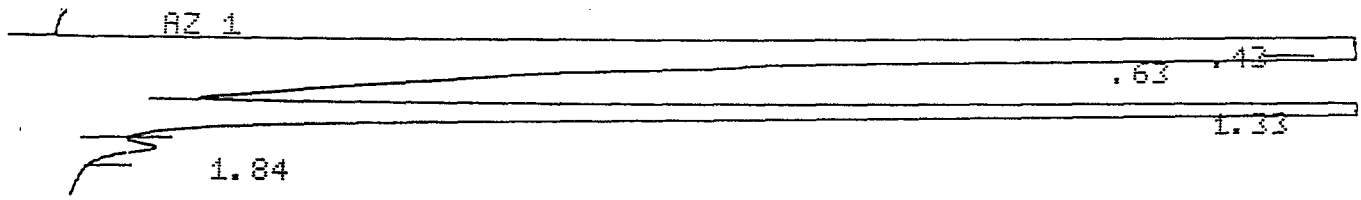
MALCOLM PIRNIE MILLCRK PA 12/15/87 14:21:46 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 45 INDEX 45

PEAK#	AREA%	RT	AREA	BC
1	90.528	0.42	10495671	02
2	2.61	0.62	302588	03
3	6.77	1.32	784860	01
4	0.092	1.82	10663	01
TOTAL	100.		11593782	

SG38-5' 1000µl

CHANNEL A INJECT 12/15/87 14:25:02



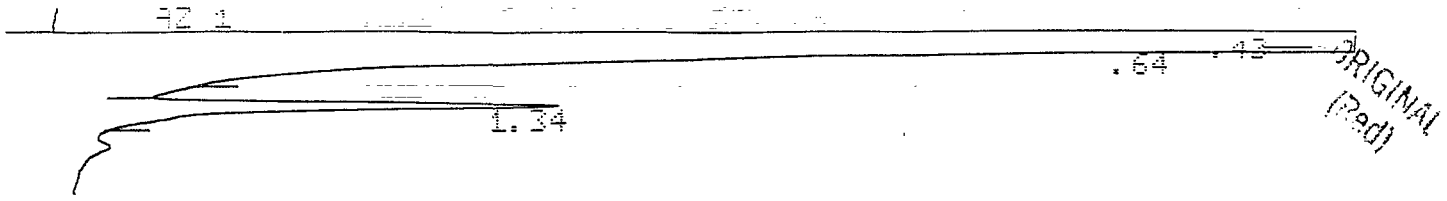
MALCOLM PIRNIE MILLCRK PA 12/15/87 14:25:02 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 46 INDEX 46

PEAK#	AREA%	RT	AREA	BC
1	88.656	0.43	9621626	02
2	3.805	0.63	412924	02
3	7.447	1.33	808239	03
4	0.092	1.84	9939	01
TOTAL	100.		10852728	

SG42-5½ 1000µl

AR001031



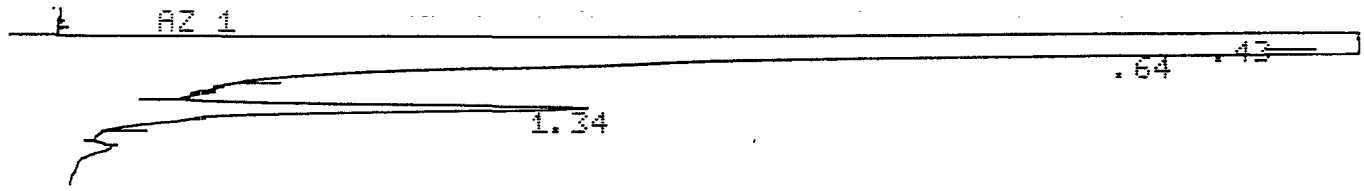
MALCOLM PIRNIE MILLCRK PA 12/15/87 15:20:20 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 47 INDEX 47

PEAK#	AREA%	RT	AREA	BC
1	96.042	0.43	9177121	02
2	3.185	0.64	304362	03
3	0.773	1.34	73841	01
TOTAL	100.		9555324	

SG42 - 5½' 1000µl

CHANNEL A INJECT 12/15/87 15:23:20



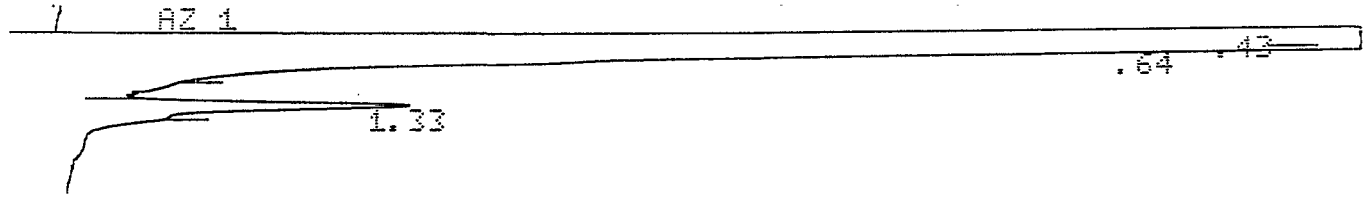
COLM PIRNIE MILLCRK PA 12/15/87 15:23:20 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 48 INDEX 48

PEAK#	AREA%	RT	AREA	BC
1	96.146	0.43	8453533	02
2	3.012	0.64	264787	03
3	0.843	1.34	74079	01
TOTAL	100.		8792399	

SG40 - 5½' 1000µl

CHANNEL A INJECT 12/15/87 15:31:21



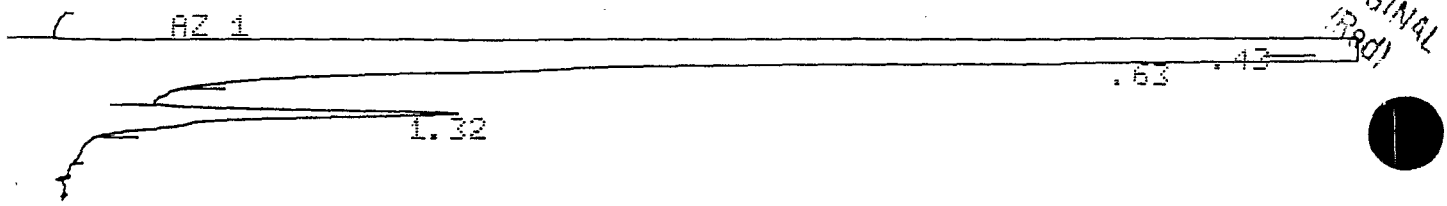
MALCOLM PIRNIE MILLCRK PA 12/15/87 15:31:21 CH= "A" PS= 1.

LE 1. METHOD 0. RUN 49 INDEX 49

PEAK#	AREA%	RT	AREA	BC
1	96.962	0.43	9569455	02
2	2.638	0.64	260363	03
3	0.4	1.33	39501	01

CHANNEL A INJECT 12/15/87 15:34:11

ORIGINAL (Red)



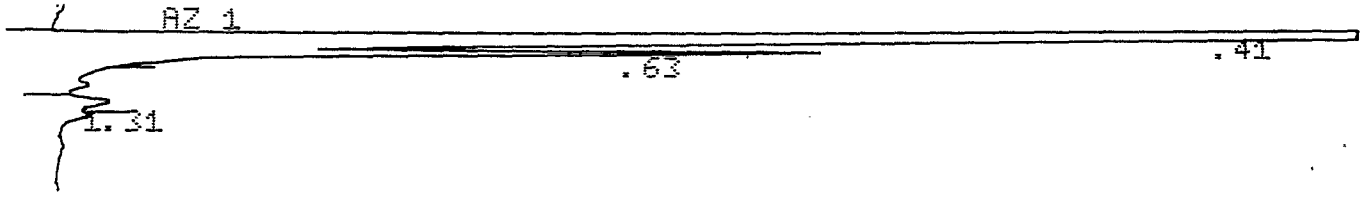
MALCOLM PIRNIE MILLCRK PA 12/15/87 15:34:11 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 50 INDEX 50

PEAK#	AREA%	RT	AREA	BC
1	96.788	0.43	9594425	02
2	2.594	0.63	257141	03
3	0.618	1.32	61255	01
TOTAL	100.		9912821	

SG37-5½' 1000µl

CHANNEL A INJECT 12/15/87 15:47:56



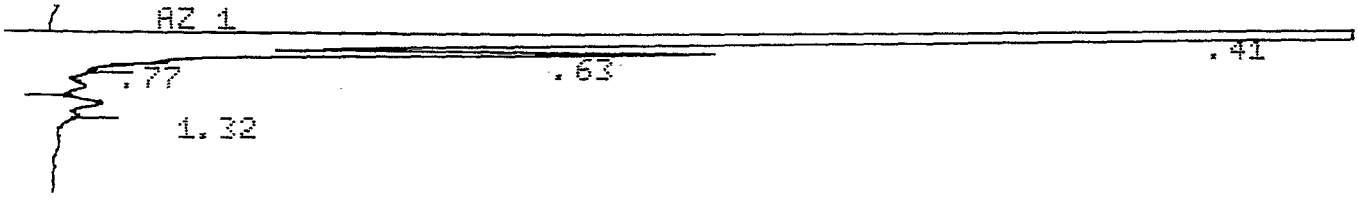
MALCOLM PIRNIE MILLCRK PA 12/15/87 15:47:56 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 51 INDEX 51

PEAK#	AREA%	RT	AREA	BC
1	98.552	0.41	5659938	02
2	1.372	0.63	78789	03
3	0.076	1.31	4348	01
TOTAL	100.		5743075	

SG37-5½' 1000µl

CHANNEL A INJECT 12/15/87 15:57:16



_COLM PIRNIE MILLCRK PA 12/15/87 15:57:16 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 52 INDEX 52

PEAK#	AREA%	RT	AREA	BC
1	98.584	0.41	5281698	02

AR001033

4	0.064	1.32	3445	01

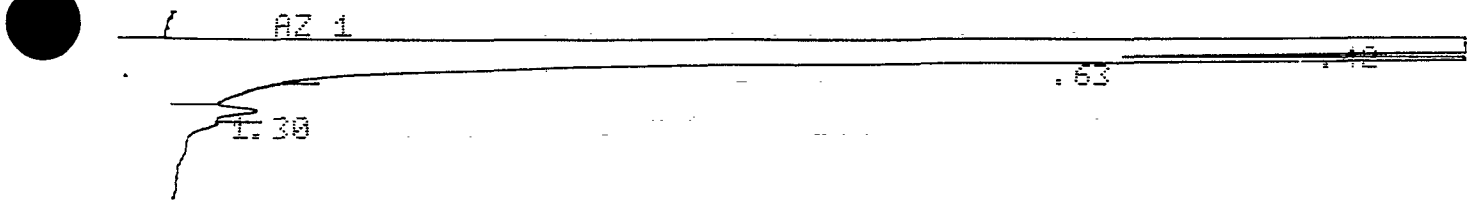
SG25-3' 1000µl

ORIGINAL (Red)

TOTAL 100. 5357545

16:07:00

CHANNEL A INJECT 12/15/87 16:08:13



MALCOLM PIRNIE MILLCRK PA 12/15/87 16:08:13 CH= "A" PS= 1.

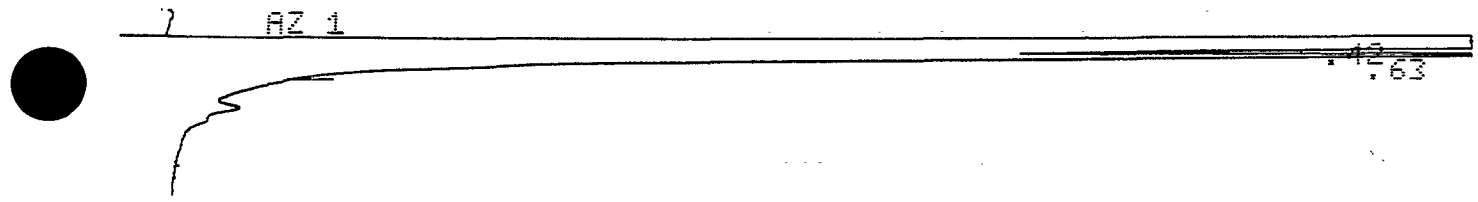
FILE 1. METHOD 0. RUN 53 INDEX 53

PEAK#	AREA%	RT	AREA	BC
1	97.608	0.42	8840157	02
2	2.337	0.63	211638	03
3	0.055	1.3	5014	01

TOTAL 100. 9056809

CHANNEL A INJECT 12/15/87 16:11:21

SG25-3' 1000µl



MALCOLM PIRNIE MILLCRK PA 12/15/87 16:11:21 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 54 INDEX 54

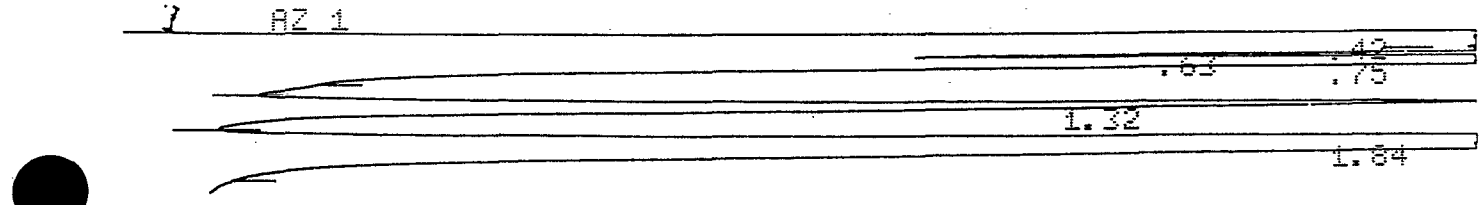
PEAK#	AREA%	RT	AREA	BC
1	97.714	0.42	8361073	02
2	2.286	0.63	195585	03

5,000

TOTAL 100. 8556658

SG35-5' 1000µl

CHANNEL A INJECT 12/15/87 16:24:15



MALCOLM PIRNIE MILLCRK PA 12/15/87 16:24:15 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 55 INDEX 55

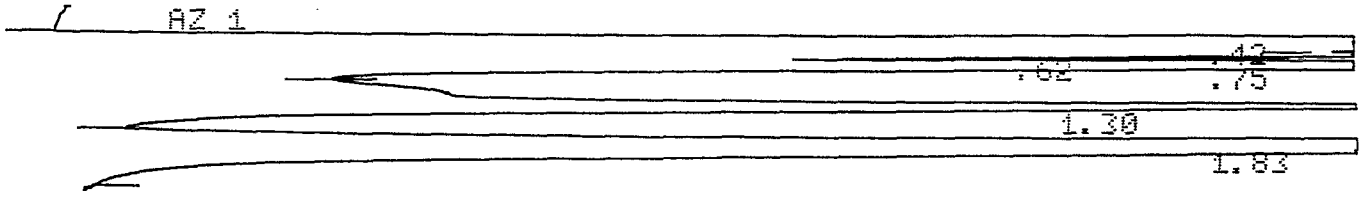
AR001034

1	82.514	0.42	8899513	02
2	1.447	0.63	156011	02
3	6.697	0.75	722317	03
4	1.956	1.32	210948	01
5	7.386	1.84	796621	01
TAL	100.		10785410	

ORIGINAL Page

SG35-5' 1000 µl

CHANNEL A INJECT 12/15/87 16:27:11



MALCOLM PIRNIE MILLCRK PA 12/15/87 16:27:11 CH= "A" PS= 1.

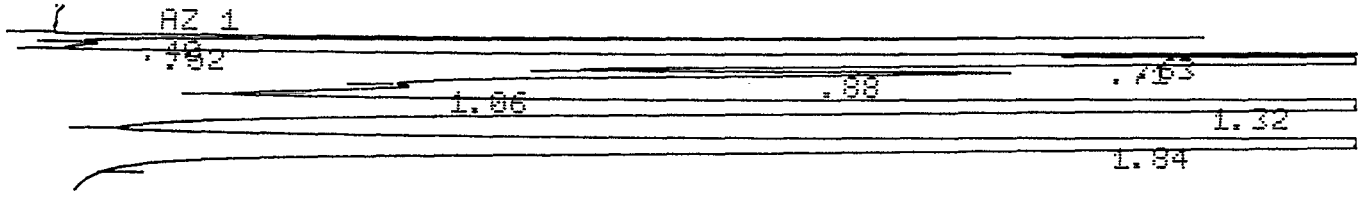
FILE 1. METHOD 0. RUN 56 INDEX 56

PEAK#	AREA%	RT	AREA	BC
1	81.594	0.42	8904012	02
2	1.333	0.62	145503	02
3	6.556	0.75	715428	03
4	2.727	1.3	297557	02
5	7.79	1.83	850098	03
TAL	100.		10912598	

STD 5µl

1,1-DCA 200µg/l
TCA 5
TCE 10
PCE 5

CHANNEL A INJECT 12/15/87 16:30:21



MALCOLM PIRNIE MILLCRK PA 12/15/87 16:30:21 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 57 INDEX 57

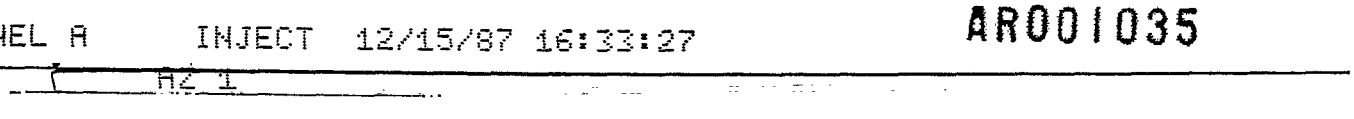
PEAK#	AREA%	RT	AREA	BC
1	1.726	0.4	41967	02
2	0.116	0.52	2814	02
3	3.279	0.63	79710	02
4	36.3	0.71	882542	02
5	6.35	0.88	154381	02
6	2.278	1.06	55387	02
7	29.467	1.32	716420	02
8	20.484	1.84	498002	03
TOTAL	100.		2431223	

STD 5µl

CH_2Cl_2 200µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

AR001035

CHANNEL A INJECT 12/15/87 16:33:27



1.09 1.28
1.50

ORIGINAL

PUT OVERRANGE AT RT= 0.06

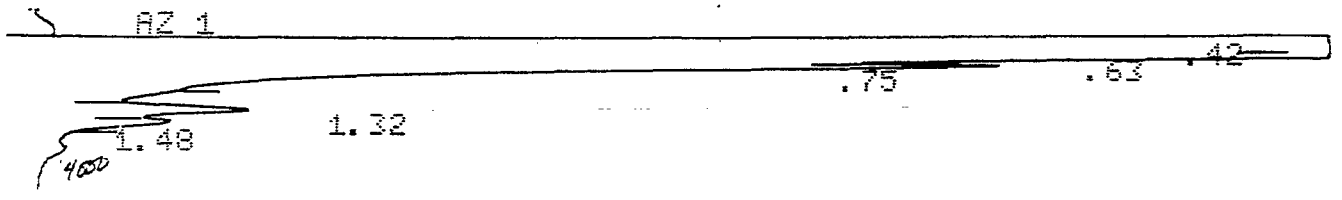
MALCOLM PIRNIE MILLCRK PA 12/15/87 16:33:27 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 58 INDEX 58

PEAK#	AREA%	RT	AREA	BC
1	1.79	0.41	38538	01
2	0.661	0.64	14236	02
3	9.705	0.73	208966	02
4	45.099	1.09	971103	02
5	14.647	1.28	315386	02
6	28.099	1.5	605055	03
TOTAL	100.		2153284	

SG 36 - 4' 1000 µl

CHANNEL A INJECT 12/15/87 16:37:19



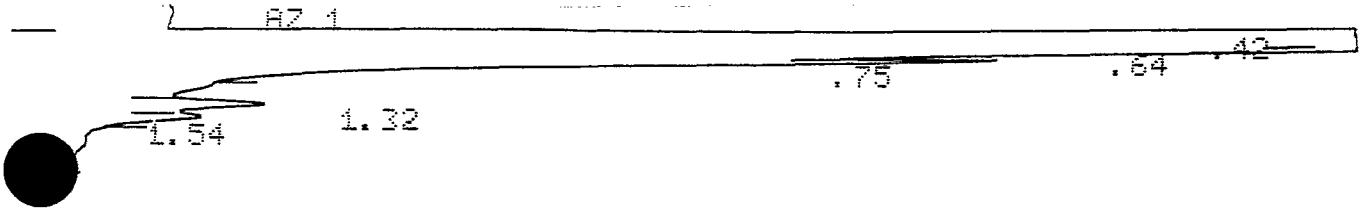
MALCOLM PIRNIE MILLCRK PA 12/15/87 16:37:19 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 59 INDEX 59

PEAK#	AREA%	RT	AREA	BC
1	95.62	0.42	8593426	02
2	2.52	0.63	226478	02
3	1.487	0.75	133653	03
4	0.23	1.32	20649	02
5	0.143	1.48	12826	03
TOTAL	100.		8987032	

SG36 - 4' 1000 µl

CHANNEL A INJECT 12/15/87 16:40:12



MALCOLM PIRNIE MILLCRK PA 12/15/87 16:40:12 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 60 INDEX 60

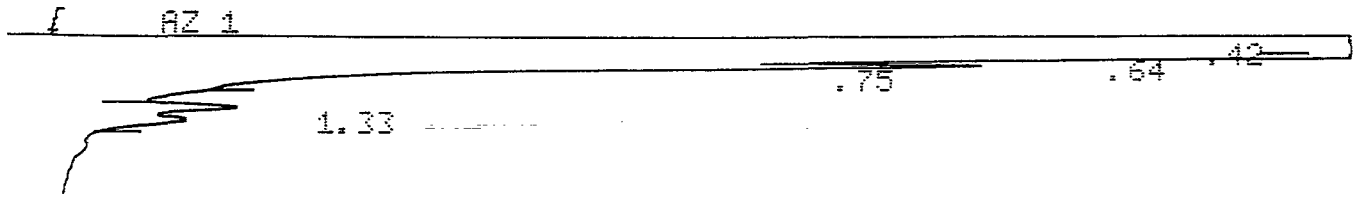
AR001036

1	95.932	0.42	8457402 02
2	2.364	0.64	208410 02
3	1.391	0.75	122615 03
4	0.18	1.32	15875 02
5	0.133	1.54	11696 03
TOTAL	100.		8815998

ORIGINAL (Red)

SG36-4' 1000 µl

CHANNEL A INJECT 12/15/87 16:43:28



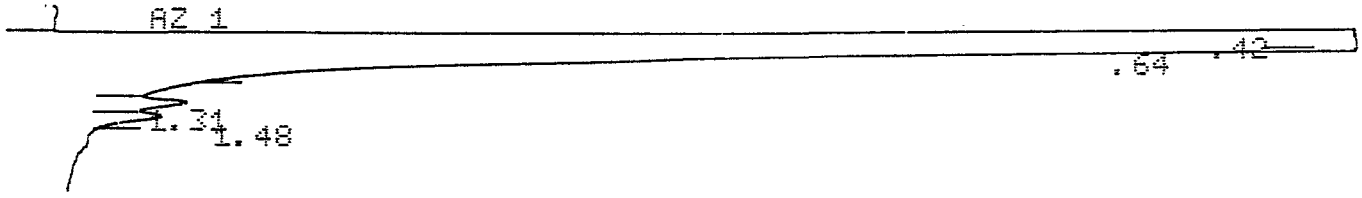
MALCOLM PIRNIE MILLCRK PA 12/15/87 16:43:28 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 61 INDEX 61

PEAK#	AREA%	RT	AREA BC
1	95.656	0.42	7957740 02
2	2.434	0.64	202520 02
3	1.605	0.75	133543 03
4	0.305	1.33	25337 01
TOTAL	100.		8319140

SG38-8' 1000 µl

CHANNEL A INJECT 12/15/87 16:52:41



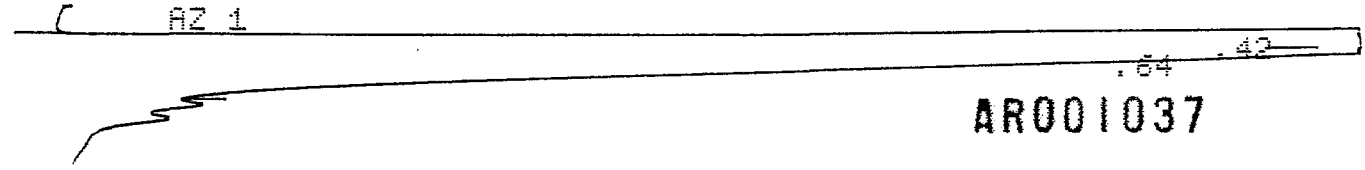
MALCOLM PIRNIE MILLCRK PA 12/15/87 16:52:41 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 62 INDEX 62

PEAK#	AREA%	RT	AREA BC
1	96.612	0.42	8114078 02
2	3.2	0.64	268762 03
3	0.094	1.31	7909 02
4	0.094	1.48	7854 03
TOTAL	100.		8398603

SG38-6' 1000 µl

CHANNEL A INJECT 12/15/87 16:56:06



MALCOLM PIRNIE MILLCRK PA 12/15/87 16:56:06 CH= "A" PS= 1.

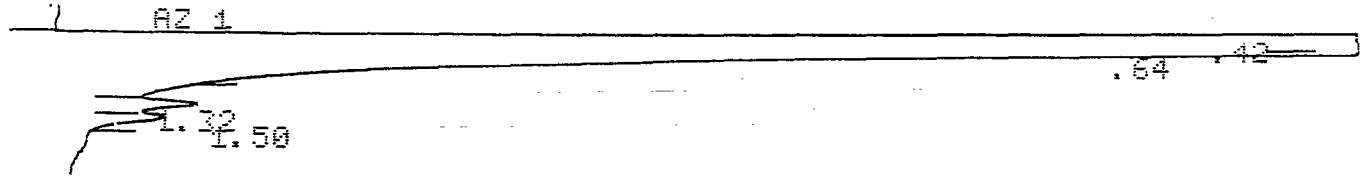
ORIGINAL (Red)

FILE 1. METHOD 0. RUN 63 INDEX 63

PEAK#	AREA%	RT	AREA BC
1	93.258	0.42	7735400 02
2	6.742	0.64	559210 03
TOTAL	100.		8294610

SG38-6' 1000µl

CHANNEL A INJECT 12/15/87 17:04:01



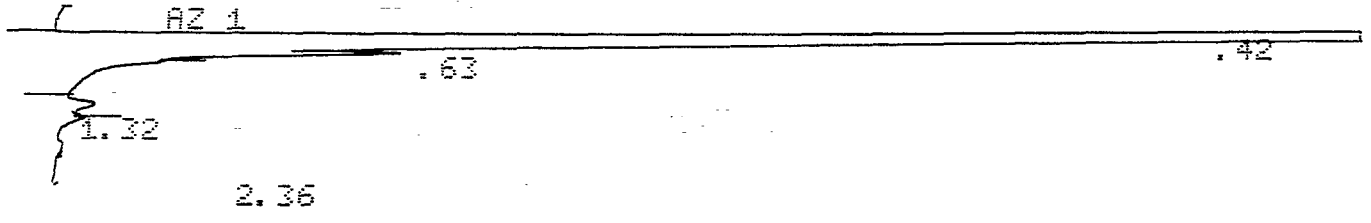
MALCOLM PIRNIE MILLCRK PA 12/15/87 17:04:01 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 64 INDEX 64

PEAK#	AREA%	RT	AREA BC
1	96.48	0.42	7944066 02
2	3.293	0.64	271178 03
3	0.119	1.32	9820 02
4	0.108	1.5	8859 03
TOTAL	100.		8233923

SG24- 4' 1000µl

CHANNEL A INJECT 12/15/87 17:09:13



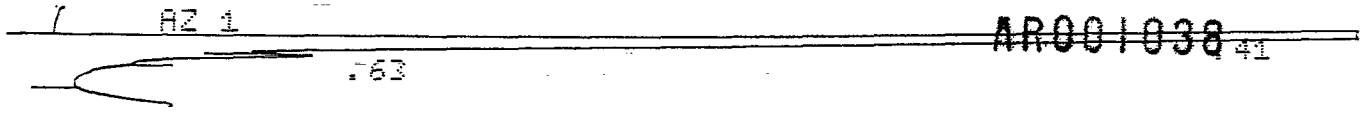
MALCOLM PIRNIE MILLCRK PA 12/15/87 17:09:13 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 65 INDEX 65

PEAK#	AREA%	RT	AREA BC
1	99.567	0.42	6002481 02
2	0.398	0.63	23979 03
3	0.035	1.32	2096 01
TOTAL	100.		6028556

SG24 - 4' 1000µl

CHANNEL A INJECT 12/15/87 17:12:00



MALCOLM PIRNIE MILLCRK PA 12/15/87 17:12:00 CH= "A" PS= 1.

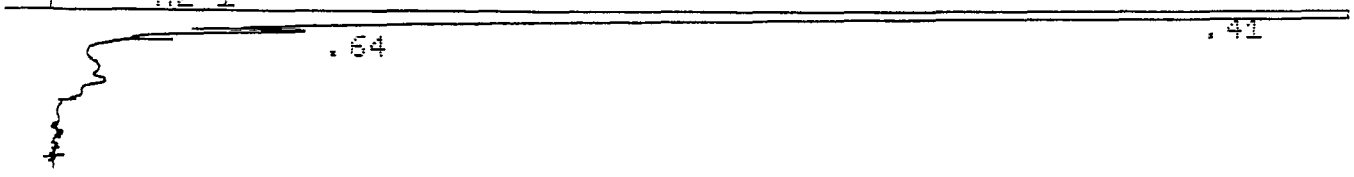
E 1. METHOD 0. RUN 66 INDEX 66

PEAK#	AREA%	RT	AREA	BC
1	98.719	0.41	4914255	02
2	0.375	0.63	18645	03
3	0.906	1.33	45100	01
TOTAL	100.		4978000	

SG24 - 4' 1000 µl

CHANNEL A INJECT 12/15/87 17:14:59

AZ 1



MALCOLM PIRNIE MILLCRK PA 12/15/87 17:14:59 CH= "A" PS= 1.

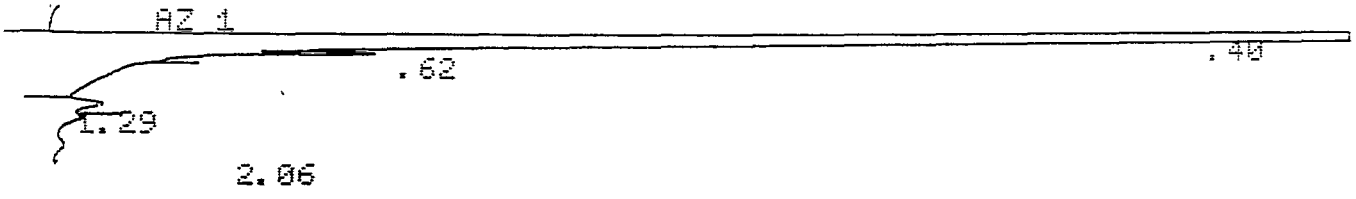
FILE 1. METHOD 0. RUN 67 INDEX 67

PEAK#	AREA%	RT	AREA	BC
1	99.625	0.41	4682548	02
2	0.375	0.64	17630	03
TOTAL	100.		4700178	

SG24-4' 1000 µl

CHANNEL A INJECT 12/15/87 17:18:15

AZ 1



MALCOLM PIRNIE MILLCRK PA 12/15/87 17:18:15 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 68 INDEX 68

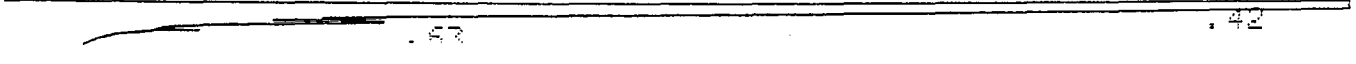
PEAK#	AREA%	RT	AREA	BC
1	99.503	0.4	5493602	02
2	0.433	0.62	23889	03
3	0.064	1.29	3544	01
TOTAL	100.		5521035	

SG24-4' 1000 µl

CHANNEL A INJECT 12/15/87 17:20:53

AZ 1

AR001039



1.23

ORIGINAL (Red)

MALCOLM PIRNIE MILLCRK PA 12/15/87 17:20:53 CH= "A" PS= 1.

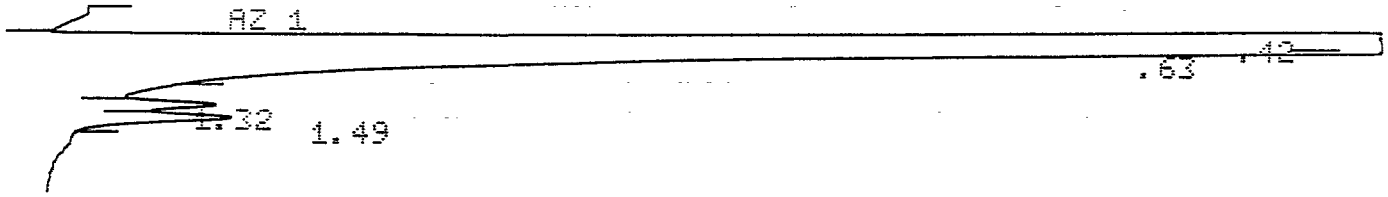
LE 1. METHOD 0. RUN 69 INDEX 69

PEAK#	AREA%	RT	AREA	BC
1	99.216	0.42	5613018	02
2	0.409	0.63	23140	03
3	0.375	1.33	21220	01
TOTAL	100.		5657378	

AIR SAMPLE 1000 µl

CHANNEL A INJECT 12/15/87 17:24:59

AZ 1



MALCOLM PIRNIE MILLCRK PA 12/15/87 17:24:59 CH= "A" PS= 1.

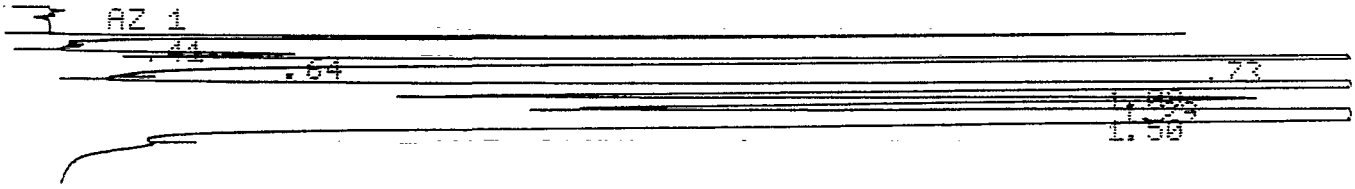
FILE 1. METHOD 0. RUN 70 INDEX 70

PEAK#	AREA%	RT	AREA	BC
1	96.331	0.42	7932854	02
2	3.217	0.63	264959	03
3	0.162	1.32	13327	02
4	0.29	1.49	23861	03
TOTAL	100.		8235001	

STD 5 µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

CHANNEL A INJECT 12/15/87 17:28:18

AZ 1



MALCOLM PIRNIE MILLCRK PA 12/15/87 17:28:18 CH= "A" PS= 1.

