R-#303-01A

IL-0178-21

ecology and environment, inc.

111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415

International Specialists in the Environment

MEMORANDUM

DATE: March 3, 1984

TO: File

FROM: Dan Cozza

SUBJECT: Drinking Water Sources in E. St. Louis Area

On March 3, 1984, I had a meeting with Brenda Brown of the Illinois Environmental Protection Agency, Division of Public Water Supplies to discuss the drinking water supplies of communities around the East St. Louis area. Ms. Brown supplied me with the following information:

1) Bethalto

7 wells, ranging from 90-100 feet deep
Top soil 0-3'
Fine sand 3-45'
Coarse brown sand 45-65'
Fine sand 65-70'
Medium to fine sand 70-85'
Coarse sand and gravel 85-91'

The wells are located on 9th Street just north of the Wood River city limits and they serve Bethalto, Moro, and Meadowbrook.

2) East Alton

3 wells, 90-103' deep serving E. Alton

3) Alton

Water intake 1 1/2-2 miles upstream from lock and dam #26. Services Alton, Godfrey, Brighton, Jersey County, Forest Homes, and Cottage Hills.

EPA Region 5 Records Ctr.

379842

recycled paper

4) Roxana

3 wells at depths 109-111' located at Route 111 and the canal. Wells services Roxana and South Roxana

Brown clay 0-16'
Gray clay 16-30'
Sand and gravel 30-60'
Fine sand 60-70'
Sand and gravel 70-80'
Fine red sand 80-105'
Sand and gravel 105-109'
Rock 109+

5) Hartford

3 wells ranging from 107-110' deep, located under Madison Street, East of Route 3.

6) Edwardsville

5 wells ranging from 112 to 117, located south of railroad tracks in Poag. Services Edwardsville, Poag, NE Central Water District-Madison County.

Yellow fine sand 0-32'
Light streak of mud with sand 32-33'
Medium sand 33-53'
Mud 53-54'
Coarse sand-some gravel 54-88'
Coarse sand-some small rock 88-95'
Good coarse sand and gravel 95-106'
Big rock and gravel 106-110'
Layer of mud and shale bottom 110-112'

7) Hamel

Has its own wells - description unknown.

8) Glen Carbon

3 wells approximately 105' deep, located off of route 162, just west of I57.

Clay 0-30'
Coarse sand and gravel 30-55'
Fine sand 55-70'
Coarse sand and gravel 70-105'
Clay 105+

9) Granite City

Serviced by Illinois American Water Company which has its intake on the Mississippi River at the NW tip of Chouteau Island. This intake services Granite City, Pontoon Beach, Venice, and Madison.

10) East St. Louis

Serviced by Illinois American Water Company with the intake on the Mississippi River at I55-I70 bridge, just north of the St. Louis Arch area. Intake serves E. St. Louis, most of St. Clair County to Millstadt, Brooklyn, and National City. This intake is connected to the Granite City Water Supply.

11) State Park Place

3 wells ranging from 90-92' deep. Located west of Black Lane, south of Route 40. Mounds Public Water District serves 2500 people.

12) St. Louis Missouri

Intake just below the old Chain of Rocks Bridge.

DC:4T

STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY

DIVISION OF LAND/NOISE POLLUTION CONTROL

GROUNDWATER WITHDRAWALS FROM AQUIFERS IN ILLINOIS WITH EMPHASIS ON PWS WELLS

by
Rauf Piskin, John D. Student, L. Jill Withers
and Jay Dickman

1981

Table 1. Quaternary aquifer, public water supply wells (con't)

County	Pumping facility	Population (pop./yr)	Average daily pumpage of facility (gpd/yr)	No. of wells	Well location (sec.,T/R)	Well depth (feet)	Well yield (gpm)	Remarks
Macon	Oreana	1,092	62,000/77	2	9,17N-3E	132	60-110	
	Warrensburg	1,165/74	85,000/74	2	10,14,17N-1E	118-132	125-152	
Macoupin	Chesterfield	262	15,000/76	1	8,9N-9W	50	35	
Madison	Alhambra	594	40,000/75	3	4,5N-6W	80-82	100-133	Wells alternate
	Bethalto	° 10,031	1,248,500/76	9	22,5N-9W	90-98	190-700	Also supplies Meadowbrook P.W.D. and Moro P.W.D.
	Collinsville	19,567	2,070,000/75	4	31,3N-8W	99-103	900-1050	
	East Alton	7,669/72	568,600/75	3	17,5N-9W	90-103	400	Cross-connected with Wood River
	Edwardsville	11,070	1,334,600/75	4	13,4N-9W	114-117	650-1500	
	Forrest Homes-Maple Park P.W.D.	1,855/75	75,000/75	2	2,5N-9W	66-67	80	
	Glen Carbon	3,082/75	304,700/75	3	5,3N-8W	99-106	500	
	Hamel	454	75,000/77	3	7,18,5N-6W	110-113	40-45	
	Hartford	2,243	393,800/74	4	4,4N-9W	106-115	276-600	
	Livingston	916	61,200/75	1	Unknown	140	80	
	Marine	882	58,700/75	2	20,4N-6W	86-90	43-80	
	Maryville	1,290	200,000/75	2	5,3N-8W	100-102	150	Cross connected with Troy

Table 1. Quaternary aquifer, public water supply wells (con't)

County	Pumping facility	Population (pop./yr)	Average daily pumpage of facility (gpd/yr)	No. of wells	Well location (sec.,T/R)	Well depth (feet)	Well yield (gpm)	Remarks
Madison	Roxanna	° 4,123	624,100/75	4 (2)	27,5N-9W	120-126	500-Un	Also supplies S. Roxanna
	Troy	2,144	623,200/74	2	20,3N-8W	115	300-410	Cross-connected with Maryville
	Wood River	13,186	1,283,600/75	5 (1)	28,5N-9W	76-95	850-1000	Cross-connected with East Alton, wells alternate
	Worden	1,091	75,000/78	3	28,6N-7W	43-46	20-35	
Marshall	Henry	2,610	384,000/76	2	16,13N-10E	62-75	500	
	Lacon	2,147	275,000/76	3	26,30N-3W	49-50	230-400	
	LaRose	165	10,000/76	2	16,29N-1W	47	50	
	Magnolia (Putnam Co.)	328	* 33,000/76	1	2,30N-1W	138	100	See tables 1 & 3 (Putnam Co.)
	Sparland	585	60,000/76	2	14,12N-9E	30-34	100	
	Wenona	1,080	* 85,000/76	1	24,30N-1E	62	60	See table 13
Mason	Easton	386	24,000/78	2	25,21N-7W	135-138	150	
	Havana	4,376	810,000/77	3	1,21N-9W 6,21N-8W	78-96	630-650	
	Manito	1,334	105,000/76	3	21,23N-6W	81-100	55-300	
	Mason City	2,611	380,000/78	3	8,20N-5W	198-222	140-500	

CHARACTERISTICS OF THE POPULATION

Number of Inhabitants

ILLINOIS

1980

Census of Population

U.S. Department of Commerce

Table 4. Population of County Subdivisions: 1960 to 1980—Con.

[Total population of a place in two or more county subdivisions appears in table 5. Counts relate to county subdivisions and places as defined at each census. For meaning of symbols, see introduction.]

County Subdivisions	1980	1970	1960
McLean County—Con.			
West township	318	424	551
White Oak township	761	647	541
Colfax village	410	373	318
Yates township	409	477	599
Macon County[56]	131 375	125 010	118 257
Austin township	300	320	411
Blue Mound township	1 040	1 036	934
Decatur township	71 849	77 546	82 107
Decatur city (pt.)[56]	70 183	75 044	74 107
Friends Creek township	1 554	1 600	1 523
Argenta village[56]	994	1 034	860
Hamsburg township	2 209	2 209	2 203
Decatur city (pt.)[56]	–	...	...
Harristown village[56]	1 456	1 253	...
Hickory Point township	16 596	12 303	8 343
Decatur city (pt.)[56]	11 893	7 393	2 012
Forsyth village[56]	1 072	585	424
Illini township	1 656	1 162	1 119
Warrensburg village[56]	1 372	811	681
Long Creek township	11 957	9 951	7 143
Decatur city (pt.)[56]	7 829	5 458	1 492
Macon township	2 116	1 959	1 800
Maroa city[56]	1 760	1 467	1 235
Milligan township	138	163	196
Mount Zion township	6 097	3 531	2 018
Mount Zion village[56]	4 563	2 343	925
Niantic township	1 019	988	992
Niantic village	761	705	629
Oakley township	1 023	869	974
Decatur city (pt.)	19	8	–
Pleasant View township	1 656	1 552	1 486
Blue Mound village[56]	1 338	1 181	1 038
South Macon township	1 697	1 713	1 721
Macon city	1 300	1 249	1 229
South Wheatland township	5 219	4 810	3 665
Decatur city (pt.)[56]	1 469	1 498	117
Whitmore township	5 249	3 298	1 622
Decatur city (pt.)[56]	2 688	996	276
Oreana village[56]	999	1 092	464
Macoupin County[57]	49 384	44 557	43 524
Bird township	437	466	555
Hettick village (pt.)	114	118	112
Bois township	363	347	393
Brighton township	3 830	2 694	1 804
Brighton village (pt.)[57]	2 005	1 583	1 076
Bushy Mound township	544	478	367
Bunker Hill township	3 114	2 647	2 451
Bunker Hill city[57]	1 700	1 465	1 524
Chesterfield township	3 515	3 148	3 503
Benld city (pt.)	1 638	1 736	1 848
Edgarville village[57]	148	116	149
East Gillespie village (pt.)	104	112	99
Gillespie city (pt.)[57]	665	625	666
Carlinville township	6 714	6 724	6 223
Carlinville city[57]	5 439	5 675	5 440
Chesterfield township	1 095	1 029	1 058
Chesterfield village	280	262	280
Medora village (pt.)	376	349	286
Dorchester township	1 551	1 312	1 320
Dorchester village (pt.)	78	74	90
Wilsonville village	608	691	688
Gillespie township	4 111	3 849	4 025
Benld city (pt.)	–	–	...
Dorchester village (pt.)	77	96	71
East Gillespie village (pt.)	93	75	109
Gillespie city (pt.)[57]	3 075	2 832	2 903
Mount Clare village	300	298	320
Girard township	2 557	2 206	2 095
Girard city[57]	2 246	1 881	1 734
Hilliard township	892	653	597
Royal Lakes village[57]	270	...	...
Honey Point township	308	308	383
Mount Olive township	3 561	3 361	3 363
Mount Olive city[57]	2 357	2 288	2 295
Sawyerville village	381	315	362
White City village[57]	214	196	197
Nilwood township	781	719	873
Nilwood town (pt.)	269	245	270
Standard City village (pt.)	116	101	138
North Otter township	852	493	507
North Palmyra township	1 060	961	1 070
Modesto village	260	221	228
Palmyra village (pt.)	382	362	370
Park township	441	327	332
Scottville township	490	473	547
Scottville village	214	196	186
Shaws Point township	529	524	559
Standard City village (pt.)	32	38	44
Shipman township	1 437	1 370	1 248
Medora village (pt.)	156	156	161
Shipman town[57]	581	482	417
South Otter township	510	475	468
Nilwood town (pt.)	9	–	4
South Palmyra township	957	932	1 056
Hettick village (pt.)	148	140	141
Palmyra village (pt.)	482	414	441
Staunton township	5 223	5 036	4 834

