FMC Corporation

Agricultural Chemical Group
1701 East Patapsco Avenue Box 1616
Baltimore Maryland 21203
(301) 355 6400

ORIGINAL
(Red)

FMC

SDMS DocID 2205014

July 20, 1983

Mr. Neil Swanson
Environmental Scientist
Waste Management Section
Air and Waste Management Division (3AW22)
USEPA, Region III
6th and Walnut Streets
Philadelphia, PA 19106

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Dear Mr. Swanson:

This is in further response to EPA Region III's letter dated June 15, 1983 concerning information relative to the possible formation of dioxins at the FMC Corporation's Baltimore facility. Below please find our reply to the six questions contained in Attachment II to EPA's letter. The information provided is based upon a review of available records and/or discussions with plant employees. As you know from previous discussions, the manufacturing of tetradifon at the Baltimore Plant, discussed below, ceased thirteen (13) years ago. Accordingly, the information we have on this subject, at this time, is very limited. Nevertheless, from a thorough search of the literature and evaluation of the FMC tetradifon process, the consensus opinion of our knowledgeable chemists is that it is highly unlikely that "dioxin" could be produced under normal or upset conditions.

Question 1

The only known substance listed on Attachments III and IV of EPA Region III's letter that has been produced, stored, processed or disposed of at the FMC Baltimore Plant is tetradifon (FMC Corporation trademark - Tedion®). This material was a product (acaricide, insecticide) produced at two separate locations on the Baltimore Plant property - Buildings 91 and 52 (See locations highlighted on Attachment I).

Production at Building 91 was started on December 10, 1957 and continued, probably on a periodic basis, until startup of full production at Building 52. Production at Building 52 began about 1959-60 and continued until May, 1970.

We have located no records which identify where this material was actually stored. It is believed, however, that material would probably have been stored at the warehouse location Building 16 - (See location highlighted on Attachment I).

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The only aqueous wastestream we are aware of is a stream referenced in an old operations manual for tetradifon production at Building 52. This Building 52 wastestream was sent to a waste pond (which is no longer in existence) located south of the Building (See Attachment I). We cannot, of course, exclude the possibility that other wastestreams could have been present. During operations at Building 91 it is believed that wastewater was eventually sewered.

Question II

Building 91 was a pilot/semi-works plant where tetradifon was initially produced for field testing and evaluation. The method of production is described in enclosed Attachment II of this letter. While production records at Building 91 are unclear we have documented production of 149,000 pounds from December, 1957 through July, 1958. This plant was used to pilot development of various organic chemicals and pesticides. Currently this facility is used to produce Pounce®, a pesticide, production of which began in 1977. It is believed that all wastewater from the manufacture of tetradifon at Building 91 was pumped to storage tanks for alcohol recovery and the remaining liquid sewered. We have located no records showing the quantities of aqueous waste which resulted from the production of tetradifon at Building 91. However, based on the production rate and the method of production described in Attachment II, we would "guesstimate" it to be less than 400 lb/hr.

Building 52 was a full scale production facility used to produce tetradifon from around 1959-60 thru 1970. (The amounts of production for these years are listed on Attachment III). The method of production is described on enclosed Attachment IV. After 1970, Building 52 was used to produce other organic chemicals, insecticides and a flame retardant. During 1979, Building 52 was razed and all demolition material sent to an unknown disposal site. Process equipment from Building 52 was scrapped by American Wrecking Company, Inc. of Baltimore, Maryland which we understand is no longer in business. The Building 52 location is now a permitted RCRA hazardous waste storage facility which is concrete paved, curbed, and fenced. The majority of the aqueous waste from tetradifon production at Building 52 was placed into a waste pond on site at an estimated rate of 900 lb/hr. Periodically, liquid from this pond overflowed into Curtis Bay when severe rainstorms occurred. The area in which this waste pond is located is now a chemical manufacturing site. We understand that the old waste pond area was excavated prior to construction of the new organic chemical production facility in 1975. The excavated material is believed to have been disposed at the Solley Road Landfill in Anne Arundel County, Maryland.

The Building 16 storage warehouse referenced in Question 1, above, is still being utilized for raw material and equipment storage.

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Question 3:

See Attachment V for a listing of employees who may have worked at the sites at the time tetradifon (Tedion®) was produced.

Question 4:

At the time of tetradifon production there was a medical surveillance program in effect for tetradifon workers in which chest x-rays, bloodwork, and urine analysis were done. Our plant records contain the individual employee medical records from this program. We do not, however, interpret EPA's request for "health and/or medical studies" to include an individual employee's medical records, especially where such records have never, to our knowledge, been grouped for purposes of comparison and analysis.

A general epidemiological study of the FMC Baltimore Plant was conducted in 1977 by Dr. Shindell and Associates of Milwaukee, Wisconsin. The study was not limited to employees involved in tetradifon production and did not specifically identify the population associated with such production. Thus, we do not feel that this is relevant to your inquiry but would release it to you if appropriate.

Question 5

The only known sampling relating to "a dioxin related compound" (i.e. tetradifon) are the soil samples shown in Attachments VI, VII, VIII.

Question 6:

We have identified no documents, reports, or plans relating to the disposition and closure of any of the properties listed in Question 1.

If you have any further questions in this regard, please do not hesitate to contact me as the environmental contact for the Baltimore Plant.

Sincerely yours,

D. W. Palmer

D. W. Palmer
Environmental Manager

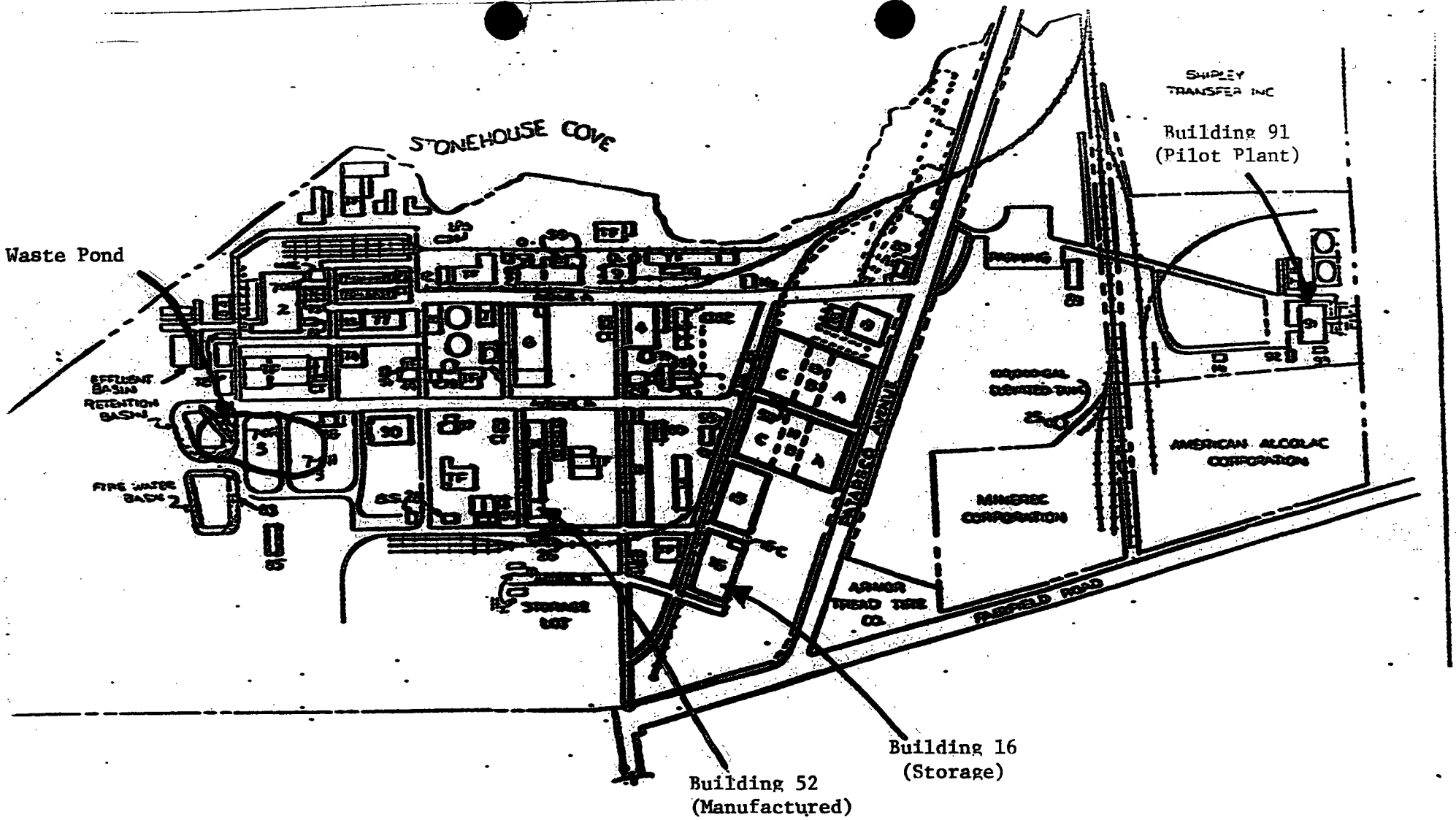
DWP:ct

cc: Elkins W. Dahle, Jr.
City of Baltimore
Health Department
Bureau of Industrial Hygiene
111 North Calvert Street
Baltimore, Maryland 21202

Art Caple
State of Maryland
Office of Environmental Programs
201 W. Preston Street
Baltimore, Maryland 21201

Attn: Joseph Stang

Attachment I



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FMC BALTIMORE PLANT 7/20/85

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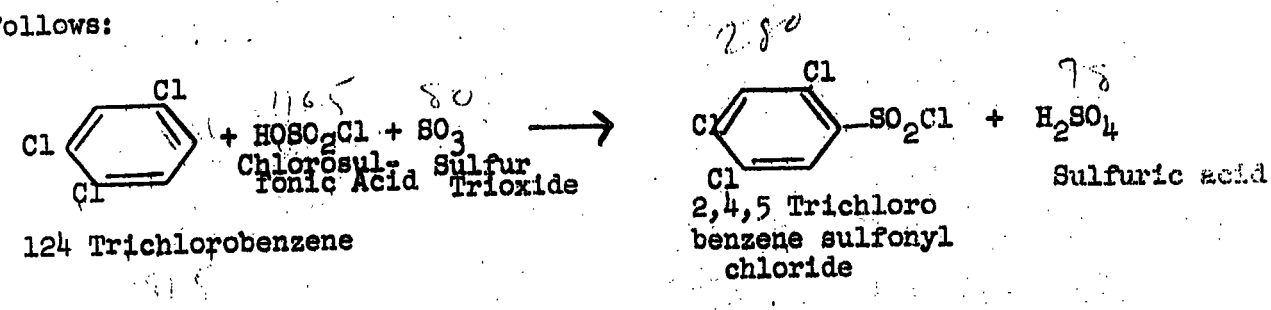
EXPERIMENTAL

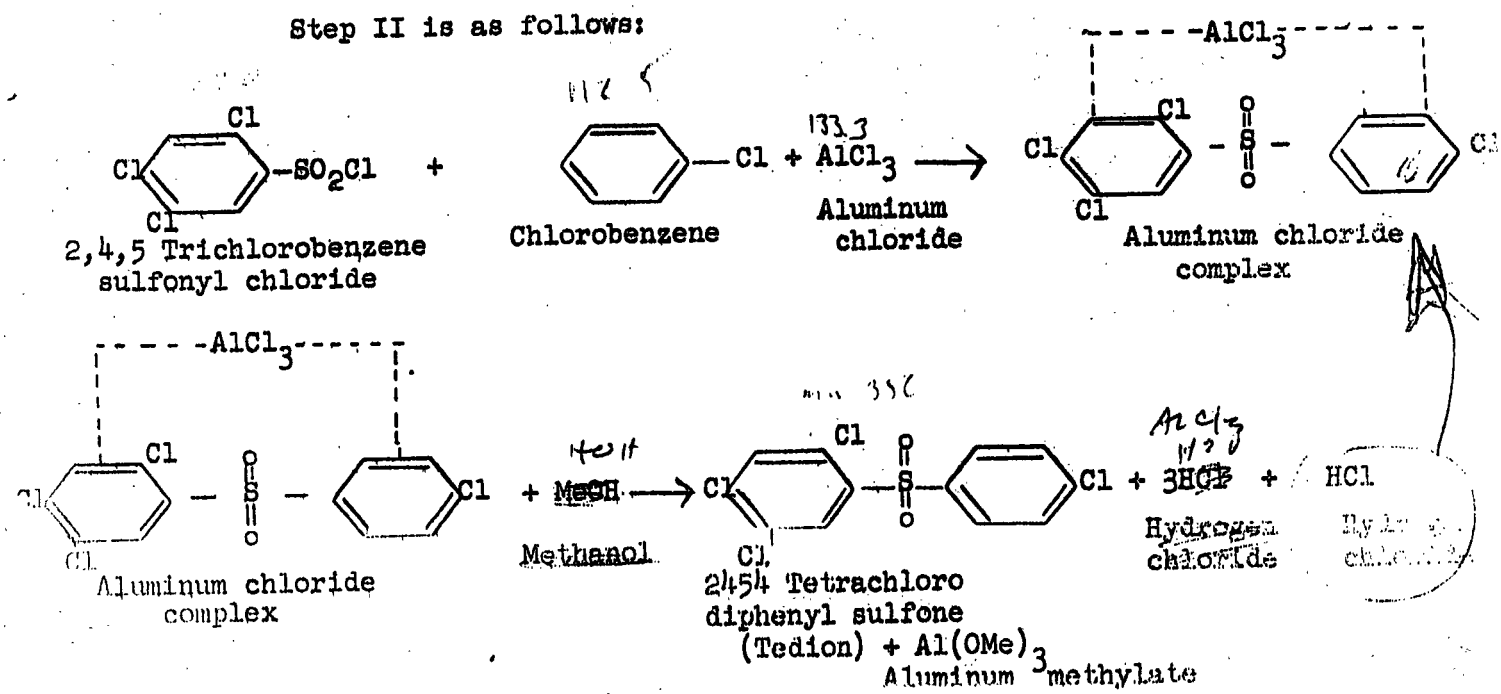
Process Description

The process for producing 2,4,5,4 Tetrachlorodiphenyl sulfone (hereafter called Tedion) is composed of two distinct chemical steps. Step I is as follows:



One mole of 1,2,4 Trichlorobenzene is added to 2.2 to 2.5 moles of chlorosulfonic acid which contains 1.0 moles of free sulfur trioxide. The TCB is added rapidly to a stirred kettle containing the acid mixture at room temperature. The temperature is allowed to rise to 70-80°C. and held for 1 hour. The reaction mixture is then cooled to 30-35°C. and acid is diluted to 35-40% with water keeping the temperature below 100°C. After quenching the agitator is stopped and the product is separated as a melt (lower phase). During the separation both layers are kept between 70-80°C. because the product has a melting point of 65-68°C. The product (2,4,5 trichlorobenzene sulfonyl chloride) is then used in Step II and the spent acid discarded. The yield is 70-80% based on the TCB.