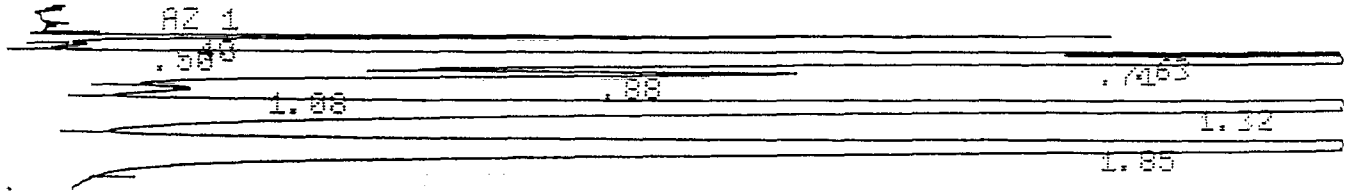
FILE 1. METHOD 0. RUN 71 INDEX 71

PEAK#	AREA%	RT	AREA	BC
1	3.215	0.41	43337	02
2	1.057	0.64	14246	02
3	15.065	0.73	203051	03
4	25.534	1.09	344142	02
5	13.603	1.29	183341	02
6	41.526	1.5	559680	03

STD 5 µl

AR001040

CHANNEL A INJECT 12/15/87 17:31:09



MALCOLM PIRNIE MILLCRK PA 12/15/87 17:31:09 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 72 INDEX 72

PEAK#	AREA%	RT	AREA	BC
1	1.659	0.4	38447	02
2	0.097	0.5	2248	03
3	3.448	0.63	79881	02
4	37.676	0.71	872926	02
5	4.009	0.88	92875	02
6	0.803	1.08	18612	02
7	30.617	1.32	709373	02
8	21.691	1.85	502559	03
TOTAL	100.		2316921	

CHANNEL A INJECT 12/15/87 17:41:34

NO DATA, CHANNEL A

ORIGINAL
(Red)

CHROMATOGRAMS
DECEMBER 16, 1987

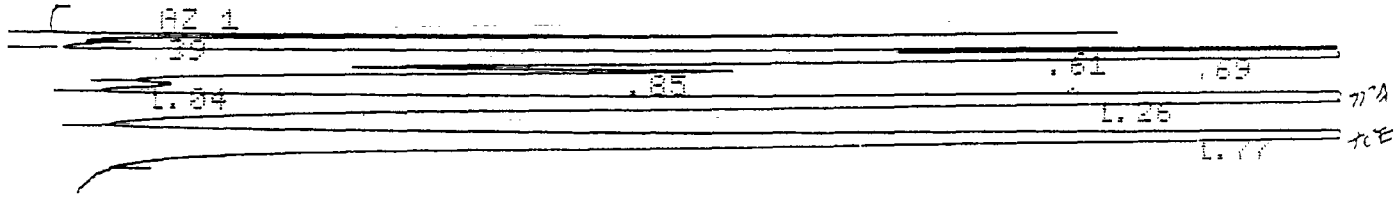
MILLCREEK PA
MALCOLM PIRNIE
12-16-87
ECD

Column OV101	Detector ECD
Length 6'	Voltage 6
Dia. 1/8"	Concn.
Liquid Phase	Flow Rates, ml/min
Wt. %	Hydrogen — Air —
Support CHROMOSORB W	Scavenge
Mesh 80/100	Split
Carrier Gas N2	Temp. 50
Rate	Det. 350 Inj. 350
Inlet 60	Column 50
Rate 30	Final —
CHART SPEED	Rate —
SAMPLE	Solvent
Size	Concn.
Operator S. CHERBA	Date 12-16-87

```
  READY
DATE "

  READY
DATE " 12/16/87
TIME " 7:16
FI= 1.      FE= 1.      MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
FILE NAME=" MALCOLM PIRNIE MILLCRK PA
TIME        FUNCTION  VALUE
TT= .01     TF=" AZ   TV= 1
    .01     TF=" PM   TV= 1
TT= 2.5     TF=" ER   TV= 1
TT=

METHOD NUMBER:MN=

END OF DIALOG
AT=16
PM=.01
PT=500
DF=10
```

STD 5 µl
1,1-DCA 200 µg/l
TCA 5
TCE 10
PCE 5

CHANNEL A INJECT 12/16/87 07:19:04



MALCOLM PIRNIE MILLCRK PA 12/16/87 07:19:04 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 1 INDEX 1

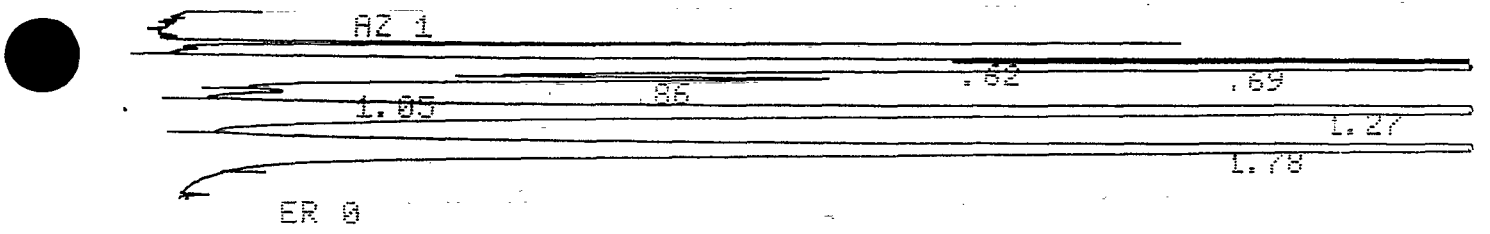
PEAK#	AREA%	RT	AREA	BC
1	1.805	0.39	34211	01
2	3.525	0.61	66805	02
3	38.617	0.69	731834	02
4	4.118	0.85	78042	02
5	[illegible]	[illegible]	[illegible]	[illegible]

AR001043

1,1-DCA 200 µg/l
TCA 5
TCE 10
PCE 5

	21.507	1.77	40,578 [illegible]
TOTAL	100.		1895125

CHANNEL A INJECT 12/16/87 07:23:48



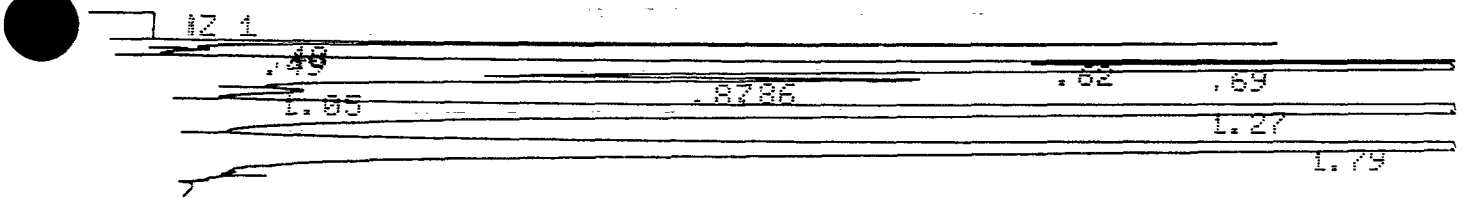
MALCOLM PIRNIE MILLCRK PA 12/16/87 07:23:48 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 2 INDEX 2

PEAK#	AREA%	RT	AREA	BC
1	3.746	0.62	67985	02
2	39.593	0.69	718476	02
3	4.197	0.86	76168	02
4	0.624	1.05	11330	02
5	30.312	1.27	550068	02
6	21.527	1.78	390638	03
TOTAL	100.		1814665	

STD 5 µl
1,1-DCA 200
TCA 5 µg/l
TCE 10
PCE 5

CHANNEL A INJECT 12/16/87 07:29:29



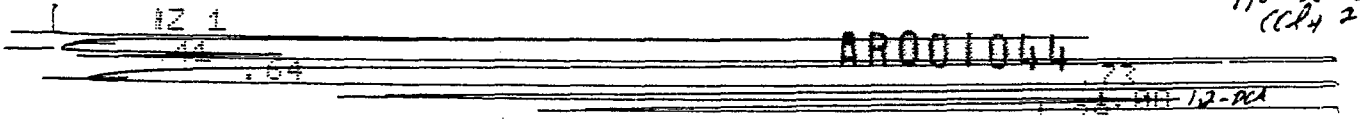
MALCOLM PIRNIE MILLCRK PA 12/16/87 07:29:29 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 3 INDEX 3

PEAK#	AREA%	RT	AREA	BC
1	1.892	0.4	39613	02
2	0.161	0.49	3366	02
3	3.812	0.62	79815	02
4	38.311	0.69	802143	02
5	1.932	0.86	40441	02
6	2.351	0.87	49215	02
7	0.867	1.05	18155	02
8	29.713	1.27	622127	02
9	20.961	1.79	438877	03
TOTAL	100.		2093752	

STD 5 µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

CHANNEL A INJECT 12/16/87 07:49:26



AR001044

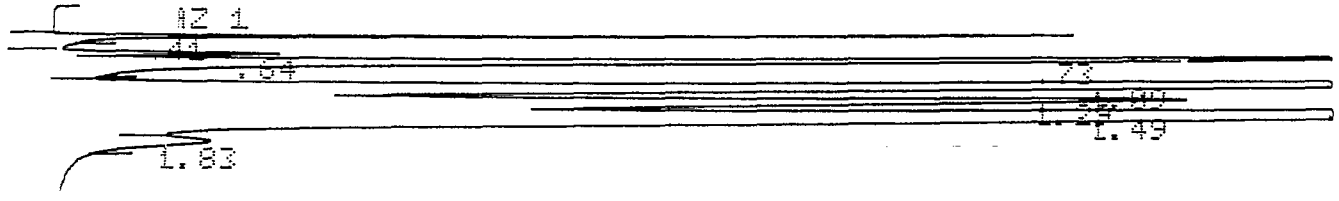
MALCOLM PIRNIE MILLCRK PA 12/16/87 07:49:26 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 4 INDEX 4

PEAK#	AREA%	RT	AREA	BC
1	2.835	0.41	35811	01
2	1.055	0.64	13333	02
3	14.818	0.73	187191	03
4	25.81	1.08	326051	02
5	13.382	1.29	169050	02
6	42.1	1.49	531835	03
TOTAL	100.		1263271	

STD 5µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

CHANNEL A INJECT 12/16/87 07:58:23



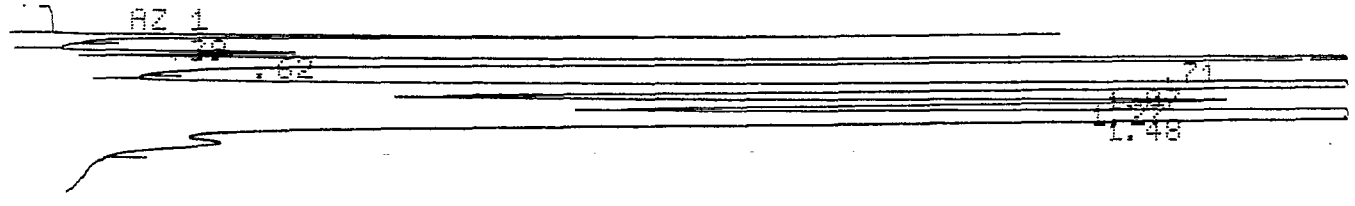
MALCOLM PIRNIE MILLCRK PA 12/16/87 07:58:23 CH= "A" PS= 1.

E 1. METHOD 0. RUN 5 INDEX 5

PEAK#	AREA%	RT	AREA	BC
1	2.729	0.41	35325	01
2	0.991	0.64	12828	02
3	14.229	0.73	184170	03
4	24.86	1.09	321784	02
5	13.601	1.29	176048	02
6	42.662	1.49	552197	08
7	0.928	1.83	12011	05
TOTAL	100.		1294363	

STD 5µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 300
CCl_4 2

CHANNEL A INJECT 12/16/87 08:01:22



COLM PIRNIE MILLCRK PA 12/16/87 08:01:22 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 6 INDEX 6

PEAK#	AREA%	RT	AREA	BC
1	2.708	0.39	35565	01
2	0.952	0.62	12511	02

AR001045

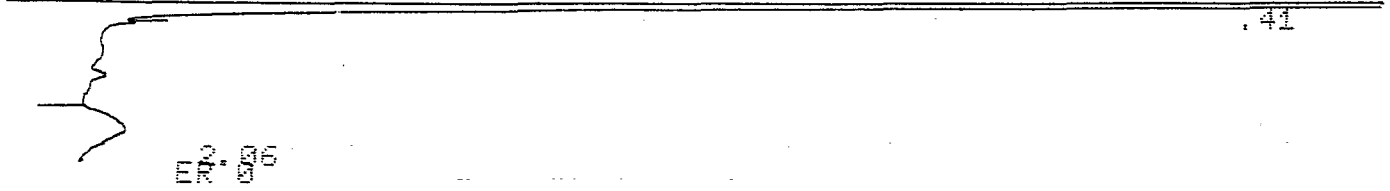
5	13.623	1.27	178940	02
6	43.768	1.48	574314	03

TOTAL 100. 1313558

ORIGINAL

N_2 BLANK 1000 µl

HANNEL A INJECT 12/16/87 08:12:32



MALCOLM PIRNIE MILLCRK PA 12/16/87 08:12:32 CH= "A" PS= 1.

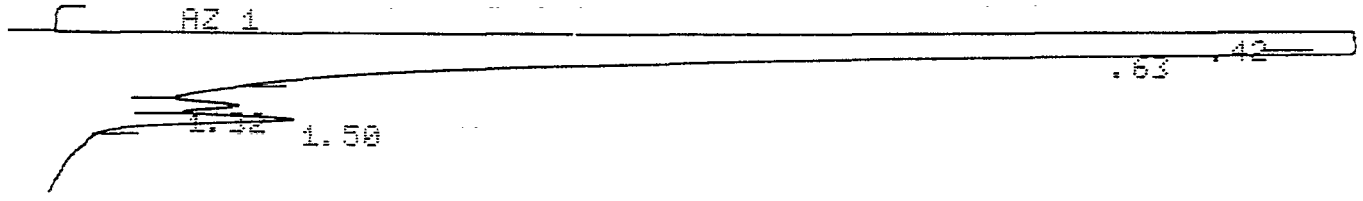
FILE 1. METHOD 0. RUN 7 INDEX 7

PEAK#	AREA%	RT	AREA	BC
1	94.286	0.41	361932	01
2	5.714	2.06	21936	01

TOTAL 100. 383868

AIR SAMPLE 1000 µl

CHANNEL A INJECT 12/16/87 09:24:31



MALCOLM PIRNIE MILLCRK PA 12/16/87 09:24:31 CH= "A" PS= 1.

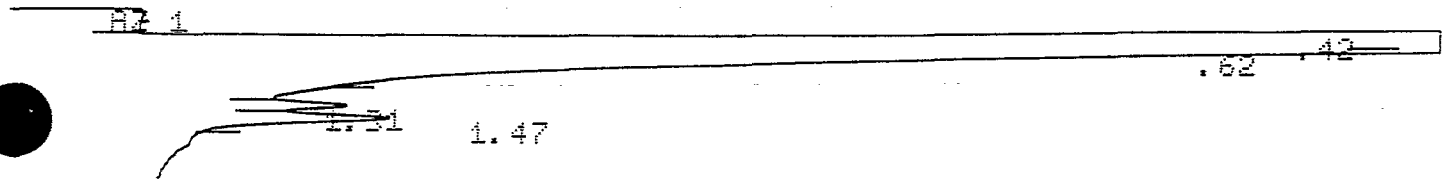
FILE 1. METHOD 0. RUN 8 INDEX 8

PEAK#	AREA%	RT	AREA	BC
1	96.514	0.42	9439992	02
2	3.09	0.63	302213	03
3	0.114	1.32	11169	02
4	0.282	1.5	27542	03

TOTAL 100. 9780916

SYSTEM BLANK 1000 µl

CHANNEL A INJECT 12/16/87 09:56:49



MALCOLM PIRNIE MILLCRK PA 12/16/87 09:56:49 CH= "A" PS= 1.

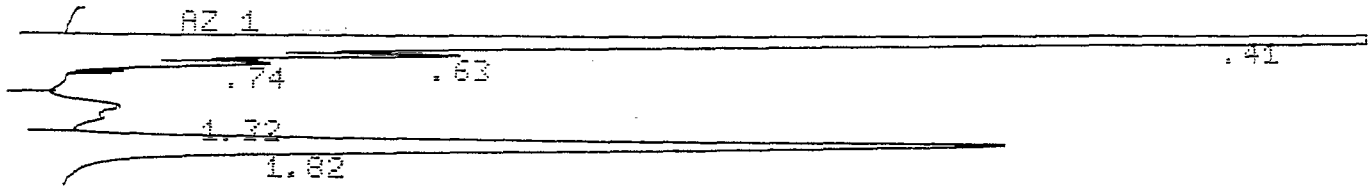
ARU01046

PEAK#	AREA%	RT	AREA	BC
1	96.445	0.42	9322037	02
2	3.161	0.62	305526	03
3	0.115	1.31	11160	02
4	0.279	1.47	26976	03
TOTAL	100.		9665699	

ORIGINAL PAGE

5G30-2½' 100

CHANNEL A INJECT 12/16/87 09:59:35



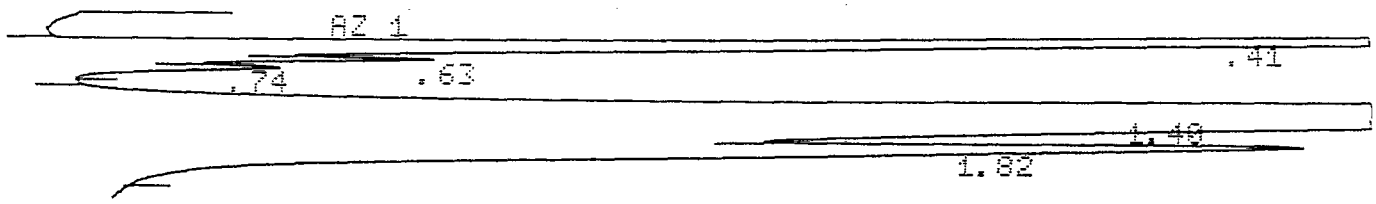
MALCOLM PIRNIE MILLCRK PA 12/16/87 09:59:35 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 10 INDEX 10

PEAK#	AREA%	RT	AREA	BC
1	85.893	0.41	1632793	08
2	0.571	0.63	10855	05
3	0.508	0.74	9657	05
4	1.236	1.32	23501	02
5	11.792	1.82	224153	03
TOTAL	100.		1900959	

5G30-2½' 1000µ

CHANNEL A INJECT 12/16/87 10:02:17



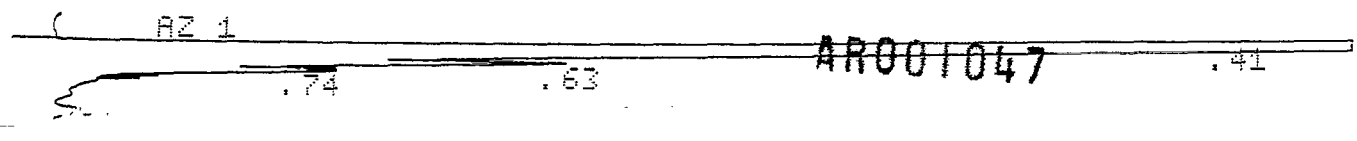
MALCOLM PIRNIE MILLCRK PA 12/16/87 10:02:17 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 11 INDEX 11

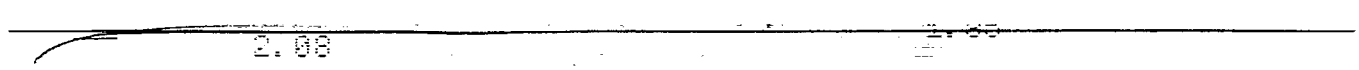
PEAK#	AREA%	RT	AREA	BC
1	46.789	0.41	1361035	02
2	1.235	0.63	35914	02
3	0.904	0.74	26282	03
4	40.166	1.4	1168380	02
5	10.907	1.82	317265	03
TOTAL	100.		2908876	

5G30-2½' 1000µ

CHANNEL A INJECT 12/16/87 10:07:26



AR001047



INPUT OVERRANGE AT RT= 2.07

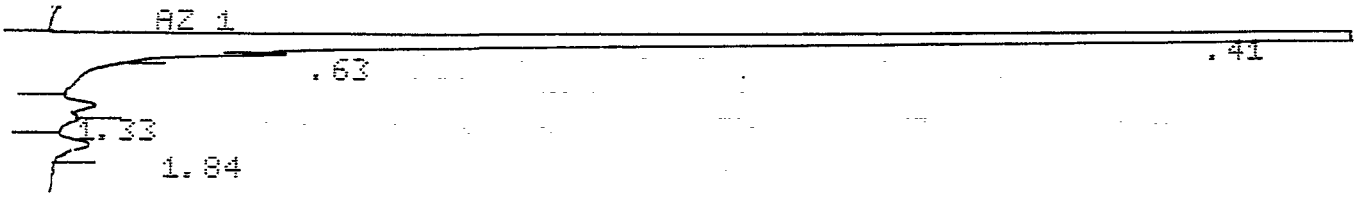
MALCOLM PIRNIE MILLCRK PA 12/16/87 10:07:26 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 12 INDEX 12

PEAK#	AREA%	RT	AREA	BC
1	67.345	0.41	2299491	08
2	0.351	0.63	11978	05
3	0.278	0.74	9486	05
4	0.057	1.3	1927	01
5	6.184	1.85	211156	02
6	25.786	2.08	880462	03
TOTAL	100.		3414510	

SG31-4' 1000µl

CHANNEL A INJECT 12/16/87 10:51:57



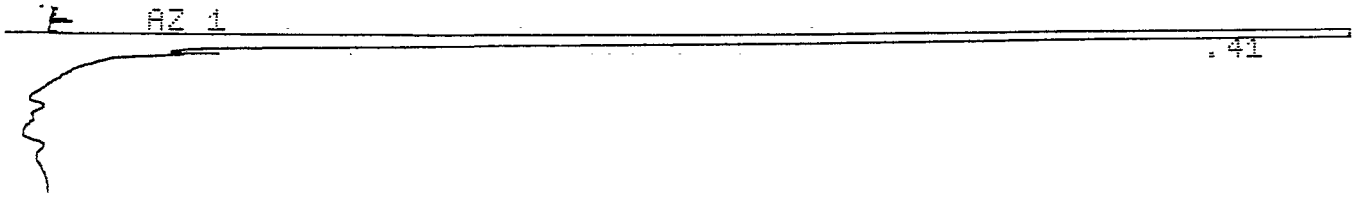
MALCOLM PIRNIE MILLCRK PA 12/16/87 10:51:57 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 13 INDEX 13

PEAK#	AREA%	RT	AREA	BC
1	99.42	0.41	4852790	02
2	0.368	0.63	17964	03
3	0.067	1.33	3256	01
4	0.145	1.84	7094	01
TOTAL	100.		4881104	

SG31-4' 1000µl

CHANNEL A INJECT 12/16/87 10:56:46



MALCOLM PIRNIE MILLCRK PA 12/16/87 10:56:46 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 14 INDEX 14

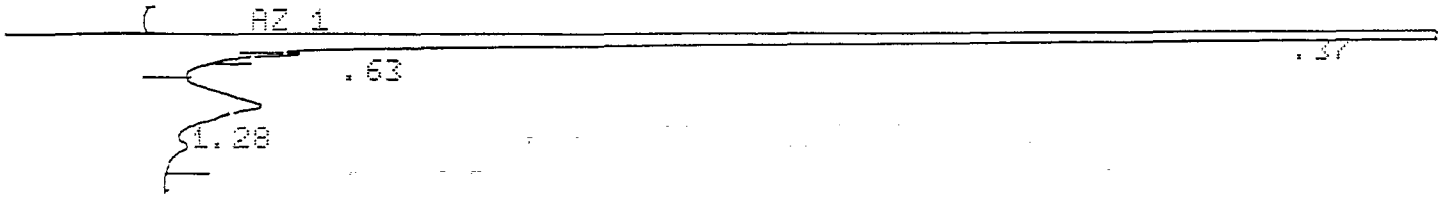
PEAK#	AREA%	RT	AREA	BC
1	100	0.41	[illegible]	04

AR001048

TOTAL 100. 3364362

SG31 - ORIGINAL (Red)

CHANNEL A INJECT 12/16/87 10:59:39



INPUT OVERRANGE AT RT= 0.36

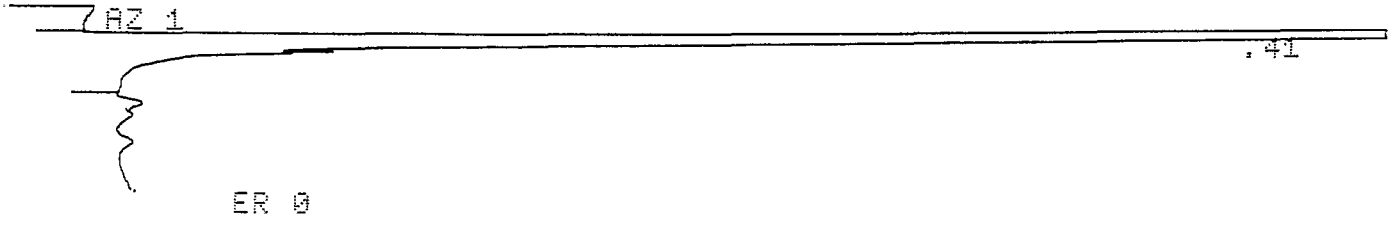
MALCOLM PIRNIE MILLCRK PA 12/16/87 10:59:39 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 15 INDEX 15

PEAK#	AREA%	RT	AREA	BC
1	98.811	0.37	4042757	02
2	0.263	0.63	10777	03
3	0.926	1.28	37880	01
TOTAL	100.		4091414	

SG31-4' 1000µl

CHANNEL A INJECT 12/16/87 11:05:23



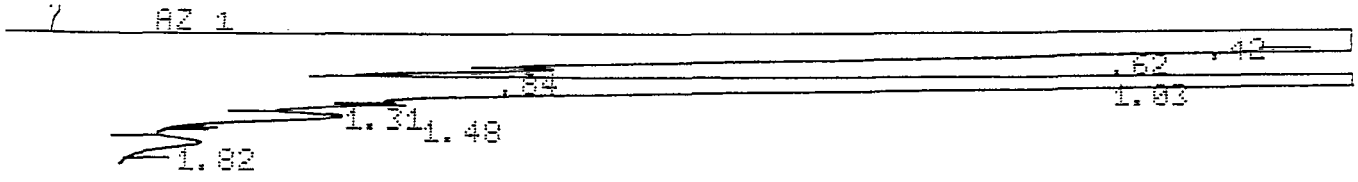
MALCOLM PIRNIE MILLCRK PA 12/16/87 11:05:23 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 16 INDEX 16

PEAK#	AREA%	RT	AREA	BC
1	100.	0.41	4512900	01
TOTAL	100.		4512900	

SG32-4' 1000µl

CHANNEL A INJECT 12/16/87 11:10:01



MALCOLM PIRNIE MILLCRK PA 12/16/87 11:10:01 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 17 INDEX 17

AR001049

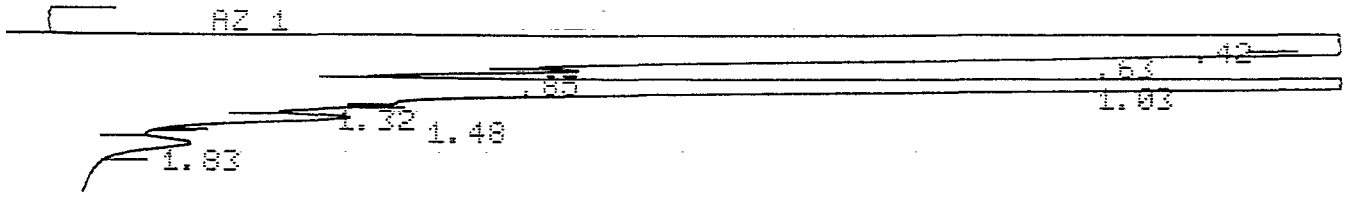
PEAK# AREA% RT AREA BC

1	87.914	0.42	9472439	02
2	2.571	0.62	276941	02
3	0.56	0.84	60325	02
4	8.689	1.03	935954	08
5	0.006	1.31	645	05
6	0.141	1.48	15207	05
7	0.099	1.82	10690	01
TOTAL	100.		10772201	

ORIGINAL (Red)

SG 32-4' 1000 µl

CHANNEL A INJECT 12/16/87 11:14:49



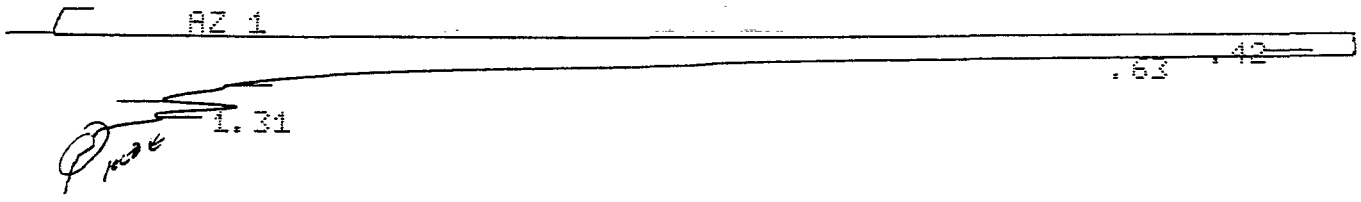
MALCOLM PIRNIE MILLCRK PA 12/16/87 11:14:49 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 18 INDEX 18

PEAK#	AREA%	RT	AREA	BC
1	87.118	0.42	9284343	02
2	2.785	0.63	296851	02
3	0.603	0.85	64217	02
4	9.228	1.03	983408	08
5	0.004	1.32	430	05
6	0.151	1.48	16142	05
7	0.111	1.83	11801	01
TOTAL	100.		10657192	

SG 34 — 3' 1000 µl

CHANNEL A INJECT 12/16/87 11:50:27



MALCOLM PIRNIE MILLCRK PA 12/16/87 11:50:27 CH= "A" PS= 1.

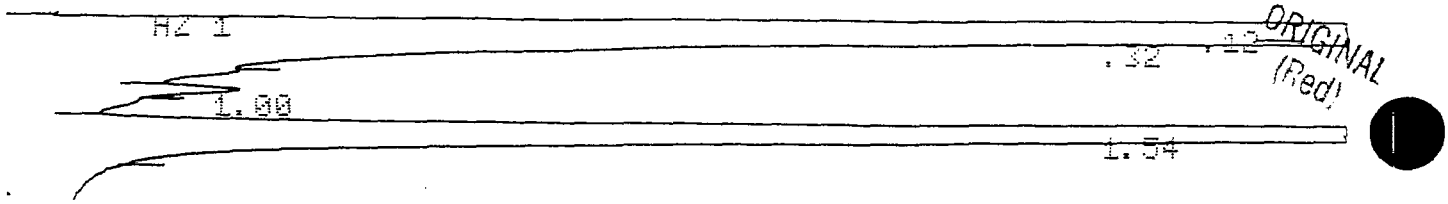
FILE 1. METHOD 0. RUN 19 INDEX 19

PEAK#	AREA%	RT	AREA	BC
1	96.694	0.42	9477796	02
2	3.218	0.63	315404	03
3	0.088	1.31	8664	01
TOTAL	100.		9801864	

SG44 - 4' 1000 µl

CHANNEL A INJECT 12/16/87 12:04:18

CHANNEL A INJECT 12/16/87 12:04:34



ORIGINAL (Red)

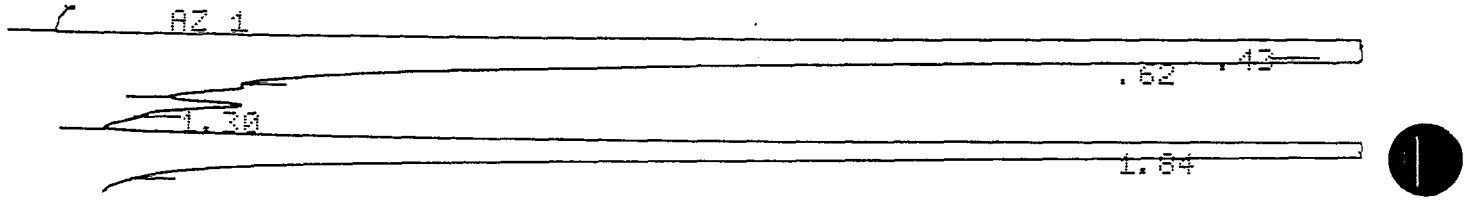
MALCOLM PIRNIE MILLCRK PA 12/16/87 12:04:34 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 21 INDEX 21

PEAK#	AREA%	RT	AREA	BC
1	89.155	0.12	9808896	02
2	2.541	0.32	279516	03
3	0.1	1.	11044	01
4	8.204	1.54	902666	01
TOTAL	100.		11002122	

5644 - 4' 1000 µl

CHANNEL A INJECT 12/16/87 12:08:55



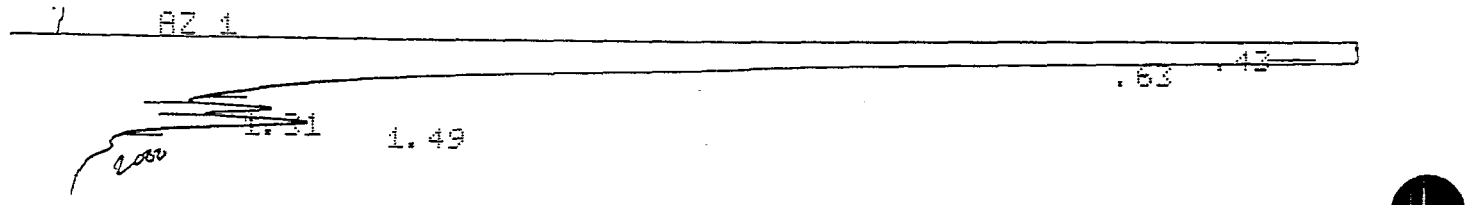
MALCOLM PIRNIE MILLCRK PA 12/16/87 12:08:55 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 22 INDEX 22

PEAK#	AREA%	RT	AREA	BC
1	89.172	0.43	10377770	02
2	2.398	0.62	279060	03
3	0.099	1.3	11475	01
4	8.332	1.84	969636	01
TOTAL	100.		11637941	

15
5645 - 4½ 1000 µl

CHANNEL A INJECT 12/16/87 12:15:42



MALCOLM PIRNIE MILLCRK PA 12/16/87 12:15:42 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 23 INDEX 23

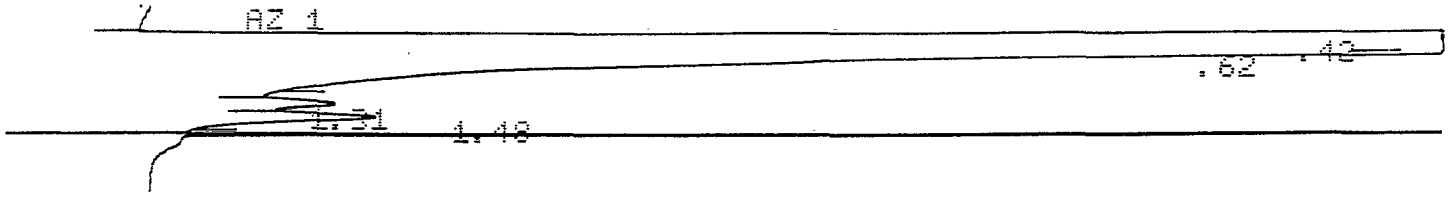
AR001051

PEAK#	AREA%	RT	AREA	BC

1	96.314	0.43	10011772	02
2	3.304	0.63	344177	03
3	0.124	1.31	12888	02
4	0.258	1.49	26835	03
TOTAL	100.		10415672	

15
SC-45-4½ ORIGINAL (Red)

CHANNEL A INJECT 12/16/87 12:20:15



INPUT OVERRANGE AT RT= 1.7

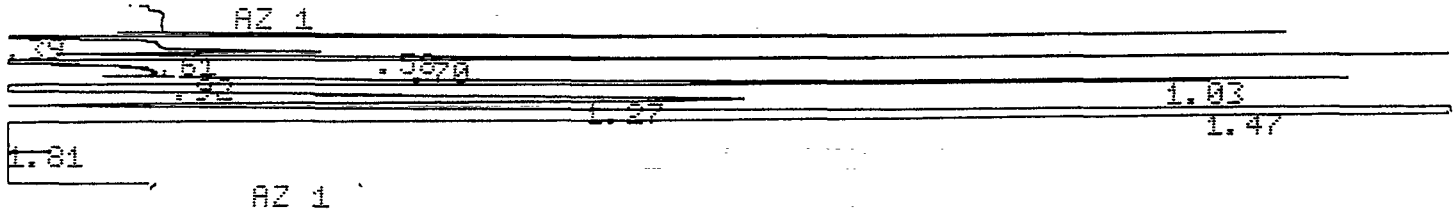
MALCOLM PIRNIE MILLCRK PA 12/16/87 12:20:15 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 24 INDEX 24

PEAK#	AREA%	RT	AREA	BC
1	96.478	0.42	10122504	02
2	3.162	0.62	331734	03
3	0.113	1.31	11880	02
4	0.247	1.48	25909	03
TOTAL	100.		10492027	

STD 5µl
CH_2Cl_2 200 µg/l
$CHCl_3$ 10
1,2-DCA 200
CCl_4 2

CHANNEL A INJECT 12/16/87 12:26:18



INPUT OVERRANGE AT RT= 1.12

MALCOLM PIRNIE MILLCRK PA 12/16/87 12:26:18 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 25 INDEX 25