County Subdivisions	1980	1970	1960
Macoupin County—Con.			
Staunton township—Con.			
Staunton city[57]	4 744	4 396	4 228
Virden township	4 225	3 744	3 559
Virden city (pt.)[57]	3 885	3 504	3 309
Western Mound township	287	281	334
Madison County[58]	247 691	250 911	224 689
Alhambra township	1 322	1 152	1 031
Alhambra village[58]	643	594	537
Alton township	34 171	39 700	43 047
Alton city[58]	34 171	39 700	43 047
Chouteau township[58]	8 627	8 521	6 194
Hartford village (pt.)[58]	1 054	1 198	1 170
Pontoon Beach village (pt.)[58]	89	–	...
Roxana village (pt.)	–	–	–
South Roxana village[58]	2 286	2 241	...
Collinsville township	27 158	26 373	20 122
Collinsville city (pt.)[58]	17 599	17 794	14 011
Glen Carbon village (pt.)[58]	69	49	38
Maryville village[58]	1 937	1 067	675
Edwardsville township	23 249	18 166	15 975
Edwardsville city (pt.)[58]	12 251	11 070	9 996
Glen Carbon village (pt.)[58]	5 128	1 848	1 203
Fort Russell township	5 912	5 487	4 190
Bethalto village (pt.)[58]	2 391	2 417	1 632
Meadowbrook (CDP)	1 082	1 295	...
Foster township[58]	3 502	2 760	2 072
Godfrey township[58]	15 860	16 168	10 313
Granite City township	36 815	40 685	40 073
Granite City city[58]	36 815	40 685	40 073
Hamel township	1 744	1 470	1 200
Hamel village[58]	537	454	362
Helvetia township	6 898	5 902	4 779
Highland city (pt.)[58]	5 616	4 871	3 963
Jarvis township	6 322	3 957	3 019
Troy city[58]	3 772	2 144	1 778
Leef township	524	486	499
Grantfork village (pt.)[58]	130	99	79
Marine township	1 871	1 475	1 405
Marine village	957	882	813
Moro township	2 135	1 704	1 238
Nameoki township[58]	13 606	13 872	9 210
Collinsville city (pt.)[58]	20	...	...
Madison city (pt.)	409	577	517
Pontoon Beach village (pt.)[58]	3 247	2 448	...
New Douglas township	632	627	634
New Douglas village	389	378	367
Olive township	1 950	1 855	1 970
Livingston village[58]	949	916	964
Williamson village	319	324	324
Omphghent township	1 964	1 939	1 833
Worden village	953	1 091	1 060
Pin Oak township	1 593	1 366	971
Edwardsville city (pt.)[58]	229	...	...
St. Jacob township	1 735	1 394	1 221
St. Jacob village[58]	792	659	529
Saline township	2 979	2 448	2 067
Grantfork village (pt.)[58]	138	63	55
Highland city (pt.)[58]	1 506	1 110	980
Pierron village (pt.)	53	35	48
Venice township[58]	9 122	12 925	13 260
Madison city (pt.)	5 506	6 465	6 344
Venice city	3 480	4 680	5 380
Wood River township[58]	38 000	40 479	38 366
Bethalto village (pt.)[58]	6 239	4 657	1 603
East Alton village[58]	7 123	7 309	7 630
Forest Homes (CDP)	1 701	1 998	2 205
Hartford village (pt.)	833	1 045	1 185
Rosewood Heights (CDP)	5 085	3 391	4 572
Roxana village (pt.)	1 587	1 882	2 090
Wood River city[58]	12 449	13 186	11 694
Marion County[59]	43 523	38 986	39 349
Alma township	893	775	825
Alma village	428	369	358
Carrigan township	442	394	478
Centralia township	17 954	17 560	17 677
Central City village[59]	1 505	1 377	1 422
Centralia city (pt.)[59]	12 353	13 351	13 427
Walnut Hill village	223	149	153
Wamac city (pt.)[59]	767	714	763
Foster township	350	315	344
Haines township	843	744	788
Kell village	283	173	194
Iuka township	884	827	873
Iuka village	353	343	378
Kinmundy township	1 379	1 139	1 249
Kinmundy city	945	759	813
Meacham township	421	420	449
Odin township	1 839	1 677	1 624
Odin village	1 285	1 263	1 242
Omega township	497	413	428
Patoka township	1 187	1 116	1 207
Patoka village[59]	662	562	601
Vernon village	199	203	235
Raccoon township	1 384	969	989
Romine township	489	450	476
Salem township	10 055	8 111	3 124

See footnotes at end of table

5N
9W

MADSN9W-24.7a

March 31,1934

BOILER WATER ANALYSIS
(C.W.A.)

Sample of water collected March 7,1934 by Mr.W.J.Urban from a well in Madison county owned by Mr.Henry Rathert and located 100'N. and 835'E. of the S.W.corner of Sec.24-T.5N-R.9W., R.F.D.No.2,E.Alton,Illinois. Depth of well 51'.

LABORATORY NO. 80916 D

Determinations made		Pts.per million
Iron	Fe	
(filtered)		0.0
(unfiltered)		1.6
Manganese	Mn	0.4
Silica	SiO_2	10.0
Turbidity		12.0
Calcium	Ca	138.0
Magnesium	Mg	82.1
Ammonium	NH_4	—
Sodium	Na	14.9
Sulfate	SO_4	41.0
Nitrate	NO_3	2.2
Chloride	Cl	30.0
Alkalinity as	$CaCO_3$	
Phenolphthalein		trace
Methyl Orange		546.0
Residue		622.0
Total Hardness		600.0

Hypothetical Combinations		Pts.per million	Grs.per gallon
Sodium Nitrate	$NaNO_3$	3.4	0.20
Sodium Chloride	NaCl	35.7	2.08
Magnesium Chloride	$MgCl_2$	11.4	0.66
Magnesium Sulfate	$MgSO_4$	51.2	2.99
Magnesium Carbonate	$MgCO_3$	169.5	9.88
Calcium Carbonate	$CaCO_3$	345.3	20.14
Manganese Oxide	MnO	0.5	0.03
Silica	SiO_2	10.0	0.58
Totals.		627.0	36.58

Spotted in Grad 2>1

SOFTENING REQUIREMENTS

Lime = 4.16 lbs. per 1,000 Gals.
Soda Ash = 0.51 lb. per 1,000 Gals.

STATE WATER SURVEY DIVISION

C.S.Boruff,Chemist

CSB/CH

City _____ County Madison

Section 25 Twp. No. 5N Range 9W

Location (in feet from section corner) 150' S. of N. line, 75' W. of E. line

Owner E. H. Dustman Authority Same

Contractor _____ Address _____

Date drilled Unknown Elev. above sea level top of well [illegible]

Depth 25'-0

Log Unknown

Were drill cuttings saved _____ Where filed _____

Size hole 4'-0 If reduced, where and how much _____

Casing record Brick

Distance to water when not pumping 19'-6 Distance to water is _____

feet after pumping at _____ G. P. M. for _____ hours.

Reference point for above measurements Ground level

Type of pump Hand, s.a. Distance to cylinder 4'-0

Length of cylinder 3"x10 Length of suction pipe below cylinder 19'-0

Length stroke _____ Speed _____

Hours used per day _____ Type of power _____

Rating of motor _____ Rating of pump in G. P. M. _____

Can following be measured: (1) Static water level _____

(2) Pumping level _____ (3) Discharge _____

(4) Influence on other wells _____

Temperature of water _____ Was water sample collected _____

Date _____ Effect of water on meters, hot water coils, etc. _____

Date of Analysis _____ Analysis No. _____

Use:- Stock, drinking
Demand:- 200 gal. daily.