Step II is as follows:



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One mole of Trichlorobenzene sulfonyl chloride, ~~1.2~~ 1.3 moles of aluminum chloride and 2 moles of monochlorobenzene are reacted at 100-130°C in a stirred vessel to form the aluminum chloride complex of Tedion. This reaction is carried out as rapidly as possible and the hydrogen chloride evolution is vigorous. The complex is then quenched in a large excess of methanol (600 ml/gm mole of sulfonyl chloride) to give Tedion hydrogen chloride and aluminum methylate. Tedion crystallizes from this methanol mixture as a fine granular solid. It is washed by decantation with two portions of methanol (approximately 400 ml/gm mole of sulfonyl chloride used) and filtered. The Tedion crystalls are dried in a vacuum oven to yield 0.45 to 0.60 moles of Tedion with a melting point of 146-149°C.

Attachment III

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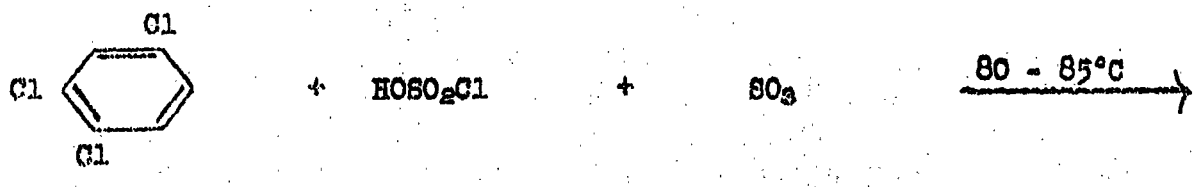
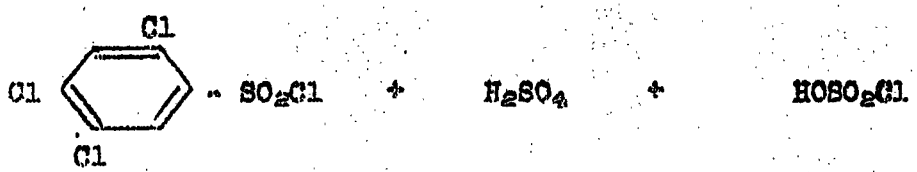
TEDION PRODUCTION DATA

1957	Semi-works started at Building 91 approx. 20k #/mo.
1959	619,064 lbs
1960	954,554
1961	663,250
1962	1,291,000
1963	1,030,750
1964	854,700
1965	777,000
1966	No Production
1967	304,250
1968	104,500
1969	105,750
1970	249,500
1971	Budget 200k # -- 22 wks -- no evidence of production
1972	Cost Center no longer existed

1. Synthesis of 2,4,5 Trichlorobenzenesulfonyl Chloride

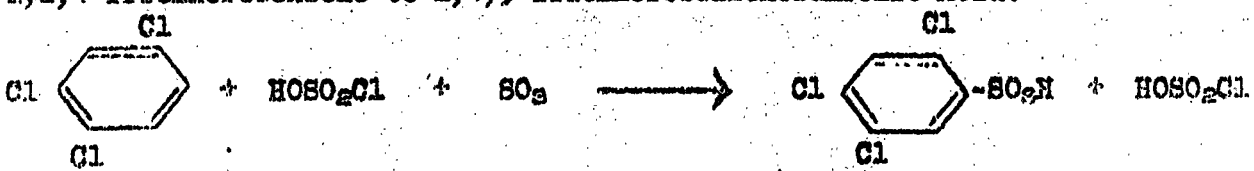


1,2,4 Trichlorobenzene M.W. = 181.5 | Chlorosulfonic Acid M.W. = 116.5 | Sulfur trioxide M.W. = 80



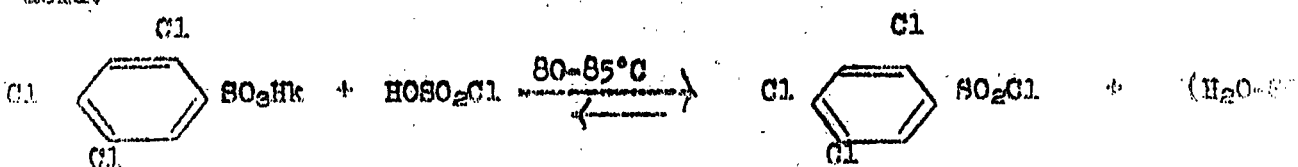
2,4,5 Trichlorobenzene Sulfonyl Chloride M.W. = 280.0 | Sulfuric Acid M.W. = 98.0 | Chlorosulfonic Acid excess

This reaction takes place in two steps, even though these steps may both occur at the same time. The first step is the conversion of the 1,2,4 Trichlorobenzene to 2,4,5 Trichlorobenzenesulfonic Acid:



1,2,4 Trichlorobenzene | Chlorosulfonic Acid | Sulfur Trioxide | 2,4,5 Trichlorobenzenesulfonic Acid | Chlorosulfonic Acid

The second step is an equilibrium between 2,4,5 Trichlorobenzenesulfonic Acid and the product 2,4,5 Trichlorobenzenesulfonyl Chloride. The equilibrium is driven to the product side by heat and excess chlorosulfonic acid.



2,4,5 Trichlorobenzenesulfonic Acid | Chlorosulfonic Acid | 2,4,5 Trichlorobenzene sulfonyl Chloride | Sulfuric Acid

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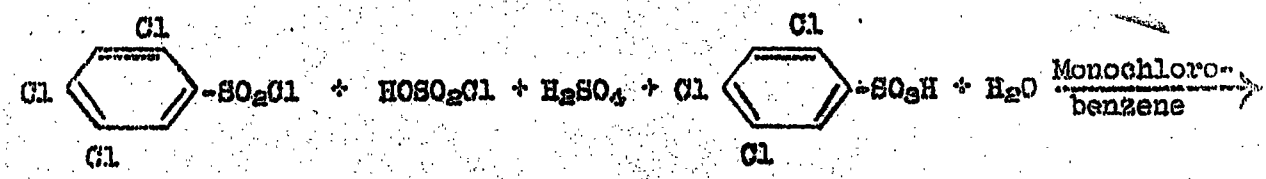
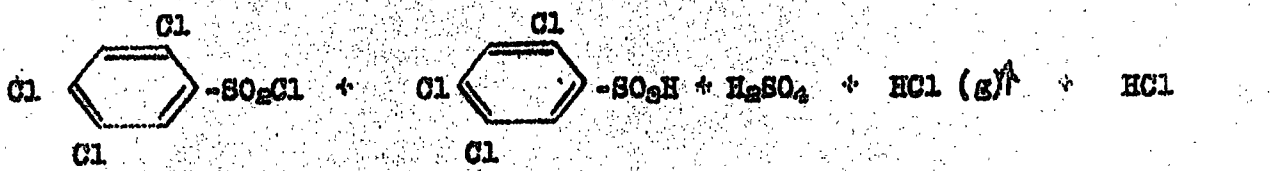
2. Quench of 2,4,5 Trichlorobenzene Sulfonyl Chloride.



2,4,5 Trichlorobenzene Sulfonyl Chloride M.W. = 280.0	Chloro-Sulfonic Acid M.W.=116.5	Sulfuric Acid 98.0	2,4,5 Trichlorobenzene Sulfonic Acid M.W. = 261.5	Water M.W. = 18.0



2,4,5 Trichlorobenzene Sulfonyl Chloride M.W. = 280.0	2,4,5 Trichlorobenzene Sulfonic Acid M.W. = 261.5	Sulfuric Acid MW98.0	Hydrogen Chloride M.W. = 36.5	Hydrochloric Acid M.W. - 36.5

This quench is to break down the excess chlorosulfonic acid with water to form the hydrochloric and sulfuric acids, and to wash out the 2,4,5 Trichlorobenzenesulfonic acid. The monochlorobenzene is used to offer some protection to the 2,4,5 Trichlorobenzenesulfonyl chloride from hydrolysis back to the 2,4,5 trichlorobenzene sulfonic acid. This hydrolysis is promoted by agitation (surface contact), heat, time, and weak acid. Of the hydrogen chloride formed, approximately 65% is retained in the waste acid phase, the balance being released to the HCl absorber.

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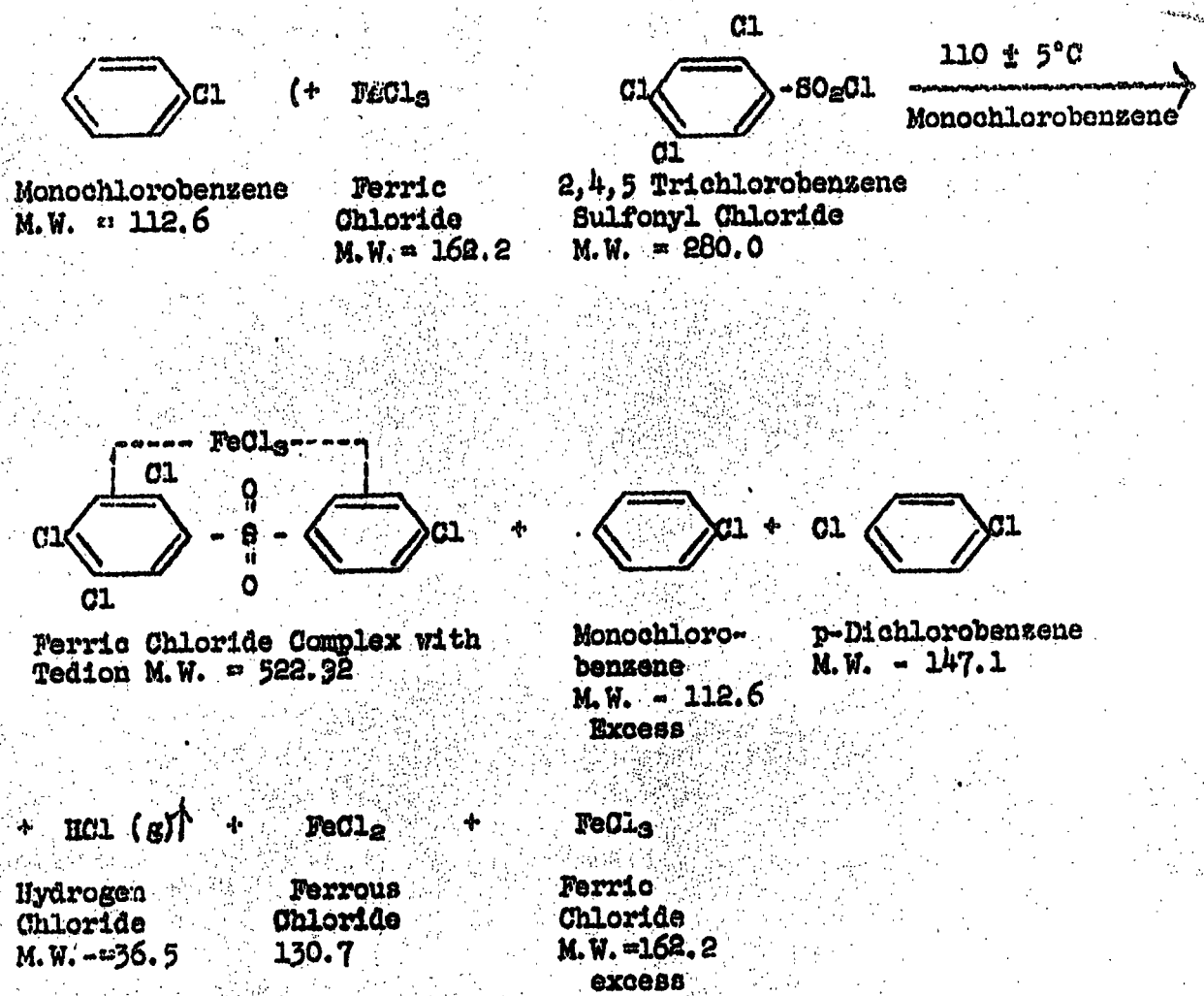
3. Synthesis of Tedion.



The reaction is essentially instantaneous as the 2,4,5 Trichlorobenzene sulfonyl chloride is metered into the ferric chloride, monochlorobenzene slurry at 110°C. The reaction is exothermic, so that no heat need be added after initiation. The cooling effect due to the evaporation of hydrogen chloride-monochlorobenzene, balances the excess heat of reaction so that no cooling is needed.

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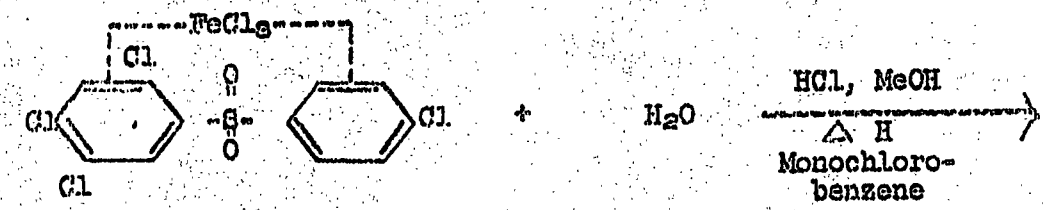
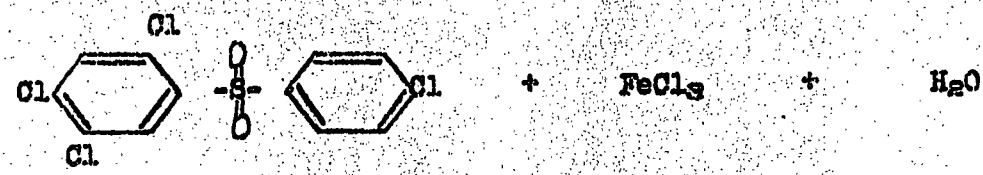
4. Quench of the Ferric Chloride-Tedion Complex.



Ferric Chloride Complex with
Tedion M.W. = 522.32



Tedion. 2,4,5 Trichlorodiphenyl sulfone. M.W. = 356.2

Ferric Chloride M.W. = 162.2

Water M.W. = 18

The acid water breaks the ferric chloride complex of Tedion, the Tedion then going into solution in the chlorobenzenes. The methanol decreases surface tension making the subsequent separation less difficult. Nearly all the impurities (ferric and ferrous chlorides, hydrochloric acid, methanol) go out with the water phase. The iron chlorides have an approximate concentration of 25% in the waste water phase.

Attachment V

POSSIBLE EXPOSURE TO TEDION

ORIGINAL (Red)

Allman J.

Allman R.

Barker B.

Brock K.

Bennett B

Bennett J.

Billings H.

Blisard J.

Booker G.

Broger C.

Brown W.

Burnett L.

Carter E.

Chojnowski E.

Clements W.

Cole W.

Crotty R.

Dernderfer H.

Driggers T.

Evans D.

Ey W.

Floyd E.

Galliher B.

Gavin D. Sr.

Grem M.

Cooper C. R.

Cotton J.

Crosbie H.

Davis D.

Debuon R.

Discus G. A.

Diggs W. F.

Dolle J. H.

Emerich W.

Floyd M.

Frederick L. H.

Fryberger F.

Gaines S.

Gibson C. W.

Gill R. R.

Gischel E. G.

Goodhand W.

Hammel L.

Hammonds J.

Hancock B.

Hardy L.

Haske A.

Hause G. W.

Heath J. E.

Hildebrand C.

Hill J.

Ingerson T. N.

Insley M. C. Jr.

ORIGINAL (Red)

Sledgesky M

Souther B. L.

Squires B. L.

Stalling J.

Sterling C.

Stevens V.

Stryzewski J.

Sykes C. J.

Velenovsky J.

Volrath L.

Williford D.

Wolfe C.

Wolfrom E.

Zepp M. H.

Zepp M. F. Jr

Zink C. J.

ORIGINAL (Red)

Jirecek C.

Johansen J.

Kaloc E.

Kaminski A. E.