PEAK#	AREA%	RT	AREA	BC
1	2.872	0.39	52520	01
2	7.154	0.58	130804	02
3	4.718	0.61	86268	02
4	7.858	0.7	143689	02
5	11.968	0.92	218838	02
6	12.264	1.03	224241	02
7	16.558	1.27	302758	02
8	36.03	1.47	658792	08

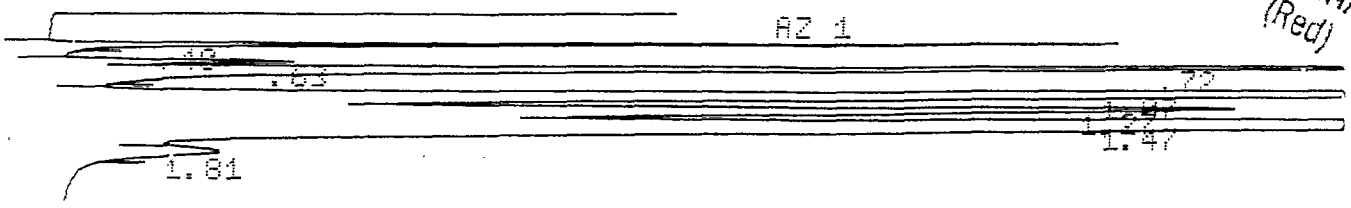
AR001052

STD 5µl

TO AL 100. 1828479

CH Cl3 10 1,1
1,2-DCA 200
(C.D.) ORIGINAL (Red)

CHANNEL A INJECT 12/16/87 12:29:36



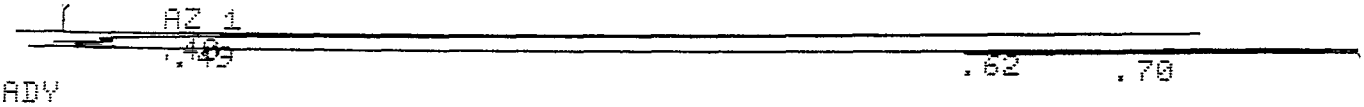
MALCOLM PIRNIE MILLCRK PA 12/16/87 12:29:36 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 26 INDEX 26

PEAK#	AREA%	RT	AREA	BC
1	2.913	0.4	38339	01
2	1.015	0.63	13352	02
3	14.194	0.72	186793	03
4	24.763	1.07	325879	02
5	13.718	1.27	180526	02
6	42.397	1.47	557950	08
7	1.001	1.81	13179	05
TOTAL	100.		1316018	

STD 5µl
1,1-DCA 200
TCA 5

CHANNEL A INJECT 12/16/87 12:34:13



READY
DATE "
READY
DATE " 12/16/87
TIME " 12:37

FI= 1. FE= 1. MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
FILE NAME=" MALCOLM PIRNIE MILLCRK PA

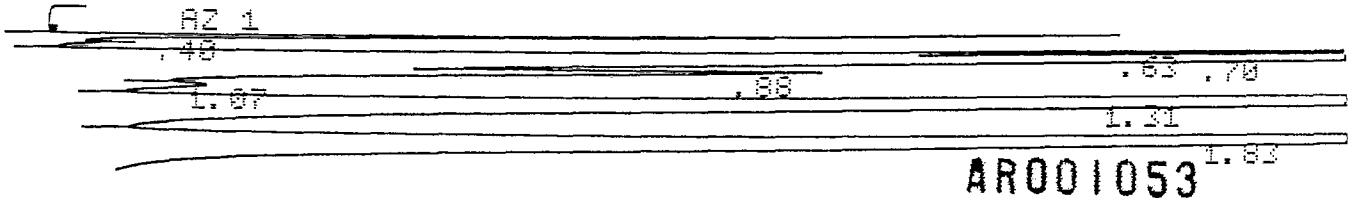
TIME	FUNCTION	VALUE
TT= .01	TF=" AZ	TV= 1
TT= .01	TF=" PM	TV= 1
TT= 2.5	TF=" ER	TV= 1
TT=		

METHOD NUMBER:MN=

END OF DIALOG
AT=16
OF=10
PT=500

STD 5µl
1,1-DCA 200 µg/l
TCA -5
TCE-10
PCE-5

CHANNEL A INJECT 12/16/87 12:41:52



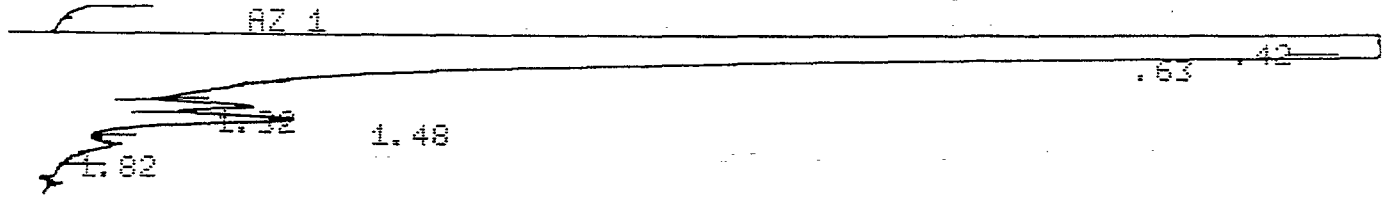
ORIGINAL (Red)

FILE 1. METHOD 0. RUN 1 INDEX 1

PEAK#	AREA%	RT	AREA	BC
1	1.704	0.4	36874	01
2	3.661	0.63	79191	02
3	37.441	0.7	809992	02
4	4.404	0.88	95279	02
5	0.943	1.07	20401	02
6	30.37	1.31	657019	02
7	21.476	1.83	464616	02
TOTAL	100.		2163372	

5645-2' 1000 µl

CHANNEL A INJECT 12/16/87 12:46:38



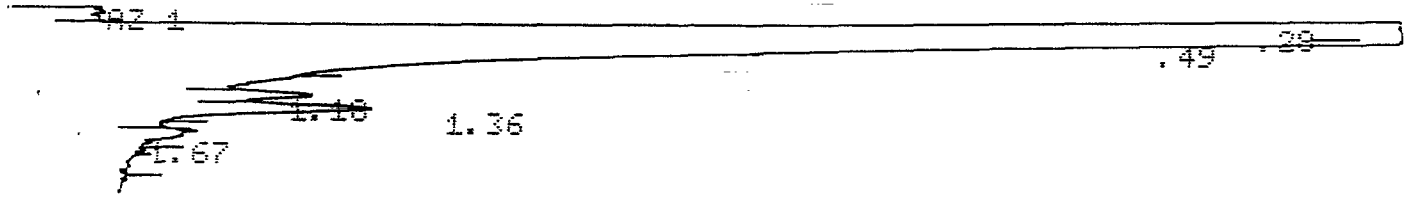
MALCOLM PIRNIE MILLCRK PA 12/16/87 12:46:38 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 2 INDEX 2

PEAK#	AREA%	RT	AREA	BC
1	95.656	0.42	9003185	02
2	3.832	0.63	360653	03
3	0.146	1.32	13770	02
4	0.303	1.48	28514	03
5	0.063	1.82	5917	01
TOTAL	100.		9412039	

5645-2' 1000 µl

CHANNEL A INJECT 12/16/87 12:51:10



MALCOLM PIRNIE MILLCRK PA 12/16/87 12:51:10 CH= "A" PS= 1.

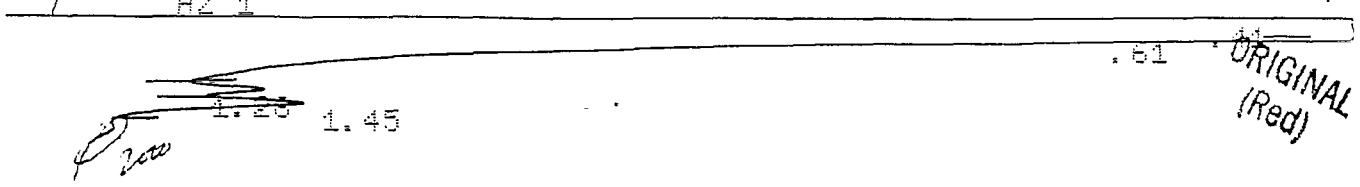
FILE 1. METHOD 0. RUN 3 INDEX 3

PEAK#	AREA%	RT	AREA	BC
1	96.19	0.28	9181101	02
2	3.314	0.49	316297	03
3	0.134	1.18	12771	02
4	0.308	1.36	29379	03
5	0.054	1.67	5193	01
TOTAL	100.		9544741	

AR001054

CHANNEL A INJECT 12/16/87 14:27:16

5627-2' 1000 µl



ORIGINAL (Red)

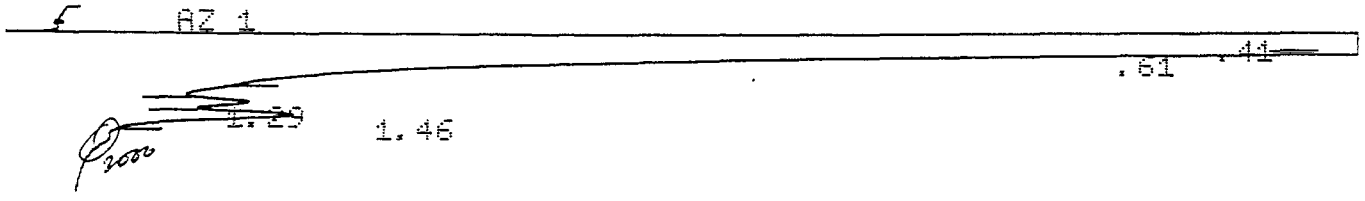
MALCOLM PIRNIE MILLCRK PA 12/16/87 14:27:16 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 4 INDEX 4

PEAK#	AREA%	RT	AREA	BC
1	96.101	0.41	9328643	02
2	3.49	0.61	338755	03
3	0.134	1.28	13047	02
4	0.275	1.45	26664	03
TOTAL	100.		9707109	

CHANNEL A INJECT 12/16/87 14:32:10

5627-2' 1000 µl



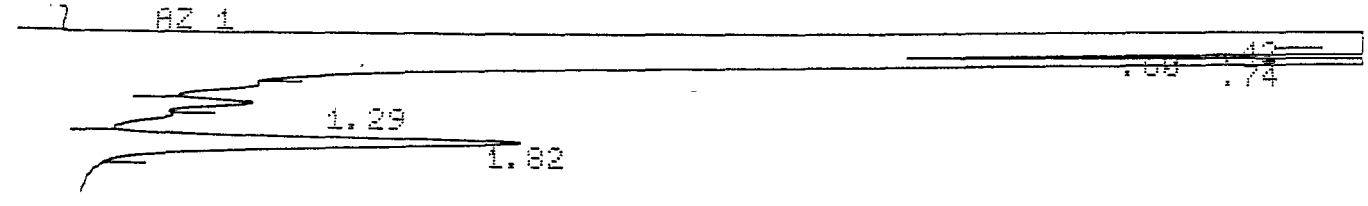
MALCOLM PIRNIE MILLCRK PA 12/16/87 14:32:10 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 5 INDEX 5

PEAK#	AREA%	RT	AREA	BC
1	96.458	0.41	8938173	02
2	3.176	0.61	294263	03
3	0.113	1.29	10454	02
4	0.254	1.46	23502	03
TOTAL	100.		9266392	

5633-1½' 1000 µl

CHANNEL A INJECT 12/16/87 14:46:24



COLM PIRNIE MILLCRK PA 12/16/87 14:46:24 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 6 INDEX 6

PEAK#	AREA%	RT	AREA	BC
1	93.697	0.42	9740701	02

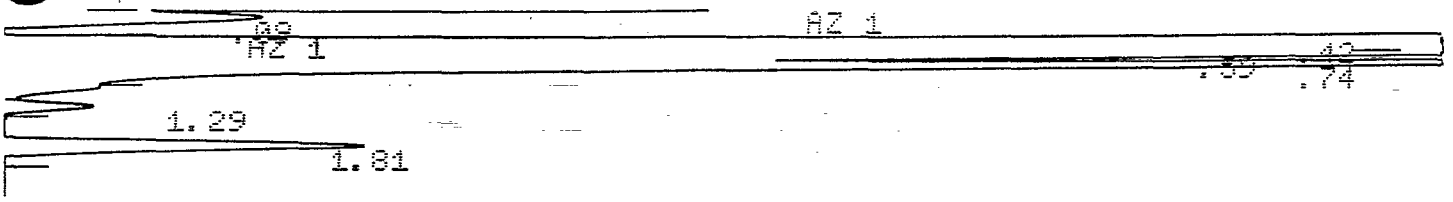
AR001055

3	2.971	0.74	308885	03
4	0.088	1.29	9126	01
5	0.874	1.82	90907	01

TOTAL 100. 10395974

SG33-11/2 1000µl ORIGINAL (Red)

NNEL A INJECT 12/16/87 14:50:23



MALCOLM PIRNIE MILLCRK PA 12/16/87 14:50:23 CH= "A" PS= 1.

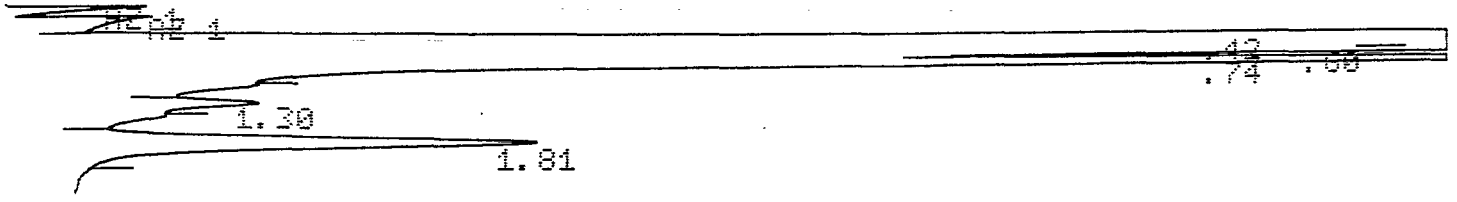
FILE 1. METHOD 0. RUN 7 INDEX 7

PEAK#	AREA%	RT	AREA	BC
1	0.562	0.09	58774	02
2	93.463	0.42	9776228	02
3	2.205	0.59	230598	02
4	2.773	0.74	290023	03
5	0.097	1.29	10151	01
6	0.901	1.81	94197	01

TOTAL 100. 10459971

SG33-11/2 1000µl

CHANNEL A INJECT 12/16/87 14:54:43



MALCOLM PIRNIE MILLCRK PA 12/16/87 14:54:43 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 8 INDEX 8

PEAK#	AREA%	RT	AREA	BC
1	93.474	0.42	9597056	02
2	2.412	0.6	247694	02
3	3.051	0.74	313220	03
4	0.107	1.3	10937	01
5	0.957	1.81	98217	01

TOTAL 100. 10267124

ORIGINAL
(Red)

LOG BOOK
DECEMBER 14 - 16, 1987

MALCOLM PIRNIE
MILLCREEK SUPERFUND SITE
MILLCREEK, PA

12-14 TO 12-17-87
S. CHERBA, S. LAMP

GOLDEN WEST

REG. U. S. PAT. OFF.

COMPOSITION BOOK

Name ERIE, PA.

_____ Grade

10 IN. x 7⅞ IN. 20 SHEETS

The Mead Corporation Dayton, Ohio 45463

AR001058

ORIGINAL (Red)

CREW: S. CAMP + S. CHERBA 12-14-87

0630 : BEGIN STANDARDS.

0740: ARRIVE ON SITE, WAIT FOR CLIENT AND CONTINUE WITH STANDARDS.

0815: HEAD OUT TO FIRST POINT.

0942: ARRIVE AT [redacted] PUSH 5.5 ft. 15" Hg PULL OUT 1.5' 5" Hg EVACUATE 30 SEC 6.5 cc A-1 P-1 1 PT.
SG-21-4'

1043: ARRIVE AT [redacted] ATTEMPT TO PUT DOWN 4-5 PROBES LANDFILL DID NOT ALLOW US TO GO DOWN ANYMORE THAN 1-3" ABANDON POINT. 3 PTS.

1123: ARRIVE [redacted] PUSH 3" HAMMER 5' 20" Hg GROUND WATER APPEARS. PULL UP 1 ft, GROUND WATER. PULL UP 1 ft STILL HAVE GROUND WATER. PULL UP 1 ft 9" Hg VACUATE 30 SEC 7CC P-3 A-2; 1 PT.
[redacted]

1224 ARRIVE BACK AT [redacted] PUSH 3" HAMMER 3 ft 4" Hg VACUATE 30SEC 7.6 cc A-3 P-4 1 PT.
SG-1-3' NO GROUND WATER.

AR001059

ORIGINAL (Red)

CREW: S. CAMP + S. CHERRA 12-14-87

1248 ARRIVE SG-4 PUSH 3.5 ft. VACUATE 30 SEC 2.5" Hg
6 cc. A-4 P-5 1 PT. NO GROUNDWATER
SG-4-3.5

1310 ARRIVE SG-5 PUSH 4 ft GROUND WATER AT 4 ft
AND 3 ft. VACUATE AT 2 ft FOR 30 SEC 4" Hg
8 CC. A-5 P-6 1 PT. SG-5-2'

1331 BREAK FOR LUNCH.

1433 ARRIVE BACK ON SITE

1444 ARRIVE AT SG-3 PUSH OFF HAMMER 3ft 2" Hg 2.5 CC
VACUATE 30 SEC. P 7 A-6 1 PT. SG-3-3
1505. SPLIT SAMPLE - 1½ MIN

1516 ARRIVE AT SG-6 HAMMER 3.5 ft 2" Hg 6.5 CC VACUATE 30 SEC
P-8 A-7 1 PT. SG-6-3.5
[redacted] SAMPLE TAKEN EVAC. TIME: 90 SEC.

1528 ARRIVE AT SG-10. PUSH 2 ft HAMMER 1 ft 5" Hg 5.5 CC
VACUATE 30 SEC P-9 A-8 1 PT. SG-10-3
POINT CAUSED PROBE TO BE BENT BADLY
NO REUSE POSIBLE. DENT IN PROBE POSSIBLE
FOR HIGH VACUUM.

AR001060

ORIGINAL (Red)

CREW: S. Amp + S. CHERBA 12-14-87

1606 ARRIVE SG-12 PUSH 1 ft HAMMER 2 ft PUSH 2 ft. VACUATE 30 SEC. 3" Hg, 9CC A-9 P-10 SG-12-5

SPLIT, SAMPLE: EVACUATION FOR 90 SEC.

1630 ARRIVE SG-11 HAMMER 5 ft. VACUATE 30 SEC. 3" Hg, 6CC A-10, P-11 SG-11-5

SOME GROUND WATER ENCOUNTERED.

1703 ARRIVE SG-13 HAMMER 5 ft. VACUATE 30 SEC. 3" Hg GROUND WATER COMES UP. PULL 1 ft. VACUATE 30 SEC. 4CC A-11 P-12 SG-13-4

1730 PACK UP BACK END.

AR001061

ORIGINAL (Red)

CREW: S. Camp & S. Cherba 12-15-87

645 BEGIN STANDARDS

710 LEAVE FOR SITE WHILE STANDARDIZING

740 ARRIVE ON SITE WAITING FOR CLIENT.

745 CLIENT ARRIVES HEAD OUT TO POINTS.

800 ARRIVE. SG-8 PUSH 1 ft HAMMER 5 ft P-1 A-1 5½" Hg
VACUATE 30 SEC 1 PT. [redacted]

836 - ARRIVE [redacted] PUSH 5 ft. P-2 A-2 2" Hg VACUATE 30 SEC
1 PT SG-8-5'

901 ARRIVE SG-17 PUSH 6 ft. P-3 A-3 2" Hg VACUATE 30 SEC
1 PT [redacted]'

930 ARRIVE SG-9 PUSH 4 ft P-4 A-4 5" Hg VACUATE 30 SEC
1 PT [redacted]'

956 ARRIVE SG-19 PUSH 6 ft P-5 A-5 5.5" Hg VACUATE 30 SEC
1 PT [redacted]'
[redacted] SAMPLE ALSO TAKEN. VAC TIME: 90 SEC

AR001062

ORIGINAL (Red)

1015 ARRIVE SG-18 PUSH 2 ft HAMMER 2 ft PUSH 2 ft P-6 A-6 15" Hg
VACUUM HIGH SO PROBE PULLED TO 5 ft. 8" Hg VACUATE 30 SEC
1 PT SG-18-5'

1043 ARRIVE SG-22 PUSH 1 ft. HAMMER 2 ft PUSH 2 ft P-7 A-7 5" Hg
VACUATE 30 SEC SG-22-5'

1100 WASH OFF VAN AND BOOTS

1134 ARRIVE SG-23 PUSH 5 ft P-8 A-8 3" Hg VACUATE 30 SEC
[redacted] 1 PT

1150 BREAK FOR LUNCH

1250 ARRIVE BACK

1300 ARRIVE [redacted] PUSH 5 ft. GROUND WATER PRESENT
GROUND WATER ALSO AT 4 ft, 3 ft. 2 ft & 1½ ft.
[redacted] P-9 1 PT.
see 12/16

1326 ARRIVE SG-43 PUSH 5 ft 5" Hg 30 sec VAC. TIME. P-10 A-9
1 PT. [redacted]
ALSO TAKE [redacted] SAMPLE VAC FOR 90 SEC.

AR001063

ORIGINAL (Red)

1346 ARRIVE SG-41 PUSH 5 ft. 6" Hg P-11 A-10 1 PT
VACUATE 30 SEC SG-41-5'

1410 ARRIVE [redacted] PUSH 5 ft 5" Hg P-12 - A-11 1 PT
VACUATE 30 SEC SG-41-5'

1430-1510 - BENT BACKEND - DOWN TIME TO STRAIGHTEN

1515 - ARRIVE. SG-42. PUSH 5.5' P-13 A-12 1 PT. VACUATE 30 SEC
3" Hg SG-42-[redacted]

1526 ARRIVE SG 40 PUSH 5.5 ft A-13 P-14 1 PT VACUATE 30 SEC
3" Hg SG-40-5.5'

1541 ARRIVE SG-37, PUSH 5.5 ft. A-14 P-15 1 PT VACUATE 30 SEC
6" Hg [redacted]
SPLIT SAMPLE ALSO TAKEN 1 VAC TIME 90 SEC

1555 ARRIVE SG-25, PUSH 6 ft. A-15 P-16 1 PT. 23" Hg
PULL UNTILL VACUUM DROPS. 5" Hg AT 3 ft. VACUATE
30 SEC. [redacted]

1615 ARRIVE SG-35 PUSH 5 ft. A-16 P-17 1 PT 5" Hg
VACUATE 30 SEC SG-35-5'

AR001064

ORIGINAL (Red)

12-15

1627 ARRIVE SG-36 PUSH 4 ft P-18 A-17 5" Hg 1 PC.
VACUATE 30 SEC [redacted]

1647 ARRIVE SG-38 PUSH 6 ft P-19 A-18 3½" Hg 1 PC
VACUATE 30 SEC [redacted]

1659 ARRIVE SG-24 PUSH 4 ft. P-20 A-19 3½" Hg
1 PC. VACUATE 30 SEC [redacted]

1710 PACK UP BACKEND.

1745 QUIT FOR DAY

ORIGINAL (Red)

CREW: S. CAMP + S. CHERRA. 12-16-87

0700 BEGIN STANDARDS.

0740 HEAD OUT TO SITE.

0750 OTHER CAR SMASHES INTO SIDE OF VAN WHILE DRIVING TO SITE ON SNOW COVERED ROAD. WAIT FOR POLICE WHILE STANDARDIZING. C62-133 PA PLATES ON CAR THAT HIT US.

0900 OFFICE ARRIVES ON SCENE. CLASSIFIED AS NON-REPORTABLE ACCIDENT. INSURANCE OF OTHER DRIVER ENCLOSED. NEED TO CONTACT OTHER INSURANCE COMPANY. HAVE 1 WITNESS.

0925 SET UP BACK END SAMPLE [redacted] PUSH 5 ft. P-1 A-1 GROUND WATER AT 5 ft, 4 ft, 3 ft, 2 ft AND 1½ ft. [redacted] POINT. 1 Pt.

945 ARRIVE SG-30 PUSH 2 ft HAND POUND ½ ft 4" Hg P-2 A-2 VAC 30 [redacted] 1 Pt.

1015 ARRIVE [redacted] PUSH 4 ft GROUNDWATER. GROUNDWATER [redacted] AT 3, 2, 1, ½ ft. SURPRISED BUILDING DOESN'T FLOAT AWAY. P-3 A-3 [redacted] 29,[redacted] 1 Pt

AR001066

ORIGINAL (Red)

CREW: S. CAMP, SCHERBA 12-16-97

1045 ARRIVE SG-31, PUSH 5 ft GROUND WATER AT 5 ft. PULL 1 ft. P-4, A-4 1 Pt 4" Hg VACUATE 30 SEC
SG-31-4'

1059 ARRIVE SG-32 PUSH 5.5 ft GROUND WATER AT 5.5 ft. PULL TO 4' P-5 A-5 1 Pt 5" Hg VACUATE 30 SEC. SG-31-4' GROUND WATER DID APPEAR. APPARENTLY TOUCHED TOP OF WATER TABLE.

~~1100~~ 1115 - ~~1115~~ 1130 DOUGHNUT BREAK.

1142 ARRIVE SG-34 PUSH 4 ft. GROUND WATER AT 4 ft. PULL UP 1 ft P-6, A-6 1 Pt. 5" Hg VACUATE 30 SEC. [redacted]

1200 ARRIVE SG-44 PUSH 4 ft P-7 A-7 5" Hg VACUATE 30 SEC [redacted] 1 Pt.

1211 ARRIVE SG-15 (OFF SITE) PUSH 4.5 ft P-8, A-8 5" Hg VACUATE 30 SEC [redacted] 1 Pt.

1220 ARRIVE SG-45 PUSH 5 ft GROUND WATER AT 5, 4, 3 ft. AT 2 ft P-9 A-9 7" Hg VACUATE 30 SEC 1 Pt.
SG-45-2'

AR001067

ORIGINAL (Red)

CREW S. CAMP + S. CHERBA 12-16-87

1241 GO TO MOTEL TO GET EVACUATION BOTTLES FOR SPLIT SAMPLES.

1405 PICK UP CLIENT AFTER GETTING BOTTLES AND EATING LUNCH

1410 ARRIVE SG-27 PUSH 6 ft. GROUND WATER AT 6, 5, 4, 3 ft AT 2 ft. 6" Hg P-10 A-10 VACUATE 30 SEC. 1 PT SG-27-2'.
ALSO 2 SPLIT SAMPLES TAKEN AT VAC TIME 90 SEC.

1435 ARRIVE SG-33 PUSH 5 ft GROUND WATER AT 5, 4, 3, 2 ft AT 1 1/2 ft 7" Hg P-11, A-11 VACUATE 30 SEC. 1 PT SG-33-1.5'
SPLIT SAMPLE BOTTLE COLECTED GROUND WATER AT 60 SEC. ABANDON SPLIT SAMPLES.
LOAD UP BACK END.

1503 FINISH JOB

AR001068

ORIGINAL
(Red)

SPLIT SAMPLE CHROMATOGRAMS
DECEMBER 14 - 16, 1987

Job MALCOLM PIRNIE MILLCREEK PA
SAMPLE SPLIT ANALYSIS - TUCSON

TRACER RESEARCH CORPORATION

Date 12-18-87 Page 1

	5.71 1,2-DCA			6.32 TCA						TOTAL 1,2-DCA + TCA & CONCENTRATIONS IF CALCULATED AS ALL 1,2-DCA OR TCA AS ON SITE		
standard conc.	200		µg/l	5		µg/l			µg/l			µg/l
response from 5 ul injection	1	132 632	area	1	335 734	area	1		area	1		area
	2	130 000	area	2		area	2		area	2		area
	3	126 312	area	3		area	3		area	3		area
RFs for this sheet	7.71×10^{-15} 129 646		g/area	7.45×10^{-17}		g/area			g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	TOTAL area	1,2-DCA µg/l	TCA ~~mean~~ µg/l
SG-12-5R	1642	1000	1 514 551	12	12	217 667	0.02	0.02				1 732 218	13	0.1
SG-12-5R	1702	1000	1683 137	13		228 871	0.02					1 912 008	15	0.1
SG-03-3R	1717	1000	102 111	0.8	0.8	165 417	0.008	0.009				267 528	2	0.02
SG-03-3R	1734	1000	108 778	0.8		166 797	0.01					275 575	2	0.02
STD	12-19 1017	5	BEGIN	NEW SHEET										

AR001070

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by S. Cheba

Checked by

Job MALCOLM IRNIE MILLCREEK PA
SAMPLE SPLIT ANALYSIS - TUCSON

TRACER RESEARCH CORPORATION

Date 12-19-87 Page 1

	5.7			6.3						TOTAL 1,2-DCA + TCA ?		
	1,2-DCA			TCA								
standard conc.	200		µg/l	5		µg/l			µg/l	CONCENTRATIONS IF CALCULATED AS ALL		µg/l
response from	1	80 497	area	1	308 422	area	1		area	1 1,2-DCA ~~OR~~ TCA		area
ul injection	2	95 736	area	2	302 745	area	2		area	2 AS ON SITE		area
	3	96 475	area	3	297 680	area	3		area	3		area
RFs for this sheet	1.10×10^{-14}		g/area	8.25×10^{-17}		g/area			g/area			g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	TOTAL area	1,2-DCA µg/l	TCA ~~mean~~ µg/l
SG43-5R	1103	1000	74 332	0.8	4	80 000 E	0.007	0.008				154 332	2	0.01
SG43-5R	12-20 1058	600	383 540	4		40 195	0.003					432 735	5	0.03
SG43-5R	1203	1000	272 536	3		115 000 E	0.009					387 536	4	0.03
SG37-5½R	1118	1000	377 656	4	84	60 000 E	0.005	0.005				437 656	5	0.04
SG37-5½R	1218	1000	252 194	3		60 000 E	0.005					312 194	3	0.02
SG37-5½R	12-26 1044	600 ~~1000~~	314 950	~~3~~ 6		30 000 E	0.004 ~~0.002~~					344 950	6	0.05
SG22-5R	1138	1000	440 908	5	5	62 000 E	0.005	0.005				502 908	6	0.04
SG22-5R	1153	1000	432 666	5		60 000 E	0.005					492 666	5	0.04
SG06-3R	1216	1000	1 261 415	14	13	307 009	0.02	0.008				1 568 424	17	0.1
SG06-3R	1232	1000	1 170 593	13		109 810	0.009					1 280 403	14	0.1
SG06-3R	1251	1000	1 053 373	12		80 000 E	0.007					1 133 373	12	0.09
SG19-6R	1312	1000	1 690 000 E	18	20	410 000 E	0.03	0.03				2 100 000	23	0.2
SG19-6R	1345	1000	1 073 972	12		302 317	0.02					1 376 289	15	0.1
SG19-6R	1401	1000	1 887 361	21		480 285	0.04					2 367 646	26	0.2

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by S. Cherta

Checked by

ORIGINAL (Red)

PR001071

L

MALCOLM PIRNIE MILLCREEK PA
SAMPLE SPLIT ANALYSIS – TUCSON, AZ
12-18-87 S. CHERBA

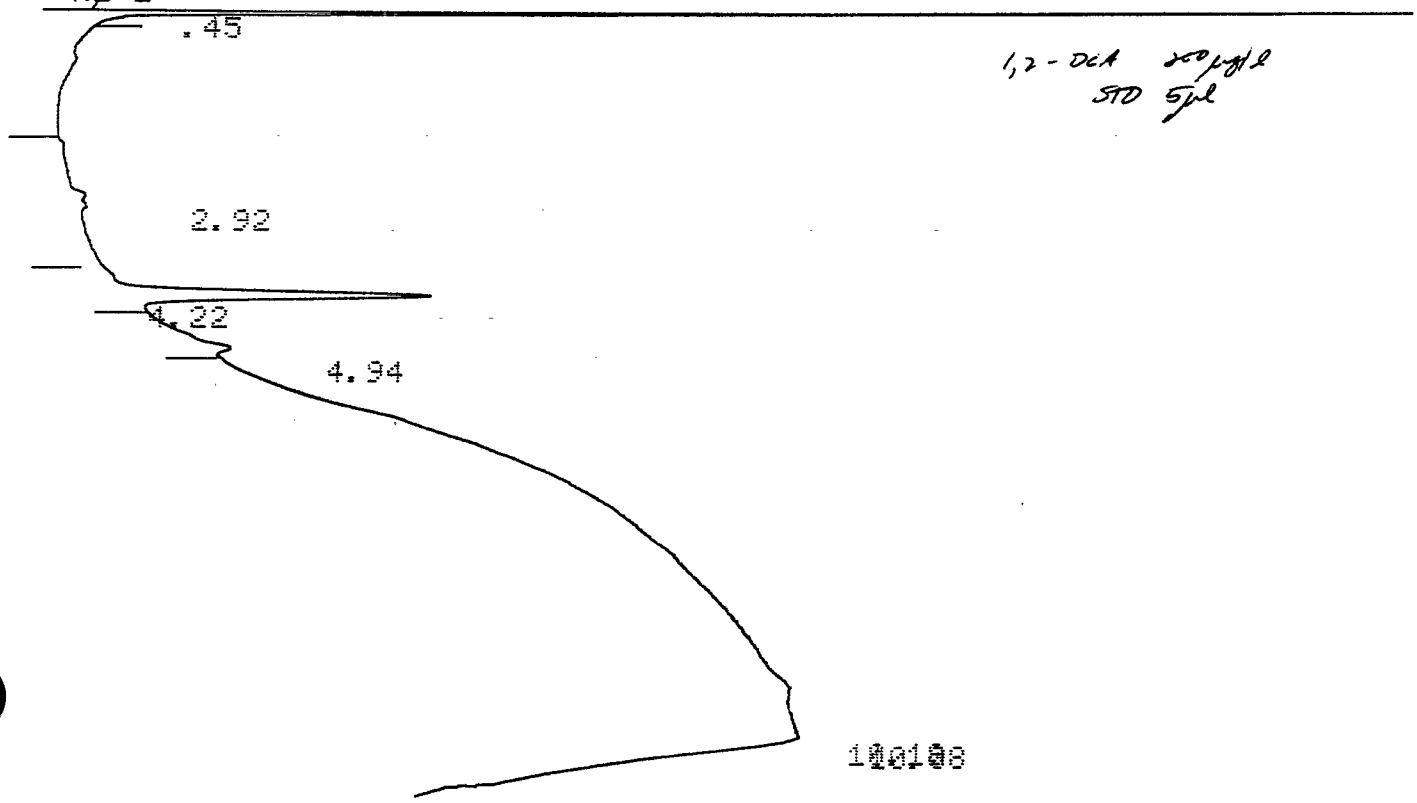
ECD: DET @ 350°C, INJ @ 200°C

COL: SP1000 & CARBO PACK; 6', 1/8" ϕ; 60/80 MESH

T PROG: 70°C FOR 2'; RAMP TO 180°C @ 20°C FOR 5 MIN
TOTAL ANALYSIS 12.5 MIN

CHANNEL A INJECT 12/18/87 15:38:40

AZ 1



LEAK 12/18/87 15:38:40 AR001072 PS= 1.