Recorder W. G. Urban

Date Feb. 7, 1934

2807-18313 12

City _____ County Madison

Section 25 Twp. No. 5N Range 9W

Location (in feet from section corner) 250' W. of E. line, 150' S. of N. line.

Owner E. H. Dustman Authority Same

Contractor _____ Address _____

Date drilled Unknown Elev. above sea level top of well 526

Depth 50'-0

Log Unknown

Were drill cuttings saved _____ Where filed _____

Size hole 4'-0 If reduced, where and how much _____

Casing record Brick

Distance to water when not pumping 49'-0 Distance to water is _____

feet after pumping at _____ G. P. M. for _____ hours.

Reference point for above measurements Ground level

Type of pump Hand Distance to cylinder 16'-0

Length of cylinder 3"x10" Length of suction pipe below cylinder 32'-6 ?

Length stroke _____ Speed _____

Hours used per day _____ Type of power _____

Rating of motor _____ Rating of pump in G. P. M. _____

Can following be measured: (1) Static water level _____

(2) Pumping level _____ (3) Discharge _____

(4) Influence on other wells _____

Temperature of water _____ Was water sample collected _____

Date _____ Effect of water on meters, hot water coils, etc. Moderate scale deposit.

Date of Analysis _____ Analysis No. _____

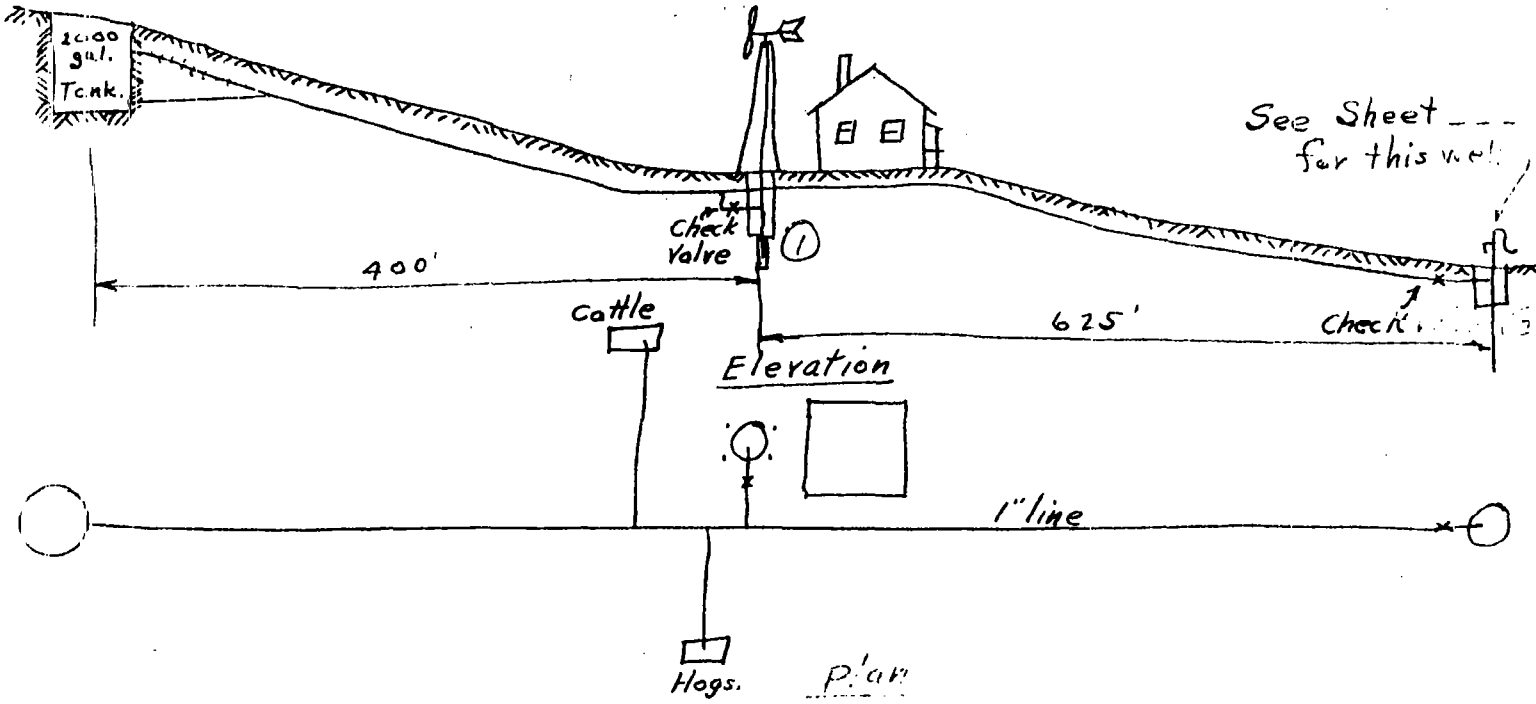
Use:- Hogs, drinking
Demand:- 50 gal./day.

Recorder W. J. Urban

2807-18313 12

Date Feb. 7, 1934

Demand equal to supply.



The supply of ① is inadequate. The demand is about 200 gal. per day on the two wells. ② is a driven well. But with the storage tank the demand can be met.

City _____ County Madison

Section 25 Twp. No. 5N Range 9W

Location (in feet from section corner) 500' E. of W. line, 1000' S. of N. line.

Owner Mrs. Westerhold Authority Same

Contractor _____ Address _____

Date drilled 1875 Elev. above sea level top of well 500'

Depth 33'-0

Log Unknown

Were drill cuttings saved _____ Where filed _____

Size hole 2'-9 If reduced, where and how much 0 to 20'-9 dia. = 2'-9, 20'-33' dia. = 18"

Casing record Brick for 20', 18" tile for 13'

Distance to water when not pumping 18'-0 Distance to water is _____

feet after pumping at _____ G. P. M. for _____ hours.

Reference point for above measurements Ground level

Type of pump #3 Way windmill, sing. act. Distance to cylinder 10'-0

Length of cylinder 2½" x 14" Length of suction pipe below cylinder 19'-0

Length stroke _____ Speed _____

Hours used per day _____ Type of power _____

Rating of motor _____ Rating of pump in G. P. M. _____

Can following be measured: (1) Static water level _____

(2) Pumping level _____ (3) Discharge _____

(4) Influence on other wells _____

Temperature of water _____ Was water sample collected _____

Date _____ Effect of water on meters, hot water coils, etc. _____

Date of Analysis _____ Analysis No. _____

Recorder W. J. Urban

Date Feb. 7, 1934

2807-18313 12

Over

City _____ County Madison

Section 25 Twp. No. 5N Range 9W

Location (in feet from section corner) 2475' W. of E. line, 375' N. of S. line

Owner T. J. Simpson Authority Same

Contractor _____ Address _____

Date drilled 1875 Elev. above sea level top of well 540

Depth 27'-6

Log Unknown

Were drill cuttings saved No Where filed _____

Size hole 3'-0 If reduced, where and how much _____

Casing record Brick

Distance to water when not pumping 20'-0 Distance to water is _____

feet after pumping at _____ G. P. M. for _____ hours.

Reference point for above measurements Ground level

Type of pump Bucket Distance to cylinder _____

Length of cylinder _____ Length of suction pipe below cylinder _____

Length stroke _____ Speed _____

Hours used per day _____ Type of power _____

Rating of motor _____ Rating of pump in G. P. M. _____

Can following be measured: (1) Static water level _____

(2) Pumping level _____ (3) Discharge _____

(4) Influence on other wells _____

Temperature of water _____ Was water sample collected _____

Date _____ Effect of water on meters, hot water coils, etc. _____

Date of Analysis _____ Analysis No. _____

Use:— Stock. The demand is small. Drinking. Too hard for washing.

Recorder W. J. Urbaw

Date Feb. 6, 1934

2807-18313 12

White Copy – Ill. Dept. of Public Health
Yellow Copy – Well Contractor
Blue Copy – Well Owner

INSTRUCTIONS TO DRILLERS

FILL IN ALL PERTINENT INFORMATION REQUESTED AND MAIL ORIGINAL TO STATE DEPARTMENT OF PUBLIC HEALTH, CONSUMER HEALTH PROTECTION, 535 WEST JEFFERSON, SPRINGFIELD, ILLINOIS, 62761. DO NOT DETACH GEOLOGICAL/WATER SURVEYS SECTION. BE SURE TO PROVIDE PROPER WELL LOCATION.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH WELL CONSTRUCTION REPORT

1. Type of Well
   a. Dug ____. Bored ____. Hole Diam. 10 in. Depth 45 ft.
   Curb material ____. Buried Slab: Yes ____ No ____
   b. Driven ____. Drive Pipe Diam. ____ in. Depth ____ ft.
   c. Drilled X. Finished in Drift X. In Rock ____.
   Tubular ____. Gravel Packed ____.
   d. Grout:

(KIND)	FROM (Ft.)	TO (Ft.)
None		

2. Distance to Nearest:
   Building ____ Ft. Seepage Tile Field ____
   Cess Pool ____ Sewer (non Cast iron) ____
   Privy ____ Sewer (Cast iron) ____
   Septic Tank ____ Barnyard ____
   Leaching Pit ____ Manure Pile ____
3. Well furnishes water for human consumption? Yes ____ No X
4. Date well completed [illegible]
5. Permanent Pump Installed? Yes ____ Date ____ No ____
   Manufacturer ____ Type ____ Location ____
   Capacity ____ gpm. Depth of Setting ____ Ft.
6. Well Top Sealed? Yes ____ No ____ Type ____
7. Pitless Adapter Installed? Yes ____ No ____
   Manufacturer ____ Model Number ____
   How attached to casing? ____
8. Well Disinfected? Yes ____ No X
9. Pump and Equipment Disinfected? Yes ____ No ____
10. Pressure Tank Size ____ gal. Type ____
    Location ____
11. Water Sample Submitted? Yes ____ No X

REMARKS:
Observation Well

GEOLOGICAL AND WATER SURVEYS WELL RECORD

10. Property owner Shell Oil Company Well No. 32-79
    Address Roxana, Illinois
    Driller J.T.Ruester License No. 102-204
11. Permit No. 85522 Date 5/14/79
12. Water from Alluvial (Formation) 13. County Madison
    at depth ____ to ____ ft. Sec. 25
    Twp. 5N
    Rge. 9W
    Elev. ____
14. Screen: Diam. 4 in.
    Length: 20 ft. Slot .020"

SHOW LOCATION IN SECTION PLAT
100'N 75'W of SE/c SW

15. Casing and Liner Pipe

Diam. (in.)	Kind and Weight	From (Ft.)	To (Ft.)
4	PVC	+1-1/2	-25

16. Size Hole below casing: 10 in.
17. Static level ____ ft. below casing top which is ____ ft. above ground level. Pumping level ____ ft. when pumping at ____ gpm for ____ hours.

18. FORMATIONS PASSED THROUGH	THICKNESS	DEPTH OF BOTTOM
Clay	3	3'
Fine sand	22'	25'
Fine to medium sand	20'	45'

(CONTINUE ON SEPARATE SHEET IF NECESSARY)

SIGNED ____ DATE 7/9/79

IDPH 4.065
1/74 – KNB-1

Study done on 1953 chemical site burial

SHELL DEVELOPMENT COMPANY
Biological Sciences Research Center
Modesto, California

TECHNICAL INFORMATION RECORD

TIR-25-003-81

Title	:	ANALYSIS OF WATER AND SOIL SAMPLES FROM WOOD RIVER REFINERY
Date	:	April 21, 1981
Author	:	E. J. Silveira
Participants	:	D. R. Farinha and G. W. Campbell
Project Number	:	83898.00
Approved by	:	R. A. Newman
References	:	MOLR 2383, p. 181, 182, 184 MOLR 2606, p. 127, 134
No. of Pages	:	18
LHINK Keywords	:	Water, soil, analysis, Wood River, GLC, mass, spectrometry, contamination, chemical, residue, pollution, aliphatic, aromatic, hydrocarbon

TIR-25-003-81

Title: ANALYSIS OF WATER AND SOIL SAMPLES FROM WOOD RIVER REFINERY

Abstract: Extracts of three soil samples and four water samples from Wood River Refinery were prepared and analyzed by GC/MS. No contaminants above the minimum detectable concentration were found in any of the water samples. The soil sample extracts contained varying amounts of aliphatic and aromatic hydrocarbons but nothing identifiable as a pesticide.

Introduction

Three soil samples from an apparent dump site at Wood River Refinery were submitted to BSRC for GC/MS analysis in an effort to identify a suspected insecticide contaminant. Also submitted were four water samples from various locations at the refinery. Table 1 lists the samples received from Wood River Refinery and analyzed at BSRC.

TABLE 1

WOOD RIVER REFINERY SAMPLES

AR Number	Type	Designation
63865	Soil	Waste Site 1
63866	Soil	Waste Site 2
63867	Soil	Waste Site 3
63861	Water	W-48
63862	Water	W-49
63863	Water	W-50
63864	Water	T-21

Extract Preparation

A 2 g portion of each soil sample was bulk extracted with 20 ml of acetone. No attempt was made to do an exhaustive extraction or to ascertain extraction efficiencies, the purpose being merely to provide an extract for qualitative examination.

Approximately 1 liter of water sample was made basic (pH 11) by addition of NaOH pellets, then extracted with 120 ml CH_2Cl_2. The CH_2Cl_2 phase was collected and the aqueous phase extracted twice more with 80 ml portions of fresh CH_2Cl_2. The CH_2Cl_2 extracts were combined and reduced to approximately 10 ml volume by rapid evaporation in a Kuderna-Danish Concentrator equipped with a 3-ball Snyder column. The CH_2Cl_2 extract was further concentrated to slightly less than 1 ml volume by blowdown with dry nitrogen. An aliquot (approximately 100 µl) of CH_2Cl_2 solution containing 100 µg of d_{10}-anthracene internal standard was added and the volume adjusted to 1.0 ml. This was the base-neutral (BN) fraction of the liquid-liquid extract (LLE).

The basic aqueous sample solution was then acidified to pH2 by addition of 6N HCl. The above extraction, concentration, standard addition and volume adjustment steps were then repeated to yield the acid extractable (AE) fraction of the LLE.

Instrumentation and Methodology for GC/MS

The soil and water extracts were analyzed by GC/MS using conditions listed in the following table.

TABLE 2

GC/MS CONDITIONS

Instrument: Finnigan 4000

Mode: Electron Impact (EI)

Electron Multiplier Voltage: 1000V

Conversion Dynode Voltage: 3000V

Electron Energy: 70V

Emission Current: 0.2 ma

Preamplifier Sensitivity: 10^{-7} a/V

Source Temperature: 250°C

GC Column: SE-54 fused silica WCOT, 30m x 0.25mm

Column Temperature: Soil extracts - 70°C for 4 minutes, then programmed to 320°C at 15°/minute
Water extracts - 70°C for 4 minutes, then programmed to 300°C at 8°/minute

Injector: Modified German-Horning

Injector Temperature: 280°C

Injector Pressure: 14 psi

Injector Flow: Approximately 20 ml/minute

Split Ratio: Approximately 10:1

Carrier: Helium

Injection Volume: 2 µl

Scan Range: 40-640 amu

Scan Time: 1.5 seconds/scan

Total Scans/Run: Soil extracts - 950 scans/run
Water extracts - 1400 scans/run

Results and Discussion

Figures 1-3 show total ion chromatograms from GC/MS runs of the soil extracts. All three extracts contain a complex mixture of components. Manual examination of the mass spectra of the major peaks in all three chromatograms, together with automated search of the NBS Mass Spectral Library of reference mass spectra, revealed that essentially all were identifiable as either aliphatic or aromatic hydrocarbons. Positive confirmation of specific compounds was not attempted and would require the running of bonafide reference materials for comparison of retention times and spectra. No attempt was made to quantitate the concentrations of the components. A thorough examination (manual inspection of the mass spectra of all peaks) of the GC/MS run of the extract of Sample 1 (AR 63865) revealed no apparent insecticides, pesticides, or chlorinated compounds.

Figures 4-11 show total ion chromatograms from GC/MS runs of the water extracts. The only peak apparent in any of the chromatograms is that of the added d_{10}-anthracene internal standard. The d_{10}-anthracene peak corresponds to a nominal equivalent concentration (in the water sample) of 100 μg/l (ppb). The minimum detectable concentration for the water analysis procedure (essentially the same methodology used for priority pollutant target compound analysis) is approximately 10 μg/l for amenable compounds.