Keeling L.

Kellogg E. C. Sr.

Kern W.

Kline L. G.

Kouns B. M.

Landon C. L.

LeCompte C. E.

Lloyd A.

Laber H. J.

Malarkey M. F.

McCartney A. J.

Meadows R. L.

Meiser E.

Meyer L. C.

Messina R.

Muraoka C

Neser J. J.

Norton C.

Payton P.

Robinson R

Reynolds O.

Sczepkowski J. F.

Shewbridge E. E.

Simon F. M.

ORIGINAL (Red)

Helms R.

Hill W.

Hilseberg A.

Hively H.

Hoover W.

Horgan D.

Hux B.

Jones W.

Kelley R.

Kennear A.

Kolodziejski C.

Kusiak C.

LaMartina J.

Lease F.

Leiben G.

Lemon A.

Lyons D.

MacDonald G.

Malec P.

Meyers F.

Miller K.

Mills B.

Newman D.

O'Brocki B. Sr.

O'Connor W.

Parkes C.

Paulley C.

Peltz W.

ORIGINAL (Red)

Peterson F.

Price T.

Redmond V.

Reynolds E.

Rogers D.

Schrecengost F.

Shanta A.

Slusher W.

Smith C.

Smith G.

Stewart W.

Thibault R.

Upton W.

Walter W.

Watkins N.

Webb C.

White A.

Wicker J.

Witkoski J.

Wolfe R.

Yanchuck A.

Zittle J.

ORIGINAL (Red)

Arnold D. K.

Arrington M.

Ault A. K.

Austin J. W. Jr.

Austin W. L.

Baldwin M. A.

Barbish T. J. Jr.

Barner A. E.

Bartlett E. E.

Basham B. L.

Bass R. K.

Bennett A. L.

Billings H J.

Bishop J.

Blackman C.

Blain K.

Blevins C. W.

Bouchat F. F.

Branchenburg L.

Britt W. F.

Britton D. L.

Burke T. F.

Butner A. N.

Byrnes A. R.

Campbell R.

Carpenski J. A.

Carter J. L.

ORIGINAL (Red)

Catterton M.

Chandrasekhar A. V.

Cilino S. A.

Clark W. E.

Cole W. G.

Cranson J. W.

Crockett K.

Crook T. H.

Darby L.

DeBease A. M.

DeBuon C.

Delaney J.

DeSmidt G. A.

Dickey J. Jr.

Diggs E. B.

Dinkel V.

Dombroski L.

Duffy E. J.

Duffy E. M.

Ebron N.

Eifert E.

Emerick J.

Emmons R. S.

Eye L.

Farmer H.

Forbes M.

Forster J. O.

Foster M.

ORIGINAL (Red)

Frazier O.

Garpstas R.

Gibbons G.

Gabris J.

Gilmore J.

Godfrey J.

Goldstraw W. Jr.

Gordon R.

Graef J. G.

Griffin R. C.

Hahn E.

Hale S. D.

Hall E. E.

Happel H. W.

Harman L.

Harman M.

Harrison H. E.

Hartzell M.

Hauch D. A.

Healy D. A.

Hejiebei D.

Hemelt M.

Hemelt W.

Hilseberg J. A.

Hoch A. T.

Holly R.

Hopper T.

Howearth L.

ORIGINAL (Red)

ORIGINAL (Red)

Hunter M. G.

Jabbarpour A.

Jasie L.

Jenkins H.

Jennings D.

Johnson C.

Johnson F. E.

Kahler W.

Kellum C. M.

King F. W.

Kirby W.

Klages G.

Kloczewski H.

Klosowski J.

Knotts D. J.

Korzybski J.

Kosterink M.

Kuhn G.

Kvech J.

Lambert R. W.

LaMonte J.

Lavezza D. N.

Lawton R.

Leimkhuler J.

Lettau R. D.

Legh F. L.

Linder S.
Lisby D. B.

Litwin J.

Long R. L.

Lucus R. C.

McBride J.

McBride M.

McClain M. W.

McClung J. E.

MacDonald E.

MacKay M.

MacKenzie M. E.

Marjon P.

Matsy T.

Matthews C. M.

Matlick D.

Miller R. J.

Mitchell F. W.

Montgomery J. C.

Morris B. R.

Murhy P.

Murray J. A.

Napier H. D.

Neal C. R.

Nowicki W.

Nuttall A. A.

Nutter L. A.

Orem A. R.

Osborne J. C.

Owens F. M.

ORIGINAL (Red)

Painter R. W.

Parks J. V.

Patel V. C.

Peeling P. K.

Plummer J. N.

Polkowski R.

Pollard J. D.

Pope S.

Powers R. W.

Queen G. W.

Raine D. K.

Rasinski E. J.

Redmond W. H.

Reed W. C.

Ringle R. E.

Rippel R.

Robbens R.

Robinson R.

Rodrick E.

Roemer F.

Sabb A. L.

Schattall F.

Schmidt S.

Sellmayer L.

Seymour R.

Shenton J. C.

Shird L.

Shull G.

ORIGINAL (Red)

Smith B.

Sovinsky J. L.

Stallman E.

Stewart H. R.

Stormes C. J.

Swafford J. V.

Sykes D. F.

Terry C. C.

Thomas D. H.

Timoll E. A.

Turc J.

Tyminski F. S.

Underwood O

Undergraeff G. E.

Vaise V. G.

Vanderhoek R.

Vanks M.

Vann A. J.

Vikus L.

Vought J. E.

Wagner H.

Walker L.

Watson C.

Weber C. H.

Weintrag S.

Wehner W. Jr.

White C.

White D.

ORIGINAL (Red)

Wiggs W.

Williams A. Jr.

Williams H.

Williams L.

Willis F.

Willis M.

Winebrenner O.

Wittich J.

Yeaney L.

Young J. F.

ORIGINAL (Red)

ORIGINAL (Red)

Allen O.

Botts J.

Boyd L.

Bouyer T. W.

Brian W. P.

Brown H.

Bryant W. E.

Buell C. R.

Cairns E. M.

Callahan J. P.

Clark A. A.

Clements C. W.

Covington T.

Crumpler M. L.

Day J. M.

Eckhardt J. W.

Enos N. H.

Gaines S. T.

Gorski F. J.

Heath J. E.

Feirchlenberger L. W.

Hildebran W. H.

Hilseberg C. H. Jr.

Hohman J. C.

Howser J.

Johnson E. F.

Leo W. L.

Jones C. R.

Knuckey D. D.

Kopeck J. A.

Kopeck N. N.

Koppelman J. T.

Koerber B. F.

Krebs C. F.

Lehmann A. A.

Lewardowski A. J.

Lutz A. L.

Matthews N. W.

Mature J. R.

Morelan P. E.

Moran C. L.

Padgett J.

Polton G.

Redmond G.

Rudolph R.

Resuta G.

Revers S.

Rihm J.

Saffram J.

Saners H.

Schultze E.

Scott W.

Sellmayer L.

ORIGINAL (Red)

Shee G.

Sledgesky F.

Smith D.

Starkey V.

Sturgeon E.

Tarbutton S.

Tucker W.

Virgin H.

Waniecki J.

Warrington F.

Wasser C.

Watkins E.

White F.

Williams R

Wilson W.

Wojcicki E.

ORIGINAL (Red)

ORIGINAL
(Red)

Connor J. C.

Nykyforchyn N.

Adams E. B.

Alkire H. V.

Anderson C. N.

Armiger F. A.

Bachman H.

Bailey C. W.

Bensor G.

Bishoff D.

Bouge T.

Bowen G.

Carson M. J.

Chaplin J. A.

Clarke A. A.

Chojnowski M.

Coffin G. W. Jr.

Collin K. J.

Compton G. E.

Concannon J. P.

Cook T. C.

Attachment VI

FMC Agricultural Chemical Group
Baltimore

ORIGINAL (Red)

Interoffice

To C. A. Shaheen

Date March 30, 1982

From A. F. Shanta AFS

cc GABalogh
APDean
IMKipnis
DWPalmer
JAPalmer

Subject SOIL ANALYSIS

A sample of soil, taken by GABalogh from material excavated north of the existing APCl H_2 tank, was analyzed.

At first glance the sample appeared to be ordinary soil, but upon closer visual observation small pieces of tar-like material could be seen. Methylene chloride extraction and concentration yielded a black liquid which was analyzed by GC/MS.

The predominant compound found was Tedion at a 74 ppm level. Small unquantified amounts (~1 ppm) of either isobutenyl or 7-nitro and DAP were observed. Several unidentified components were also present in what appears to be the low ppm level.

A GC/MS report on the Tedion quantitation is attached along with scans of the other components.

Attachments

lmc

MS DATA FILE FRN: 5701

NAME: TEDION STD
MISC DATA: 100UG + 100UG D10

IDFILE FRN: 5703

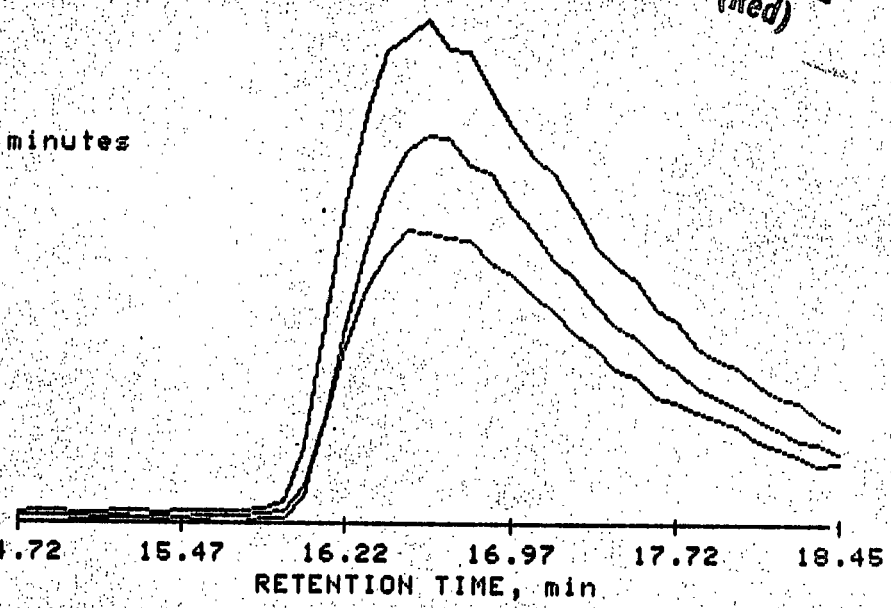
IDFILE NAME: TEDION
MISC DATA: 3/30/82

ORIGINAL (Red)

COMPOUND # 1

NAME: TEDION
RETENTION TIME: 16.58 minutes
MAJOR PEAK AREA: 5490.
CONCENTRATION: 100.0 UG

ION	MASS	AREA%
1	159.0	100
2	356.0	77
3	229.0	60



FINAL REPORT

MS DATA FILE FRN: 5812

NAME: DIRT EXT
MISC DATA:

IDFILE FRN: 5703

IDFILE NAME: TEDION
MISC DATA: 3/30/82

STANDARD
NAME: D10 ANTHRACENE
SPECTRUM NUMBER: 33
RETENTION TIME: 7.22 minutes
MAJOR PEAK AREA: 10530.
CONCENTRATION: 1.0 PPM

COMPOUND # 1

NAME: TEDION
PRESENT AT SCAN # 132 EXPECTED AT SCAN # 136
RETENTION TIME: 16.50 minutes
MAJOR PEAK AREA: 70170.
CONCENTRATION: 74.0 PPM

7/19/83

ORIGINAL (Red)

MS DATA FILE FRN: 5812

NAME: DIRT EXT
MISC DATA:

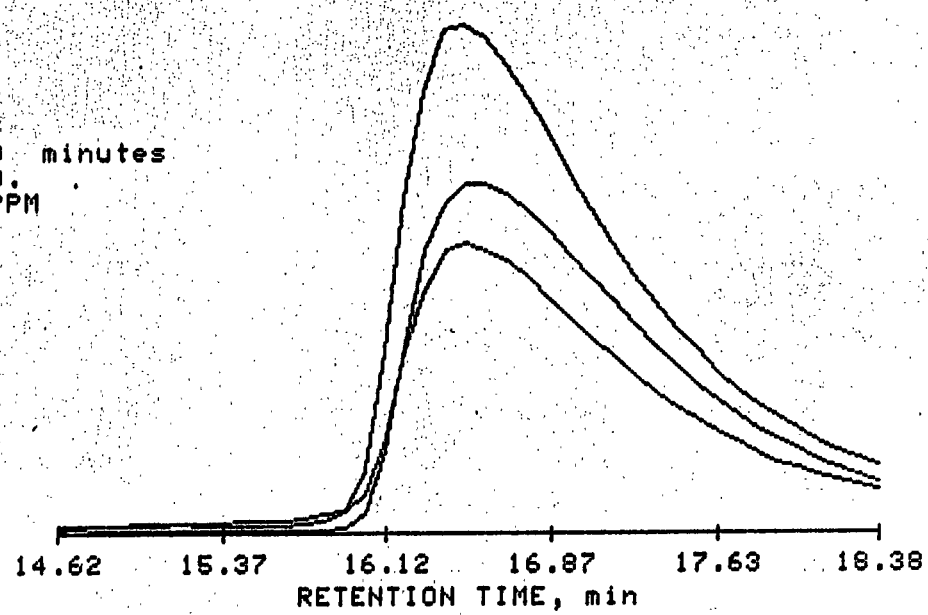
IDFILE FRN: 5703

IDFILE NAME: TEDION
MISC DATA: 3/30/82

COMPOUND # 1

NAME: TEDION
RETENTION TIME: 16.50 minutes
MAJOR PEAK AREA: 70170.
CONCENTRATION: 74.0 PPM

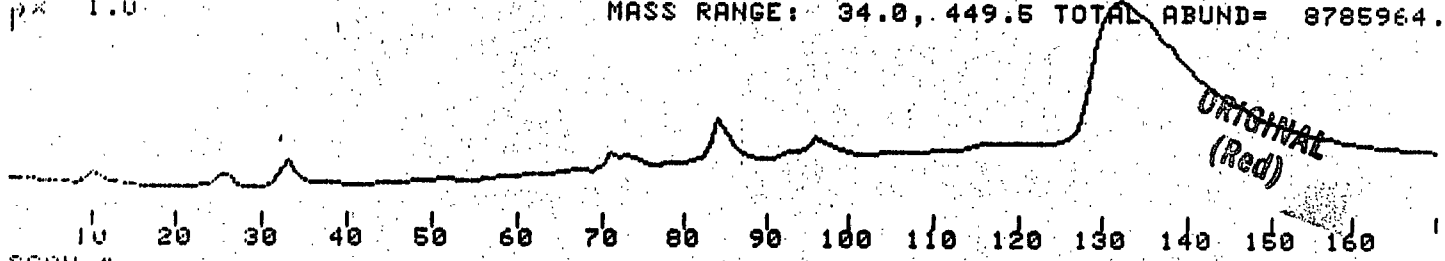
ION	MASS	AREA%
1	159.0	100
2	356.0	77
3	229.0	60