PEAK#	AREA%	RT	AREA	BC
1	1.959	0.45	104307	01
2	0.721	2.92	38371	02
3	2.491	4.22	132632	02
4	1.799	4.94	95778	02
5	93.031	10.08	4953802	03
TOTAL	100.		5324890	

ORIGINAL (Red)

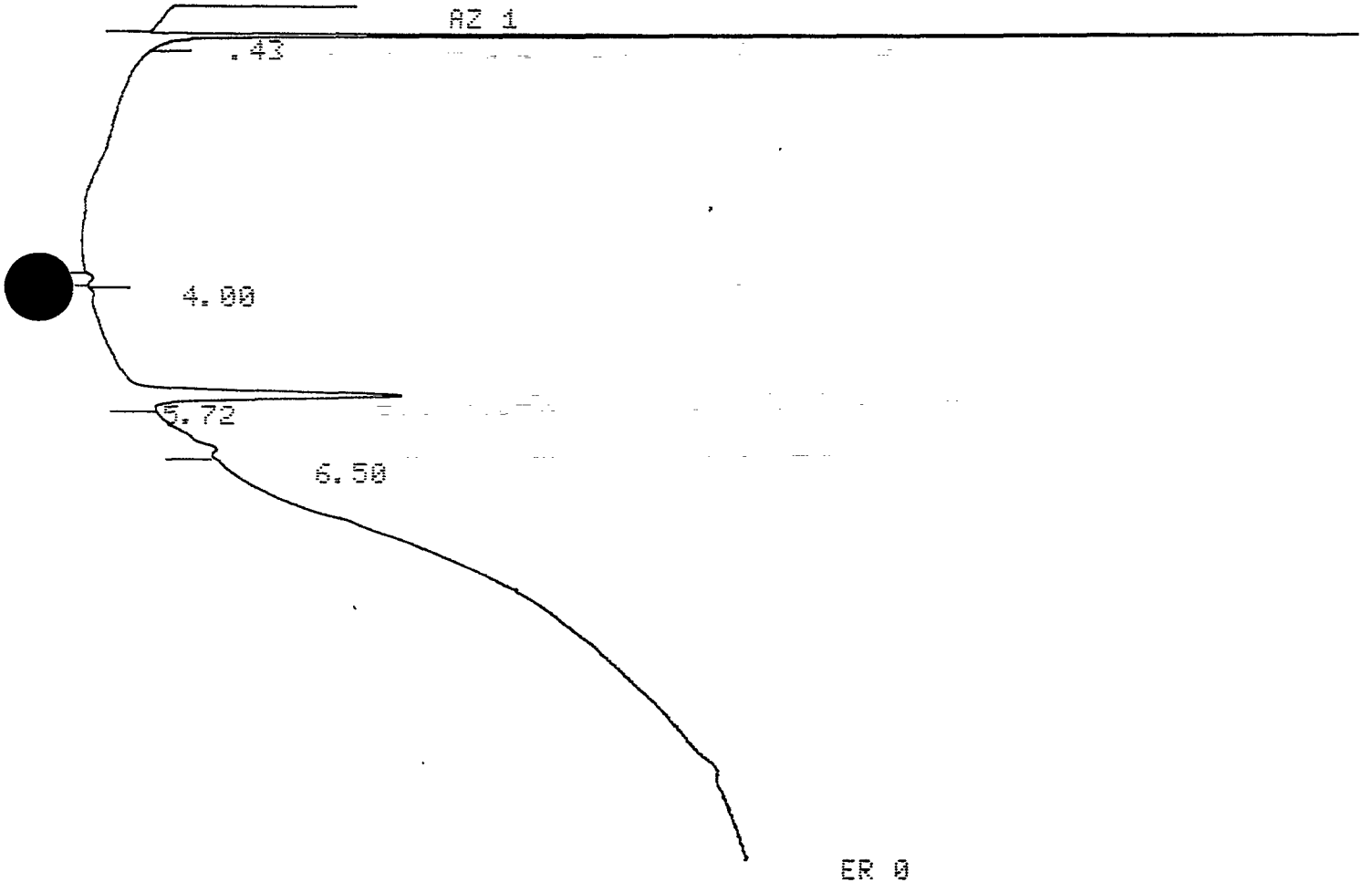
FI= 1. FE= 1. MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
FILE NAME=" MALCOLM PIRNIE MILLCRK PA
TIME FUNCTION VALUE
TT= 12.5 TF=" ER TV= 1
TT=

METHOD NUMBER:MN=

END OF DIALOG

1,2-DCA 200 µg/l STD 5µl

CHANNEL A INJECT 12/18/87 15:51:07



MALCOLM PIRNIE MILLCRK PA 12/18/87 15:51:07 CH= "A" PS= 1.

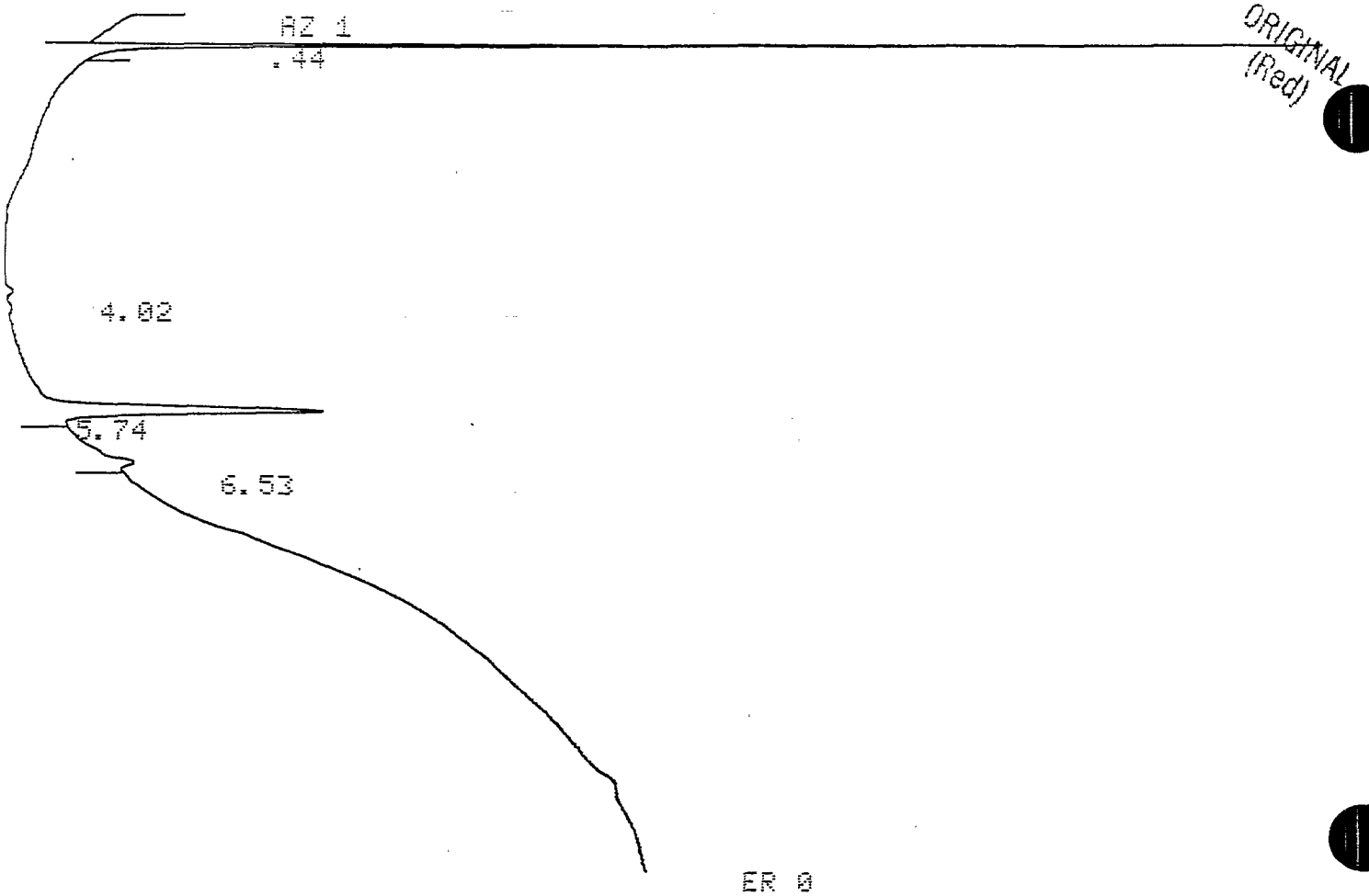
FILE 1. METHOD 0. RUN 47 INDEX 47

PEAK#	AREA%	RT	AREA	BC
1	70.303	0.43	121162	01
2	1.106	4.	1906	01
3	25.873	5.72	44591	02
4	2.718	6.5	4684	03

AR001073

1,2-DCA 200 ug/l

CHANNEL A INJECT 12/18/87 16:05:32



ORIGINAL (Red)

ER 0

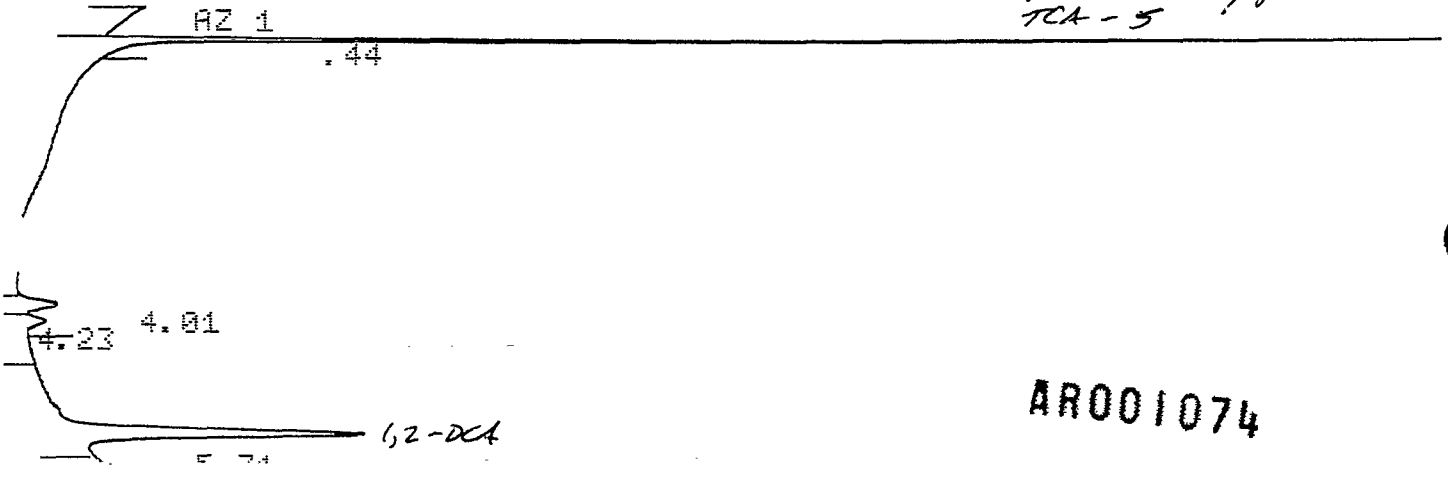
MALCOLM PIRNIE MILLCRK PA 12/18/87 16:05:32 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 48 INDEX 48

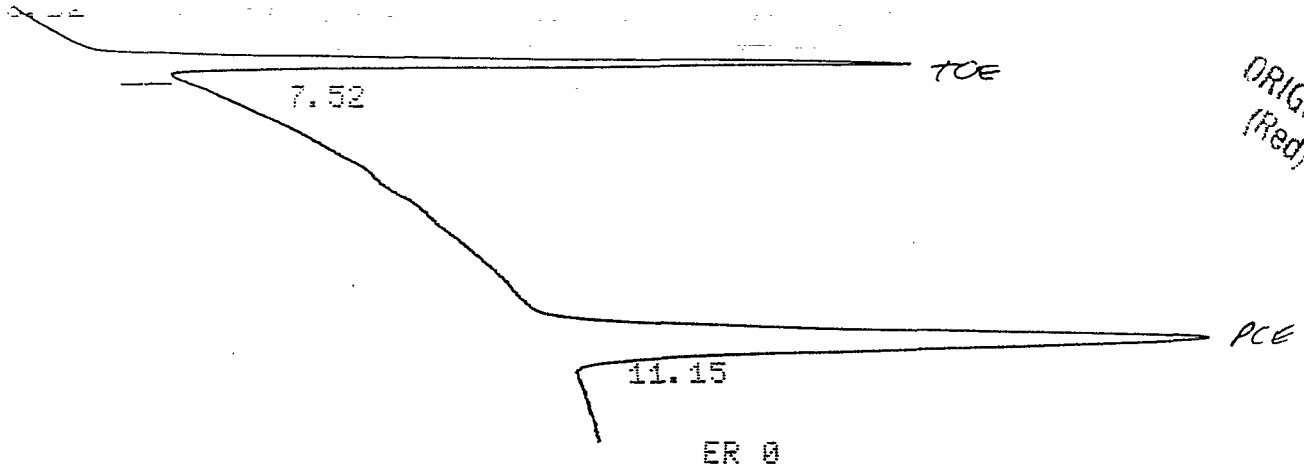
PEAK#	AREA%	RT	AREA	BC
1	39.656	0.44	124626	01
2	15.784	4.02	49603	02
3	40.193	5.74	126312	02
4	4.367	6.53	13723	03
TOTAL	100.		314264	

CHANNEL A INJECT 12/18/87 16:20:09

STD 5µl
1,2-DCA 200 µg/l
TCA - 5



AR001074



ORIGINAL (Red)

ER 0

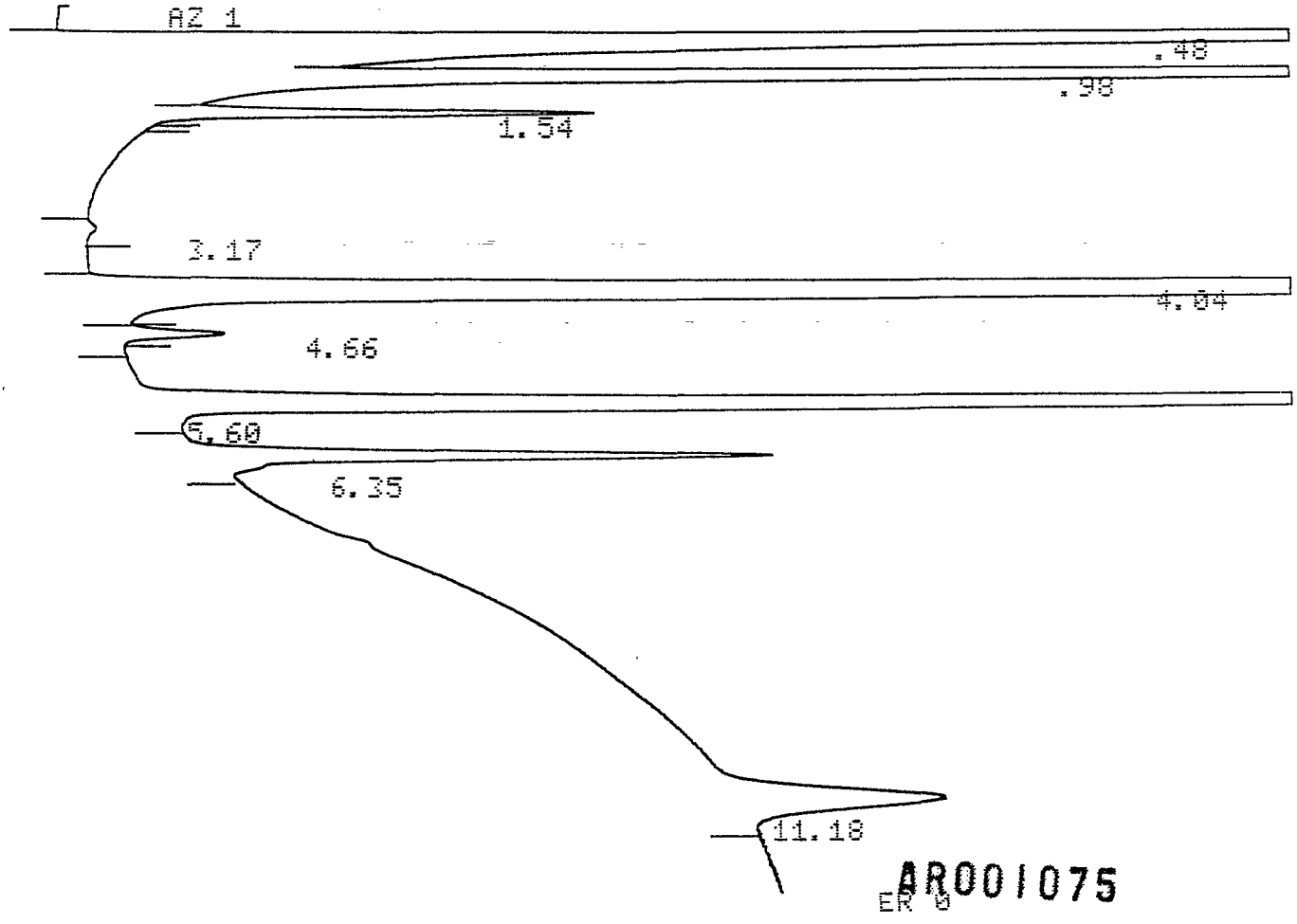
MALCOLM PIRNIE MILLCRK PA 12/18/87 16:20:09 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 49 INDEX 49

PEAK#	AREA%	RT	AREA	BC
1	5.17	0.44	131049	01
2	0.49	4.01	12423	02
3	0.285	4.23	7221	03
4	3.457	5.71	87622	02
5	13.244	6.32	335734	02
6	12.157	7.52	308162	02
7	65.197	11.15	1652689	03
TOTAL	100.		2534900	

SG-12-5R 1000µl

CHANNEL A INJECT 12/18/87 16:42:23



AR001075

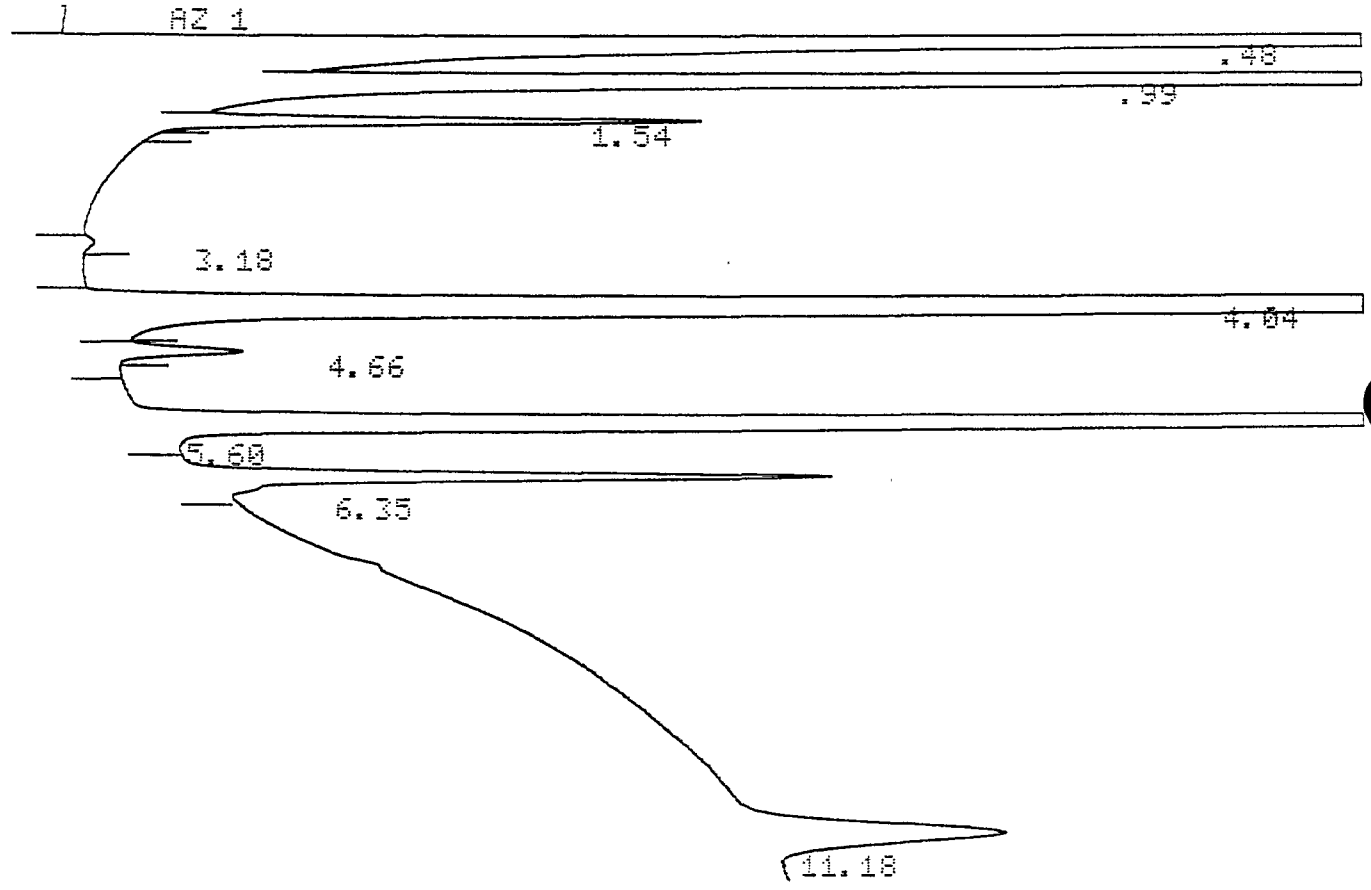
FILE 1. METHOD 0. RUN 50 INDEX 50

ORIGINAL (Red)

PEAK#	AREA%	RT	AREA	BC
1	45.98	0.48	13298817	02
2	25.197	0.98	7287811	08
3	0.395	1.54	114233	05
4	0.011	3.17	3098	01
5	18.923	4.04	5473070	01
6	0.109	4.66	31484	01
7	5.237	5.6	1514551	02
8	0.753	6.35	217667	02
9	3.396	11.18	982144	03
TOTAL	100.		28922875	

SG12-5R 1000µl

CHANNEL A INJECT 12/18/87 17:02:40



MALCOLM PIRNIE MILLCRK PA 12/18/87 17:02:40 CH= "A" PS= 1.

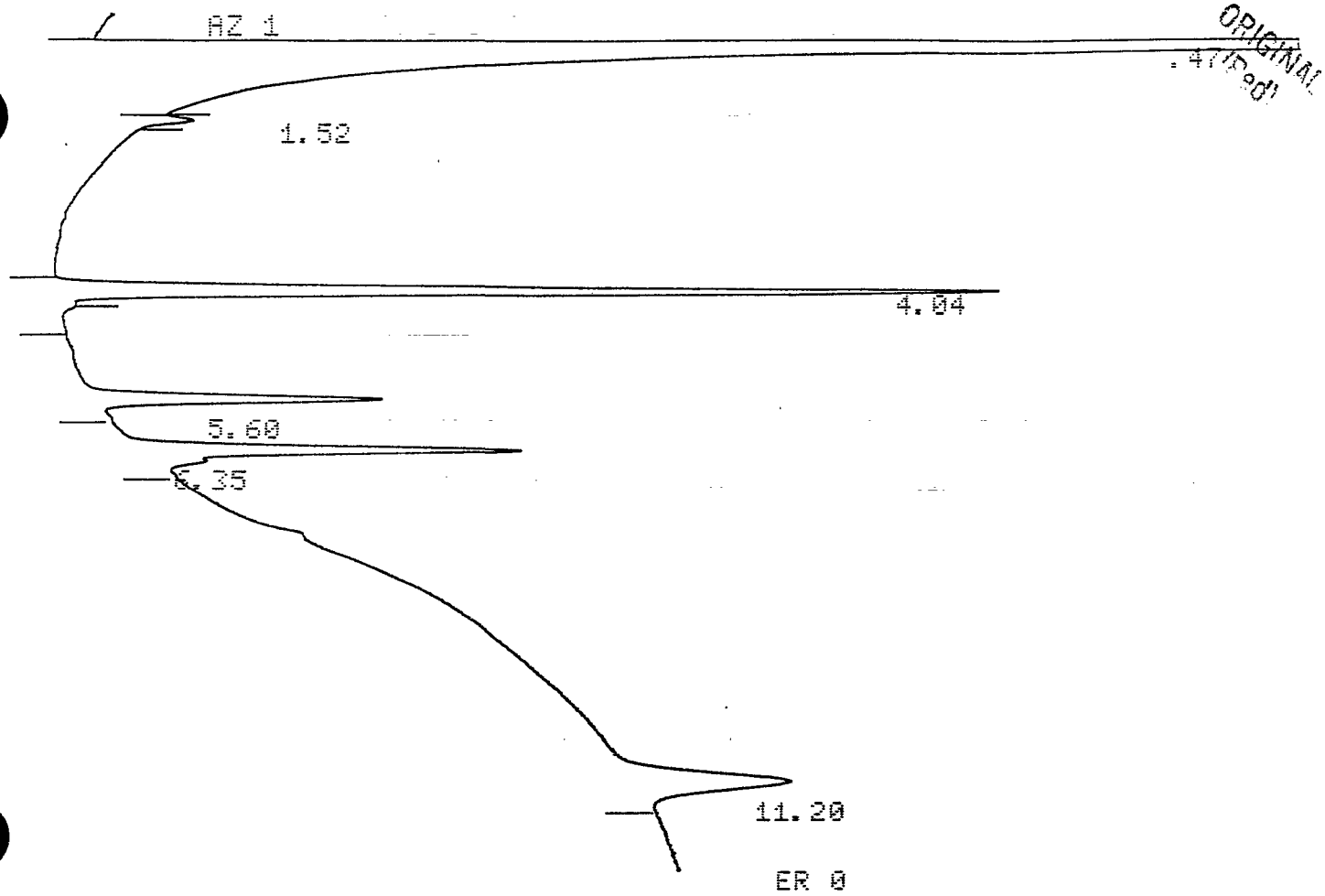
FILE 1. METHOD 0. RUN 51 INDEX 51

PEAK#	AREA%	RT	AREA	BC
1	40.366	0.48	12681686	02
2	30.294	0.99	9517294	08
3	0.425	1.54	133585	05
4	0.011	3.18	3437	01
5	19.453	4.04	6111336	01
6	0.113	4.66	35594	01
7	5.358	5.6	1683137	02
8	0.729	6.35	228871	02
9	3.251	11.18	1021423	03

AR001076

56-03-3R 1000µl

CHANNEL A INJECT 12/18/87 17:17:42



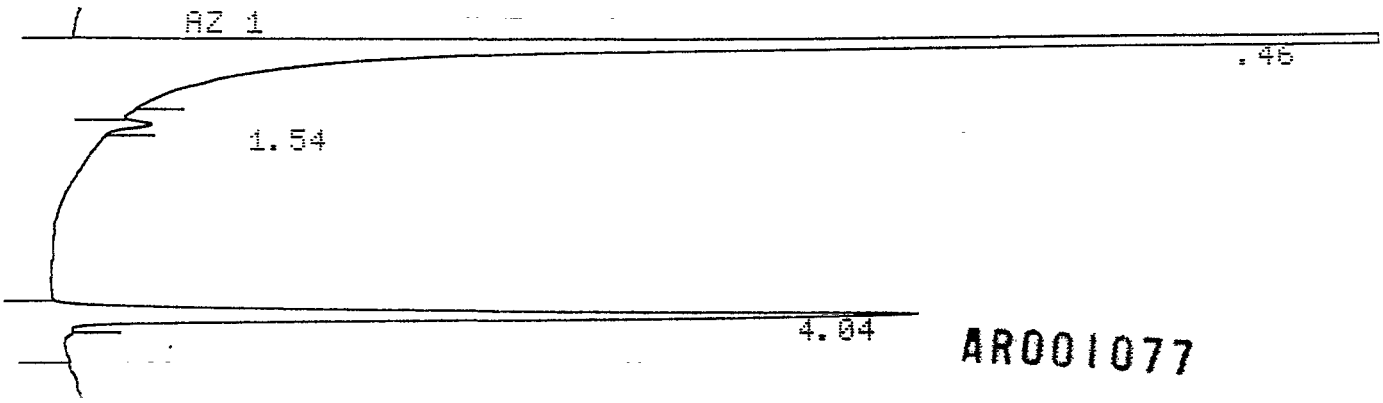
ORIGINAL

MALCOLM PIRNIE MILLCRK PA 12/18/87 17:17:42 CH= "A" PS= 1.

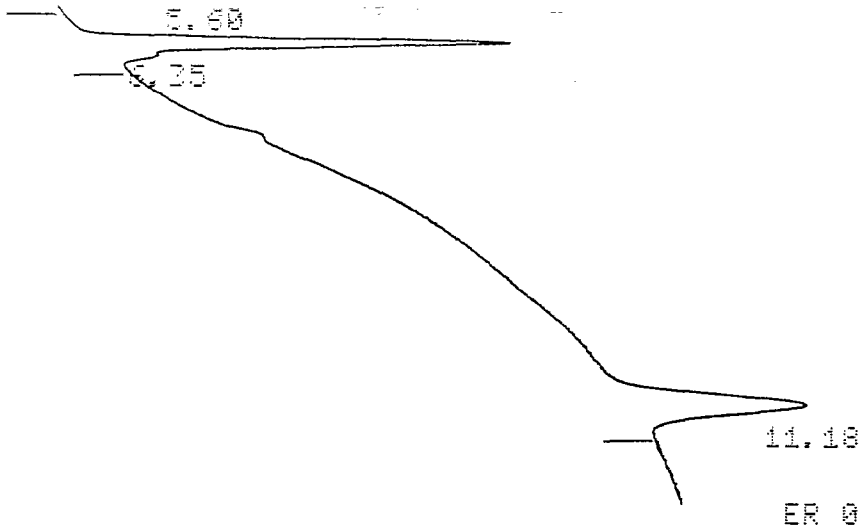
FILE 1. METHOD 0. RUN 52 INDEX 52

PEAK#	AREA%	RT	AREA	BC
1	88.841	0.47	12412526	01
2	0.069	1.52	9702	01
3	2.517	4.04	351607	01
4	0.731	5.6	102111	02
5	1.184	6.35	165417	02
6	6.658	11.2	930190	03
TOTAL	100.		13971553	

CHANNEL A INJECT 12/18/87 17:34:34 5603-3R 1000



AR001077



ORIGINAL

ER 0

MALCOLM PIRNIE MILLCRK PA 12/18/87 17:34:34 CH= "A" PS= 1.

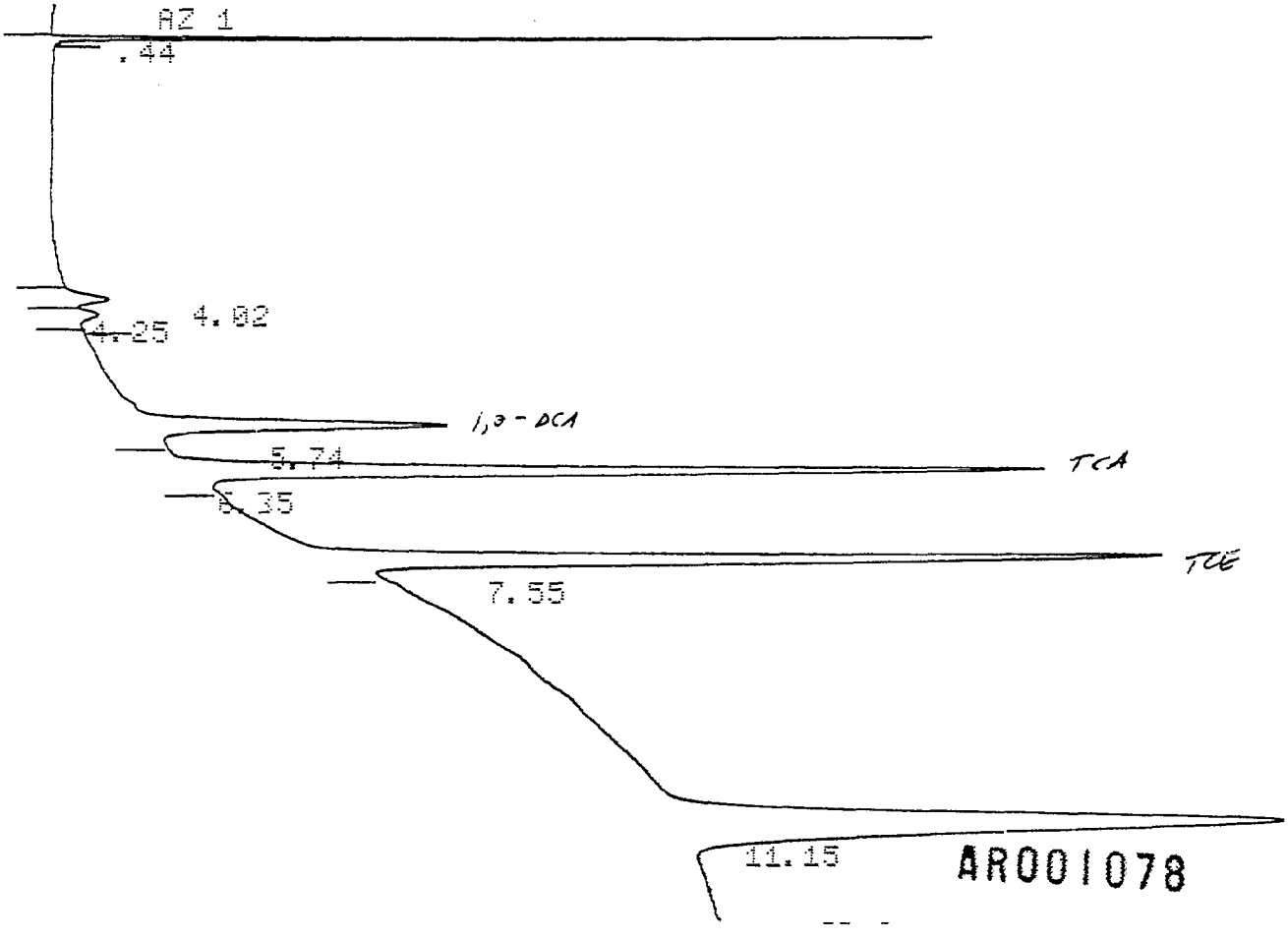
FILE 1. METHOD 0. RUN 53 INDEX 53

PEAK#	AREA%	RT	AREA	BC
1	86.146	0.46	9067054	01
2	0.076	1.54	8011	01
3	2.766	4.04	291087	01
4	1.033	5.6	108778	02
5	1.585	6.35	166797	02
6	8.394	11.18	883486	03
TOTAL	100.		10525213	

TD 5µl

1,2-DCA 200 µg/l
TCA-5
TCE -10
PCE -5

CHANNEL A INJECT 12/19/87 10:17:16



AR001078

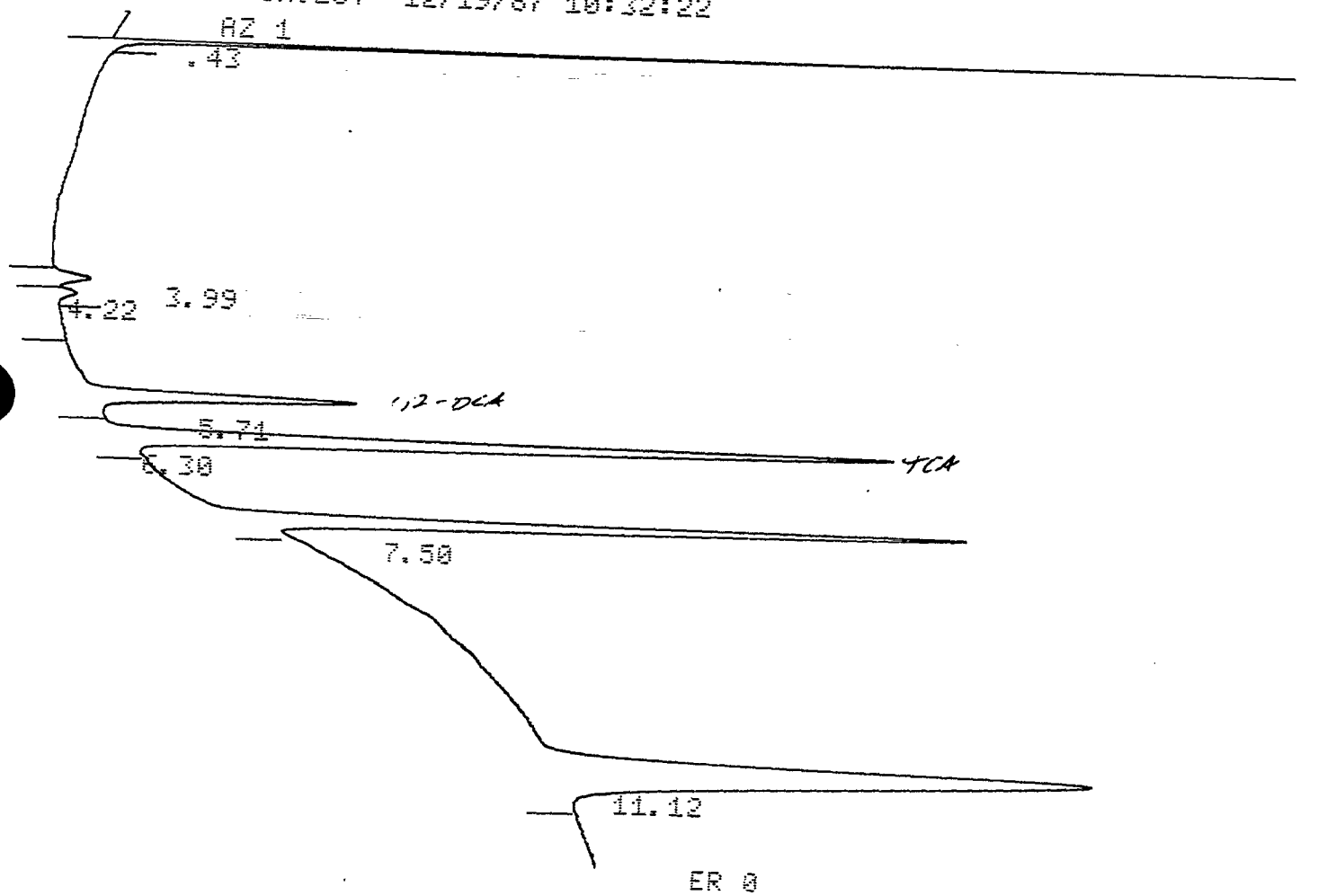
MALCOLM PIRNIE MILLCRK PA 12/19/87 10:17:16 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 54 INDEX 54

PEAK#	AREA%	RT	AREA	BC
1	2.264	0.44	52900	01
2	0.543	4.02	12698	02
3	0.292	4.25	6835	03
4	3.444	5.74	80497	02
5	13.197	6.35	308422	02
6	15.513	7.55	362539	02
7	64.746	11.15	1513153	03
TOTAL	100.		2337044	

STD Spl 1,2-DCA 200µg/l
TCA-5
TCE-10
PCE-5

CHANNEL A INJECT 12/19/87 10:32:22



MALCOLM PIRNIE MILLCRK PA 12/19/87 10:32:22 CH= "A" PS= 1.