E. J. Silveira

E. J. Silveira

EJS/mt

FIGURE 1

GC/MS TOTAL ION CHROMATOGRAM OF EXTRACT OF AR 63865, SOIL SAMPLE 1

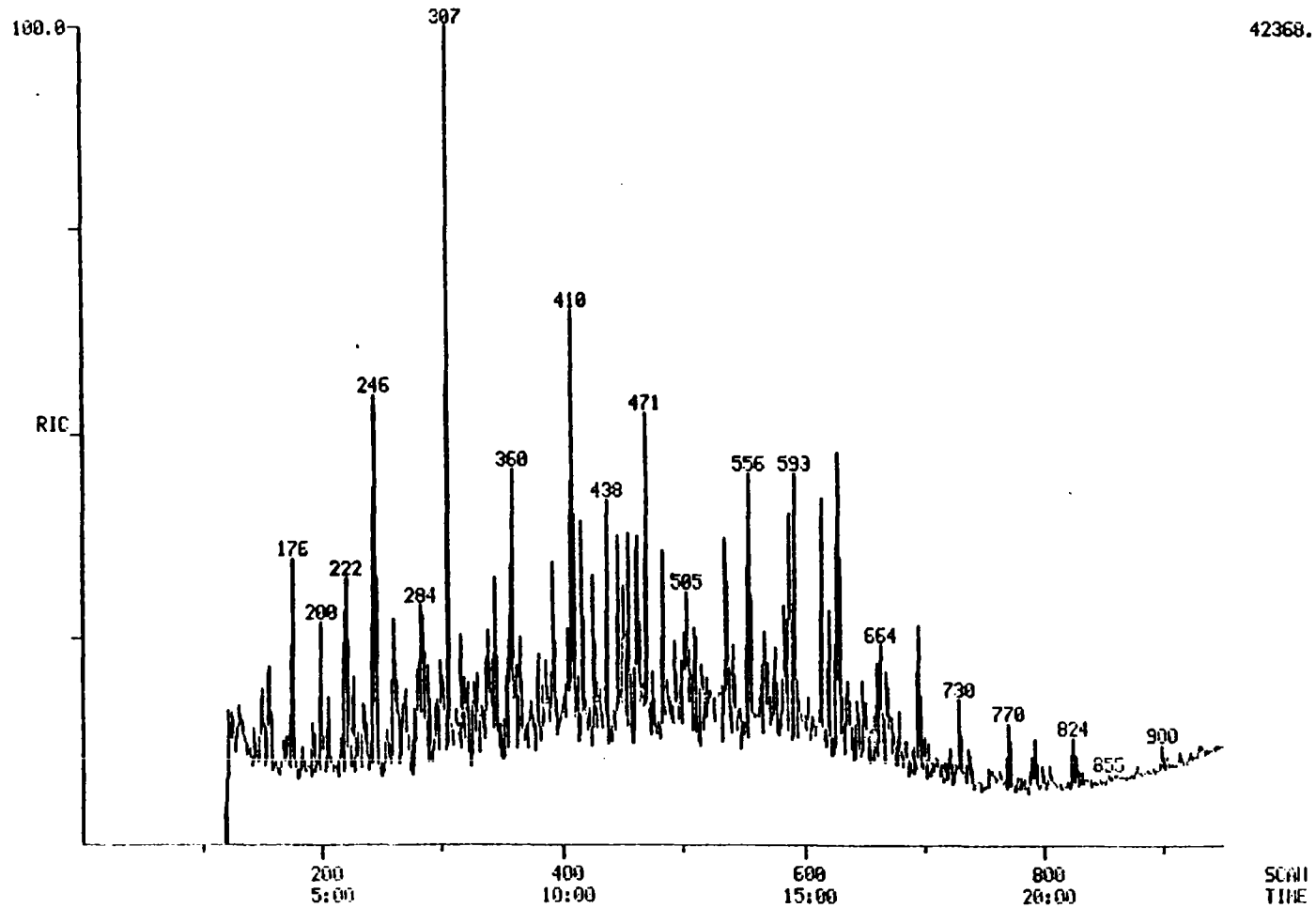


FIGURE 2

GC/MS TOTAL ION CHROMATOGRAM OF EXTRACT OF AR 63866, SOIL SAMPLE 2

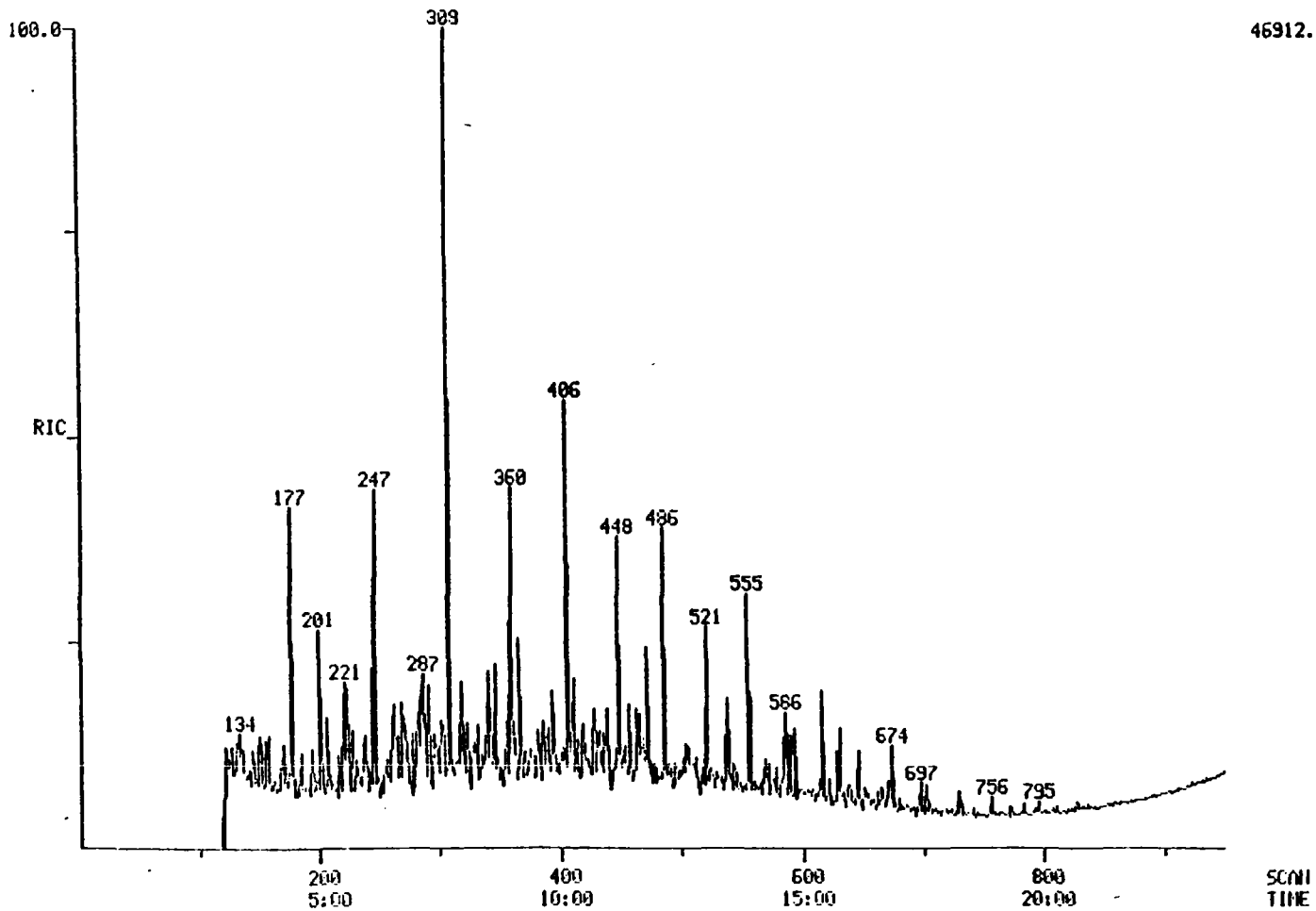


FIGURE 3