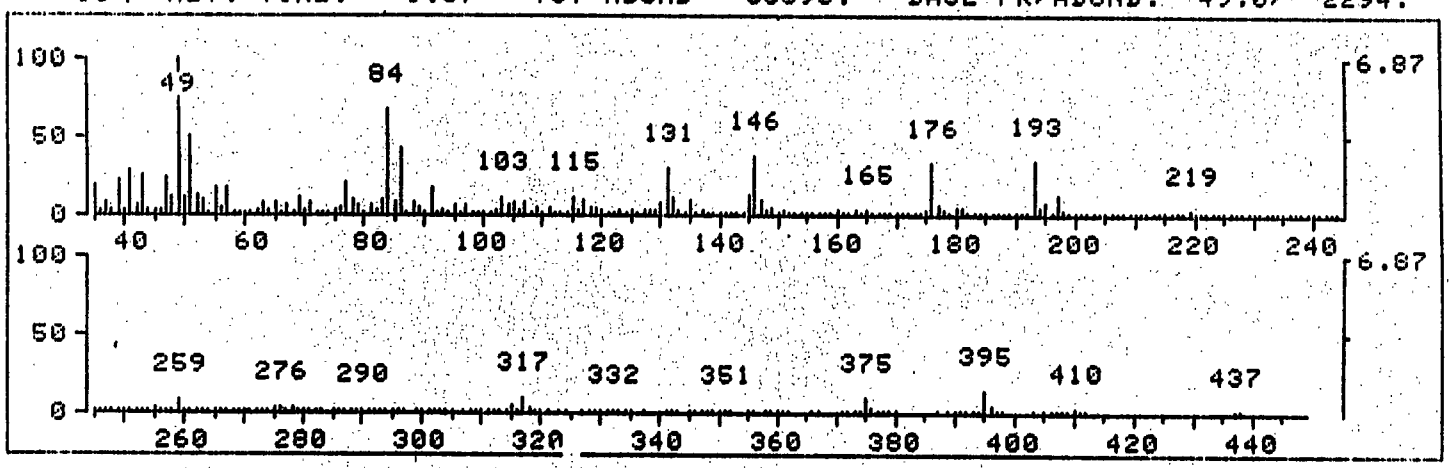
DIRT EXT

px 1.0

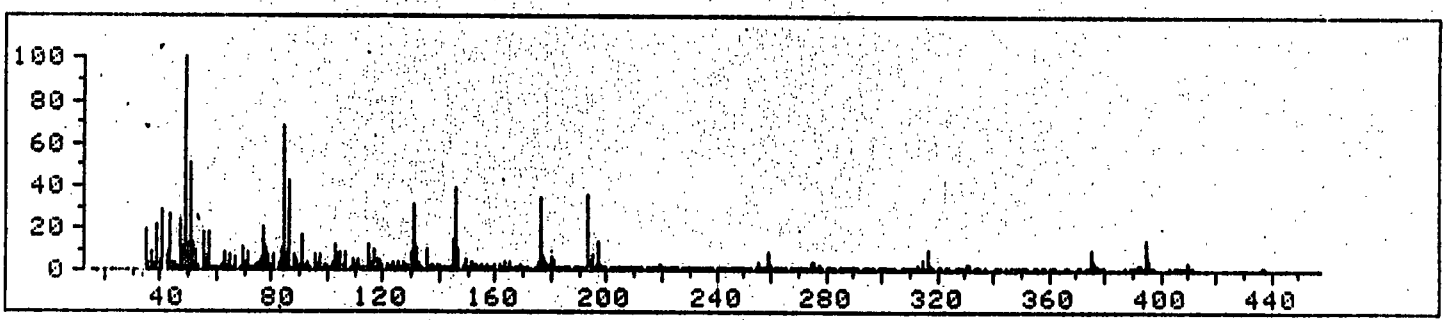
FRN 5812, CRN 27
170 SCANS (170 SCANS, 15.87 MINS)
MASS RANGE: 34.0, 449.5 TOTAL ABUND= 8785964.

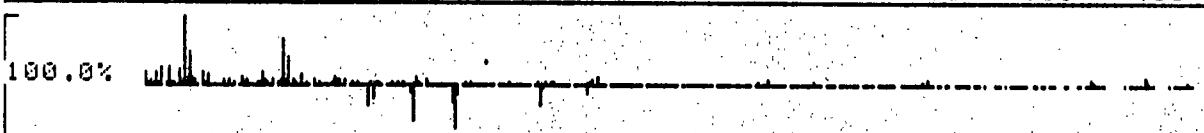


10. RET. TIME: 5.07 TOT ABUND= 33395. BASE PK/ABUND: 49.0/ 2294.

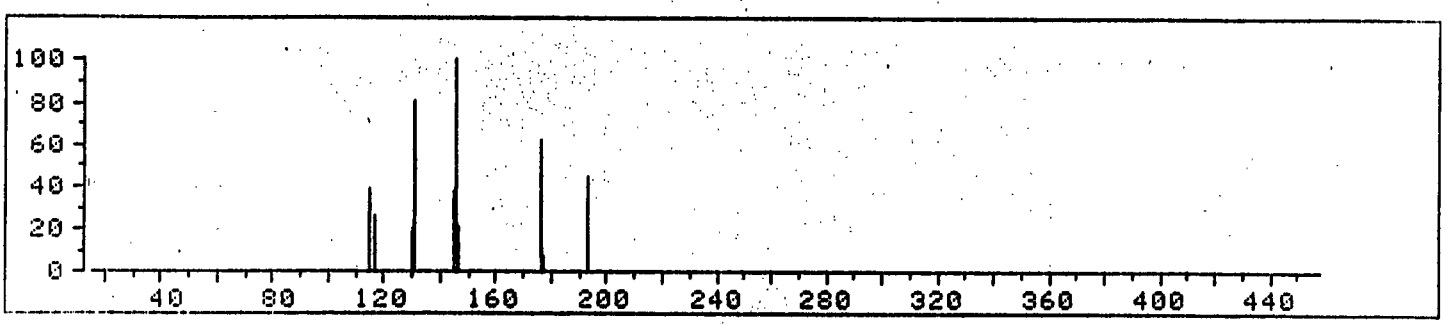


10 HITS: REFERENCE FRN 5812 SCAN 10



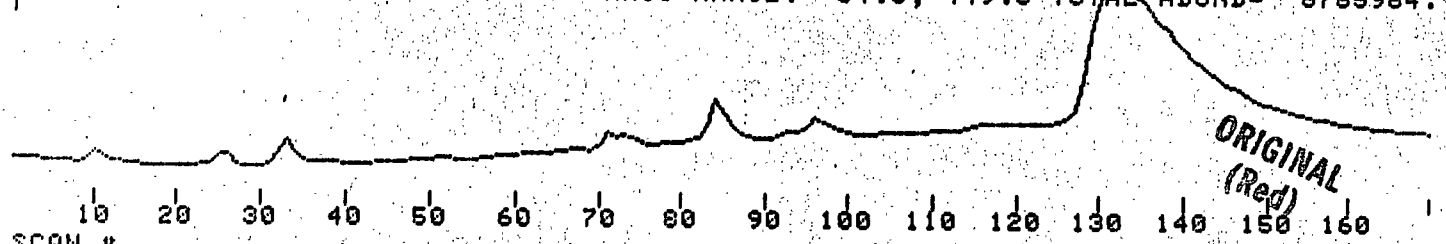


1 LFRN 3071 SPECT 39 MW= 193 C10 H11 N O3
.9767 2-ISOBUTENYL-6-NITROPHENOL
ISOBUTENYL

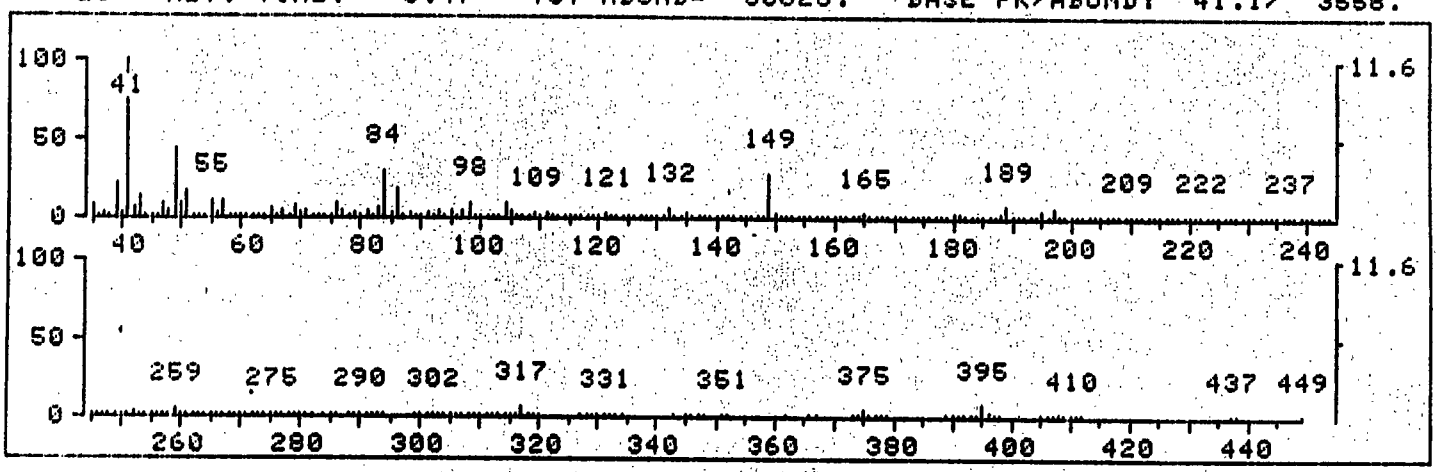


DIRT EXT

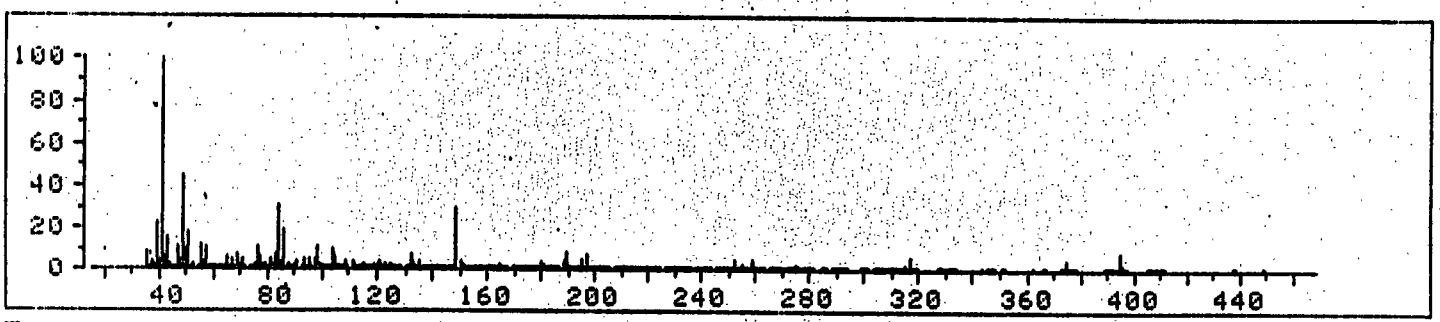
FRN 5812, CRN 27
170 SCANS (170 SCANS, 15.87 MINS)
MASS RANGE: 34.0, 449.5 TOTAL ABUND= 8785964.

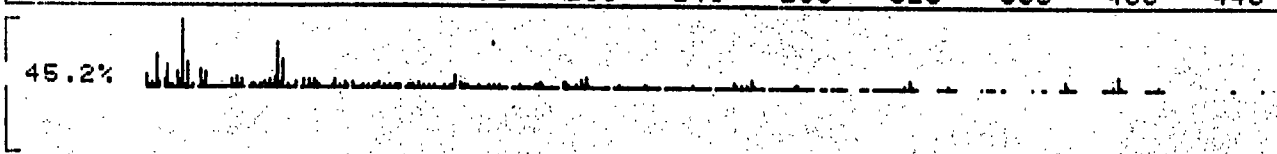


25 RET. TIME: 6.47 TOT ABUND= 30623. BASE PK/ABUND: 41.1/ 3558.

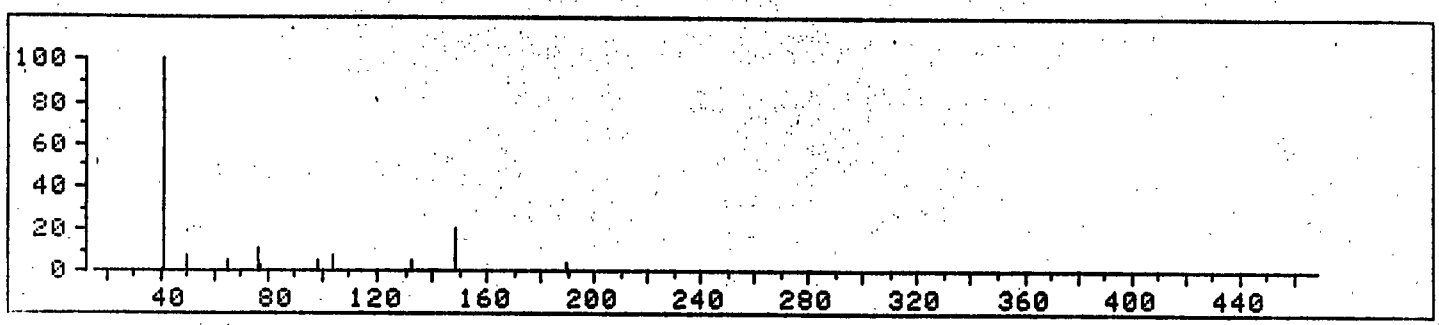


5 HITS: REFERENCE FRN 5812 SCAN 25



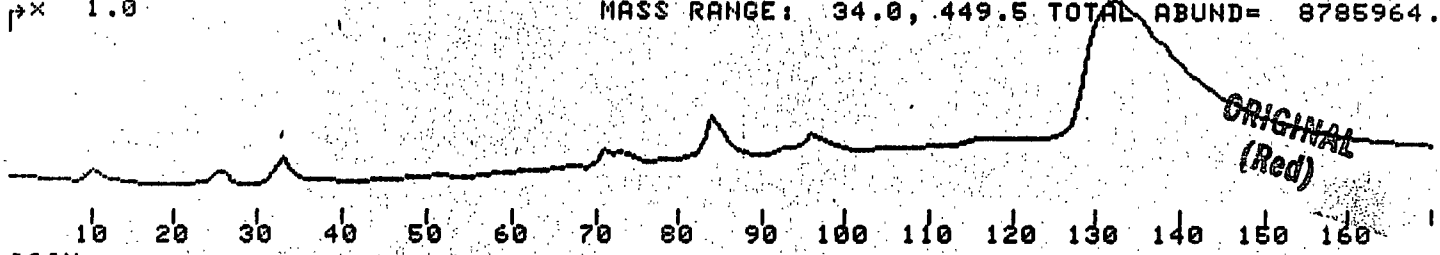


1 LFRN 3071 SPECT 49 MW= 246 C14 H14 O4
.9763 DIALLYL PHTHALATE
DAP

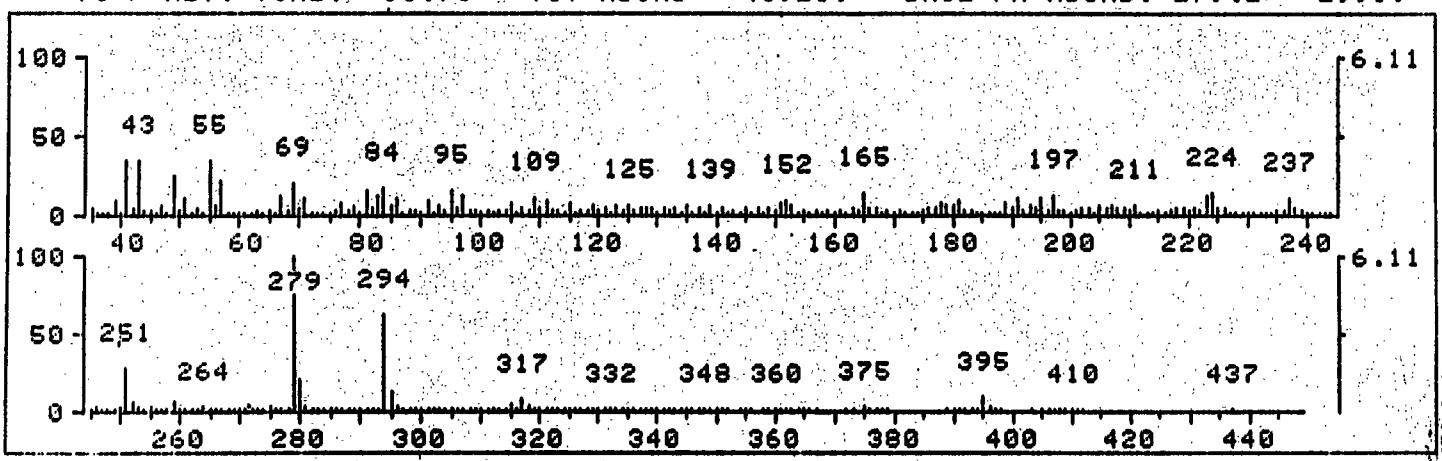


DIRT EXT

FRN 5812, CRN 27
170 SCANS (170 SCANS, 15.87 MINS)
MASS RANGE: 34.0, 449.5 TOTAL ABUND= 8785964.