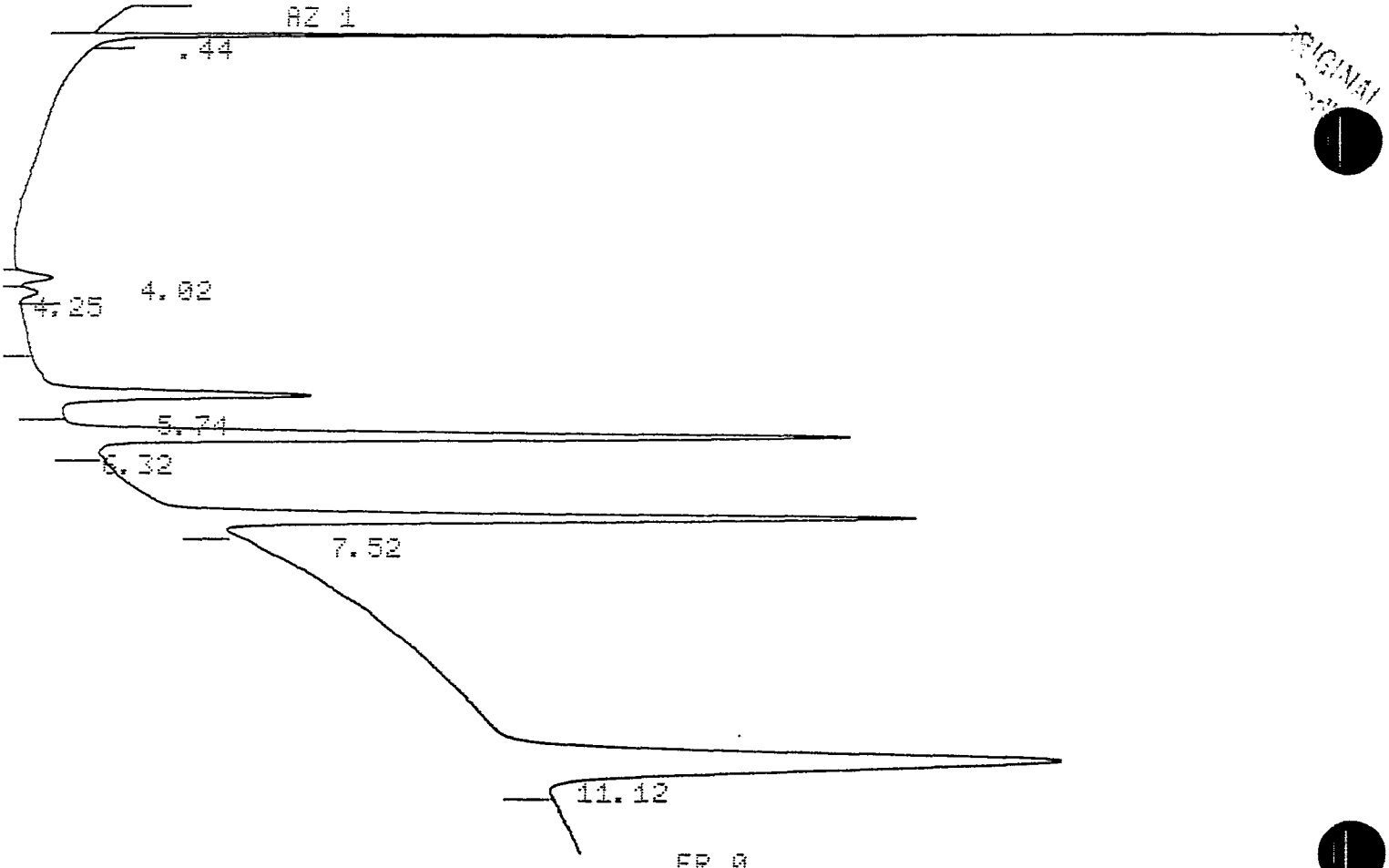
FILE 1. METHOD 0. RUN 55 INDEX 55

PEAK#	AREA%	RT	AREA	BC
1	4.161	0.43	85359	01
2	0.641	3.99	13151	02
3	0.34	4.22	6976	03
4	4.667	5.71	95736	02
5	14.758	6.3	302745	02
6	15.344	7.5	314755	02
7	60.089	11.12	1232635	03
TOTAL	100.		2051757	

STD Spl 1,2-DCA 200µg/l
TCA-5
TCE-10
PCE-5

AR001079

CHANNEL A INJECT 12/19/87 10:46:47



ER 0

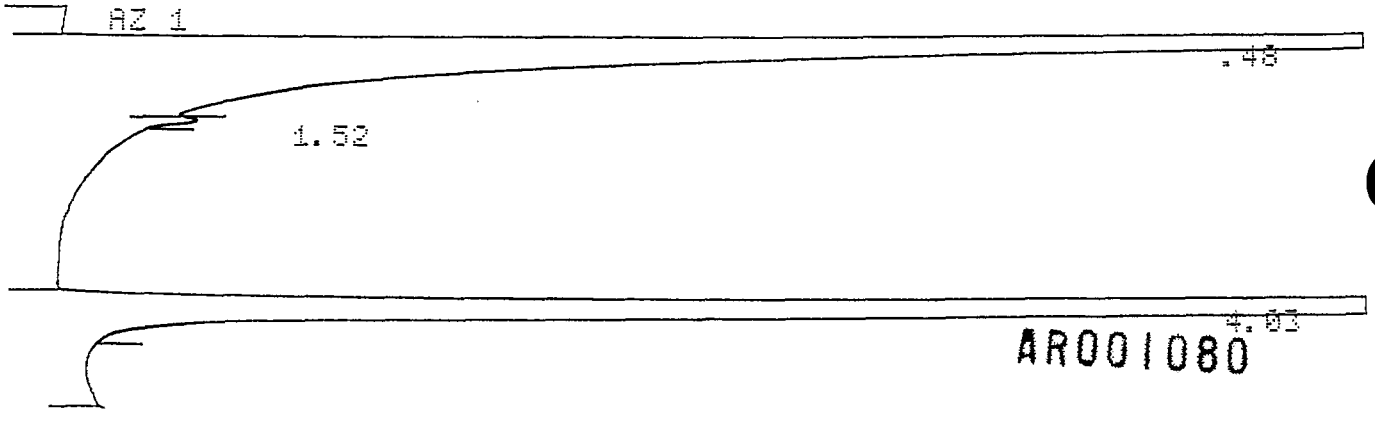
MALCOLM PIRNIE MILLCRK PA 12/19/87 10:46:47 CH= "A" PS= 1.

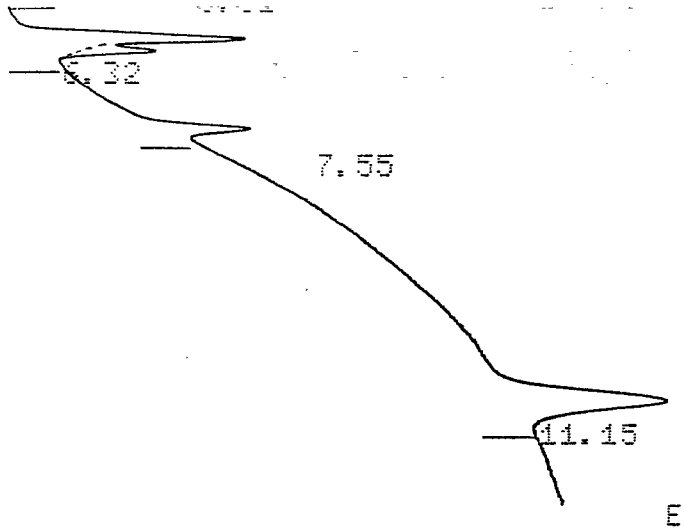
FILE 1. METHOD 0. RUN 56 INDEX 56

PEAK#	AREA%	RT	AREA	BC
1	5.666	0.44	99952	01
2	0.705	4.02	12432	02
3	0.389	4.25	6862	03
4	5.469	5.74	96475	02
5	16.87	6.32	297580	02
6	16.171	7.52	285256	02
7	54.73	11.12	965421	03
TOTAL	100.		1763978	

5643-5R 1000 µl

CHANNEL A INJECT 12/19/87 11:03:48





ORIGINAL

ER 0

MALCOLM PIRNIE MILLCRK PA 12/19/87 11:03:48 CH= "A" PS= 1.

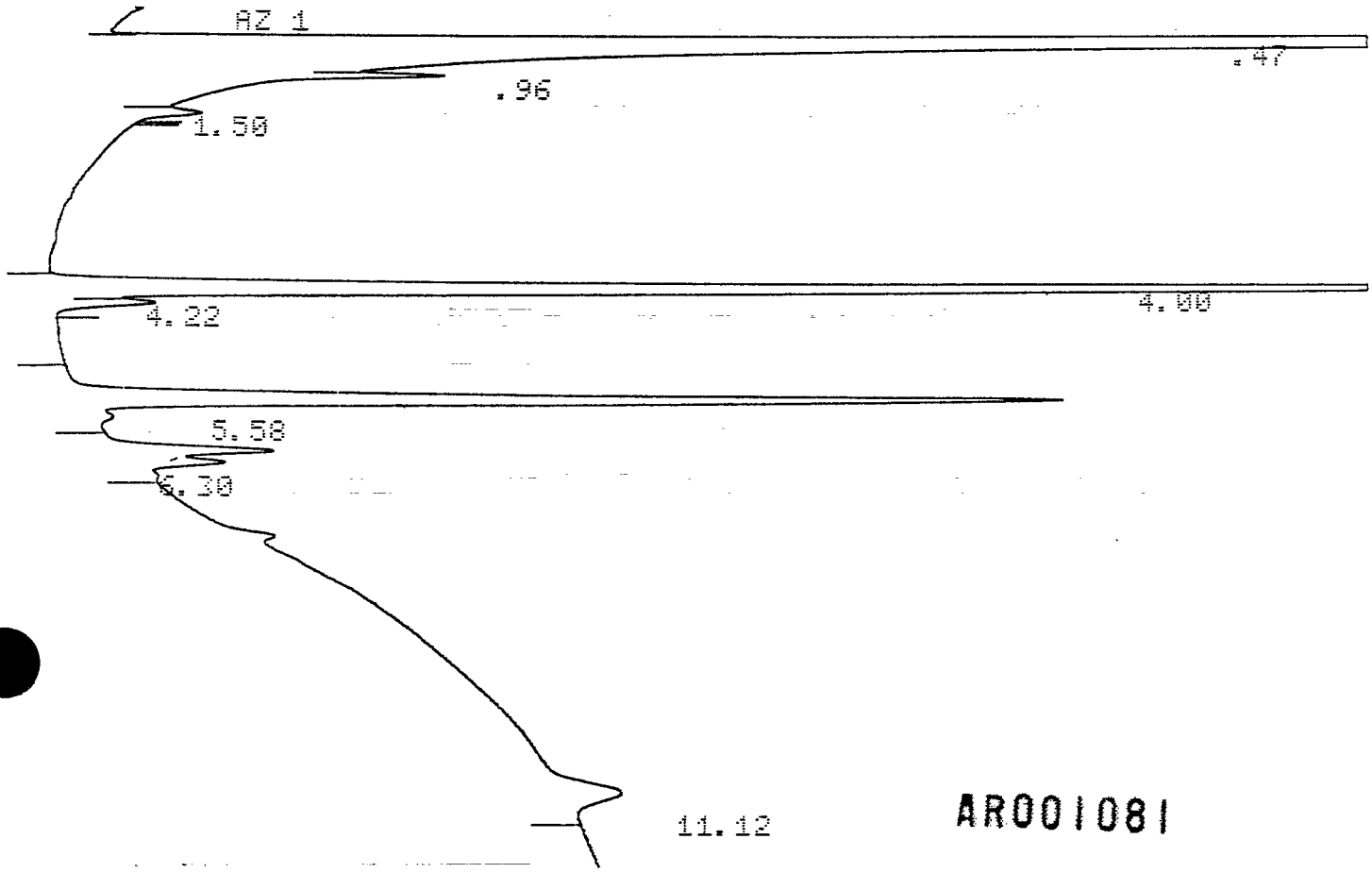
FILE 1. METHOD 0. RUN 57 INDEX 57

PEAK#	AREA%	RT	AREA	BC
1	66.751	0.48	13238525	01
2	0.035	1.52	6937	01
3	28.29	4.03	5610643	01
4	0.375	5.61	74332	01
5	0.519	6.32	102901	02
6	0.334	7.55	66235	02
7	3.696	11.15	733109	03
TOTAL	100.		19832682	

5637-5/2R 1000µl

CHANNEL A INJECT 12/19/87 11:18:20

AZ 1



AR001081

MALCOLM PIRNIE MILLCRK PA 12/19/87 11:18:20 CH= "A" PS= 1.

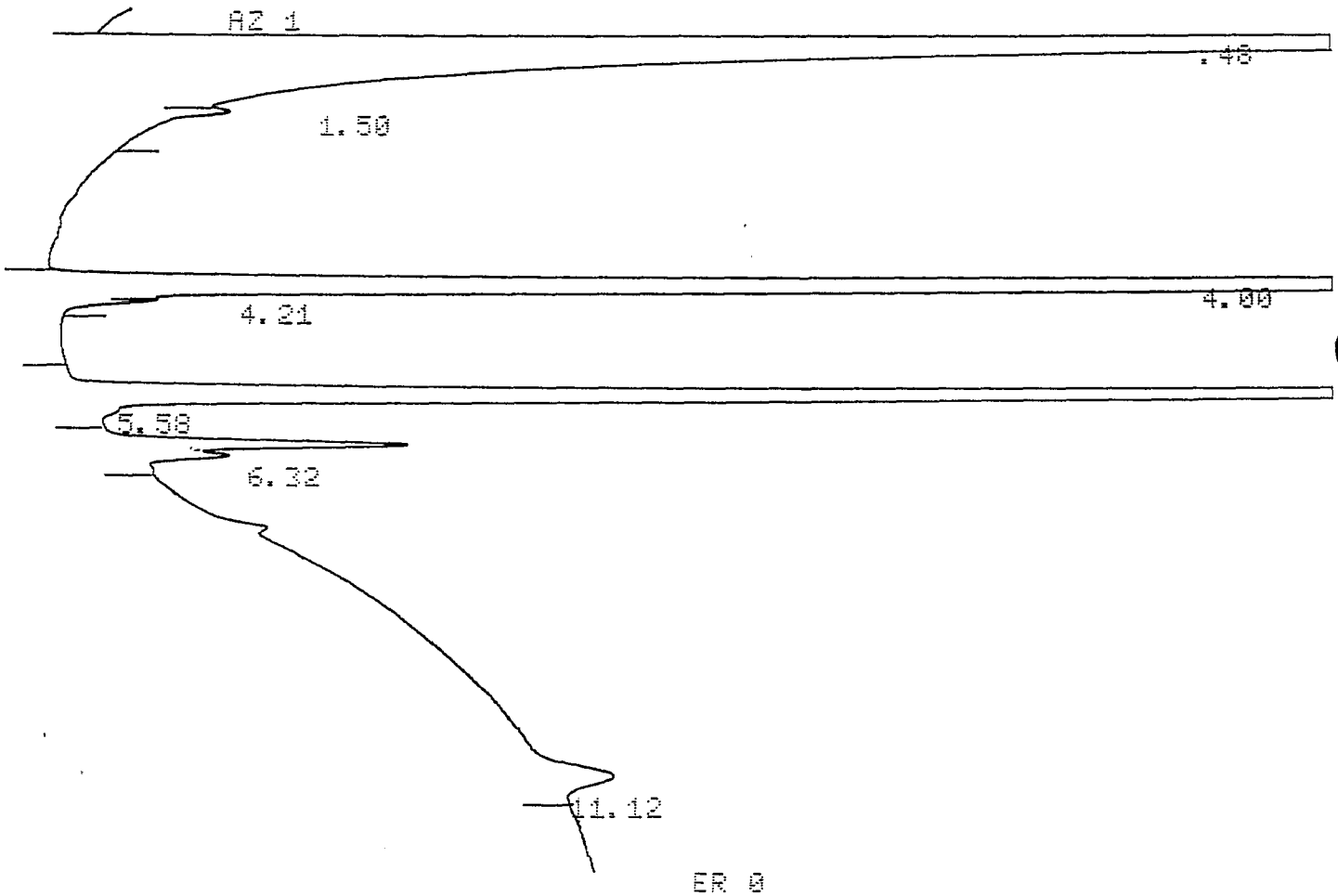
FILE 1. METHOD 0. RUN 58 INDEX 58

ORIGINAL (Red)

PEAK#	AREA%	RT	AREA	BC
1	86.369	0.47	12692375	02
2	1.302	0.96	191402	08
3	0.077	1.5	11325	05
4	4.67	4.	686294	02
5	0.226	4.22	33261	03
6	2.57	5.58	377656	02
7	0.601	6.3	88358	02
8	4.184	11.12	614820	03
TOTAL	100.		14695491	

SG27-2R 1000µl

CHANNEL A INJECT 12/19/87 11:32:51



MALCOLM PIRNIE MILLCRK PA 12/19/87 11:32:51 CH= "A" PS= 1.

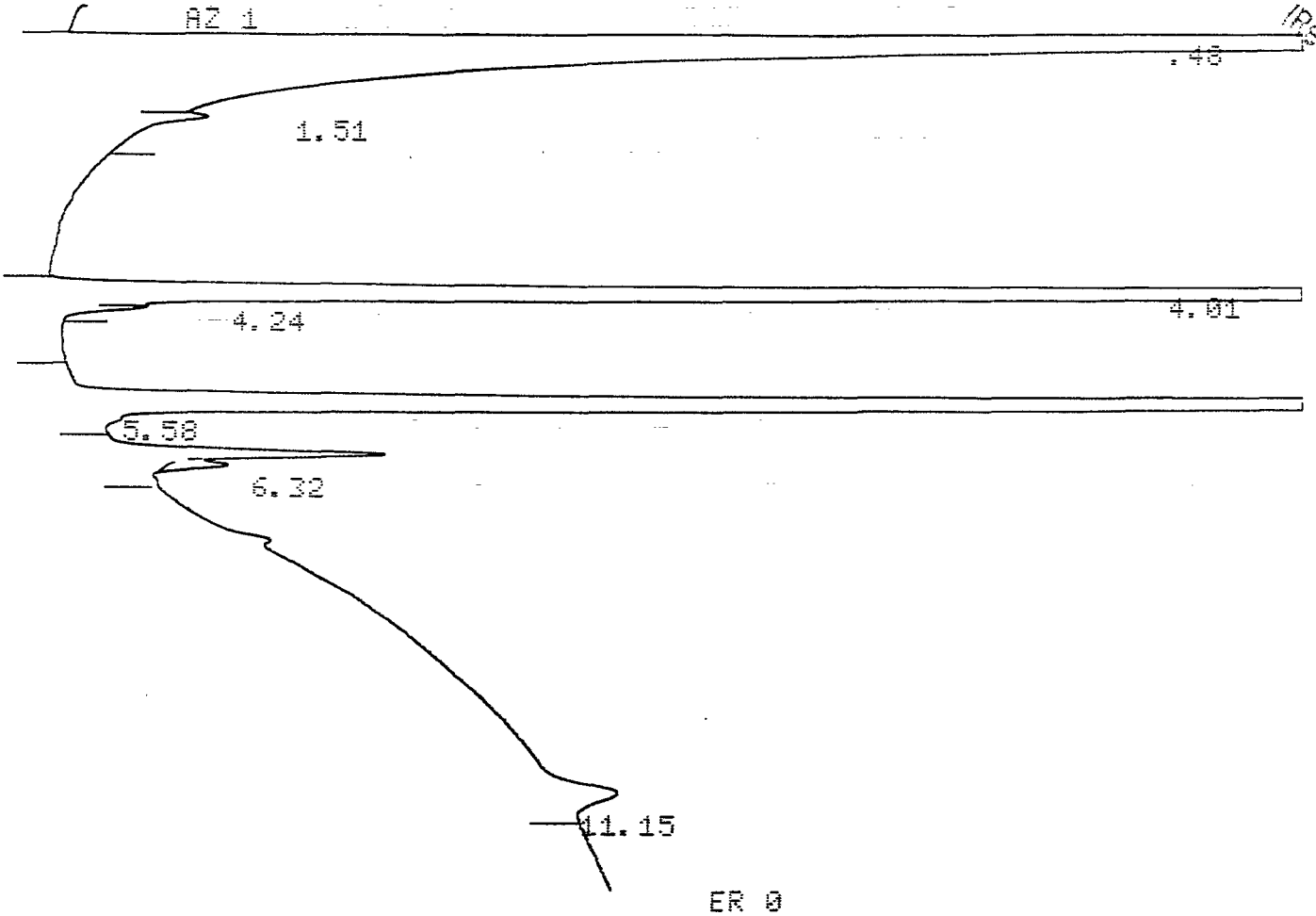
FILE 1. METHOD 0. RUN 59 INDEX 59

PEAK#	AREA%	RT	AREA	BC
1	75.683	0.48	14533719	02
2	0.429	1.5	82326	03
3	12.43	4.	2386996	02
4	0.139	4.21	26733	03
5	7.575	5.58	1454671	02
6	0.736	6.32	141375	02
7	3.008	11.12	577683	03

AR001082

CHANNEL A INJECT 12/19/87 11:48:28

ORIGINAL (Red)



ER 0

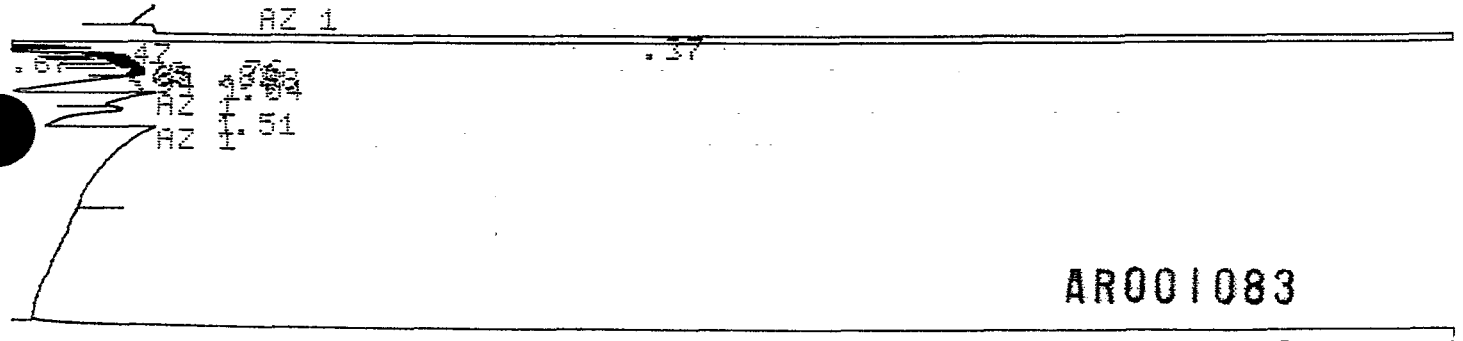
MALCOLM PIRNIE MILLCRK PA 12/19/87 11:48:28 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 60 INDEX 60

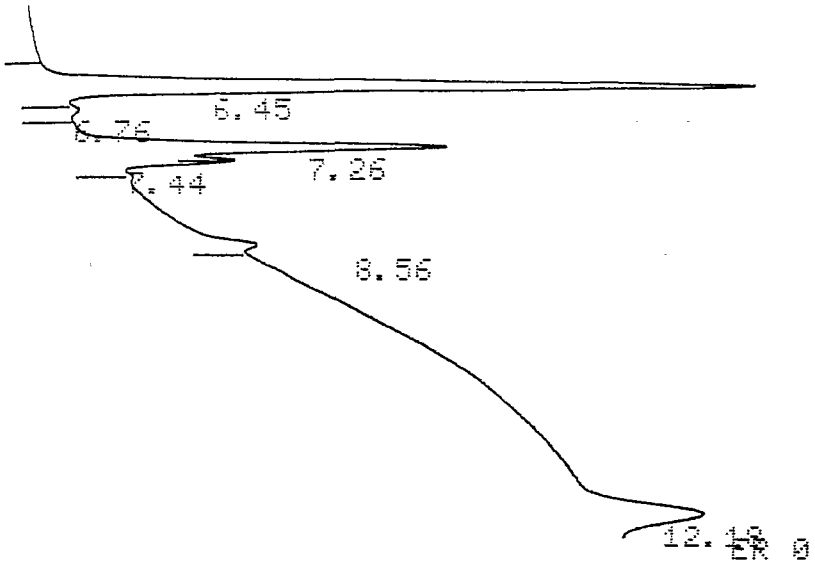
PEAK#	AREA%	RT	AREA	BC
1	76.489	0.48	13882842	02
2	0.402	1.51	72879	03
3	10.723	4.01	1946261	02
4	0.13	4.24	23599	03
5	8.293	5.58	1505108	02
6	0.714	6.32	129643	02
7	3.249	11.15	589717	03
TOTAL	100.		18150049	

SL43-5R 1000µl

CHANNEL A INJECT 12/19/87 12:03:02



AR001083



INPUT OVERRANGE AT RT= 0.59

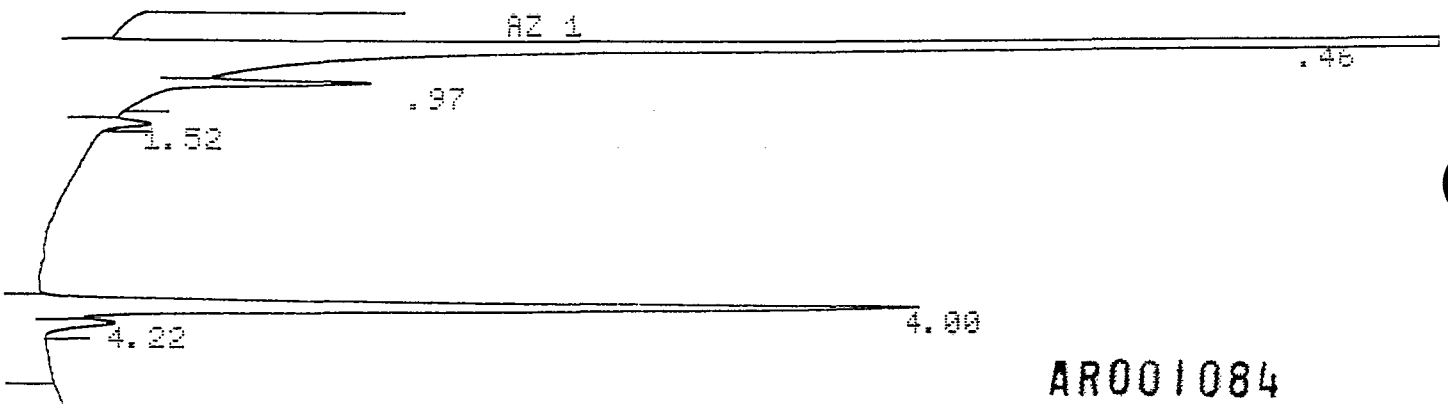
MALCOLM PIRNIE MILLCRK PA 12/19/87 12:03:02 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 61 INDEX 61

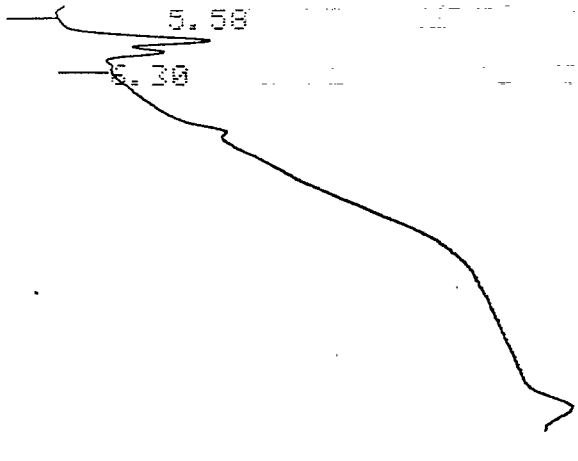
PEAK#	AREA%	RT	AREA	BC
1	0.012	0.37	1813	02
2	73.162	0.47	10794934	03
3	0.595	0.67	87847	02
4	0.446	0.76	65873	02
5	0.215	0.79	31778	02
6	0.218	0.82	32148	02
7	0.22	0.85	32395	02
8	0.442	0.88	65250	02
9	0.794	0.94	117084	02
10	2.146	1.04	316631	02
11	1.994	1.51	294166	03
12	13.702	4.56	2021664	02
13	0.177	4.85	26095	03
14	1.847	6.45	272536	02
15	0.027	6.76	3972	02
16	0.916	7.26	135222	02
17	0.196	7.44	28870	02
18	2.891	12.18	426587	03
TOTAL	100.		14754865	

SG37-5½R 1000 µl

CHANNEL A INJECT 12/19/87 12:18:45



AR001084



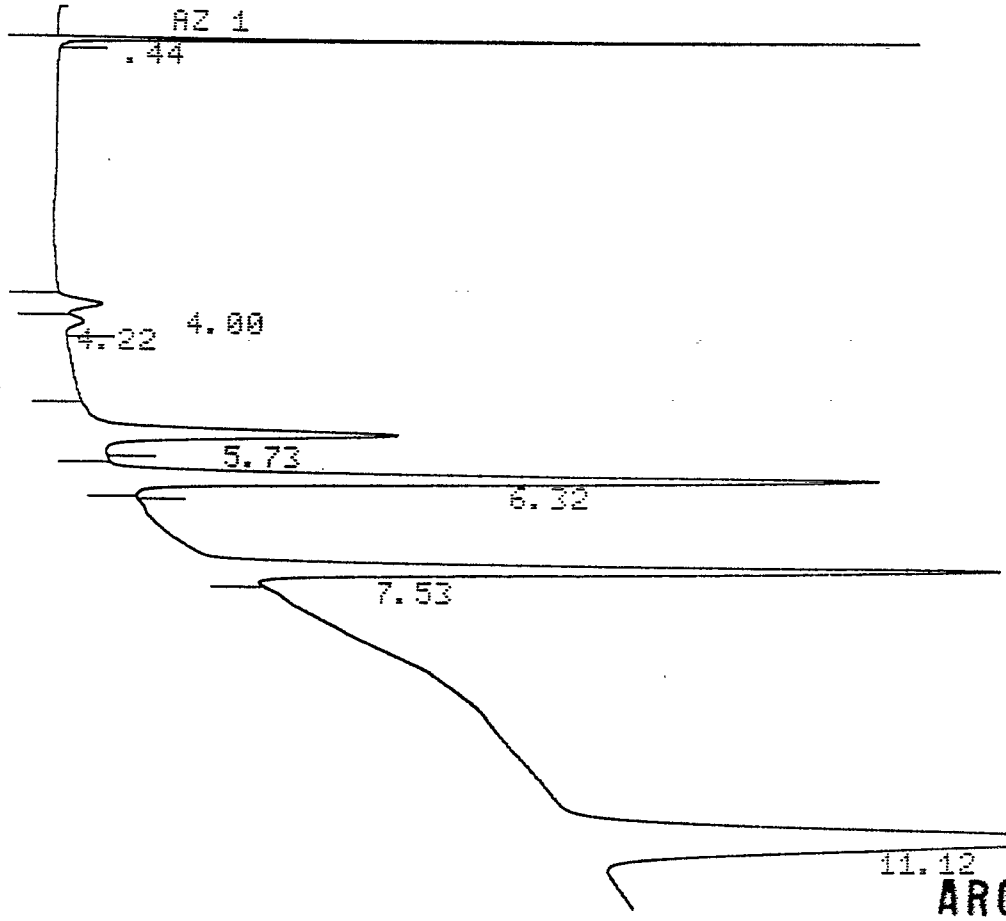
MALCOLM PIRNIE MILLCRK PA 12/19/87 12:18:45 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 62 INDEX 62

PEAK#	AREA%	RT	AREA	BC
1	85.795	0.46	8001988	02
2	0.834	0.97	77829	03
3	0.099	1.52	9247	01
4	3.241	4.	302260	02
5	0.25	4.22	23337	03
6	2.704	5.58	252194	02
7	0.736	6.3	68635	02
8	6.341	11.34	591386	03
TOTAL	100.		9326876	

STD 5µl
1,2-DCA 200µg/l
TCA - 5
TCE - 10
PCE - 5

CHANNEL A INJECT 12/20/87 10:30:02

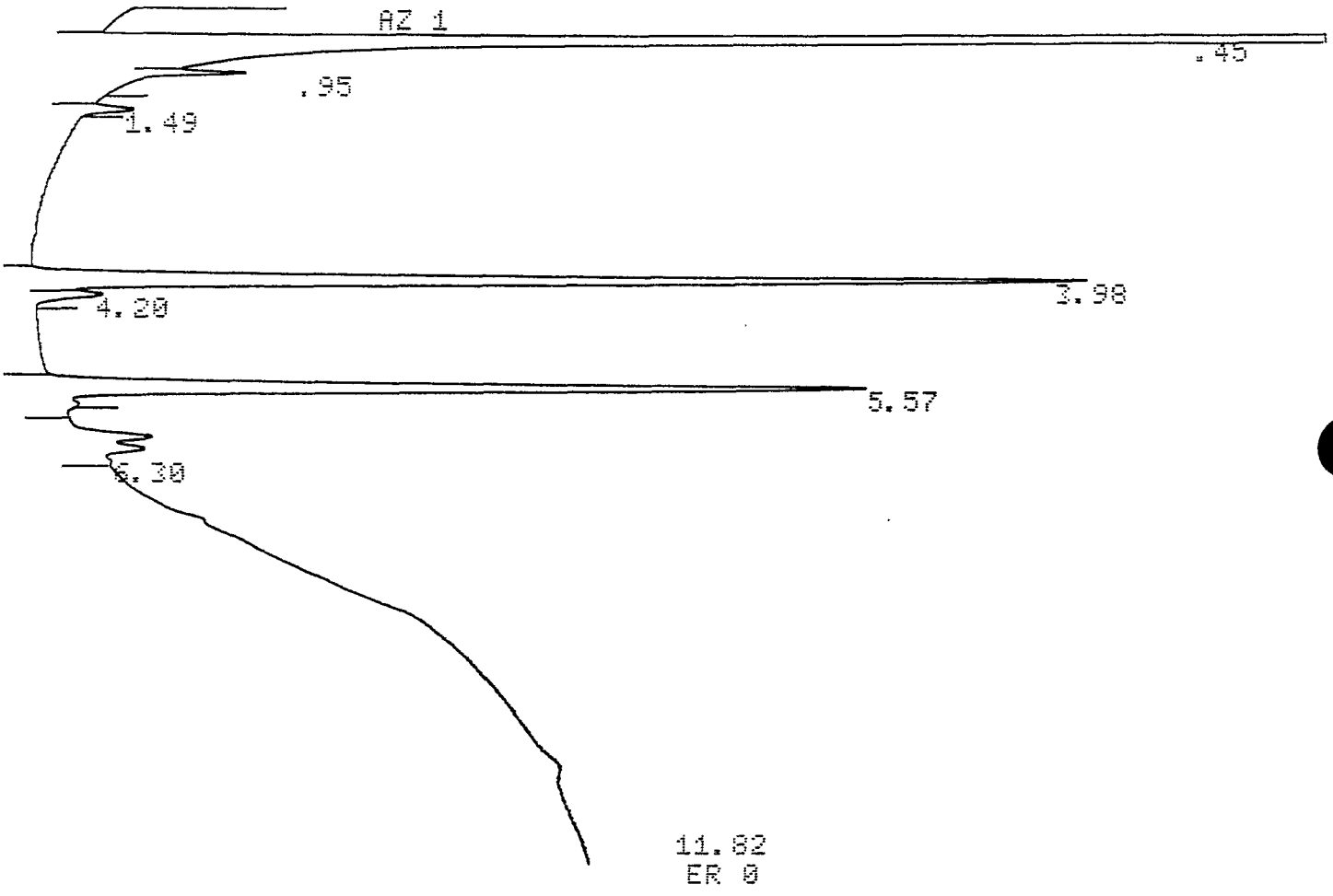


FILE 1. METHOD 0. RUN 63 INDEX 63

PEAK#	AREA%	RT	AREA	BC
1	3.077	0.44	50845	01
2	0.845	4.	13963	02
3	0.426	4.22	7037	03
4	6.549	5.73	108221	01
5	16.053	6.32	265294	01
6	14.282	7.53	236023	02
7	58.769	11.12	971218	03
TOTAL	100.		1652601	

SC37-5½R 600µl

CHANNEL A INJECT 12/20/87 10:44:01



MALCOLM PIRNIE MILLCRK PA 12/20/87 10:44:01 CH= "A" PS= 1.