GC/MS TOTAL ION CHROMATOGRAM OF EXTRACT OF AR 63867, SOIL SAMPLE 3

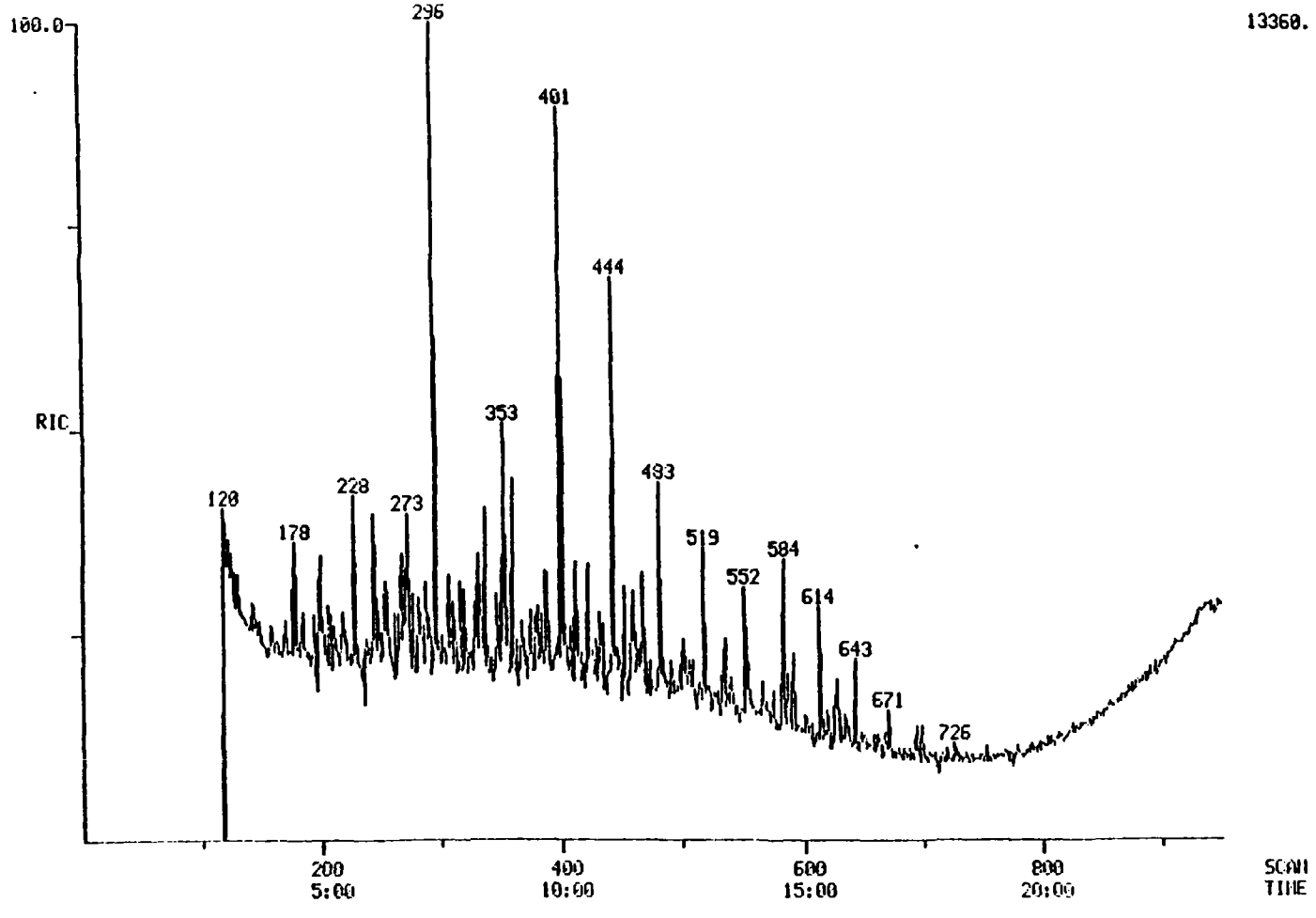


FIGURE 4

CC/MS TOTAL ION CHROMATOGRAM OF BN EXTRACT OF AR 63861, WATER SAMPLE W 48

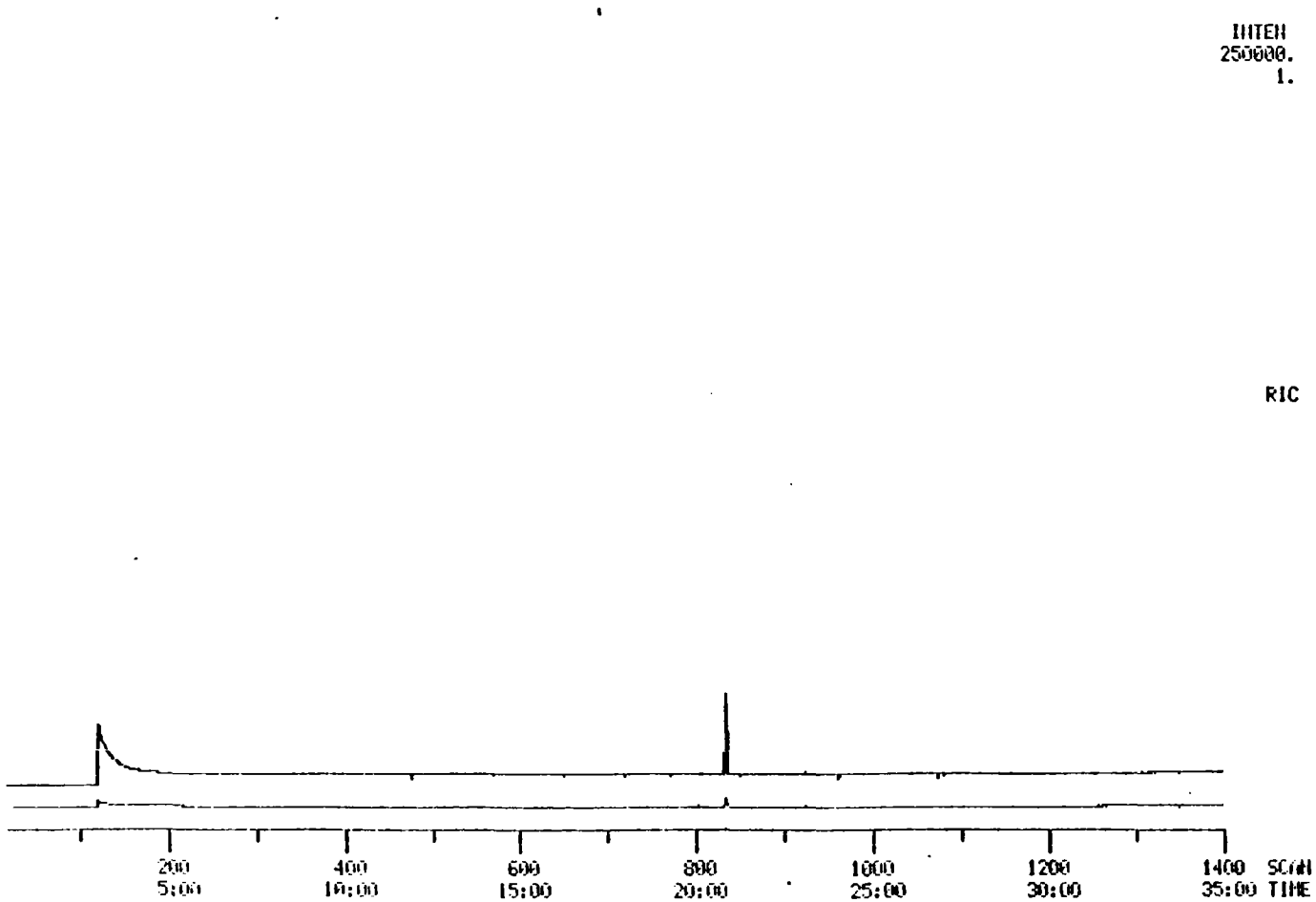


FIGURE 5

GC/MS TOTAL ION CHROMATOGRAM OF AE EXTRACT OF AR 63861, WATER SAMPLE W 48

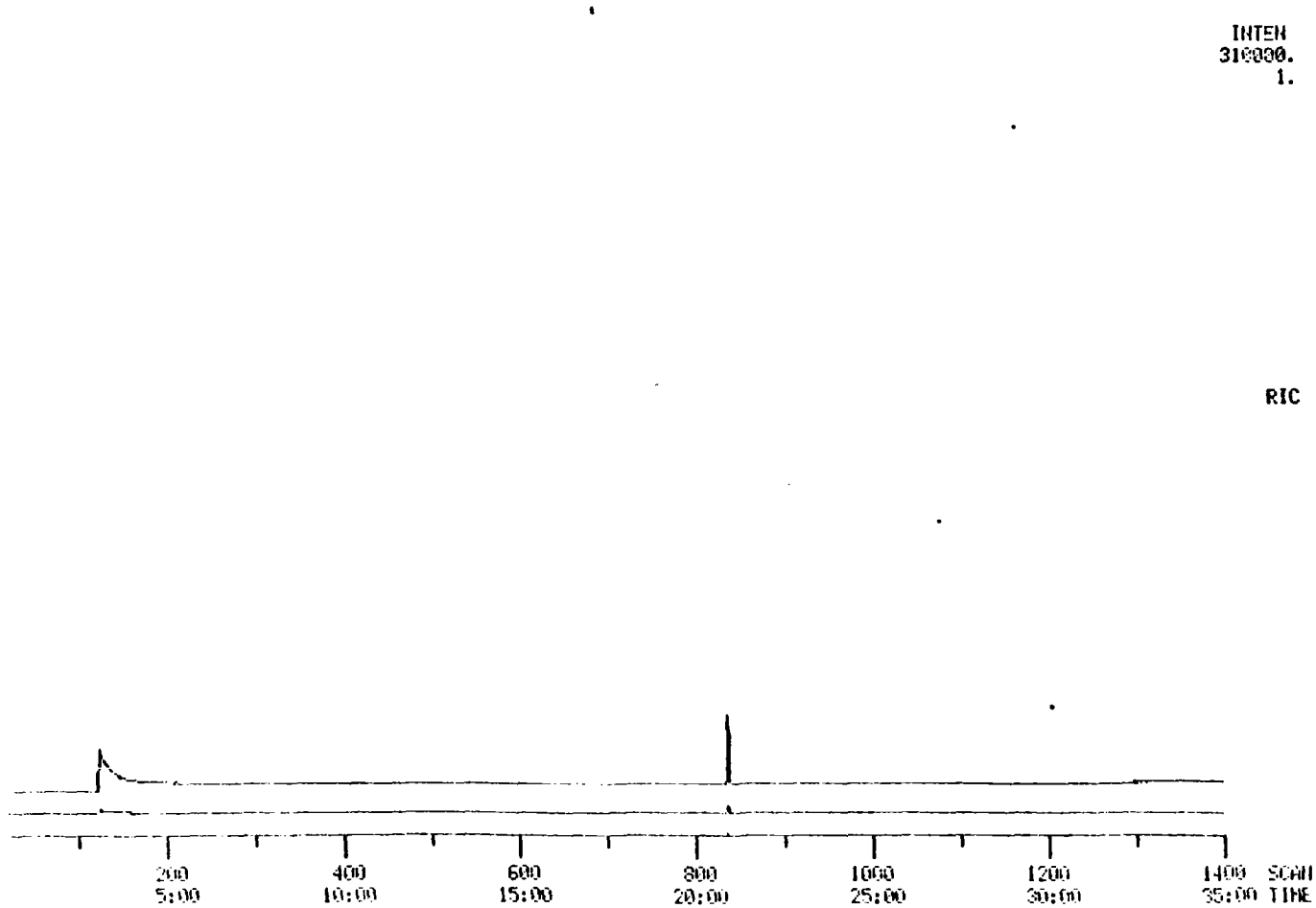