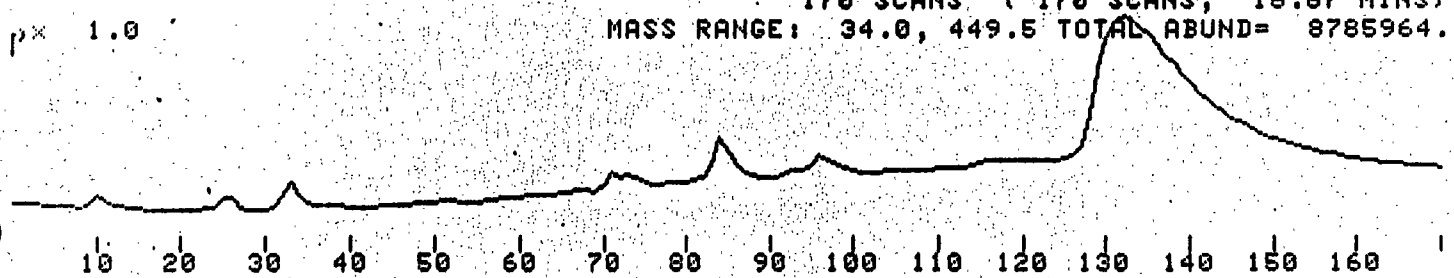


71 RET. TIME: 10.78 TOT ABUND= 48920. BASE PK/ABUND: 279.2/ 2991.

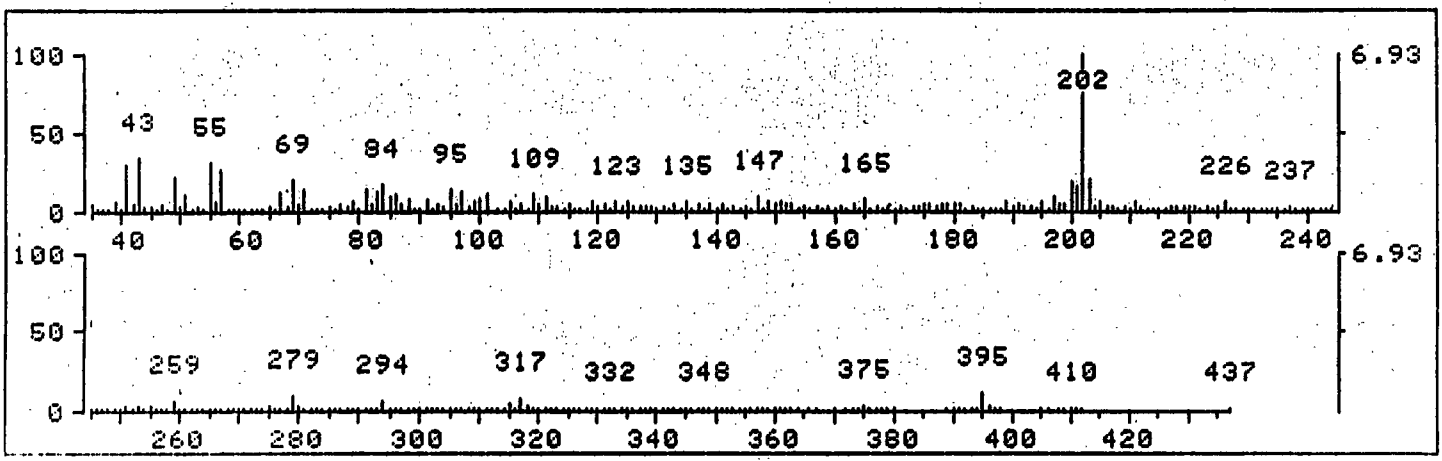


DIRT EXT

FRN 5812, CRN 27
170 SCANS (170 SCANS, 15.87 MINS)
MASS RANGE: 34.0, 449.5 TOTAL ABUND= 8785964.

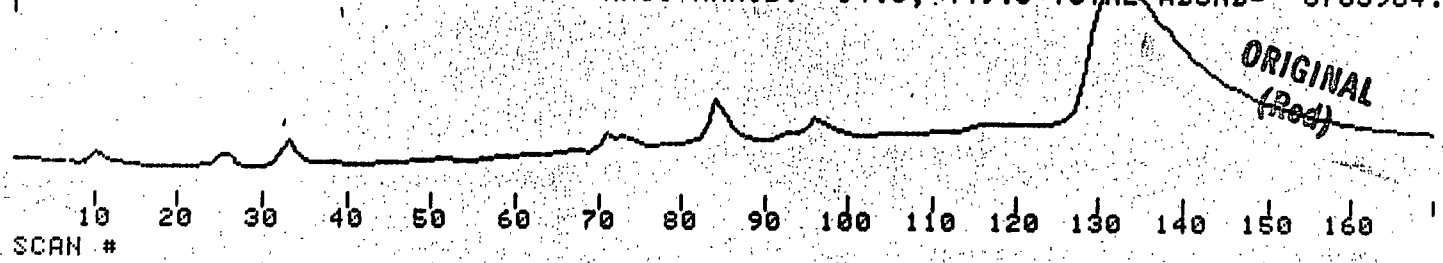


74 RET. TIME: 11.07 TOT ABUND= 44981. BASE PK/ABUND: 202.1/ 3115.

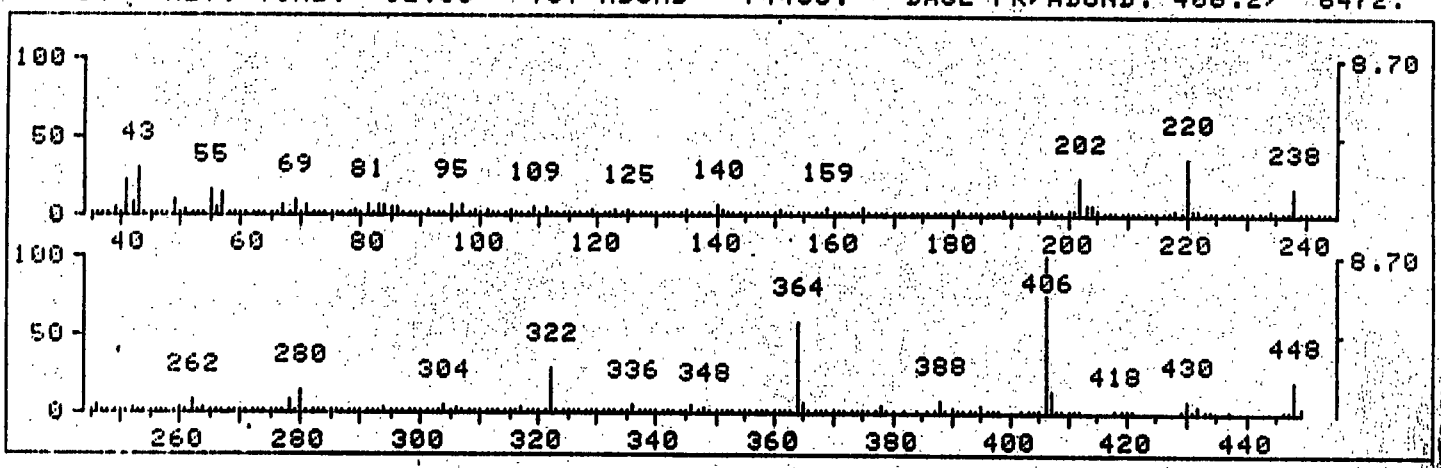


DIRT EXT

FRN 5812, CRN 27
170 SCANS (170 SCANS, 15.87 MINS)
MASS RANGE: 34.0, 449.5 TOTAL ABUND= 8785964.

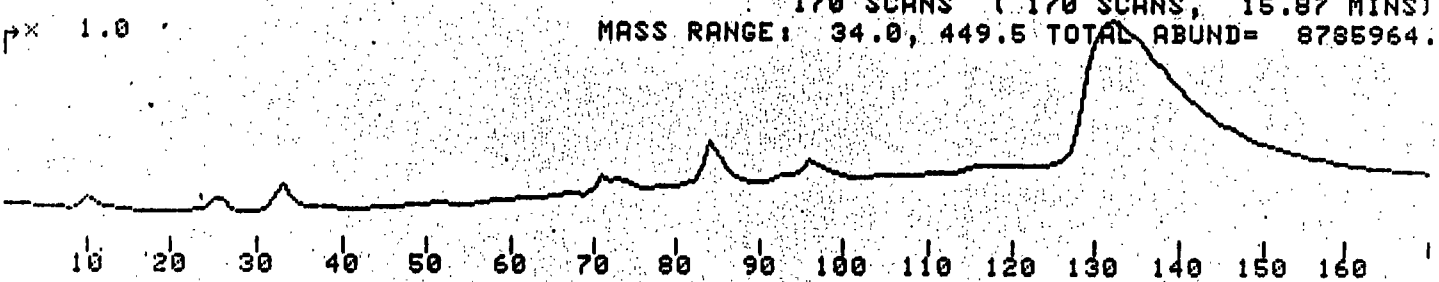


84 RET. TIME: 12.00 TOT ABUND= 74430. BASE PK/ABUND: 406.2/ 6472.

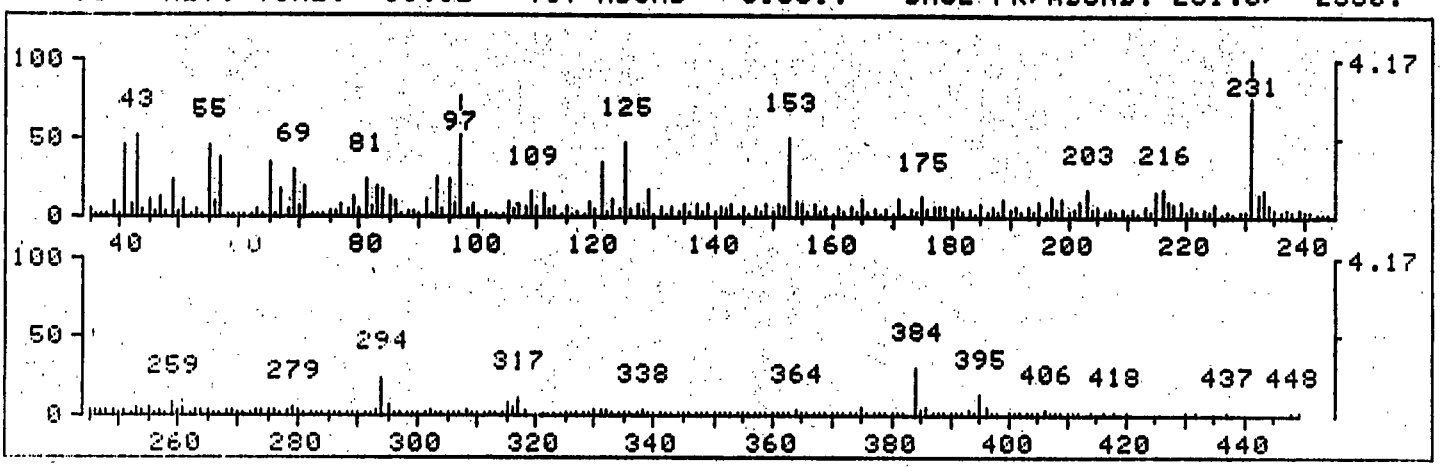


DIRT EXT

FRN 5812, CRN 27
170 SCANS (170 SCANS, 15.87 MINS)
MASS RANGE: 34.0, 449.5 TOTAL ABUND= 8785964.



96 RET. TIME: 13.12 TOT ABUND= 61081. BASE PK/ABUND: 231.0/ 2550.



Attachment VII

FMC Agricultural Chemical Group
Baltimore

ORIGINAL (Red)

Interoffice

To C. A. Shaheen

Date 3/30/83

From A. F. Shanta CCS

cc JAPalmer
DWPalmer
IMKipnis

Subject Yellow Dirt S.W. of Bldg 91

As we suspected, the yellow stains observed at the soil surface southwest of Bldg 91 were caused by the presence of 2,4-dinitro-6-sec-butylphenol (DNBP).

A sample of the soil, which included some stones and vegetation, was extracted with slightly alkaline water. The water extract, which was a pale yellow in color, was acidified with hydrochloric acid causing the yellow color to disappear. The acidified water was then extracted using several portions of methylene chloride. After evaporation of most of the solvent, the residue was analyzed by GC/MS. Three peaks were observed as shown on the attached GC/MS trace.

The largest was DNBP which amounted to 77% of the total ion area. Tedion, another former FMC product, was present at about 7%. The intermediate peak, about 16% of the total, could not be identified. It gives only one major peak at an m/e of 83 and a smaller one at m/e 55. As time permits I will make a further attempt to identify the unknown.