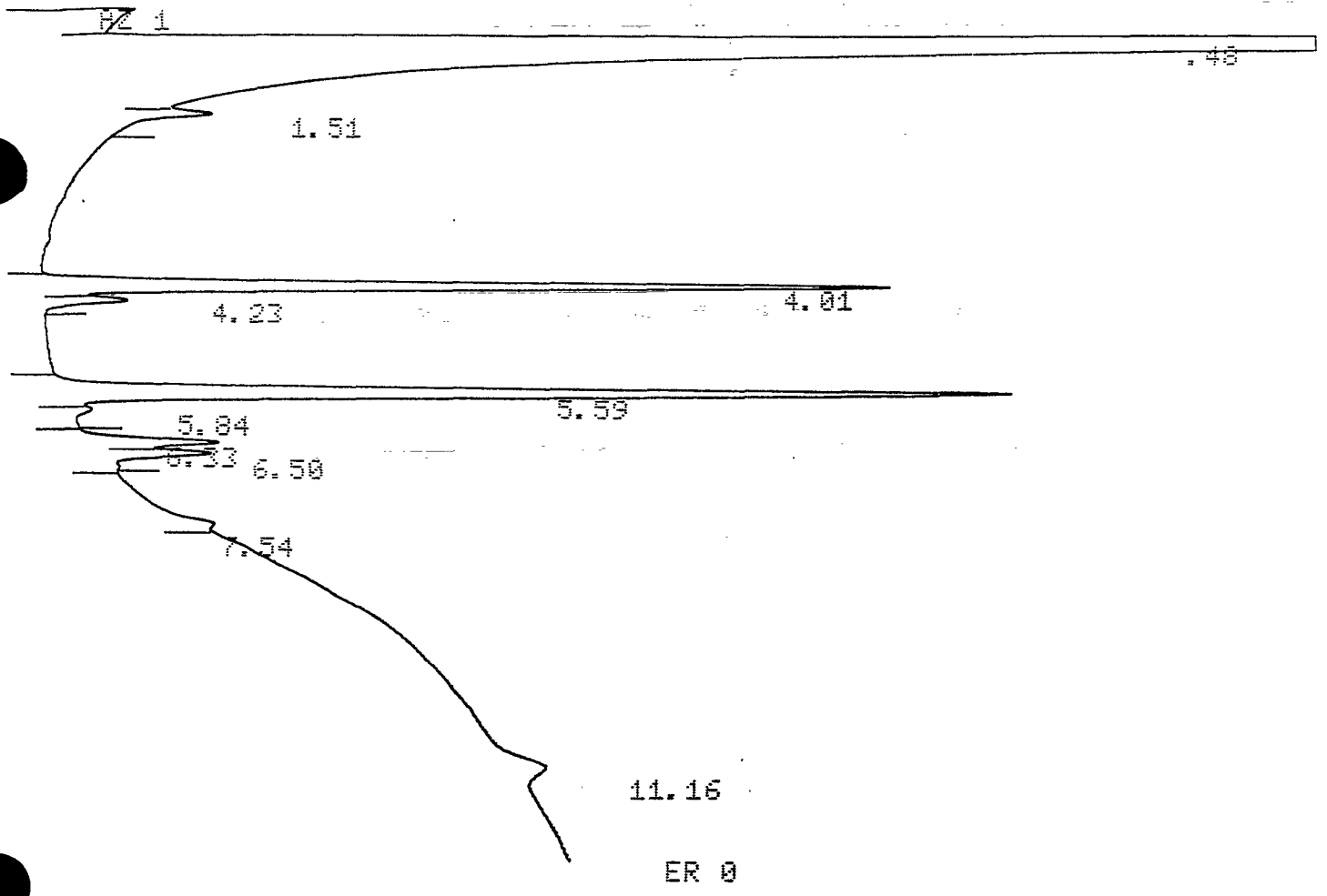
FILE 1. METHOD 0. RUN 64 INDEX 64

PEAK#	AREA%	RT	AREA	BC
1	82.617	0.45	7792392	02
2	0.54	0.95	50939	03
3	0.117	1.49	11081	01
4	4.22	3.98	398005	02
5	0.254	4.2	24004	03
6	3.339	5.57	314950	01
7	0.407	6.3	38433	02
8	8.505	11.82	802182	03
TOTAL	100.		9431986	

SC43-5R 1000µl

AR001086

CHANNEL A INJECT 12/20/87 10:58:31



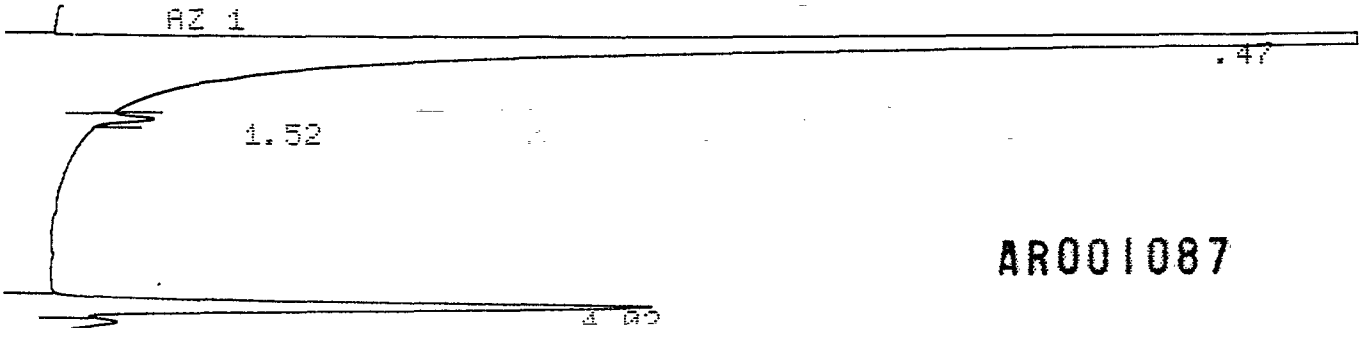
MALCOLM PIRNIE MILLCRK PA 12/20/87 10:58:31 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 65 INDEX 65

PEAK#	AREA%	RT	AREA	BC
1	88.949	0.48	13839475	02
2	0.3	1.51	46746	03
3	2.094	4.01	325756	02
4	0.194	4.23	30215	03
5	2.465	5.59	383540	02
6	0.044	5.84	6915	03
7	0.303	6.33	47160	02
8	0.258	6.5	40195	03
9	0.048	7.54	7428	02
10	5.344	11.16	831511	03
TOTAL	100.		15558941	

SG43-5R 1000 µl

CHANNEL A INJECT 12/20/87 11:17:33



AR001087

APPENDIX 2

Tracer Research Corporation

3855 North Business Center Drive Tucson, Arizona 85705 (602) 888-9400

April 7, 1988

Dharmarajan R. Iyer
Malcolm Pirnie, Inc.
S. 3515 Abbott Road
Buffalo, New York 14219

Dear Dharma:

Enclosed are the results of the resampling conducted at the Millcreek Superfund Site on March 24, 1988. The attached table (Table I) includes data from the December 1987 investigation for comparison. With few exceptions, corresponding analyses from both soil gas surveys were within an order of magnitude of each other. At this site, the inability to accurately relocate points and complex subsurface material (fill) variations would explain additional discrepancies.

If you have any questions, please call me at (602) 888-9400.

Sincerely,

R. Scott Cherba
Staff Hydrogeologist

TABLE I. COMPARISON OF ANALYSES FROM TWO INVESTIGATIONS PERFORMED AT THE MILLCREEK SUPERFUND SITE, PENNSYLVANIA

SAMPLING LOCATION	DEPTH		1,2-DCA (µg/L)		TCA (µg/L)		TCE (µg/L)	
	12/87	3/88	12/87[1]	3/88	12/87[1]	3/88	12/87	3/88
SG06	3.5'	4'	1	0.1	0.009	0.003	0.0004	0.003
SG09	4'	3'	0.2	0.3	0.001	0.006	0.0008	0.002
SG11	5'	5'	0.8	0.2	0.007	0.004	1	0.1
SG18	5'	3'	0.08	4	0.0006	0.08	0.6	0.1
SG19	6'	2.5'	0.2	0.1	0.002	0.002	0.002	0.004
SG26	NA	2'	NA	0.8	NA	0.02	NA	<0.0005
SG35	5'	5'	1	0.6	0.008	0.01	0.08	0.1

[1] 1,2-DCA and TCA co-eluted on the analytical column used during the Dec 1987 investigation. Therefore, the concentration reported for each compound is an upper and lower limit of the combined concentrations. The value reported for 1,2-DCA would be the upper limit and TCA the lower limit for the combined actual concentrations. The sum of the actual 1,2-DCA and TCA concentrations will be between the two reported values.

MALCOLM PIRNIE/MILL CREEK, PENNSYLVANIA

Sample	Depth	Date	1,1-DCE (ug/l)	1,2-DCA (ug/l)	1,1-DCA (ug/l)	TCA (ug/l)	TCE (ug/l)	PCE (ug/l)	CH2Cl2 (ug/l)	CHCl3 (ug/l)	CCl4 (ug/l)
SG06	4'	03/24	<0.006	0.1	<0.02	0.003	0.003	0.003	<0.03	<0.0007	<0.00009
SG09	3'	03/24	<0.006	0.3	<0.02	0.006	0.002	0.01	<0.03	0.006	<0.00009
SG11	5'	03/24	<0.006	0.2	<0.02	0.004	0.1	0.01	<0.03	0.003	0.0007
SG18	3'	03/24	<0.006	4	<0.02	0.08	0.1	0.04	<0.03	0.01	<0.00009
SG19	2.5'	03/24	<0.006	0.1	<0.02	0.002	0.004	0.002	<0.03	<0.0007	<0.00009
SG26	2'	03/24	<0.006	0.8	<0.02	0.02	<0.0005	0.007	2	0.01	<0.00009
SG35	5'	03/24	<0.006	0.6	<0.02	0.01	0.1	0.007	<0.03	<0.0007	<0.00009

AR001091

Tracer Research Corporation

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by T. Bode

Checked by R. Rosenthal

Proofed by L. Laplander

LOG BOOK
MARCH 24, 1988

25" Hg = max

NO 3-24-88
DATE

rainy, cloudy, 57°

11:15 - arrive on site; STD; meet Malcolm Pirnie

12:00 go to lunch

12:45 arrive on site;

12:50 set up backend; blanks (air, N_2)

13:05 system (A=9; P=21)

13:25 SG35

A=13	30sec	dirt
P=1	8cc	pushed to 1'; pounded to 6'
5" Hg	5'	raised to 5' for sample -
		request by client

14:20 SG-18

A=9	45sec	dirt
P=24	9cc	pounded to 3'
8" Hg	3'	2 pts

first probe pounded to 5' very hard material at 4', drew H_2O into sampler's probe; had to move van ~~forward~~ forward 2'.

14:25 standing by as location of point decided

15:00 SG-11

A=13	30sec	Pounded to 5' - very hard
P=3	9cc	material
5" Hg	5'	dirt

15:20 SG-6

A=9	30sec	pounded to 4.5'
P=4	8cc	dirt
5" Hg	4'	

NO
DATE

16:10 SG·19

A=7 5' Hg 5pts !!!! :(Pounded
P=23 8cc pounded to 3' through
2.5' 30sec very hard
probe material
first pounded to 6'; hit water

16:20 STD
16:30 SG·9

A=5 5" Hg pounded to 4'
P=6 8cc
3' 30sec

16:40 leave land fill to go off site

7:00 SG·26

A=7 5" Hg pushed to 7'; pulled to 2'
P=7 8cc due to ground H_2O
2' 30sec

17:10 breakdown backend

17:20 STD

17:40 leave site

AR001094

DATA SHEETS
MARCH 24, 1988

...mill creek, PA Malcolm-Pernie

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TRACER RESEARCH CORPORATION

PRELIMINARY DRAFT

Date 3-24-88 Page 1 CONDENSED DATA

standard conc.					µg/l			µg/l			µg/l			µg/l
response from			1		area	1		area	1		area	1		area
ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet					g/area			g/area			g/area			g/area
sample	~~time~~ depth	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
			1,1 DCE	1,2 DCA	1,2 DCA	1,1,1 TCA	TCE	PCE	CH_2Cl_2	$CHCl_3$	CCl_4			
SG35	5'		<0.006	0.7	<0.02	0.01	0.1	0.007	<0.03	<0.0007	<0.00009			
SG18	3'		<0.006	4	<0.02	0.08	0.1	0.04	<0.03	0.01	<0.00009			
SG11	5'		<0.006	0.2	<0.02	0.004	0.1	0.01	<0.03	<0.003	0.0007			
SG06	4'		<0.006	0.1	<0.02	0.003	0.003	0.003	<0.03	<0.0007	<0.00009			
SG19	2.5'		<0.006	0.1	<0.02	0.002	0.004	0.002	<0.03	<0.0007	<0.00009			
SG09	3'		<0.006	0.3	<0.02	0.006	0.002	0.01	<0.03	0.006	<0.00009			
SG26	2'		<0.006	0.8	<0.02	0.02	<0.0005	0.007	2	0.01	<0.00009			

AR001096

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by T Bode

Checked by

mill creek PA, malcolm - Perine

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TRACER RESEARCH CORPORATION

PRELIMINARY DRAFT

Date 3-24-88 Page 1A

			0.7			1.24			1.21					
			1,1 DCE			1,2 DCA			1,1,[illegible] DCA					
standard conc.			200		µg/l	200		µg/l	200		µg/l			µg/l
response from			1 736284		area	1 288388		area	1 201966		area	1		area
5 ul injection			2 700065		area	2 270340		area	2 160305		area	2		area
			3 685642		area	3 296940		area	3 149606		area	3		area
RFs for this sheet			1.41×10^{-15}		g/area	3.51×10^{-15}		g/area	5.86×10^{-15}		g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 BLK	1251	500												
air sample	1256	~~500~~ 1000	<2000	<0.003		115833	0.4		<2000	<0.01				
sys BLK	1301	~~500~~ 1000	<2000	<0.003		33269	0.1		<2000	<0.01				
SG35@5'	1318	500	<2000	<0.006	<0.006	92103	0.65	0.7	<2000	<0.02	<0.02			
SG35@5'	1322	500	<2000	<0.006		93155	0.65		<2000	<0.02				
SG18@3'	1414	500	<2000	<0.006	<0.006	600300	4.2	4	<2000	<0.02	<0.02			
SG18@3'	1419	500	<2000	<0.006		613229	4.3		<2000	<0.02				
SG11@5'	1447	500	<2000	<0.006		44114	0.31		<2000	<0.02				
SG11@5'	1451	500	<2000	<0.006	<0.006	14992	0.11	0.2	<2000	<0.02	<0.02			
SG11@5'	1459	500	<2000	<0.006		26408	0.19		<2000	<0.02				
SG6@4'	1511	500	<2000	<0.006	<0.006	~~17127~~ 21332	0.15	0.1	<2000	<0.02	<0.02			
SG6@4'	1517	500	<2000	<0.006		17127	0.12		<2000	<0.02				
SG19@2.5'	1601	500	<2000	<0.006	<0.006	15059	0.11	0.1	<2000	<0.02	<0.02			
SG19@2.5'	1606	500	<2000	<0.006		19564	0.14		<2000	<0.02				
Std	1620	5	706582			295269			165914					
SG09@3'	1627	500	<2000	<0.006	<0.006	59245	0.41	0.3	<2000	<0.02	<0.02			
SG09@3'	1632	500	<2000	<0.006		28520	0.20		<2000	<0.02				

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by [illegible]

Checked by _____

AR001097

PRI[illegible]EGED AND CONFIDENTIAL

[illegible] Mill Creek, PA Malcolm - Pernie

TRACER RESEARCH CORPORATION

PRELIMINARY DRAFT

Date 3-24-88 Page 1B

						1.24			1.7			3.65		
			F113 RT= 0.73			1,1,1 TCA			TCE			PCE		
standard conc.					µg/l	5		µg/l	10		µg/l	5		µg/l
response from			1		area	1 363415		area	1 398167		area	1 670887		area
5 ul injection			2		area	2 369225		area	2 420025		area	2 715591		area
			3		area	3 373374		area	3 424828		area	3 711782		area
RFs for this sheet					g/area	6.78×10^{-17}		g/area	1.21×10^{-16}		g/area	3.57×10^{-17}		g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 Blk	1251	500												
air sample	1256	~~500~~ 1000				115833	0.008		<2000	<0.0002		1412367	0.05	
sys Blk	1301	~~500~~ 1000				33269	0.002		<2000	<0.0002		920332	0.03	
SG35@5'	1318	500				92103	0.012	0.01	493532	0.12	0.1	115798	0.0083	0.00
SG35@5'	1322	500				93155	0.013		494352	0.12		82474	0.0059	
SG18@3'	1414	500				600300	0.081	0.08	566767	0.14	0.1	493564	0.035	0.04
SG18@3'	1419	500				613229	0.083		567224	0.14		649675	0.046	
SG11@5'	1447	500				44114	0.0060		377582	0.091		284469	0.020	
SG11@5'	1451	500				14992	0.0020	0.004	467521	0.11	0.1	165238	0.012	0.01
SG11@5'	1459	500				26408	0.0036		466053	0.11		115677	0.0083	
SG6@4'	1511	500				21332	0.0029	0.003	14365	0.0035	0.003	55793	0.0040	0.00
SG6@4'	1517	500				17127	0.0023		13616	0.0033		40051	0.0029	
SG19@2.5'	1601	500				15059	0.0020	0.002	18374	0.0044	0.004	23621	0.0017	0.0
SG19@2.5'	1606	500				19564	0.0027		17545	0.0042		26881	0.0019	
Std	1612	5				383369			426239			698681		
SG09@3'	1627	500				59245	0.0080	0.006	8060	0.0020	0.002	191297	0.014	0.0
SG09@3'	1632	500				28520	0.0039		8063	0.0020		200340	0.014	

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by T Bode

Checked by

AR001098

Mill Creek PA Malcolm-Pernie

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TRACER RESEARCH CORPORATION

PRELIMINARY DRAFT

Date 3-24-88 Page 1C

	0.72			1.03			1.39					
	CH_2Cl_2			$CHCl_3$			CCl_4					
standard conc.	200		µg/l	10		µg/l	2		µg/l			µg/l
response from 5ul injection	1	127181	area	1	272861	area	1	370886	area	1		area
	2	121032	area	2	287781	area	2	442831	area	2		area
	3	148727	area	3	290000 E	area	3	453715	area	3		area
RFs for this sheet	7.56×10^{-15}		g/area	1.76×10^{-16}		g/area	2.37×10^{-17}		g/area			g/area

sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
N_2 Blank	1251	500												
air sample	1256	~~500~~ 1000	57424	0.4		10696	0.002		<2000	<0.00005				
sys PIK	1301	~~500~~ 1000	72984	0.6		10300	0.002		<2000	<0.00005				
SG35@5'	1318	500	<2000	<0.03	<0.03	<2000	<0.0007	<0.0007	<2000	<0.00009	<0.00009			
SG35@5'	1322	500	<2000	<0.03		<2000	<0.0007		<2000	<0.00009				
SG18@3'	1414	500	<2000	<0.03	<0.03	~~35553~~ 34159	0.012	0.01	<2000	<0.00009	<0.00009			
SG18@3'	1419	500	<2000	<0.03		35553	0.013		<2000	<0.00009				
SG11@5'	1447	500	<2000	<0.03		9862	0.0035		<2000	<0.00009				
SG11@5'	1451	500	<2000	<0.03	<0.03	<2000	<0.0007	0.003	<2000	<0.00009	0.0007			
SG11@5'	1459	500	<2000	<0.03		5492	0.0019		13879	0.00066				
SG6@4'	1511	500	<2000	<0.03	<0.03	<2000	<0.0007	<0.0007	<2000	<0.00009	<0.00009			
SG6@4'	1517	500	<2000	<0.03		<2000	<0.0007		<2000	<0.00009				
SG19@2.5'	1601	500	<2000	<0.03	<0.03	<2000	<0.0007	<0.0007	<2000	<0.00009	<0.00009			
SG19@2.5'	1606	500	<2000	<0.03		<2000	<0.0007		<2000	<0.00009				
Std	1618	5	132150			298946			393013					
SG09@3'	1627	500	<2000	<0.03	<0.03	17060	0.0060	0.006	<2000	<0.00009	<0.00009			
SG09@3'	1632	500	<2000	<0.03		<2000	<0.0007		<2000	<0.00009				

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by [illegible]

Checked by _____

AR001099

Job Mill Creek, PA Malcolm-Pernie

PRIVILEGED AND CONFIDENTIAL

PRELIMINARY DRAFT

TRACER RESEARCH CORPORATION

Date 3-24-88 Page 2A

			1,1 DCE			1,2 DCA			1,1 DCA					
standard conc.					µg/l			µg/l			µg/l			µg/l
response from			1		area	1		area	1		area	1		area
ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet					g/area			g/area			g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG26 @2'	1657	500	<2000	<0.006	<0.006	130868	0.92	0.8	<2000	<0.02	<0.02			
SG26 @2'	1702	500	<2000	<0.006		~~94415~~ 102342	0.71		<2000	<0.02				
air sample	1707	1000	<2000	<0.003	—	56688	0.2	—	<2000	<0.01	—			
Std	1719	5	708890	—	—	285708	—	—	159455	—	—			

Notations:
RF response factor
I interference with adjacent peaks
NA not analysed
E estimated peak area

Analysed by T Bode

Checked by

AR001100

mill Creek, PA Malcolm - Pernie

PR[illegible]GED AND CONFIDENTIAL

PRELIMINARY DRAFT

TRACER RESEARCH CORPORATION

Date 3-24-88 Page 2B

						1,1,1 TCA			TCE			PCE		
standard conc.					µg/l			µg/l			µg/l			µg/l
response from			1		area	1		area	1		area	1		area
ul injection			2		area	2		area	2		area	2		area
			3		area	3		area	3		area	3		area
RFs for this sheet					g/area			g/area			g/area			g/area
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
SG26@2'	1657	500				130868	0.018	0.02	<2000	<0.0005	<0.0005	98389	0.0070	0.007
SG26@2'	1702	500				101242	0.014		<2000	<0.0005		89091	0.0063	
air sample	1707	1000				56688	0.004	—	<2000	~~<0.0002~~ <0.0002	—	62540	0.002	—
Std	1712	5				374915	—	—	419115	—	—	695712	—	—

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by [illegible]

Checked by _____

AR001101

PRI' EGED AND CONFIDENTIAL

... Mill Creek, PA malcolm-Pernie

PRELIMINARY DRAFT

TRACER RESEARCH CORPORATION

Date 3-24-88 Page 2C

			CH_2Cl_2			$CHCl_3$			CCl_4					
standard conc.				µg/l			µg/l			µg/l			µg/l	
response from			1	area		1	area		1	area		1	area	
ul injection			2	area		2	area		2	area		2	area	
			3	area		3	area		3	area		3	area	
RFs for this sheet				g/area			g/area			g/area			g/area	
sample	time	amt inj	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean	area	µg/l	mean
S626@2'	1657	500	124577	1.9	2	55817	0.020	0.01	<2000	<0.00009	<0.00009			
S626 @2'	1702	500	94115	1.4		12750	0.0045		<2000	<0.00009				
air sample	1707	1000	<2000	<0.02	—	26098	0.005	—	11913	0.0003	—			
Std	1717	5	131110	—	—	82853	—	—	408456	—	—			

Notations:
- RF response factor
- I interference with adjacent peaks
- NA not analysed
- E estimated peak area

Analysed by [illegible]

Checked by

AR001102

CHROMATOGRAMS
MARCH 24, 1988

3-24-88

ECD

Column	OV101	Detector	ECD
Length	6'	Voltage	
Dia.	1/8"	Sensit.	
Liquid Phase		Flow Rates, ml/min	
Wt. %	10	Hydrogen	NA Air NA
Support		Scavenge	
Mesh	80/100	Split	
Carrier Gas	N2	Temperature, °C	55
Rotameter		Det. 250	Inj. 350
Inlet Press	psig	Column Initial	55
Rate 30	ml/min	Final	150
CHART SPEED	1	Rate	
SAMPLE		Solvent	
Size		Concn.	
Operator	T Bode	Date	3-24-88

F113 = 10
1,1,1 TCA = 5
TCE = 10
PCE = 5
1,1 DCE = 200
1,1 DCA = 200
1,2 DCA = 200
→ 10

CH_2Cl_2 = 200 → 10
$CHCl_3$ = 10
CCl_4 = 2

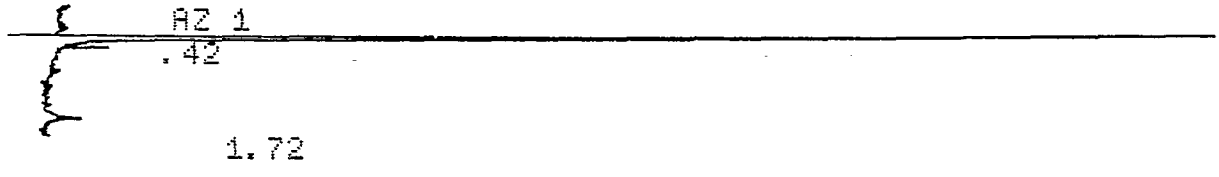
```
  READY
DATE "
  READY
DATE "

  READY
DATE " 3/24/88
TIME " 10:14
SAMPLE TABLE...
ANALYST:AN=" T BODE
INJECTIONS/SAMPLE:RA=
SAMPLES BETWEEN CALIB:CI=
CONC UNITS:CU="
SAM IDX   NAME          SAM AMT      IS AMT      SCALE FACTOR
SI=
END OF DIALOG
FI= 1.      FE= 1.      MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
FILE NAME=" MILL CR
 IME        FUNCTION  VALUE
TT= .01     TF=" AZ   TV= 1
TT= .01     TF=" PM   TV= 1
TT=

METHOD NUMBER:MN=

END OF DIALOG
AT= 32
OF=10
PT=1000
```

CHANNEL A INJECT 03/24/88 10:20:39



MILL CR 03/24/88 10:20:39 CH= "A" PS= 1.

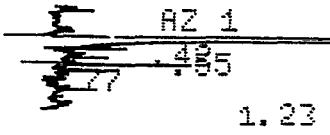
ILE 1. METHOD 0. RUN 1 INDEX 1

ANALYST: T BODE

PEAK#	AREA%	RT	AREA BC
1	100.	0.42	90921 01

AR001104

CHANNEL A INJECT 03/24/88 10:27:38



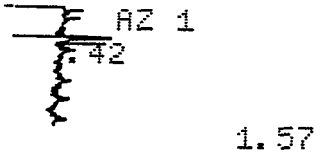
MILL CR 03/24/88 10:27:38 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 2 INDEX 2

ANAL ST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	95.191	0.42	142030	02
2	3.688	0.55	5502	03
3	1.121	0.77	1673	01
TOTAL	100.		149205	

CHANNEL A INJECT 03/24/88 10:31:26



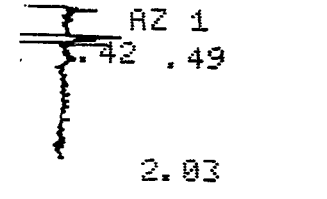
MILL CR 03/24/88 10:31:26 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 3 INDEX 3

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	100.	0.42	4118	01
TOTAL	100.		4118	

CHANNEL A INJECT 03/24/88 10:35:14



MILL CR 03/24/88 10:35:14 CH= "A" PS= 1.

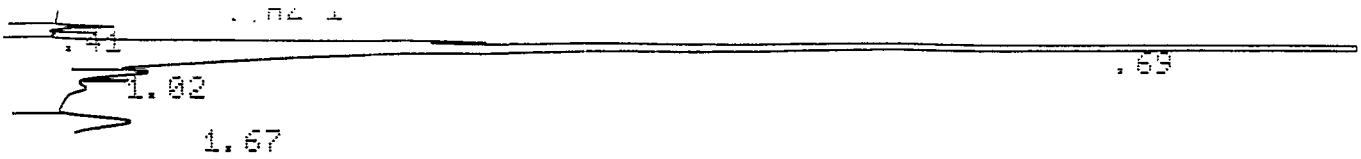
FILE 1. METHOD 0. RUN 4 INDEX 4

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	100.	0.42	4890	03
TOTAL	100.		4890	

Std. 1/1 DCE 5ml

AR001105



MILL CR 03/24/88 11:12:24 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 5 INDEX 5

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.62	0.41	4721	01
2	96.7	0.69	736284	08
3	0.962	1.02	7323	05
4	1.718	1.67	13084	01
TOTAL	100.		761412	

Std. 1,1 DCE 5ul

CHANNEL A INJECT 03/24/88 11:14:30

MILL CR 03/24/88 11:14:30 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 6 INDEX 6

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.611	0.41	4327	01
2	98.934	0.7	700065	08
3	0.454	1.03	3215	05
TOTAL	100.		707607	

Std 1,1 DCE 5ul

CHANNEL A INJECT 03/24/88 11:15:50

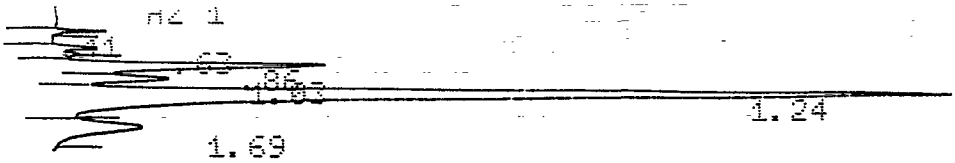
MILL CR 03/24/88 11:15:50 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 7 INDEX 7

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	2.588	0.35	18736	02
2	1.024	0.41	7415	03
3	94.723	0.7	685642	08
4	1.665	1.03	12049	05
TOTAL	100.		723842	

Std 1,2 DCA 5ul



MILL CR 03/24/88 11:17:53 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 8 INDEX 8

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.951	0.41	3880	01
2	0.915	0.63	3730	01
3	13.982	0.86	57021	02
4	6.276	1.03	25594	02
5	70.717	1.24	288388	03
6	7.158	1.69	29192	01
TOTAL	100.		407805	

Std 1,2 DCA 5µl

CHANNEL A INJECT 03/24/88 11:20:12

MILL CR 03/24/88 11:20:12 CH= "A" PS= 1.

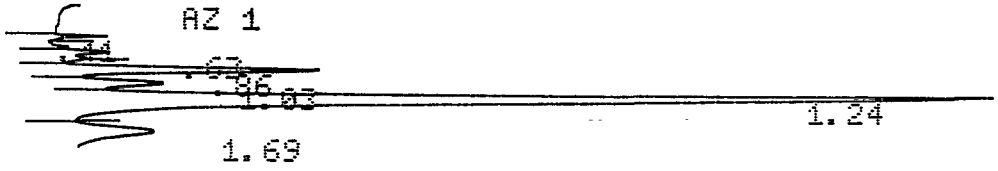
FILE 1. METHOD 0. RUN 9 INDEX 9

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	1.127	0.41	3851	01
2	4.417	0.63	15096	02
3	15.353	0.85	52468	02
4	79.103	1.24	270340	03
TOTAL	100.		341755	

Std 1,2 DCA 5µl

CHANNEL A INJECT 03/24/88 11:22:03



MILL CR 03/24/88 11:22:03 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 10 INDEX 10

ANALYST: T BODE

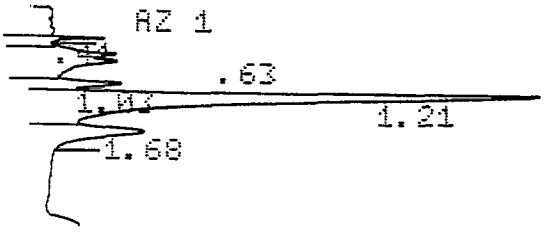
PEAK#	AREA%	RT	AREA	BC
1	1.073	0.41	4331	01
2	0.875	0.63	3532	01

AR001107

7	[illegible]	1.03	[illegible]	02
5	73.586	1.24	296940	03
6	6.686	1.69	26978	01
TOTAL	100.		403528	

Std 1,1 DCA 5ul

HANNEL A INJECT 03/24/88 11:24:22



MILL CR 03/24/88 11:24:22 CH= "A" PS= 1.

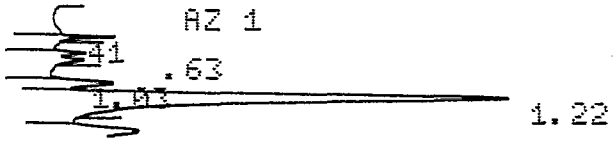
FILE 1. METHOD 0. RUN 11 INDEX 11

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	1.349	0.41	3821	01
2	11.697	0.63	33122	02
3	5.522	1.03	15637	02
4	71.321	1.21	201966	08
5	10.111	1.68	28632	05
TOTAL	100.		283178	

Std 1,1 DCA 5ul

CHANNEL A INJECT 03/24/88 11:27:37



MILL CR 03/24/88 11:27:37 CH= "A" PS= 1.

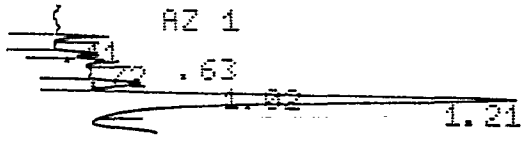
FILE 1. METHOD 0. RUN 12 INDEX 12

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	2.36	0.41	4378	01
2	4.78	0.63	8868	01
3	6.455	1.03	11975	02
4	86.406	1.22	160305	03
TOTAL	100.		185526	

Std 1,1 DCA 5ul

HANNEL A INJECT 03/24/88 11:29:43



AR001108

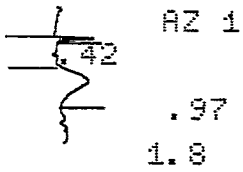
FILE 1. METHOD 0. RUN 13 INDEX 13

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	2.492	0.41	4299	01
2	2.597	0.63	4480	02
3	2.496	0.72	4307	03
4	5.699	1.02	9832	02
5	86.716	1.21	149606	03
TOTAL	100.		172524	

N2 ul Blank 10ul

CHANNEL A INJECT 03/24/88 11:31:44



MILL CR 03/24/88 11:31:44 CH= "A" PS= 1.