FIGURE 6

GC/MS TOTAL ION CHROMATOGRAM OF BN EXTRACT OF AR 63862, WATER SAMPLE W-49

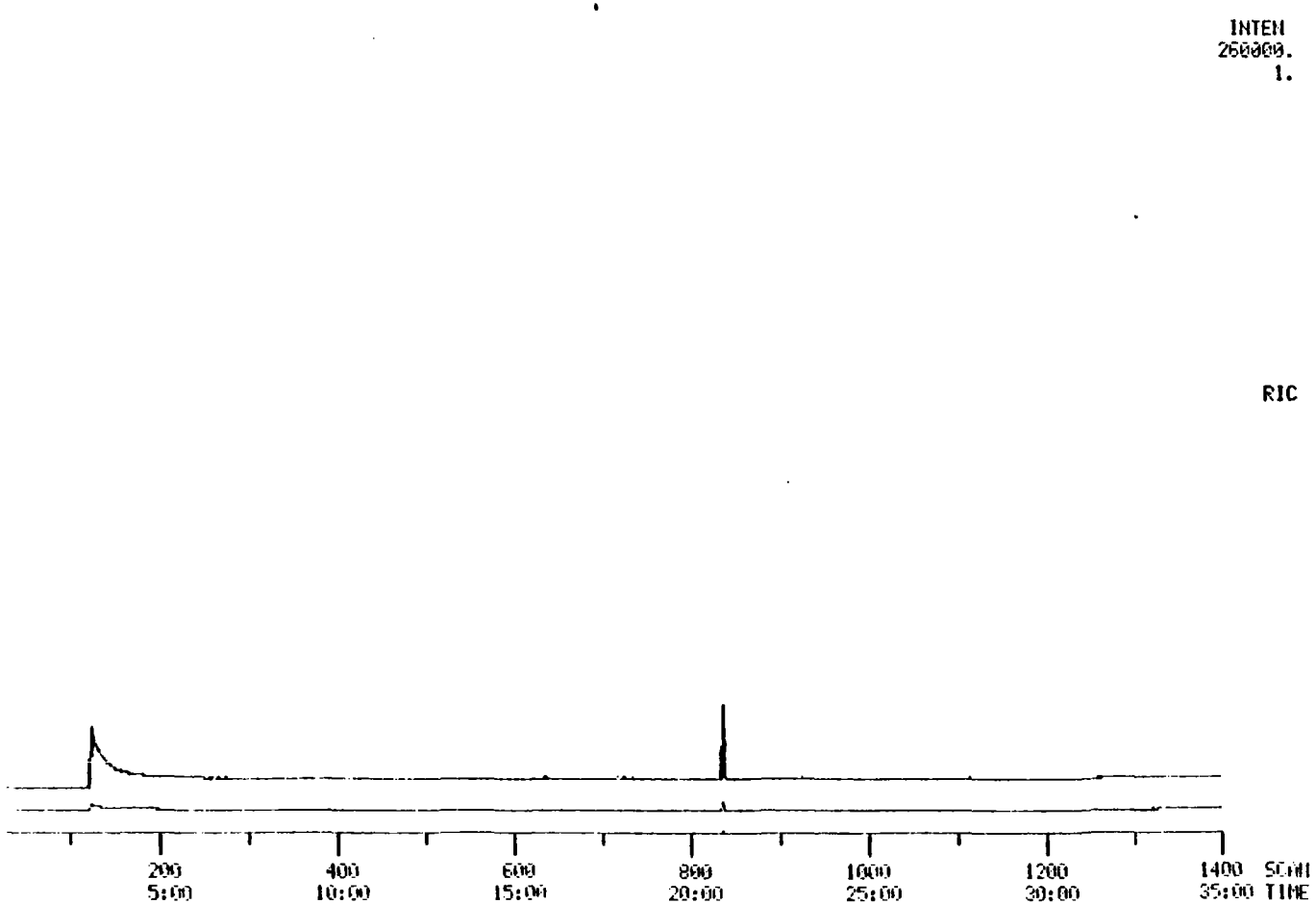


FIGURE 7

GC/MS TOTAL ION CHROMATOGRAM OF AE EXTRACT OF AR 63862, WATER SAMPLE W-49

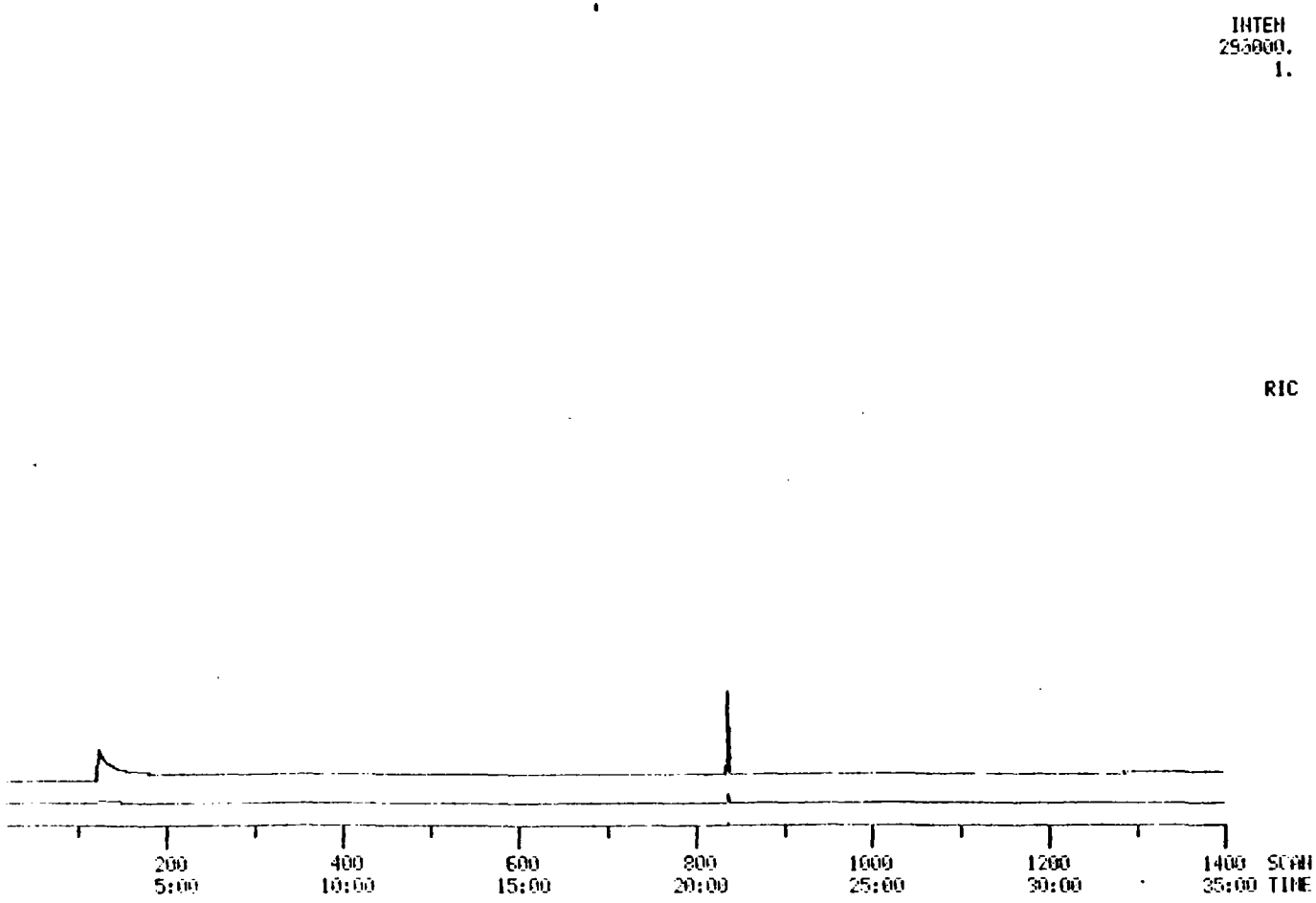


FIGURE 8

GC/MS TOTAL ION CHROMATOGRAM OF BN EXTRACT OF AR 6186 I, WATER SAMPLE W-50