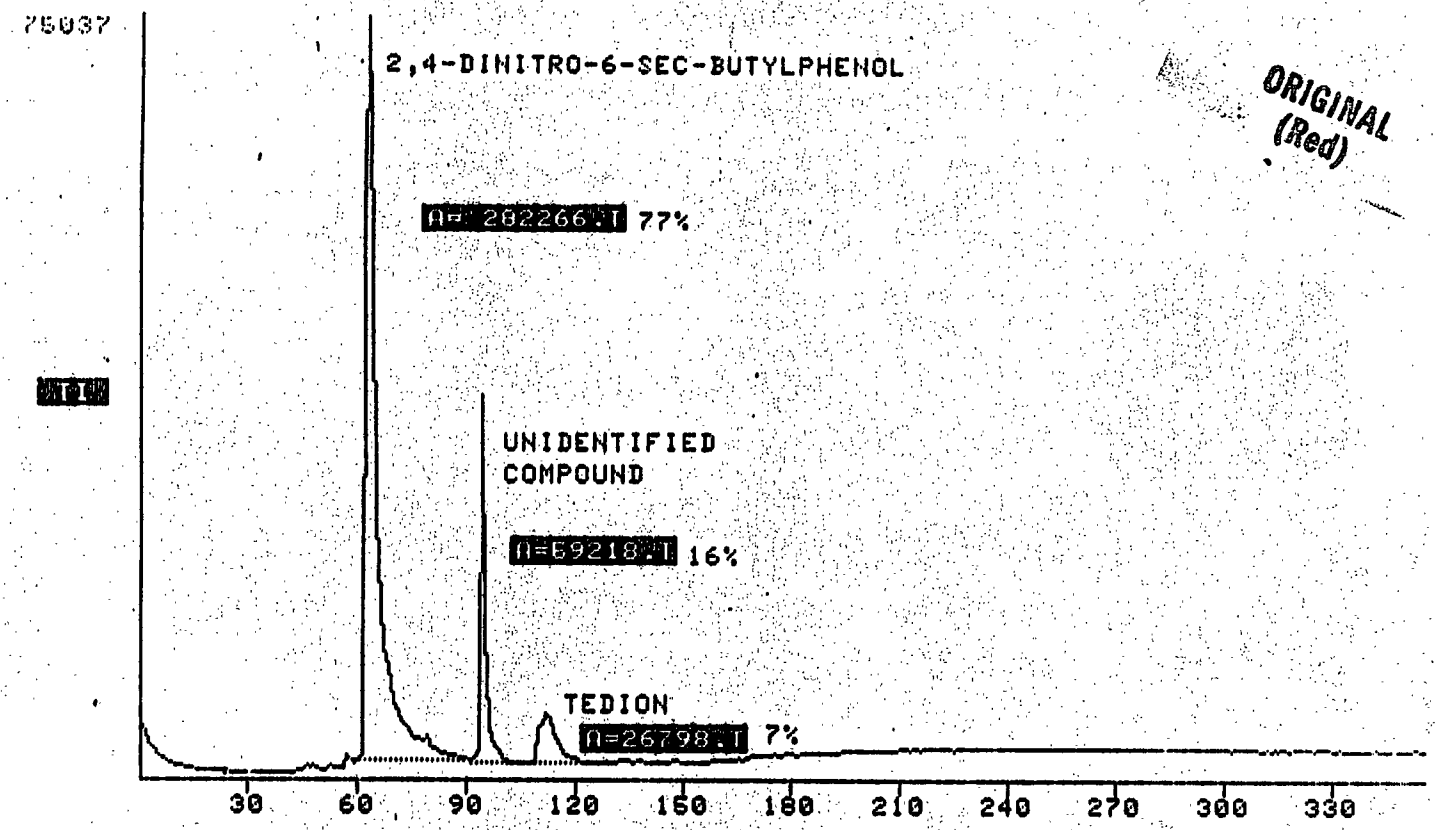
Attachment

ejb

2 of 2
7/19/83

[redacted] EXTRACT FROM YELLOW DIRT TAKEN
[redacted] SOUTH WEST OF BLDG 91 3/22/83

[redacted] 5119



ORIGINAL
(Red)

Attachment VIII

FMC Agricultural Chemical Group
Baltimore

ORIGINAL (Red)

Interoffice

To C. A. Shaheen

Date May 9, 1983

From W. T. Upton/A. M. Zablotny

cc IMKipnis
DWPalmer
JAPalmer

Subject CONTAMINANTS IN EXCAVATION SITE

At your request, samples of excavated soil and water seepage taken on 5/4/83 were extracted and the extracts analyzed by GC/MS. The single major component in the soil extract was found to be Tedion. Two major components found in the aqueous sample were 7-hydrogen and 7-hydroxy.

1mc

AQUEOUS SAMPLE 7/19/83

P.43 [Similarity/Condensed Search: MW Range: 1-9999]

REF. SPECT #= 82 LSN= 82. MW= 0 FRN= 5249 RET. TIME= 8.9
118 PEAKS, 51 SIGNIFICANT MAX K 23.6

ORIGINAL (Red)

LIBRARY 3075 87 SPECTRA SEARCHED, 5 HIT(S)

.9812 + METHALLYL PHENOL

SPEC= 25 LSN= 25. MW= 148 C10 H12 O
FRN = 3077 [3054.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 16.6
MATCHING PEAKS CONTAMINATED MISSING PEAKS QUAL INDEX= 0
23.6 10 53% .0 0 0% .0 0 0% MULTIPLIER= .57

#1 .9809 + 2,3-DIHYDRO-2,2-DIMETHYLBENZOFURAN
7-HYDROGEN
SPEC= 24 LSN= 24. MW= 148 C10 H12 O
FRN = 3077 [FMC 3012.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 1.7
MATCHING PEAKS CONTAMINATED MISSING PEAKS QUAL INDEX= 0
23.1 10 56% .0 0 0% .0 0 0% MULTIPLIER= .78

.7476 * METHYL BENZOATE

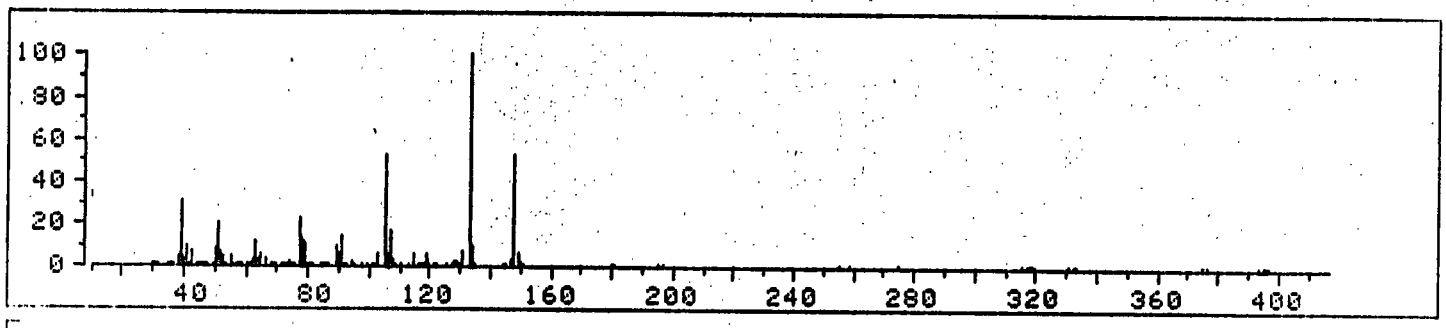
SPEC= 19 LSN= 19. MW= 136 C8 H8 O2
FRN = 3077 [FMC 3067.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 5.4
MATCHING PEAKS CONTAMINATED MISSING PEAKS QUAL INDEX= 0
16.3 8 22% 2.1 1 2% 2.6 1 5% MULTIPLIER= .53

.7183 * O-TOLUIDINE
1-METHYL-2-AMINOBENZENE
SPEC= 11 LSN= 11. MW= 107 C7 H9 N
FRN = 3077 [FMC 3072.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 13.7
MATCHING PEAKS CONTAMINATED MISSING PEAKS QUAL INDEX= 0
16.5 8 17% .0 0 0% 5.7 2 38% MULTIPLIER= 1.27

.6298 O-NITROPHENYL METHALLYL ETHER

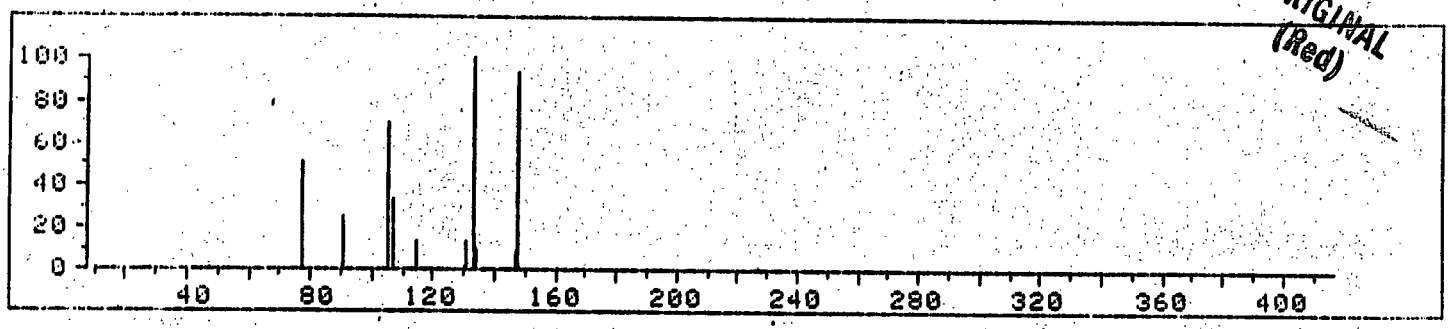
SPEC= 51 LSN= 51. MW= 193 C10 H11 N O3
FRN = 3077 [FMC 3001.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 4.3
MATCHING PEAKS CONTAMINATED MISSING PEAKS QUAL INDEX= 0
14.2 7 11% 2.1 1 2% 5.2 2 16% MULTIPLIER= .74

>PAUSE
5 HITS: REFERENCE FRN 5249 SCAN 82

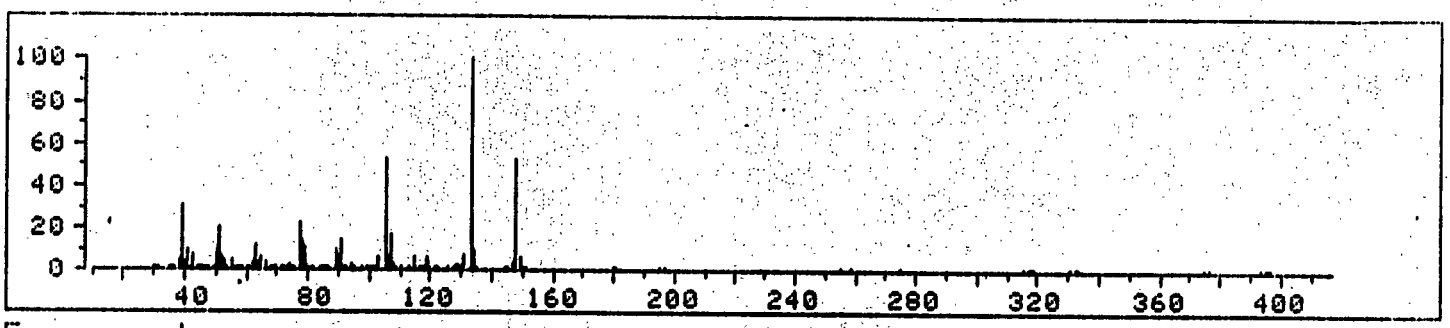


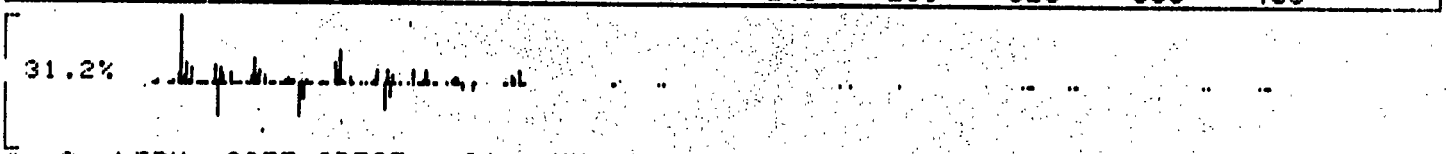
1 LFRN 3077 SPECT 25 MW= 148 C10 H12 O
.9812 METHALLYL PHENOL

ORIGINAL (Red)

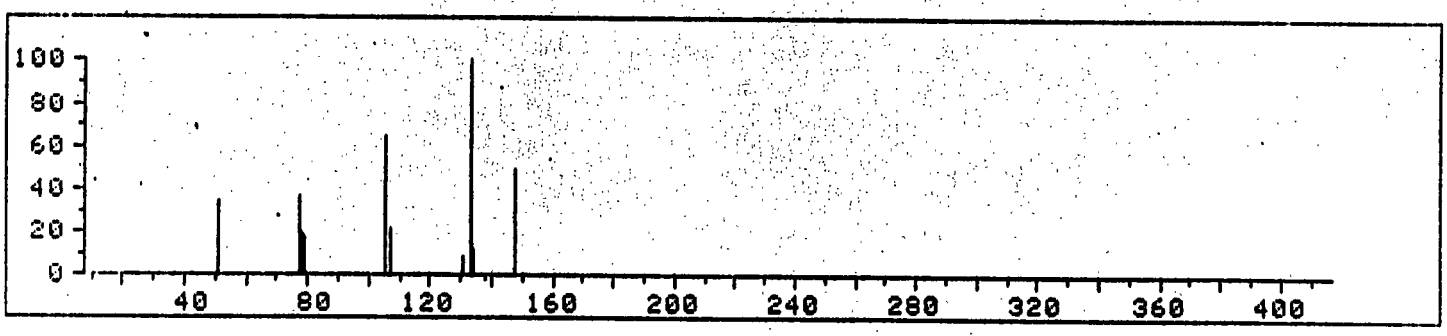


5 HITS: REFERENCE FRN 5249 SCAN 82





2 LFRN 3077 SPECT 24 MW= 148 C10 H12 O
.9809 2,3-DIHYDRO-2,2-DIMETHYLBENZOFURAN
7-HYDROGEN



[Similarity/Condensed Search: MW Range: 1-9999]

REF. SPECT #= 158 LSN= 158. MW= 0 FRN= 5249 RET. TIME= 15.1
153 PEAKS, 146 SIGNIFICANT MAX K 23.1

LIBRARY 3075 87 SPECTRA SEARCHED, 10 HIT(S)

ORIGINAL (Red)

#2 .9774 + 2,3-DIHYDRO-2,2-DIMETHYL-7-BENZOFURANOL
7-HYDROXY
SPEC= 34 LSN= 34. MW= 164 C10 H12 O2
FRN = 3077 [FMC 3003.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 2.9

MATCHING PEAKS			CONTAMINATED			MISSING PEAKS			QUAL INDEX=	0
18.9	10	37%	.0	0	0%	.0	0	0%	MULTIPLIER=	.74

.8335 ETHYL CHRYSANTHEMUMATE

SPEC= 48 LSN= 48. MW= 186 C12 H20 O2
FRN = 3077 [FMC 3078.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 4.1

MATCHING PEAKS			CONTAMINATED			MISSING PEAKS			QUAL INDEX=	100
13.2	8	8%	.0	0	0%	2.1	1	3%	MULTIPLIER=	.48

.7102 + DIHYDROSAFROLE
4-PROPYL-1,3-BENZODIOXOLE
SPEC= 35 LSN= 35. MW= 165 C10 H13 O2
FRN = 3077 [FMC 3033.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 4.9

MATCHING PEAKS			CONTAMINATED			MISSING PEAKS			QUAL INDEX=	0
13.9	8	19%	.0	0	0%	4.9	2	42%	MULTIPLIER=	4.08

.6232 + ISOBUTYL PHENOL

SPEC= 26 LSN= 26. MW= 150 C10 H14 O
FRN = 3077 [3050 3050.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 17.6

MATCHING PEAKS			CONTAMINATED			MISSING PEAKS			QUAL INDEX=	0
11.5	7	7%	1.6	1	1%	4.4	2	9%	MULTIPLIER=	.92

.6213 * 2-METHALLYL-6-NITROPHENOL
CLAISEN
SPEC= 53 LSN= 53. MW= 193 C10 H11 N O3
FRN = 3077 [FMC 3005.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 4.1