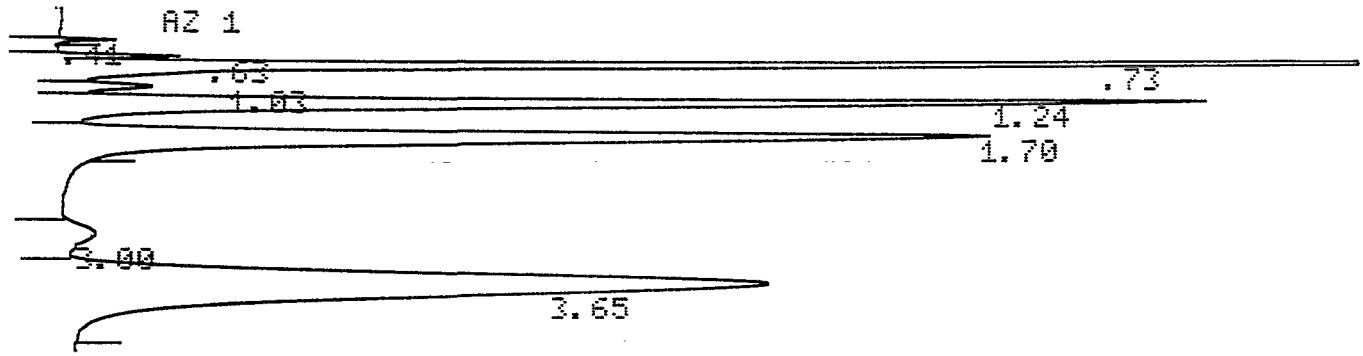
FILE 1. METHOD 0. RUN 14 INDEX 14

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	12.009	0.42	2761	01
2	87.991	0.97	20230	01
TOTAL	100.		22991	

std F113 TCA TCE PCE 5ul

CHANNEL A INJECT 03/24/88 11:34:00



MILL CR 03/24/88 11:34:00 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 15 INDEX 15

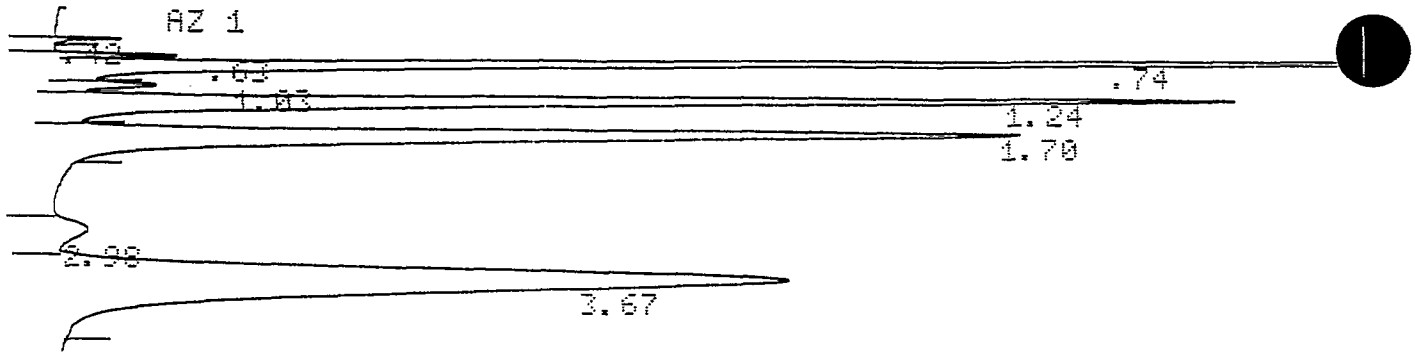
ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.235	0.41	4485	01
2	0.778	0.63	14844	02
3	22.13	0.73	422205	08
4	0.666	1.03	12709	06
5	19.049	1.24	363415	02
6	20.87	1.7	398167	03

Std TCA TCE PCE Smd

TOTAL 100. 1907839

CHANNEL A INJECT 03/24/88 11:39:06



MILL CR 03/24/88 11:39:06 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 16 INDEX 16

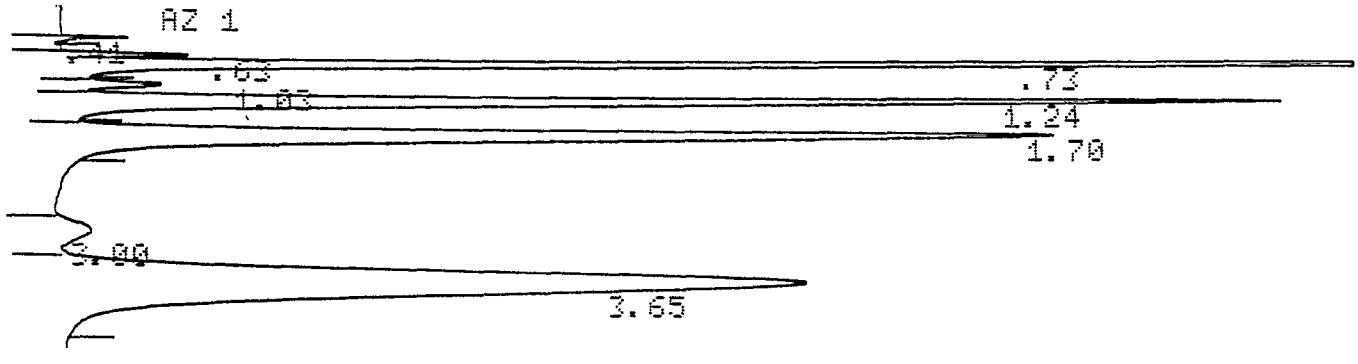
ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.265	0.42	5245	01
2	0.716	0.63	14159	02
3	21.119	0.74	417431	03
4	0.66	1.03	13039	02
5	18.68	1.24	369225	03
6	21.25	1.7	420025	01
7	1.107	2.98	21876	02
8	36.203	3.67	715591	03

TOTAL 100. 1976591

Std F113 TCA TCE PCE Smd

CHANNEL A INJECT 03/24/88 11:44:05



MILL CR 03/24/88 11:44:05 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 17 INDEX 17

ANALYST: T BODE

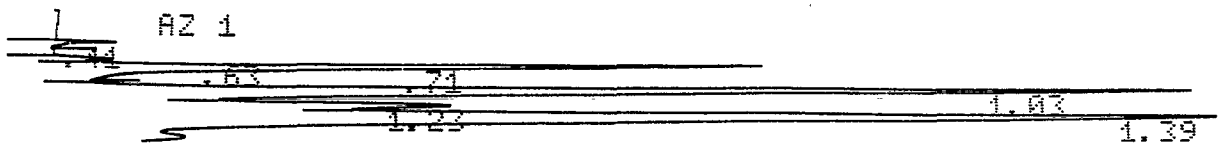
PEAK#	AREA%	RT	AREA	BC
1	0.281	0.41	5586	01
2	0.733	0.63	14572	02
3	21.115	0.73	419779	03
4	0.742	1.03	14749	02

7	1.177	3.[illegible]	23406	02
8	35.803	3.65	711782	03
TOTAL	100.		1988076	

Std CH_2Cl_2 $CHCl_3$ CCl_4 5ml

CHANNEL A INJECT 03/24/88 11:48:58

AZ 1



MILL CR 03/24/88 11:48:58 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 18 INDEX 18

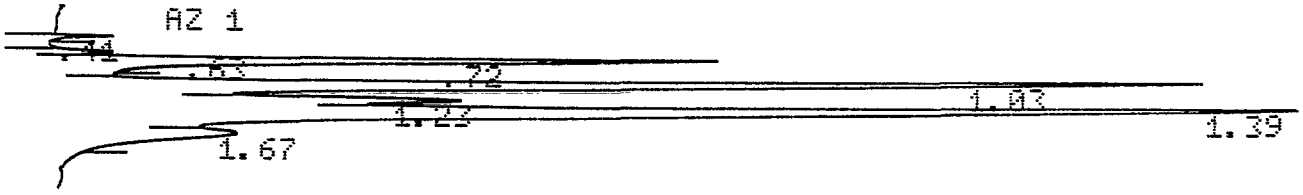
ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.581	0.41	5034	01
2	0.647	0.63	5606	02
3	14.68	0.71	127181	03
4	31.495	1.03	272861	02
5	9.788	1.23	84802	02
6	42.809	1.39	370886	03
TOTAL	100.		866370	

Std CH_2Cl_2 $CHCl_3$ CCl_4 5ml

CHANNEL A INJECT 03/24/88 11:51:01

AZ 1



MILL CR 03/24/88 11:51:01 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 19 INDEX 19

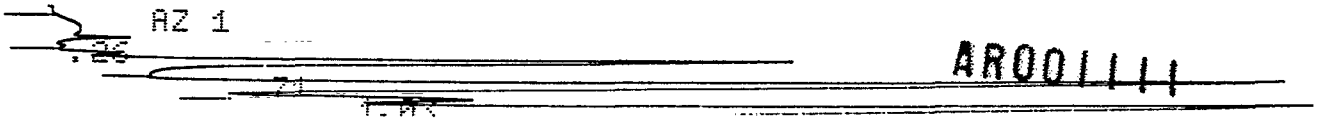
ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.496	0.41	5108	01
2	0.513	0.63	5285	02
3	11.758	0.72	121032	03
4	27.958	1.03	287781	02
5	9.237	1.23	95085	02
6	43.02	1.39	442831	02
7	7.017	1.67	72228	03
TOTAL	100.		1029350	

Std CH_2Cl_2 $CHCl_3$ CCl_4 5ml

CHANNEL A INJECT 03/24/88 11:53:44

AZ 1



AR001111

MILL CR 03/24/88 11:53:44 CH= "A" PS= 1.

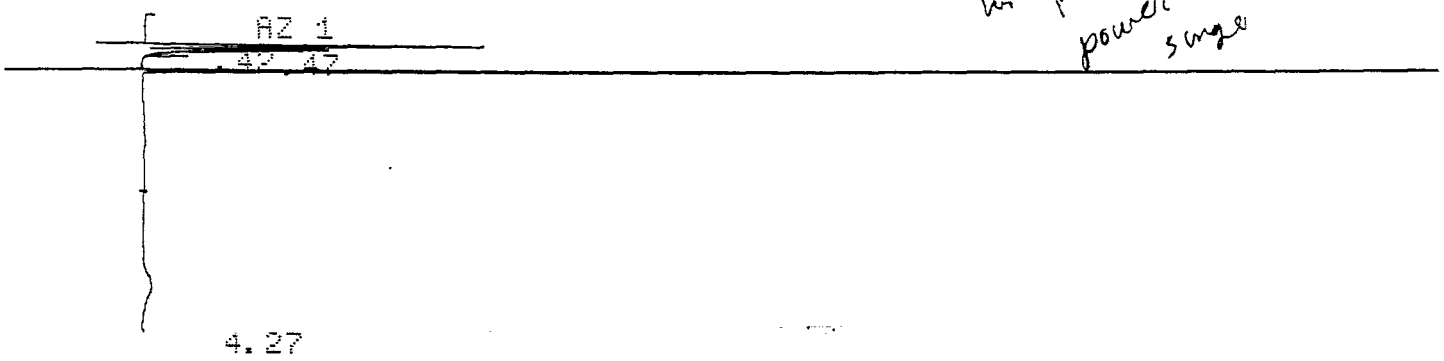
FILE 1. METHOD 0. RUN 20 INDEX 20

ANALYST: T BODE

PEAK#	AREA%	RT	AREA BC
1	2.32	0.26	21924 02
2	15.74	0.71	148727 02
3	33.924	1.03	320556 02
4	48.016	1.38	453715 03
TOTAL	100.		944922

N2 syringe Blank 500 ml

CHANNEL A INJECT 03/24/88 12:51:07



INPUT OVERRANGE AT RT= 0.75

MILL CR 03/24/88 12:51:07 CH= "A" PS= 1.

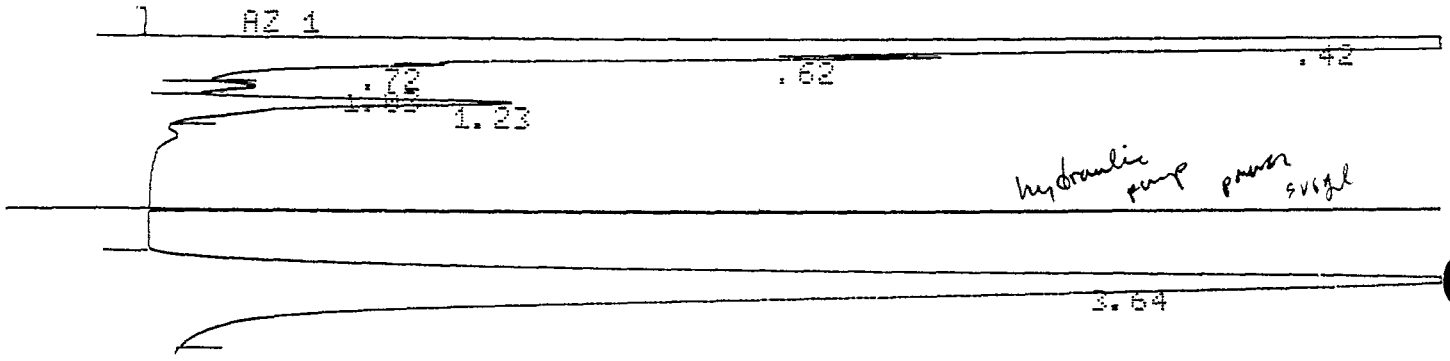
FILE 1. METHOD 0. RUN 21 INDEX 21

ANALYST: T BODE

PEAK#	AREA%	RT	AREA BC
1	59.909	0.42	25284 02
2	40.091	0.47	16920 03
TOTAL	100.		42204

air sample 500 ml

CHANNEL A INJECT 03/24/88 12:56:58



AR001112

INPUT OVERRANGE AT RT= 2.69

MILL CR 03/24/88 12:56:56 CH= "A" PS= 1.

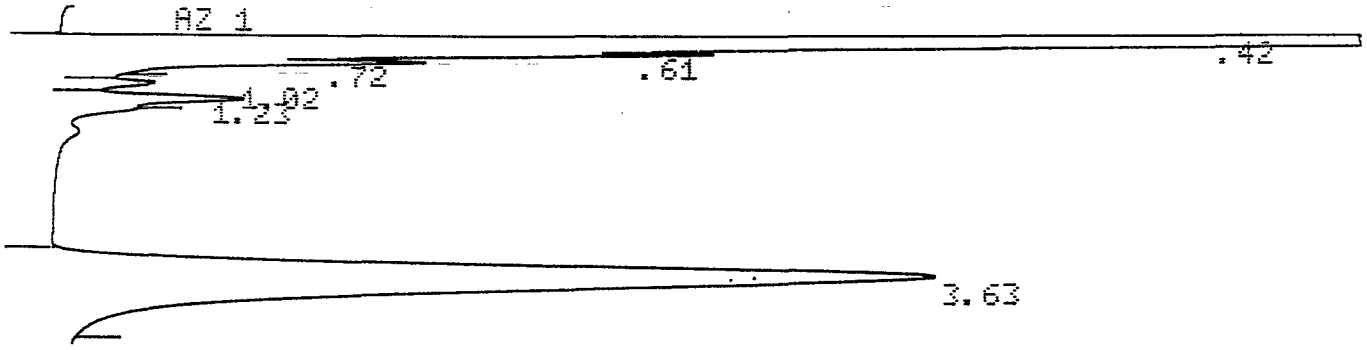
FILE 1. METHOD 0. RUN 22 INDEX 22

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	79.275	0.42	6661689	02
2	1.729	0.62	145252	02
3	0.683	0.72	57424	03
4	0.127	1.03	10696	02
5	1.378	1.23	115833	03
6	16.807	3.64	1412367	01
TOTAL	100.		8403261	

Mys BLK 1500mL

CHANNEL A INJECT 03/24/88 13:01:57



INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 13:01:57 CH= "A" PS= 1.

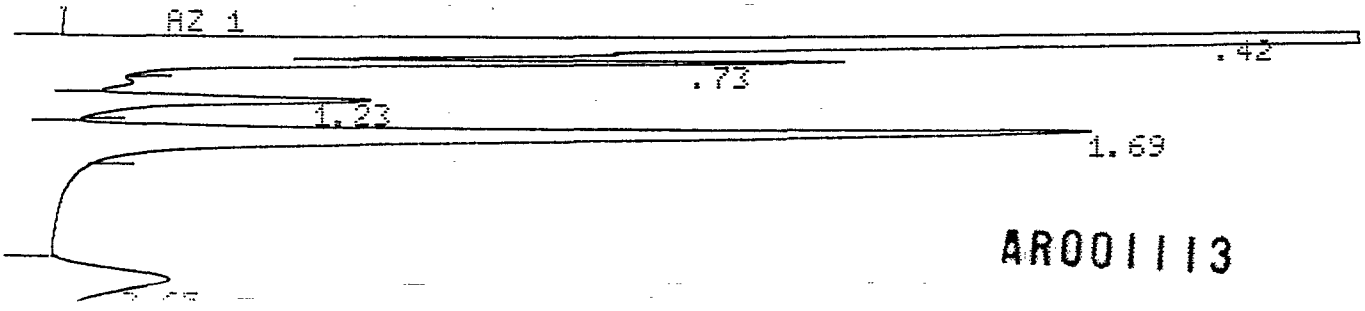
FILE 1. METHOD 0. RUN 23 INDEX 23

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	84.321	0.42	6154933	02
2	1.474	0.61	107587	02
3	1.	0.72	72984	03
4	0.141	1.02	10300	02
5	0.456	1.23	33269	03
6	12.608	3.63	920332	01
TOTAL	100.		7299405	

SG35@5' 500mL

CHANNEL A INJECT 03/24/88 13:18:02



AR001113

INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 13:18:02 CH= "A" PS= 1.

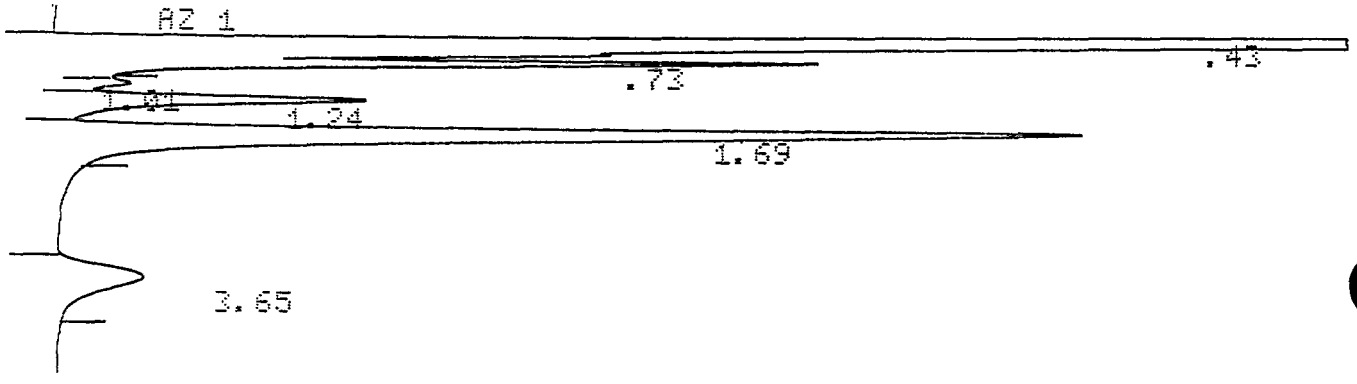
FILE 1. METHOD 0. RUN 24 INDEX 24

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	88.364	0.42	6596066	02
2	2.239	0.73	167128	03
3	1.234	1.23	92103	01
4	6.612	1.69	493532	01
5	1.551	3.65	115798	01
TOTAL	100.		7464627	

SG35@5' 500ml

CHANNEL A INJECT 03/24/88 13:22:49



INPUT OVERRANGE AT RT= 0.44

MILL CR 03/24/88 13:22:49 CH= "A" PS= 1.

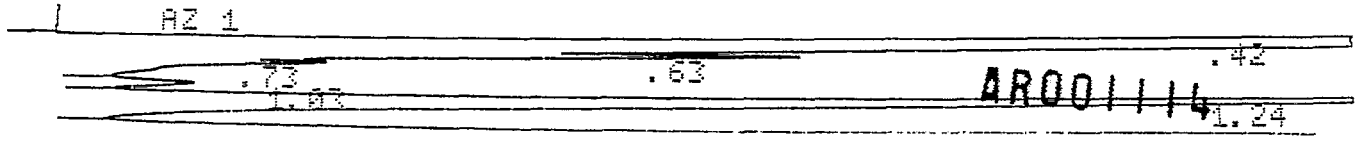
FILE 1. METHOD 0. RUN 25 INDEX 25

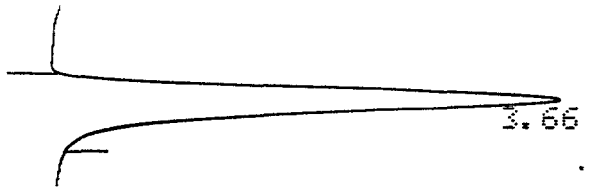
ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	88.672	0.43	6575292	02
2	2.21	0.73	163862	03
3	0.083	1.01	6187	02
4	1.256	1.24	93155	02
5	6.667	1.69	494352	03
6	1.112	3.65	82474	01
TOTAL	100.		7415322	

SG18 @3' 500ml

CHANNEL A INJECT 03/24/88 14:14:40





INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 14:14:40 CH= "A" PS= 1.

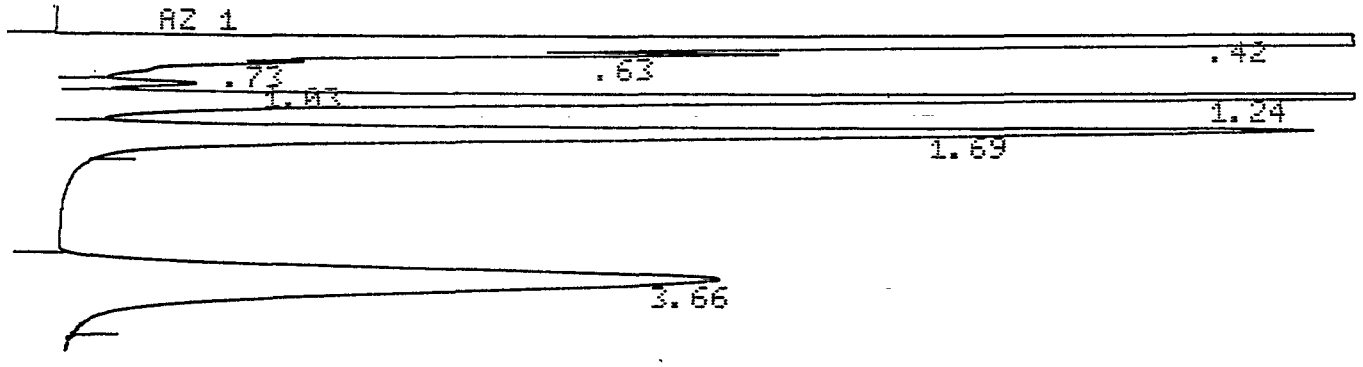
FILE 1. METHOD 0. RUN 26 INDEX 26

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	75.476	0.42	5902034	02
2	1.867	0.63	145976	02
3	0.984	0.73	76931	02
4	0.437	1.03	34159	02
5	7.677	1.24	600300	02
6	7.248	1.69	566767	03
7	6.312	3.66	493564	01
TOTAL	100.		7819731	

SG18@3' 500ml

CHANNEL A INJECT 03/24/88 14:19:56



INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 14:19:56 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 27 INDEX 27

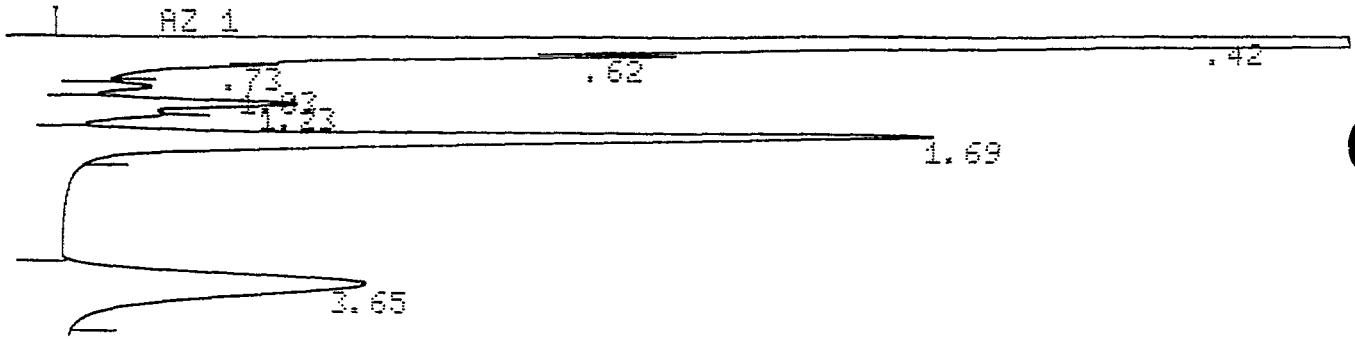
ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	73.878	0.42	5885309	02
2	1.82	0.63	145007	02
3	0.881	0.73	70205	02
4	0.446	1.03	35553	02
5	7.698	1.24	613229	02
6	7.12	1.69	567224	03
7	8.155	3.66	649675	01

AR001115

SG11@5' 500ml

CHANNEL A INJECT 03/24/88 14:47:09



INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 14:47:09 CH= "A" PS= 1.

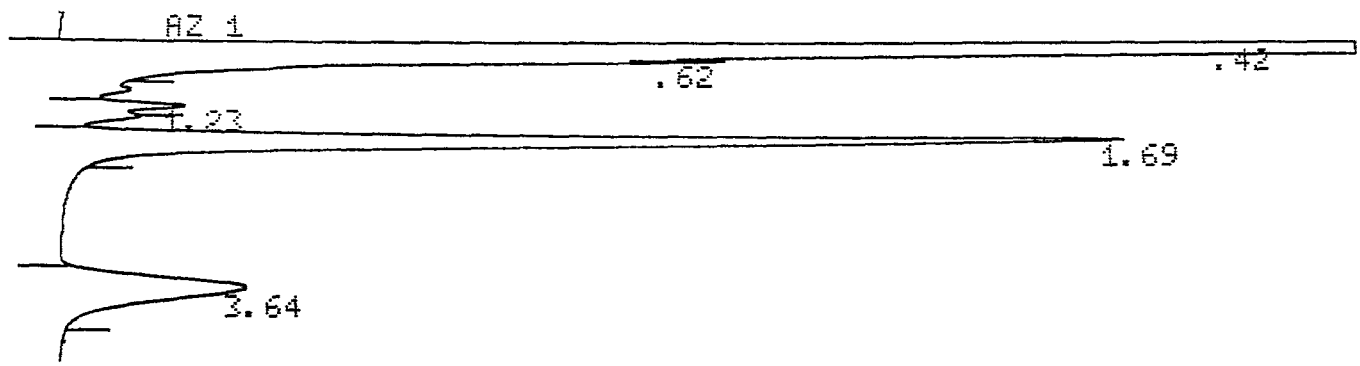
FILE 1. METHOD 0. RUN 28 INDEX 28

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	86.821	0.42	5742156	02
2	1.777	0.62	117526	02
3	0.576	0.73	38111	03
4	0.149	1.03	9862	02
5	0.667	1.23	44114	03
6	5.709	1.69	377582	01
7	4.301	3.65	284469	01
TOTAL	100.		6613820	

SG11 @ 5

CHANNEL A INJECT 03/24/88 14:51:52



INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 14:51:52 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 29 INDEX 29

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC

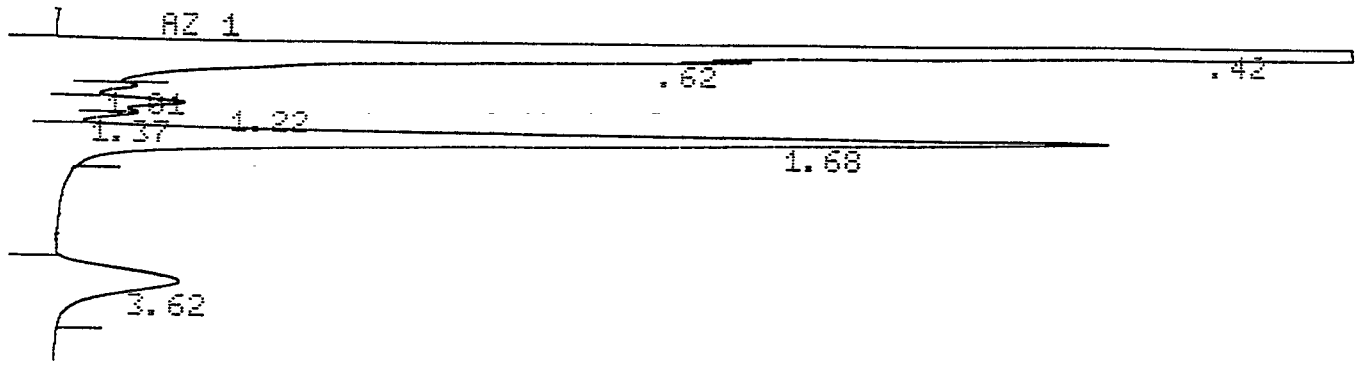
AR001116

3	0.211	1.23	14992	01
4	6.571	1.69	467521	01
5	2.322	3.64	165238	01
TOTAL	100.		7115105	

SG11@5' soaul

T=750

CHANNEL A INJECT 03/24/88 14:59:02



INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 14:59:02 CH= "A" PS= 1.

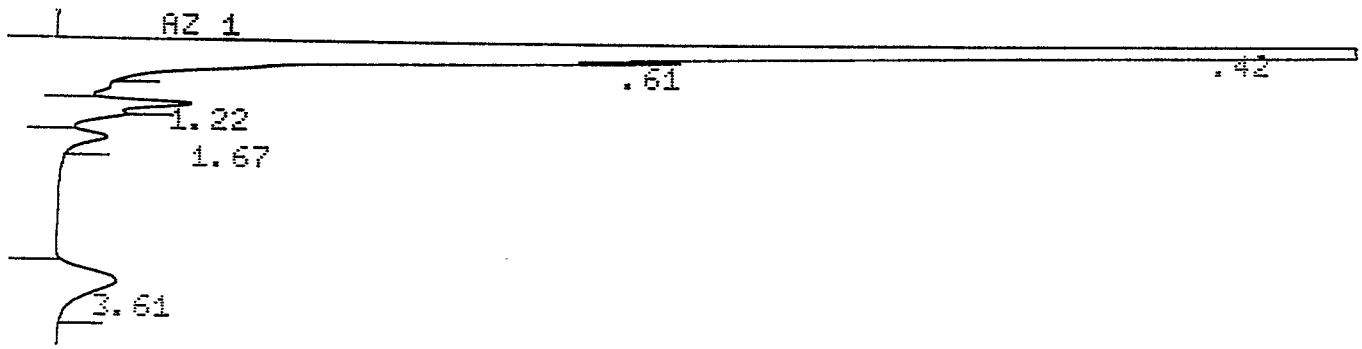
FILE 1. METHOD 0. RUN 30 INDEX 30

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	89.274	0.42	6566383	02
2	2.195	0.62	161428	03
3	0.075	1.01	5492	02
4	0.359	1.22	26408	02
5	0.189	1.37	13879	02
6	6.336	1.68	466053	03
7	1.573	3.62	115677	01
TOTAL	100.		7355320	

SG6@4' soaul

CHANNEL A INJECT 03/24/88 15:11:54



INPUT OVERRANGE AT RT= 0.43

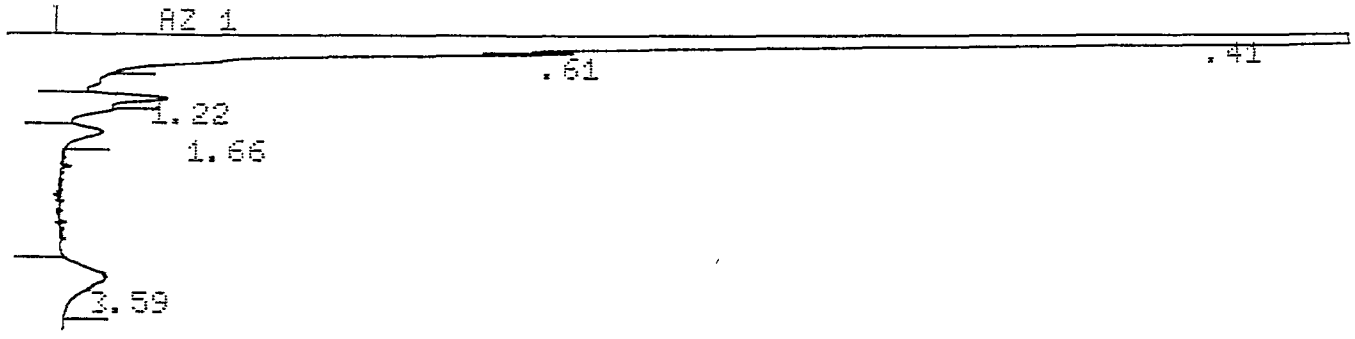
MILL CR 03/24/88 15:11:54 CH= "A" PS= 1.

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	96.187	0.42	6003994	02
2	2.347	0.61	146530	03
3	0.342	1.22	21332	01
4	0.23	1.67	14365	01
5	0.894	3.61	55793	01
TOTAL	100.		6242014	

SG6@4' soil

CHANNEL A INJECT 03/24/88 15:17:06



INPUT OVERRANGE AT RT= 0.42

MILL CR 03/24/88 15:17:06 CH= "A" PS= 1.

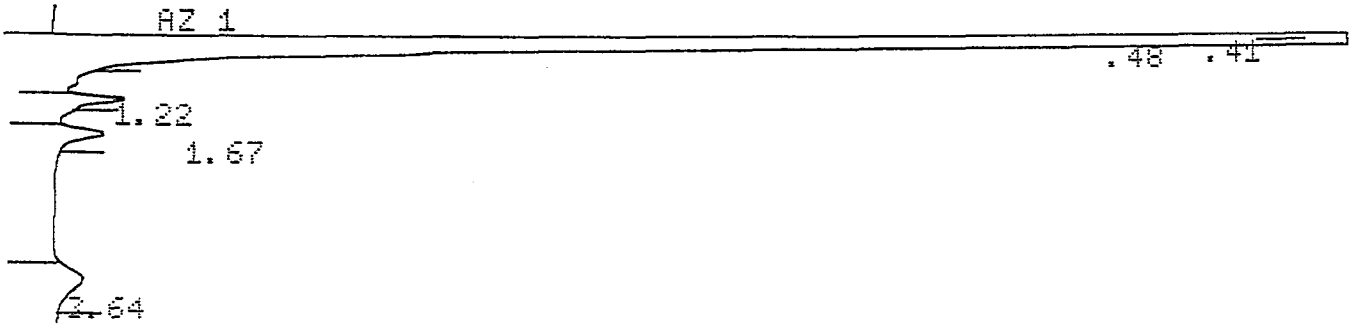
FILE 1. METHOD 0. RUN 32 INDEX 32

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	96.589	0.41	5334414	02
2	2.129	0.61	117572	03
3	0.31	1.22	17127	01
4	0.247	1.66	13616	01
5	0.725	3.59	40051	01
TOTAL	100.		5522780	

SG19@2.5' soil

CHANNEL A INJECT 03/24/88 16:01:40



MILL CR 03/24/88 16:01:40 CH= "A" PS= 1.

AR001118

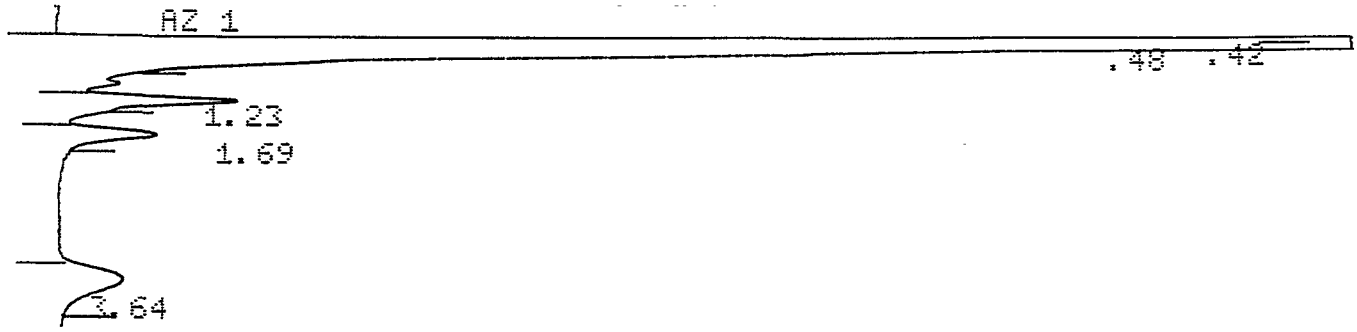
FILE 1. METHOD 0. RUN 33 INDEX 33

PEAK#	AREA%	RT	AREA	BC
1	47.113	0.41	1496772	02
2	51.092	0.48	1623181	03
3	0.474	1.22	15059	01
4	0.578	1.67	18374	01
5	0.743	3.64	23621	01
TOTAL	100.		3177007	

SG19@2.5' 500ml

AT= 16

CHANNEL A INJECT 03/24/88 16:06:30



MILL CR 03/24/88 16:06:30 CH= "A" PS= 1.