MATCHING PEAKS			CONTAMINATED			MISSING PEAKS			QUAL INDEX=	0
12.0	7	12%	.0	0	0%	6.5	3	3%	MULTIPLIER=	.36

.6210 + SAFROLE
4-PROPENYL-1,2-BENZODIOXOLE
SPEC= 32 LSN= 32. MW= 163 C10 H11 O2
FRN = 3077 [FMC 3018.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 4.5

MATCHING PEAKS			CONTAMINATED			MISSING PEAKS			QUAL INDEX=	0
12.0	7	11%	.0	0	0%	6.5	3	6%	MULTIPLIER=	.36

.6176 + ISOSAFROLE
4-ALLYL-1,3-BENZODIOXOLE
SPEC= 33 LSN= 33. MW= 163 C10 H11 O2
FRN = 3077 [FMC 3032.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 6.3

MATCHING PEAKS			CONTAMINATED			MISSING PEAKS			QUAL INDEX=	0
12.0	7	10%	.0	0	0%	6.7	3	6%	MULTIPLIER=	.39

.6115 + 2,3-DIHYDRO-2,2-DIMETHYLBENZOFURAN

```
                    7-HYDROGEN
        SPEC=    24  LSN=     24. MW= 148  C10 H12 O
        FRN = 3077 [FMC   3012.]  CAS #  0000000000   EPA #  0000000000   RET.
TIME=    1.7
        MATCHING PEAKS   CONTAMINATED   MISSING PEAKS  QUAL INDEX=    0
         11.3    7   8%   1.8    1   3%    4.4    2   7%  MULTIPLIER=  .40

 .6010 *  2,3-DIHYDRO-2,2-DIMETHYL-7-NITROBENZOFURAN
                    7-NITRO
        SPEC=    52  LSN=     52. MW= 193  C10 H11 N O3
        FRN = 3077 [FMC   3002.]  CAS #  0000000000   EPA #  0000000000   RET.
TIME=    4.6
        MATCHING PEAKS   CONTAMINATED   MISSING PEAKS  QUAL INDEX=    0
         12.0    7  12%   .0    0   0%    7.2    3   9%  MULTIPLIER=  .42

 .5988 *  1,2-DIMETHOXYPROPENYLBENZENE

        SPEC=    42  LSN=     42. MW= 178  C11 H14 O2
        FRN = 3077 [FMC   3035.]  CAS #  0000000000   EPA #  0000000000   RET.
TIME=    8.1
        MATCHING PEAKS   CONTAMINATED   MISSING PEAKS  QUAL INDEX=    0
         12.0    7  10%   2.3    1   9%    4.9    2   8%  MULTIPLIER=  .62
>PAUSE
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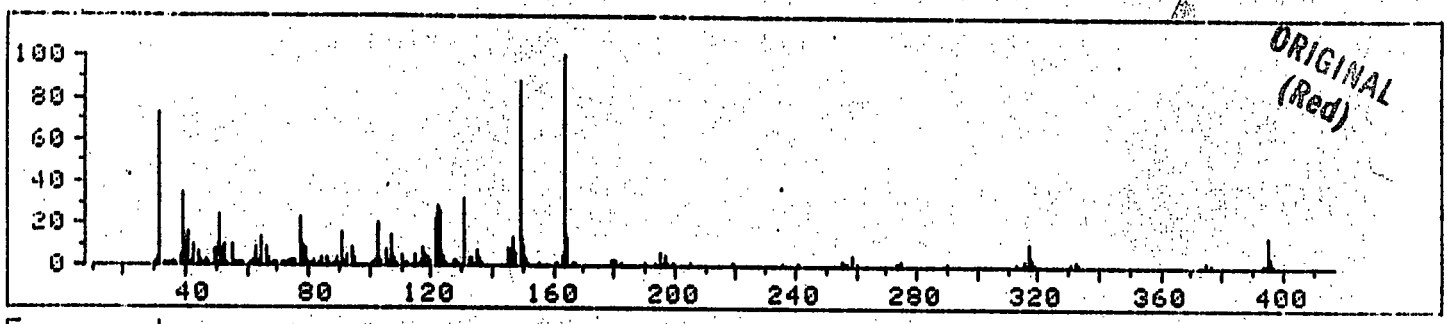
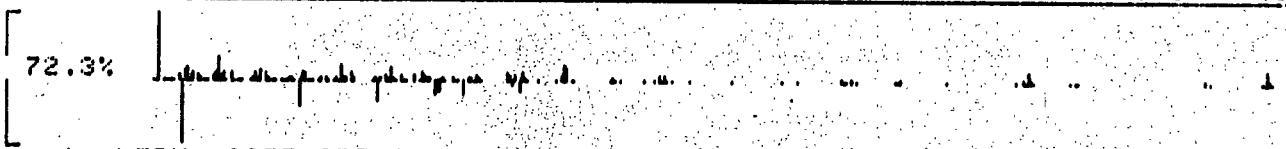
ORIGINAL (Red)

OPTIONS

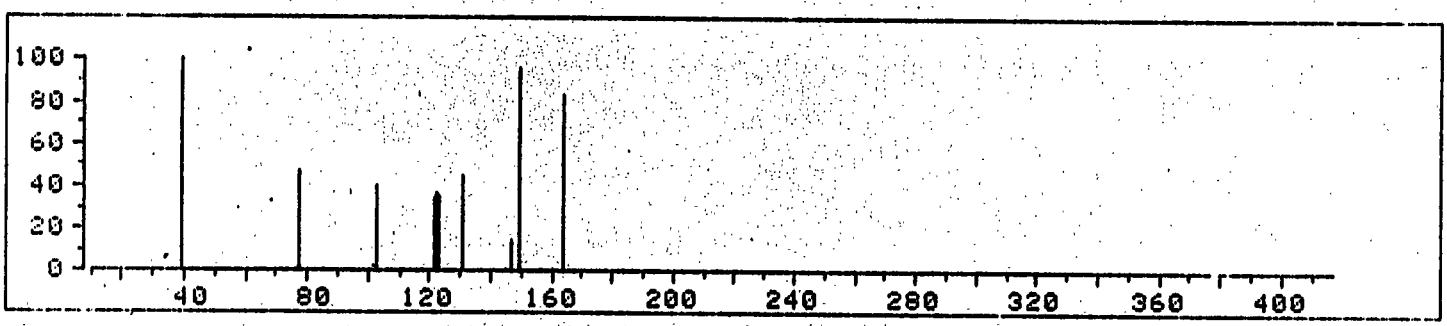
<CR> Next hit
<Number> graph that hit
0: Exit to main disply

10 HITS: REFERENCE FRN 5249 SCAN 158

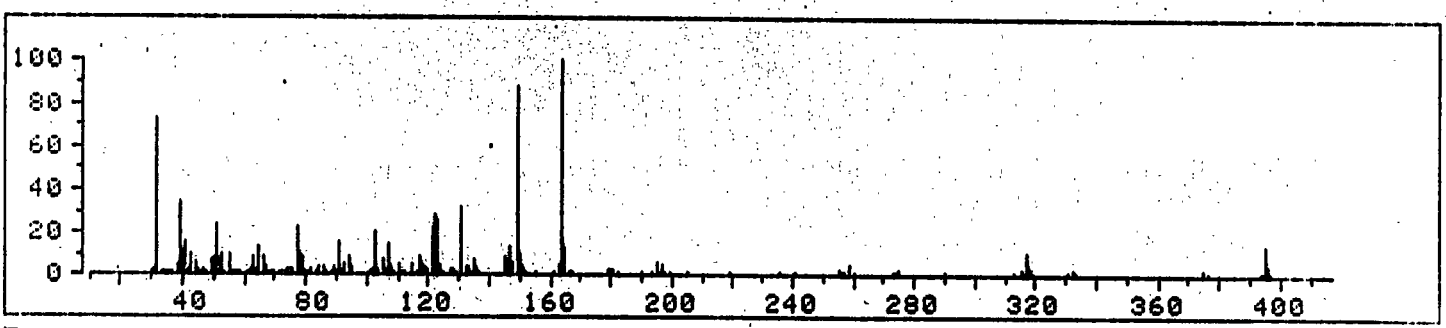


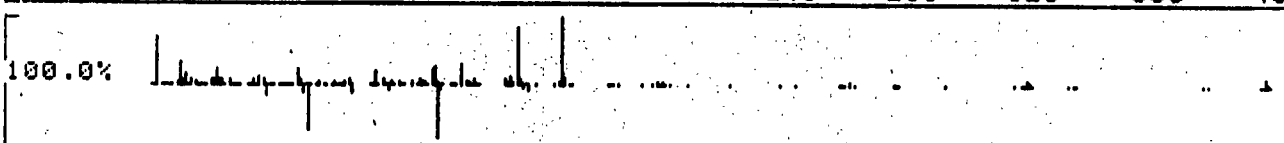


1 LFRN 3077 SPECT 34 MW= 164 C10 H12 O2
.9774 2,3-DIHYDRO-2,2-DIMETHYL-7-BENZOFURANOL
7-HYDROXY

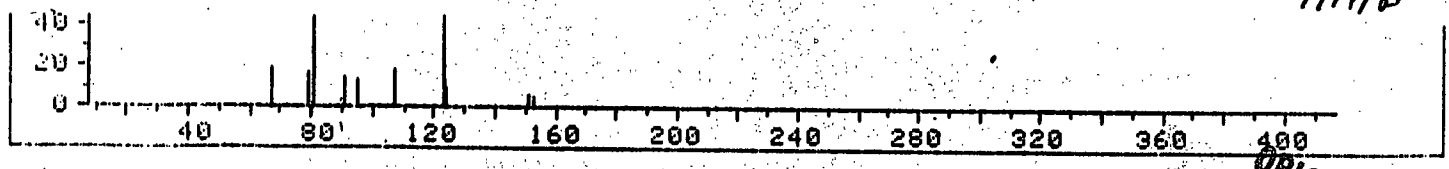


10 HITS: REFERENCE FRN 5249 SCAN 158





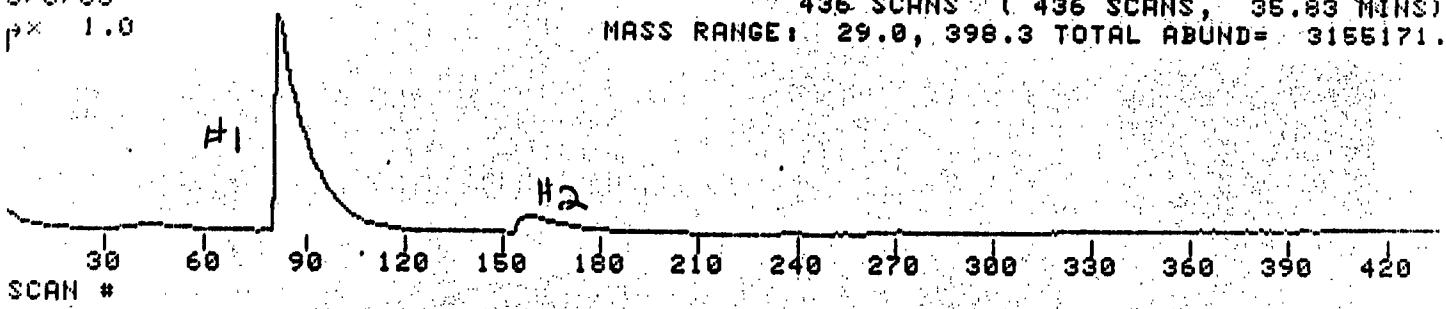
2 LFRN 3077 SPECT 48 MW= 186 C12 H20 O2
.8339 ETHYL CHRYSANTHEMUMATE



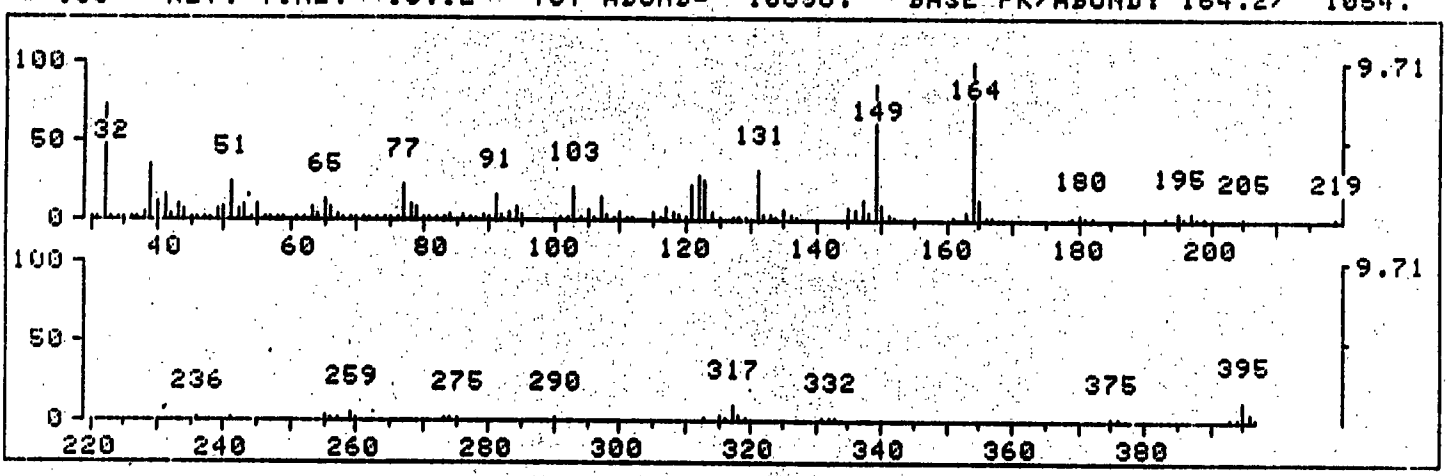
ORIGINAL (Red)

WASTE 1120 - B/N AQUEOUS LAYER
5/6/83

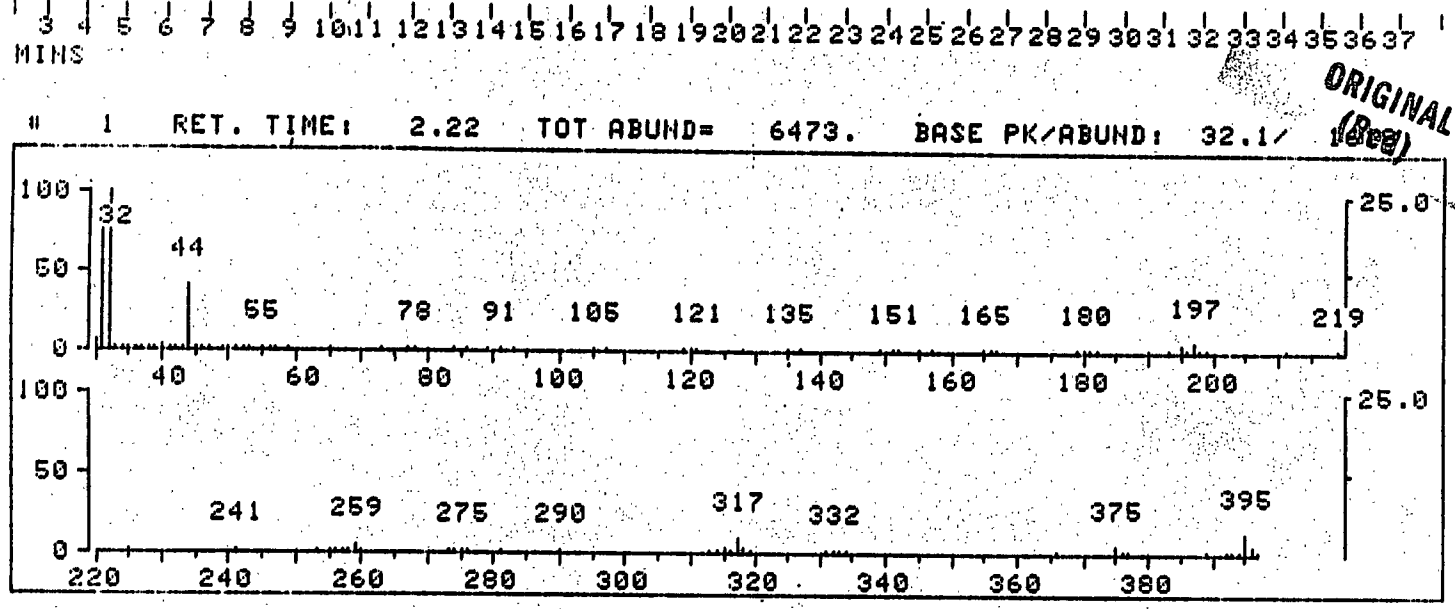
FRH 5249, CRN 30
436 SCANS (436 SCANS, 35.83 MINS)
MASS RANGE: 29.0, 398.3 TOTAL ABUND= 3155171.



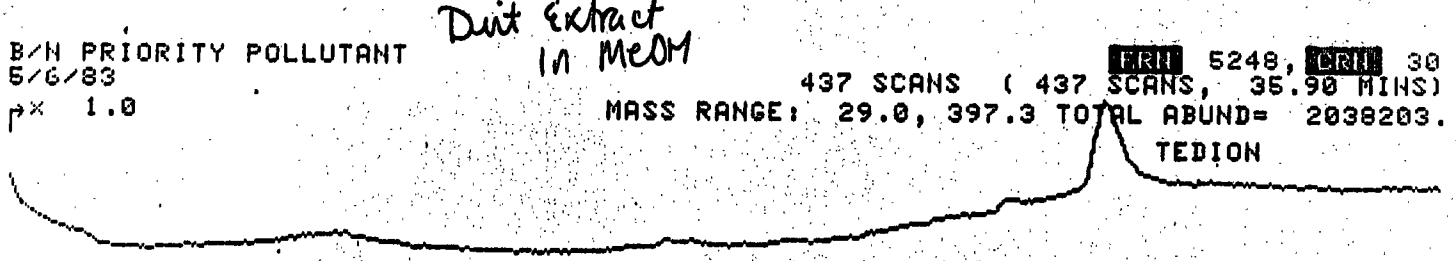
158 RET. TIME: 15.12 TOT ABUND= 10856. BASE PK/ABUND: 164.2/ 1054.

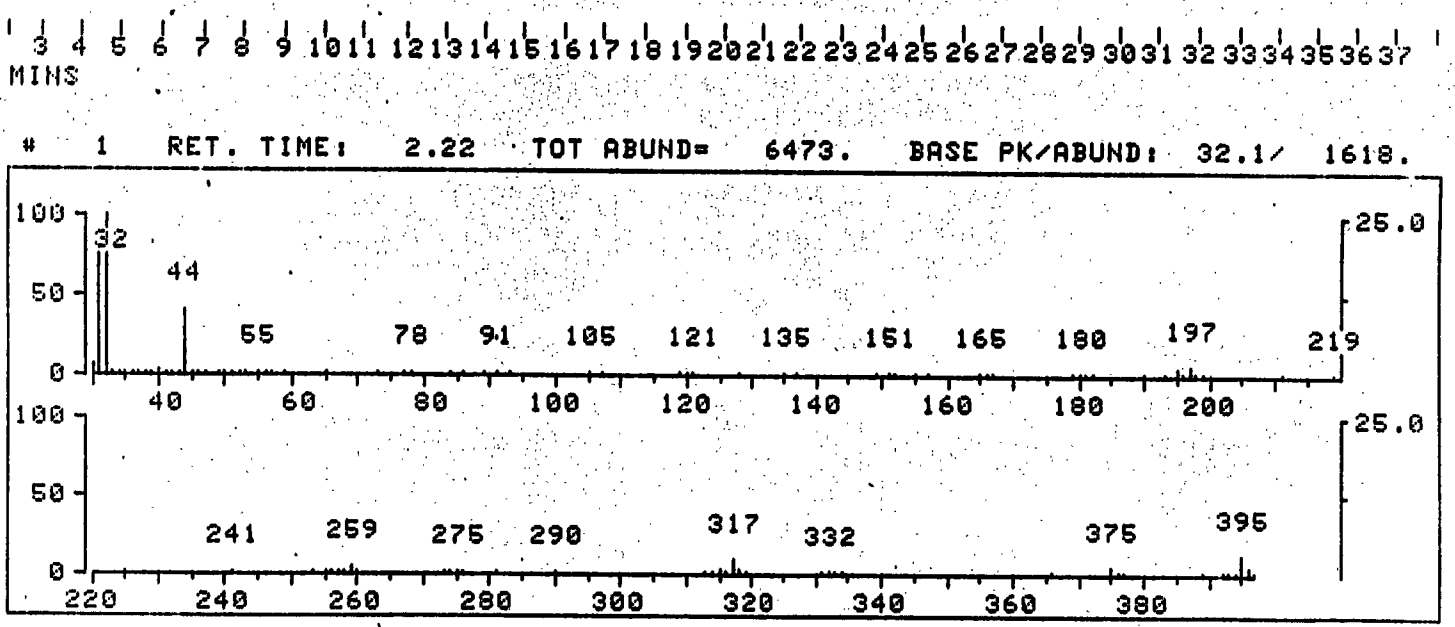


Soil Sample
P.92



Dust Extract in MeOH





P.42 Soil sample

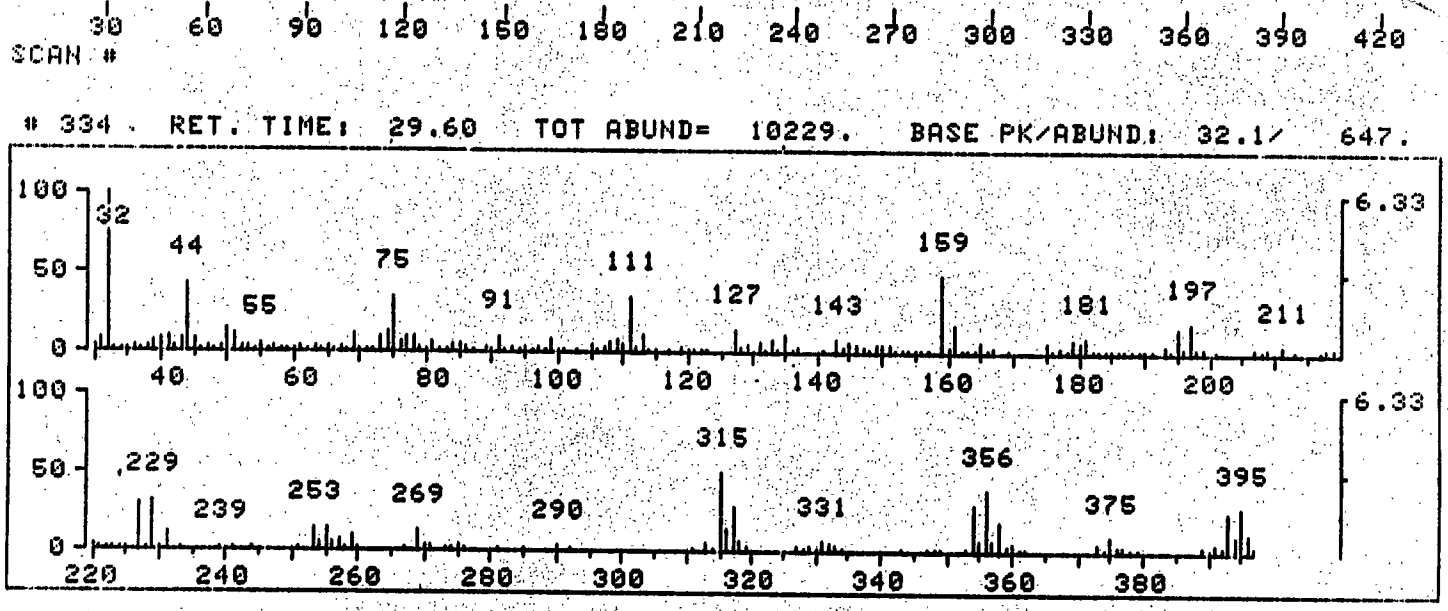
9 of 10
7/19/83

8

B/N PRIORITY POLLUTANT
5/6/83
px 1.0

FRN 5248, CRN 30
437 SCANS (437 SCANS, 35.90 MINS)
MASS RANGE: 29.0, 397.3 TOTAL ABUND= 2038203.

Tedlar ORIGINAL (Red)



Soil Sample

P.42

10 of 10
7/19/83

[Similarity/Condensed Search: MW Range: 1-9999]

REF. SPECT #= 335 LSN= 335. MW= 0 FRN= 5248 RET. TIME= 29.7
246 PEAKS, 245 SIGNIFICANT MAX K 24.3

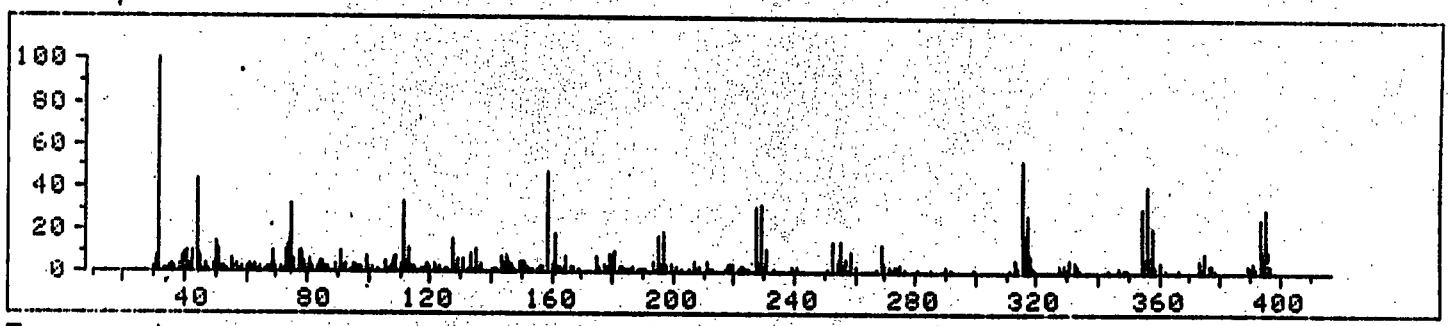
ORIGINAL (Red)

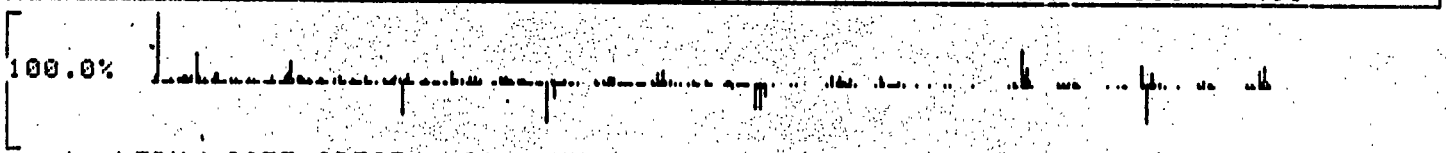
LIBRARY 3075 87 SPECTRA SEARCHED, 2 HIT(S)

.9781 + TEDION
4-CHLOROPHENYL 3,4,5-TRICHLOROPHENYL SULFONE
SPEC= 81 LSN= 81. MW= 354 C12 H6 O2 CL4 S
FRN = 3077 [FMC 3077.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 37.2
MATCHING PEAKS CONTAMINATED MISSING PEAKS QUAL INDEX= 0
19.0 10 14% .0 0 0% .0 0 0% MULTIPLIER= .50

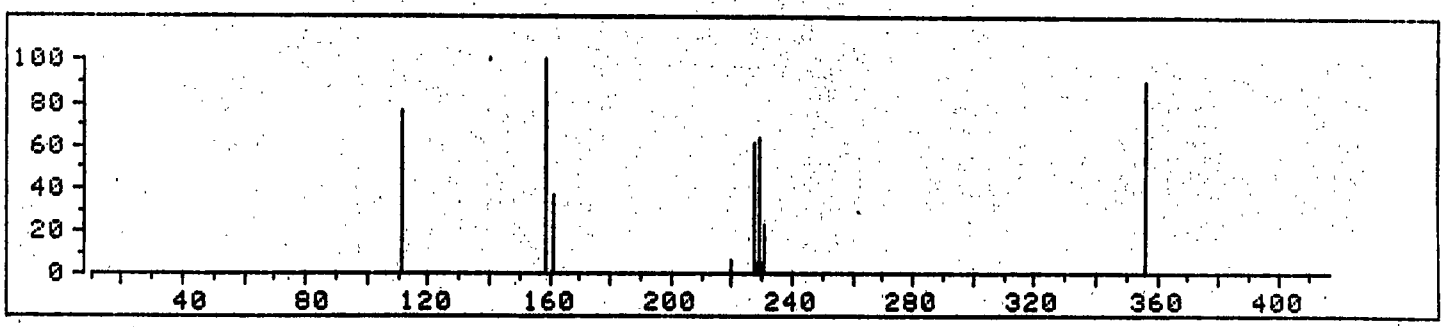
.7238 * O-NITROCHLOROBENZENE
ONCB 2-NITROCHLOROBENZENE
SPEC= 29 LSN= 29. MW= 157 C6 H4 CL N O2
FRN = 3077 [FMC 3014.] CAS # 0000000000 EPA # 0000000000 RET. TIME= 4.4
MATCHING PEAKS CONTAMINATED MISSING PEAKS QUAL INDEX= 0
11.9 8 8% .0 0 0% 3.9 2 2% MULTIPLIER= .39

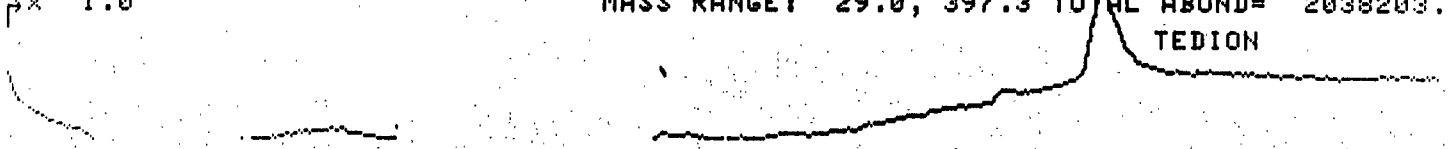
>PAUSE
2 HITS: REFERENCE FRN 5248 SCAN 335





1 LFRN 3077 SPECT 81 MW= 354 C12 H6 O2 CL4 S
.9781 TEDION
4-CHLOROPHENYL 3,4,5-TRICHLOROPHENYL SULFONE



B/N PRIORITY POLLUTANT
5/6/83
x 1.0

FRN 5248, CRN 30
437 SCANS (437 SCANS, 35.90 MINS)
MASS RANGE: 29.0, 397.3 TOTAL ABUND= 2038203.
TEDION