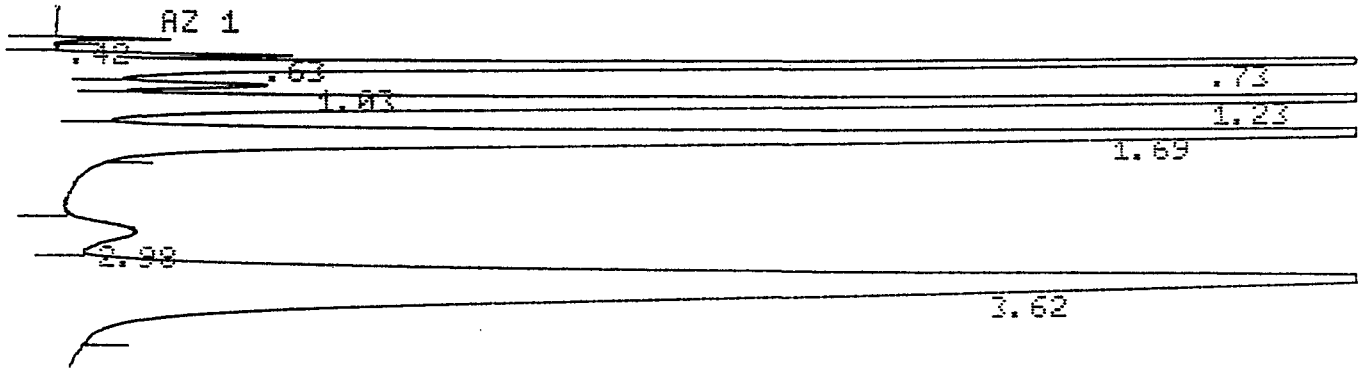
FILE 1. METHOD 0. RUN 34 INDEX 34

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	49.658	0.42	1665706	02
2	48.435	0.48	1624687	03
3	0.583	1.23	19564	01
4	0.523	1.69	17545	01
5	0.801	3.64	26881	01
TOTAL	100.		3354383	

Std F113 TCA TCE PCE 5ml

CHANNEL A INJECT 03/24/88 16:12:40



MILL CR 03/24/88 16:12:40 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 35 INDEX 35

ANALYST: T BODE

AR001119

1	0.23	0.42	4614	01
2	0.711	0.63	14267	02
3	21.907	0.73	439448	08
4	0.719	1.03	14421	06
5	19.111	1.23	383369	02
6	21.248	1.69	426239	03
7	1.243	2.98	24934	02
8	34.83	3.62	698681	03

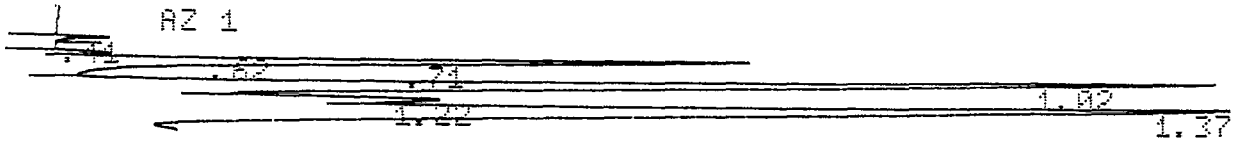
TOTAL 100. 2005973

AT= 32

Std CH_2Cl_2 $CHCl_3$ CCl_4 Smd

CHANNEL A INJECT 03/24/88 16:18:12

AZ 1



MILL CR 03/24/88 16:18:12 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 36 INDEX 36

ANALYST: T BODE

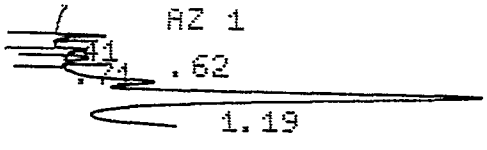
PEAK#	AREA%	RT	AREA	BC
1	0.489	0.41	4487	01
2	0.615	0.62	5643	02
3	14.405	0.71	132150	02
4	32.587	1.02	298946	02
5	9.063	1.22	83140	02
6	42.841	1.37	393013	03

TOTAL 100. 917379

Std 1,1 DCA Smd

CHANNEL A INJECT 03/24/88 16:20:08

AZ 1



MILL CR 03/24/88 16:20:08 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 37 INDEX 37

ANALYST: T BODE

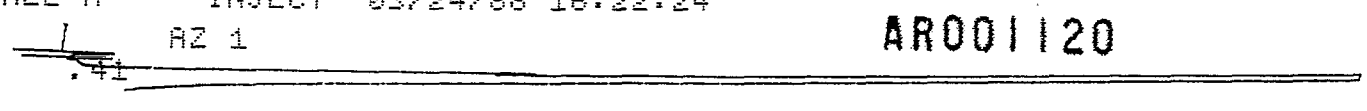
PEAK#	AREA%	RT	AREA	BC
1	2.247	0.41	4033	01
2	2.338	0.62	4195	02
3	2.956	0.71	5304	03
4	92.459	1.19	165914	03

TOTAL 100. 179446

Std 1,1 DCE Smd

CHANNEL A INJECT 03/24/88 16:22:24

AZ 1



AR001120

MILL CR 03/24/88 16:22:24 CH= "A" PS= 1.

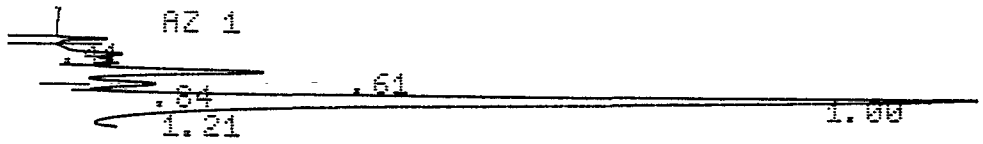
FILE 1. METHOD 0. RUN 38 INDEX 38

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.473	0.41	3502	01
2	95.441	0.68	706582	02
3	4.086	1.01	30249	03
TOTAL	100.		740333	

Std 1,2 DCA 5 ul

CHANNEL A INJECT 03/24/88 16:24:39



MILL CR 03/24/88 16:24:39 CH= "A" PS= 1.

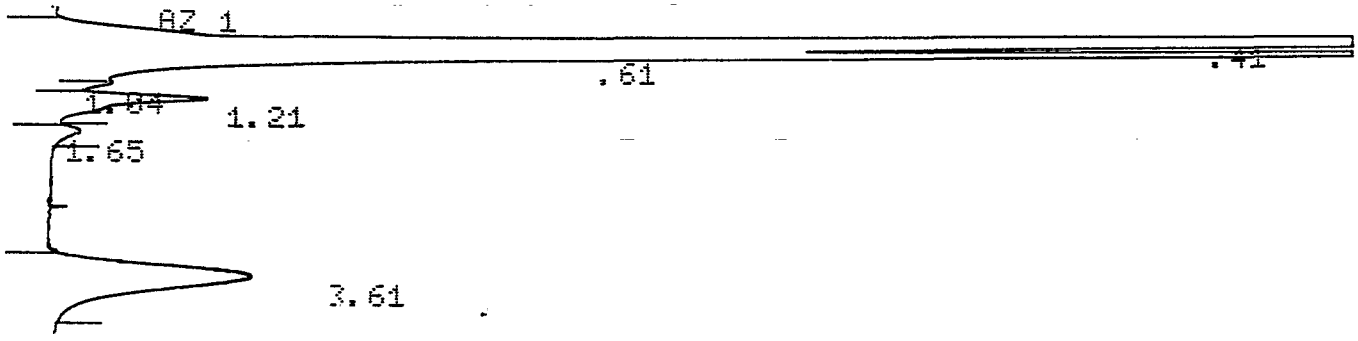
FILE 1. METHOD 0. RUN 39 INDEX 39

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	1.047	0.41	3887	01
2	4.142	0.61	15384	02
3	12.068	0.84	44818	02
4	3.239	1.	12030	02
5	79.504	1.21	295269	03
TOTAL	100.		371388	

SG09 @3' 500ul

CHANNEL A INJECT 03/24/88 16:27:49



INPUT OVERRANGE AT RT= 0.42

MILL CR 03/24/88 16:27:49 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 40 INDEX 40

ANALYST: T BODE

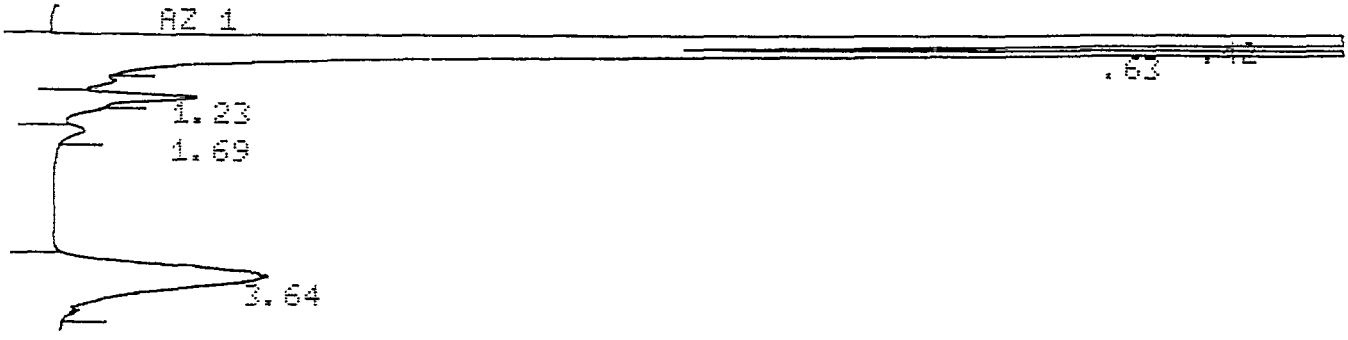
AR001121

PEAK# AREA% RT AREA BC

1	86.811	0.41	6121436 02
2	9.489	0.61	670631 02
3	0.241	1.04	17060 02
4	0.838	1.21	59245 03
5	0.114	1.65	8060 01
6	2.707	3.61	191297 01
TOTAL	100.		7067729

5609 @ 3' 500ml

CHANNEL A INJECT 03/24/88 16:32:38



INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 16:32:38 CH= "A" PS= 1.

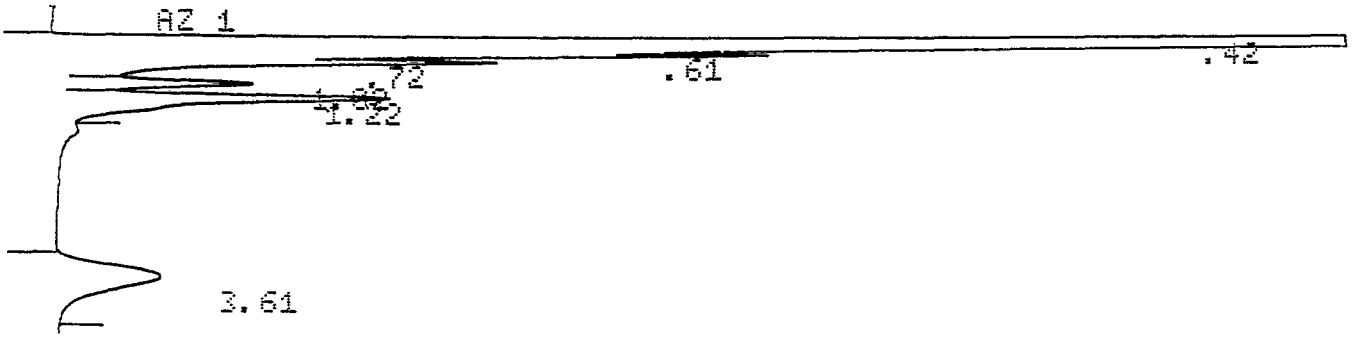
FILE 1. METHOD 0. RUN 41 INDEX 41

ANALYST: T BODE

PEAK#	AREA%	RT	AREA BC
1	87.743	0.42	6055433 02
2	8.824	0.63	608964 03
3	0.413	1.23	28520 01
4	0.117	1.69	8063 01
5	2.903	3.64	200340 01
TOTAL	100.		6901320

5626 @ 2' 500ml

CHANNEL A INJECT 03/24/88 16:57:19



INPUT OVERRANGE AT RT= 0.43

MILL CR 03/24/88 16:57:19 CH= "A" PS= 1.

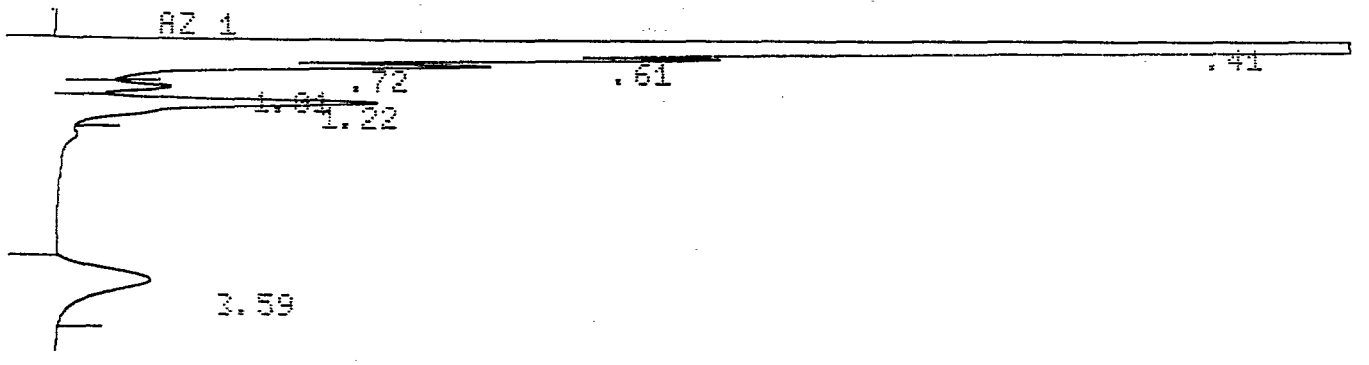
AR001122

FILE 1. METHOD 0. RUN 42 INDEX 42

PEAK#	AREA%	RT	AREA	BC
1	92.134	0.42	6327203	02
2	1.901	0.61	130552	02
3	1.814	0.72	124577	02
4	0.813	1.02	55817	02
5	1.906	1.22	130868	03
6	1.433	3.61	98389	01
TOTAL	100.		6867406	

SG26821
50ml

CHANNEL A INJECT 03/24/88 17:02:01



INPUT OVERRANGE AT RT= 0.42

TILL CR 03/24/88 17:02:01 CH= "A" PS= 1.

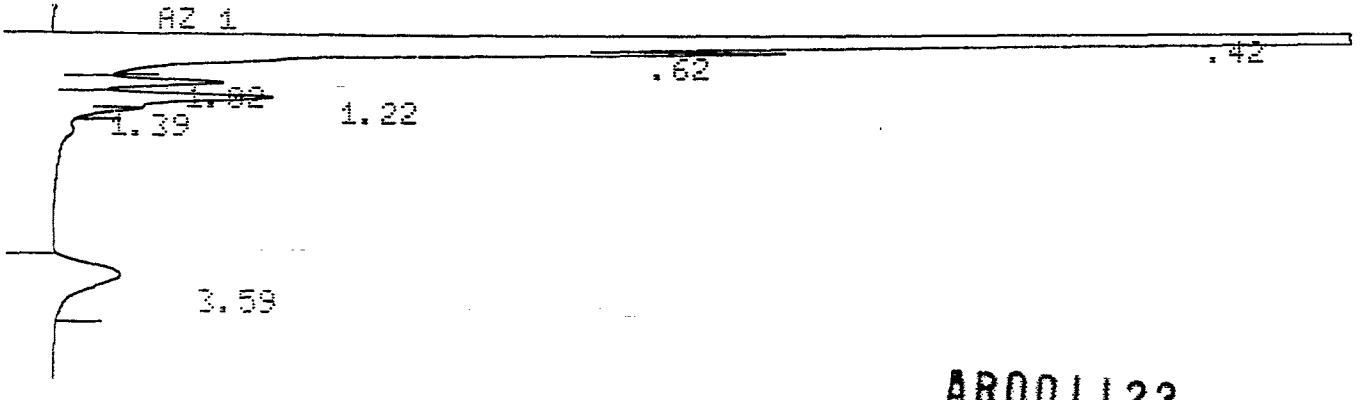
FILE 1. METHOD 0. RUN 43 INDEX 43

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	93.65	0.41	6022456	02
2	1.728	0.61	111153	02
3	1.464	0.72	94115	03
4	0.198	1.01	12750	02
5	1.574	1.22	101242	03
6	1.385	3.59	89091	01
TOTAL	100.		6430807	

PM air sample
1000 ml

CHANNEL A INJECT 03/24/88 17:07:00



MILL CR 03/24/88 17:07:00 CH= "A" PS= 1.

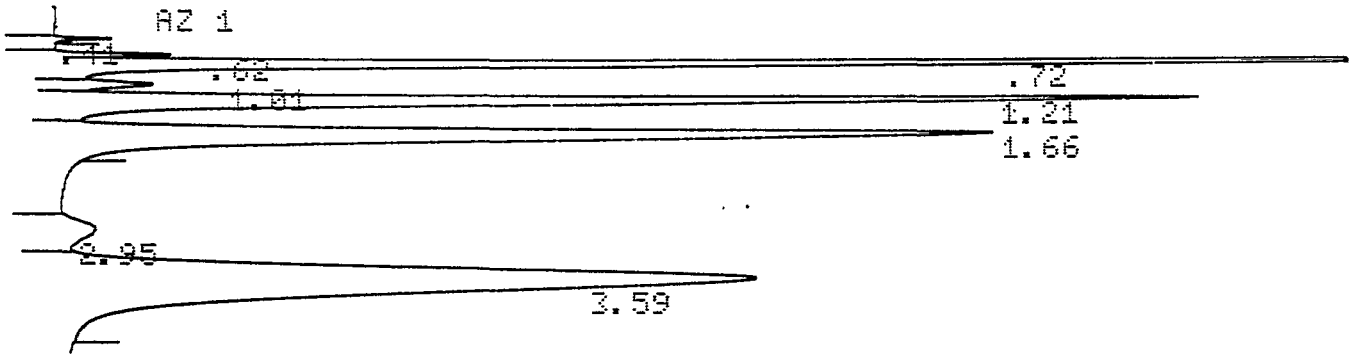
FILE 1. METHOD 0. RUN 44 INDEX 44

IALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	94.723	0.42	5959026	02
2	2.777	0.62	174710	03
3	0.415	1.02	26098	02
4	0.901	1.22	56688	02
5	0.189	1.39	11913	03
6	0.994	3.59	62540	01
TOTAL	100.		6290975	

Std F113 TCA TCE PCE 5ml

CHANNEL A INJECT 03/24/88 17:12:24



MILL CR 03/24/88 17:12:24 CH= "A" PS= 1.

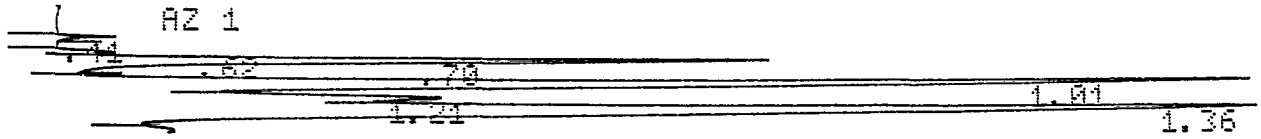
FILE 1. METHOD 0. RUN 45 INDEX 45

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.227	0.41	4490	01
2	0.726	0.62	14348	02
3	21.733	0.72	429329	08
4	0.677	1.01	13366	06
5	18.978	1.21	374915	02
6	21.216	1.66	419115	03
7	1.226	2.95	24213	02
8	35.217	3.59	695712	03
TOTAL	100.		1975488	

Std CH_2Cl_2 $CHCl_3$ CCl_4 5ml

CHANNEL A INJECT 03/24/88 17:17:21



MILL CR 03/24/88 17:17:21 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 46 INDEX 46

AR001124

PEAK#	AREA%	RT	AREA	BC
1	0.495	0.41	4636	01
2	0.688	0.62	6442	02
3	13.995	0.7	131110	03
4	32.377	1.01	303311	02
5	8.844	1.21	82853	02
6	43.601	1.36	408456	03
TOTAL	100.		936808	

Std 1,1 DCE 5ml

CHANNEL A INJECT 03/24/88 17:19:22

AZ 1

.41 .69 1.01

MILL CR 03/24/88 17:19:22 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 47 INDEX 47

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	0.506	0.41	3666	01
2	97.88	0.69	708890	08
3	1.614	1.01	11686	05
TOTAL	100.		724242	

Std 1,2 DCA 5ml

CHANNEL A INJECT 03/24/88 17:21:19

AZ 1

.41 .62 .84 1.01 1.21

MILL CR 03/24/88 17:21:19 CH= "A" PS= 1.

FILE 1. METHOD 0. RUN 48 INDEX 48

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	1.073	0.41	3845	01
2	1.039	0.62	3724	01
3	10.613	0.84	38028	02
4	7.541	1.01	27023	02
5	79.734	1.21	285708	03
TOTAL	100.		358328	

Std 1,1 DCA 5ml

CHANNEL A INJECT 03/24/88 17:23:10

AZ 1

.41 .62 .74 1.02 1.20

AR001125

FILE 1. METHOD 0. RUN 49 INDEX 49

ANALYST: T BODE

PEAK#	AREA%	RT	AREA	BC
1	1.921	0.41	3725	01
2	2.336	0.62	4531	02
3	3.299	0.71	6399	03
4	10.23	1.02	19841	02
5	82.214	1.2	159455	03
TOTAL	100.		193951	

APPENDIX 3

Tracer Research Corporation

DRAFT

SHALLOW SOIL GAS INVESTIGATION
AT A SITE IN
MILLCREEK, PENNSYLVANIA

DECEMBER, 1987

PREPARED FOR:

MALCOLM PIRNIE, INC.
S. 3515 Abbot Road
Buffalo, Ney York 14219

SUBMITTED BY:

Tracer Research Corporation

AR001128

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INTRODUCTION

A shallow soil gas survey was conducted by Tracer Research Corporation at a site in Millcreek, Pennsylvania. The investigation was conducted December 14, 15 and 16, 1987 under contract to Malcolm Pirnie, Inc. The main purpose was to delineate the subsurface distribution of volatile organic compounds.

For this survey, soil gas samples were taken and analyzed in the field. The following compounds were investigated:

1,2-Dichloroethane (1,2-DCA)
1,1,1-Trichloroethane (TCA)
Trichloroethene (TCE)

1,2-DCA and TCA co-eluted on the analytical column used in the field by Tracer Research Corporation. Therefore, the concentration reported for each compound is an upper and lower limit of the combined concentrations. The value reported for 1,2-DCA would be the upper limit and TCA the lower limit for the combined actual concentrations. Therefore, the sum of the actual 1,2-DCA and TCA concentrations will be between the two reported values. This analytical limitation was considered acceptable because the previous information indicated that 1,2-DCA was present in very high concentrations as compared to TCA. Subsqeuent analysis of samples splits analyzed by Tracer Research Corporation in the Tucson lab confirmed the presence of both 1,2-DCA and TCA.

1,1-dichloroethene, total (cis and trans) 1,2-dichloroethene and 1,1-dichloroethane were not detected at the Millcreek site during the on-site analyses. THe detection limit for the above compounds was approximately 0.01 µg/L. Chloroethane and vinyl chloride could not be measured during the field analyses.

BACKGROUND ON THE METHODOLOGY

The presence of volatile organic chemicals (VOCs) in shallow soil gas indicates the observed compounds may either be in the vadose zone near the probe or in groundwater below the probe. The soil gas technology is most effective in mapping low molecular weight halogenated solvent chemicals and petroleum hydrocarbons possessing high vapor pressures and low aqueous solubilities. These compounds readily partition out of the groundwater and into the soil gas as a result of their high gas/liquid partitioning coefficients. Once in the soil gas, VOCs diffuse vertically and horizontally through the soil to the ground surface where they dissipate into the atmosphere. The contamination acts as a source and the above ground atmosphere acts as a sink, and typically a concentration gradient develops between the two. The concentration gradient in soil gas between the source and ground surface may be locally distorted by hydrologic and geologic anomalies (e.g. clays, perched water); however, soil gas mapping generally remains effective because distribution of the contamination is usually broader in areal extent than the local geologic barriers and is defined using a large data base. The presence of geologic obstructions on a small scale tends to create anomalies in the soil gas-groundwater correlation, but generally does not obscure the broader areal picture of the contaminant distribution.

The results of a soil gas survey are generally used as a small part of an overall contaminant investigation. The most common use of the data obtained during a soil gas investigation is to more efficiently use conventional monitoring techniques such as soil borings and monitoring wells. The results commonly highlight areas that warrant further investigation and locate areas where, because of the lack of contaminants detected,

sampling densities could be decreased. This use of the soil gas as a preliminary survey technique eliminates the need for a "shotgun" approach for the placement of conventional samples. The over all result is a time and cost savings by eliminating unneeded samples. The results from a soil gas survey almost never preclude further, conventional monitoring techniques.

SAMPLING AND ANALYTIC PROCEDURES

Tracer Research Corporation utilized an analytical field van which was equipped with two gas chromatographs and two Spectra Physics SP4270 computing integrators. In addition, the van has two built-in gasoline powered generators which provide the electrical power (110 volts AC) to operate all of the gas chromatographic instruments and field equipment. A specialized hydraulic mechanism consisting of two cylinders and a set of jaws was used to drive and withdraw the sampling probes. Probes consist of 7-foot lengths of 3/4 inch diameter steel pipe which are fitted with detachable drive points. A hydraulic hammer was used to assist in driving probes past cobbles and through unusually hard soil.

Soil gas samples were collected by driving a hollow steel probe to a depth between 1.5 and 6 feet into the ground. Soil gas samples were not taken when saturated conditions were encountered at a depth less than 1.5 feet. The above-ground end of the sampling probes were fitted with a steel reducer and a length of polyethylene tubing leading to a vacuum pump. Five to 10 liters of gas was evacuated with a vacuum pump. During the soil gas evacuation, samples were collected by inserting a syringe needle through a silicone rubber segment in the evacuation line and down into the steel probe. Ten milliliters of gas were collected for immediate analysis in the TRC analytical field van. Soil gas was subsampled (duplicate injections) in volumes ranging from 1 µL to 2 mL, depending on the VOC concentration at any particular location.

A gas chromatograph equipped with an electron capture detector was used for analyses of 1,2-DCA, TCA and PCE. Nitrogen was used as the carrier gas.

Detection limits are a function of the injection volume as well as the detector sensitivity for individual compounds. Thus, the detection limit varies with the sample size. Generally, the larger the injection size the greater the sensitivity. However, peaks for compounds of interest must be kept within the linear range of the detector. If any compound has a high concentration, it is necessary to use small injections, and in some cases to dilute the sample to keep it within linear range. This may cause decreased detection limits for other compounds in the analyses. The detection limits range down to 0.00005 µg/L for compounds such as TCA depending on the conditions of the measurement, in particular, the sample size. If any component being analyzed is not detected, the detection limit for that compound in that analysis is given as a "less than" value (e.g. <0.0001 µg/L). This number is calculated from the current response factor, the sample size, and the estimated minimum peak size (area) that would have been visible under the conditions of the measurement.

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Tracer Research Corporation's normal quality assurance procedures were followed in order to prevent any cross-contamination of soil gas samples.

- Steel probes are used only once during the day and then washed with high pressure soap and hot water spray or steam-cleaned to eliminate the possibility of cross-contamination. Enough probes are carried on each van to avoid the need to reuse any during the day.

- Probe adaptors (steel reducer and tubing) are used once during the course of the day and cleaned at the end of each working day by baking in the GC oven. The tubing is replaced periodically as needed during the job to insure cleanliness and good fit.

- Silicone tubing (connecting the adaptor to the vacuum pump) is replaced as needed to insure proper sealing around the syringe needle. This tubing does not directly contact soil gas samples.

- Glass syringes are usually used for only one sample per day and are washed and baked out at night. If they must be used twice, they are purged with carrier gas (nitrogen) and baked out between probe samplings.

- Septa through which soil gas samples are injected into the chromatograph are replaced on a daily basis to prevent possible gas leaks from the chromatographic column.

- Analytical instruments are calibrated each day by the use of chemical standards prepared in water by serial dilution from commercially available pure chemicals. Calibration checks are also run after approximately every five soil gas sampling locations.

- 2 cc subsampling syringes are checked for contamination prior to sampling each day by injecting nitrogen carrier gas into the gas chromatograph.

- Prior to sampling each day, system blanks are run to check the sampling apparatus (probe, adaptor, 10 cc syringe) for contamination by drawing ambient air from above ground through the system and comparing the analysis to a concurrently sampled air analysis.

- All sampling and 2 cc subsampling syringes are decontaminated each day and no such equipment is reused before being decontaminated. Microliter size subsampling syringes are reused only after a nitrogen carrier gas blank is run to insure it is not contaminated by the previous sample.

- Soil gas pumping is monitored by a vacuum gauge to insure that an adequate gas flow from the vadose zone is maintained. A negative pressure (vacuum) of 2 in. Hg less than the maximum capacity of the pump (evacuation rate >0.02 cfm) usually indicates that a reliable gas sample cannot be obtained because the soil has a very low air permeability.

RESULTS

A total of 39 soil gas samples were taken and analyzed during the investigation of the Millcreek site. At six locations soil gas samples could not be extracted due to saturated conditions at a depth of less than 1.5 feet. Analytical results are condensed in Appendix A.

The results obtained by NUS Corporation, PADER and ERT (November 1982 through September 1984) from subsurface soil and groundwater samples suggest that there is widespread volatile organic compound contamination underlying the Millcreek site. The greatest density of VOC's were detected in the vicinity of Marshall's Run in the eastern portion of the site. The predominant compound detected was 1,2-dichloroethene. Based on these results it was expected that Tracer Research Corporation would detect fairly high concentrations of 1,2-dichloroethene and other volatiles in the vicinity of Marshall's Run, where the NUS report outlined a groundwater contamination plume. Soil gas samples taken in the area of the suspected plume did not confirm the presence of
underlying groundwater or soil contamination or identify a source of contamination which may be causing the groundwater contamination.

The soil gas vapor concentrations were much lower than expected based on the groundwater data collected from previous investigations. Several factors may be responsible for the low soil gas values. Several mechanisms decrease concentrations of contaminant vapors in the vadose zone. Infiltration of clean water onto contaminated water will cause a contaminant plume to sink. Infiltration produces a layer of clean water that will become a barrier to the upward migration of contaminant vapors preventing them from being detected in the shallow soil gas. Biological degradation and the natural depletion of vapors due

diffusion into the atmosphere are other mechanisms to deplete the concentration of vapors above a contaminant plume. The hydrologic setting and age of the contaminant plume are probably responsible for the poor correlation with the data from the previous investigations.

Although the concentrations detected over most of the Millcreek site were relatively low, the strict adherence of the Tracer Research Corporation field crew to the Quality Assurance/Quality Control plan and the standard sampling and analysis techniques, assures that the data obtained is representative of the present conditions in the shallow soil gas underlying the Millcreek site.

The presence of very low concentrations over the entire site is evidence that degradation, the natural depletion of vapors to the atmosphere and clean water overlying the contaminated aquifer impacted the concentrations of volatiles in the shallow soil gas. In areas where there is significant groundwater contamination, residual soil contamination from the source is almost always detected using the soil gas. The residual soil contamination of a source that has caused groundwater contamination is often detectable as far as 500 feet away from the point of the source. The fact that no such source was detectable during the December 1987 soil gas investigation is evidence that the mechanisms discussed above which cause decreased concentrations of contaminant vapors are the reasons that the soil gas survey does not correlate with the previous sampling efforts.

TCE Distribution

The highest concentrations were detected at sampling locations SG-11 and SG-21 (1 µg/L). Elevated concentrations of TCE are apparent in two main areas. One area is centered in the

vicinity of monitoring wells MW-23, the other near soil gas samples SG-10 and SG-11. Confirming samples in these two areas would identify the source of elevated concentrations as either low level soil contamination, groundwater contamination or a combination of soil and groundwater contamination.

1,2-DCA/TCA Distribution

Elevated concentrations of 1,2-DCA/TCA were detected in three main areas. These three areas include the area on site in the vicinity of the test pits and west to Marshall Drive, the southern end of the estimated DCE plume and down gradient to the north of the estimated plume. The level of contamination detected in these areas, 0.02 µg/L to 4 µg/L as DCA or 0.002 µg/L to 0.03 µg/L as TCA, may indicate either low level soil contamination or underlying groundwater contamination. Further soil and groundwater sampling would identify the source of contaminant vapors detected in the soil gas.

CONCLUSIONS

The results of this survey indicate that there are several areas containing slightly elevated concentrations of TCE and 1,2-DCA/TCA. Conventional soil and groundwater samples on site in the test pit area, within the estimated plume, and downgradient from the estimated plume would indicate if the elevated concentrations detected in the soil gas reflect low level soil contamination, underlying groundwater contamination or a combination of soil and groundwater contamination.

AR001140

APPENDIX A: CONDENSED DATA

AR001141

MALCOLM PIRNIE/MILL CREEK, PENNSYLVANIA

Sample	Depth	Date	DCA (ug/l)	TCA (ug/l)	TCE (ug/l)
S601	3'	12/14	1	0.01	0.0003
S602	2'	12/14	0.4	0.004	<0.0003
S603	3'	12/14	1	0.01	0.0004
S604	3.5'	12/14	0.2	0.002	0.005
S605	2'	12/14	0.4	0.003	0.004
S606	3.5'	12/14	1	0.009	0.0004
S607	5'	12/15	0.1	0.0008	0.0007
S608	6'	12/15	0.6	0.004	0.006
S609	4'	12/15	0.2	0.001	0.0008
S610	3'	12/14	0.7	0.006	0.6
S611	5'	12/14	0.8	0.007	1
S612	5'	12/14	2	0.02	0.002
S613	4'	12/14	3	0.02	0.007
S615	4.5'	12/16	0.07	0.0006	0.0002
S617	6'	12/15	0.1	0.0007	0.0002
S618	5'	12/15	0.08	0.0006	0.6
S619	6'	12/15	0.2	0.002	0.002
S621	4'	12/14	0.1	0.001	1
S622	5'	12/15	0.03	0.0002	0.0002
S623	5'	12/15	0.02	0.0001	0.0006
S624	4'	12/15	0.02	0.0001	0.0001
S625	3'	12/15	0.03	0.0002	<0.0001
S627	2'	12/16	0.06	0.0005	0.0002
S630	2.5'	12/16	0.01	0.00008	0.02
S631	4'	12/16	0.02	0.0001	0.0006
S632	4'	12/16	0.003	0.00002	0.001
S633	1.5'	12/16	0.06	0.0004	0.01
S634	3'	12/16	0.05	0.0004	0.0001
S635	5'	12/15	1	0.008	0.08
S636	4'	12/15	0.09	0.0007	0.0001
S637	5.5'	12/15	0.02	0.0002	0.0001
S638	6'	12/15	0.04	0.0004	<0.0001
S639	5'	12/15	4	0.03	0.001
S640	5.5'	12/15	0.2	0.002	<0.0001

Tracer Research Corporation

Notations:
I interference with adjacent peaks
NA [illegible]t analyzed

Analyzed by S. Cherba

Checked [illegible]S. Camp

Proofed [illegible] L. Laplander

AR001142

MALCOLM PIRNIE/MILL CREEK, PENNSYLVANIA

Sample	Depth	Date	DCA (ug/l)	TCA (ug/l)	TCE (ug/l)
SG41	5'	12/15	0.2	0.001	0.0002
SG42	5.5'	12/15	0.4	0.003	0.0006
SG43	5'	12/15	0.02	0.0002	<0.0001
SG44	4'	12/16	0.06	0.0005	0.1
SG45	2'	12/16	0.08	0.0006	0.0006

Tracer Research Corporation

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by S. Cherba

Checked by S. Camp

Proofed by L. Laplandre