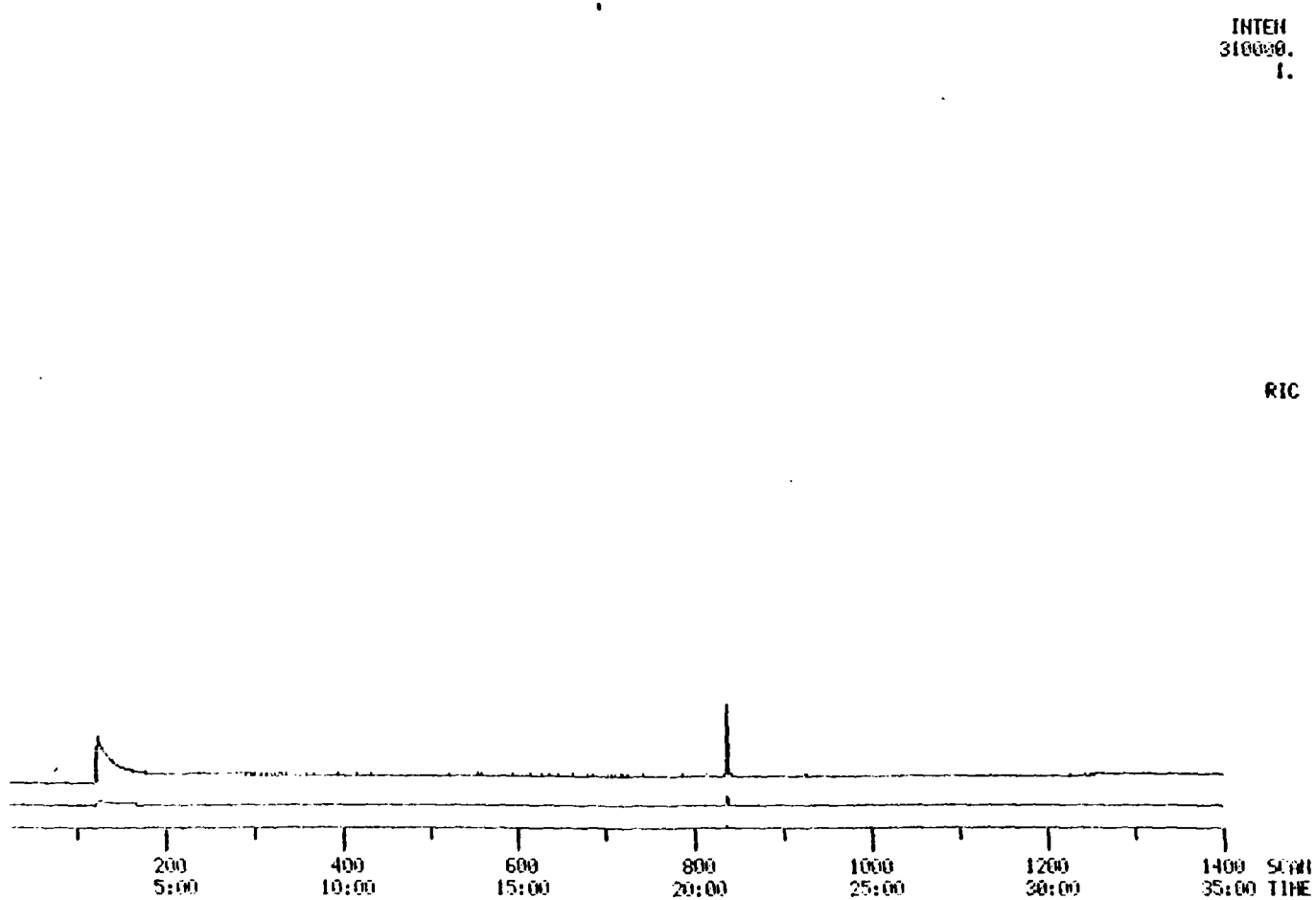


FIGURE 9

CC/MS TOTAL ION CHROMATOGRAM OF AE EXTRACT OF AR 63863, WATER SAMPLE W-50

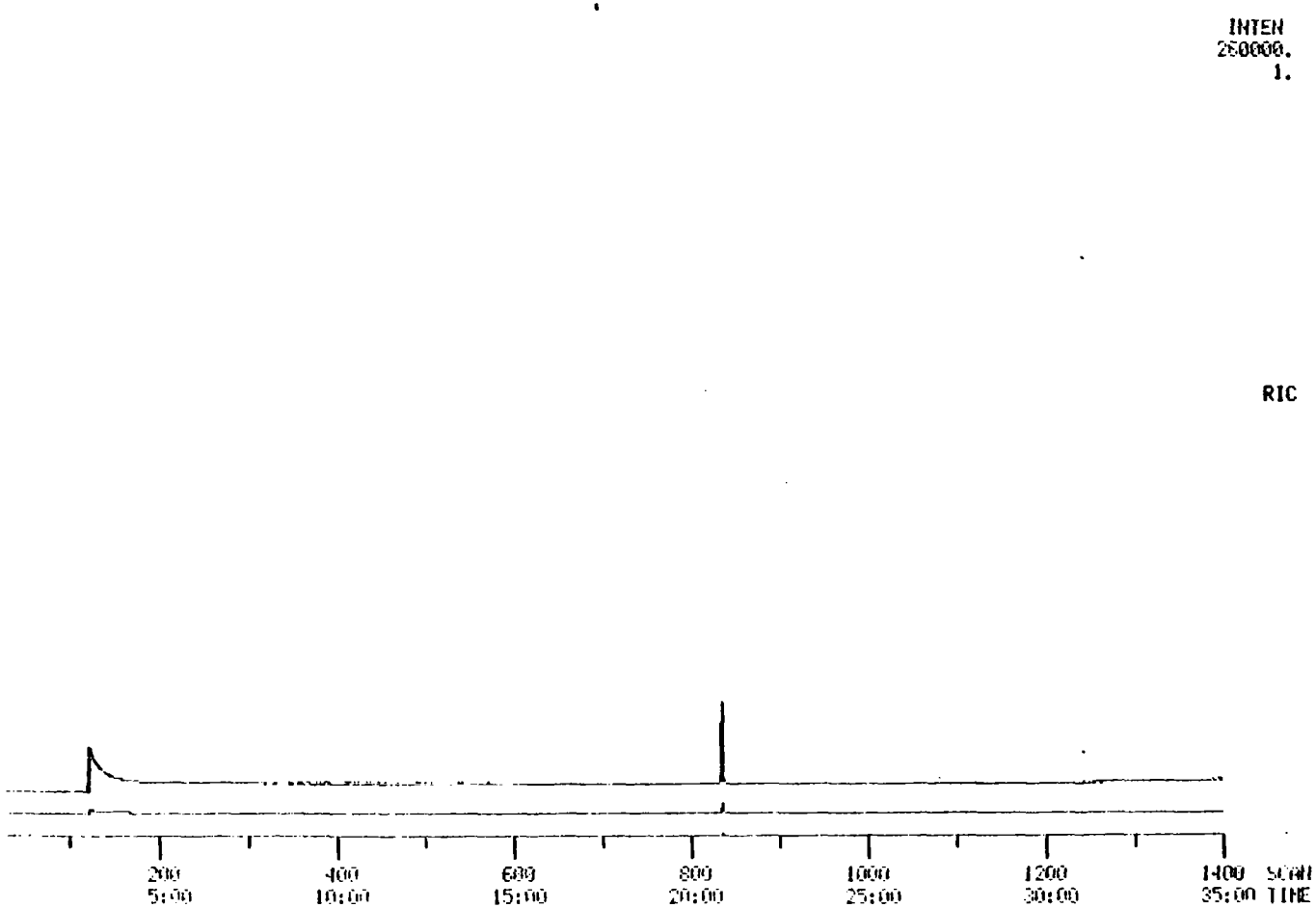


FIGURE 10

GC/MS TOTAL ION CHROMATOGRAM OF BN EXTRACT OF AR 63864, WATER SAMPLE T-21

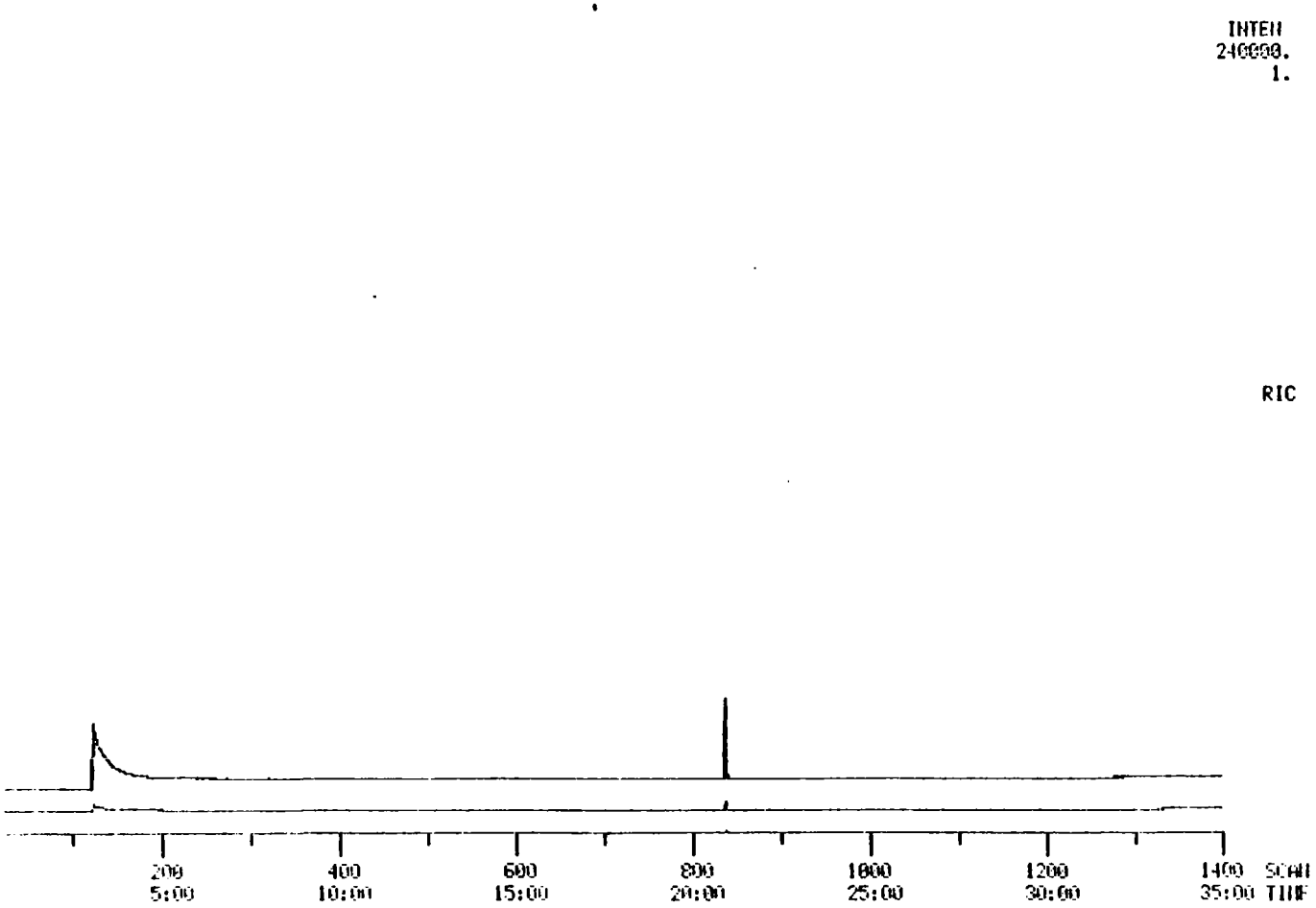
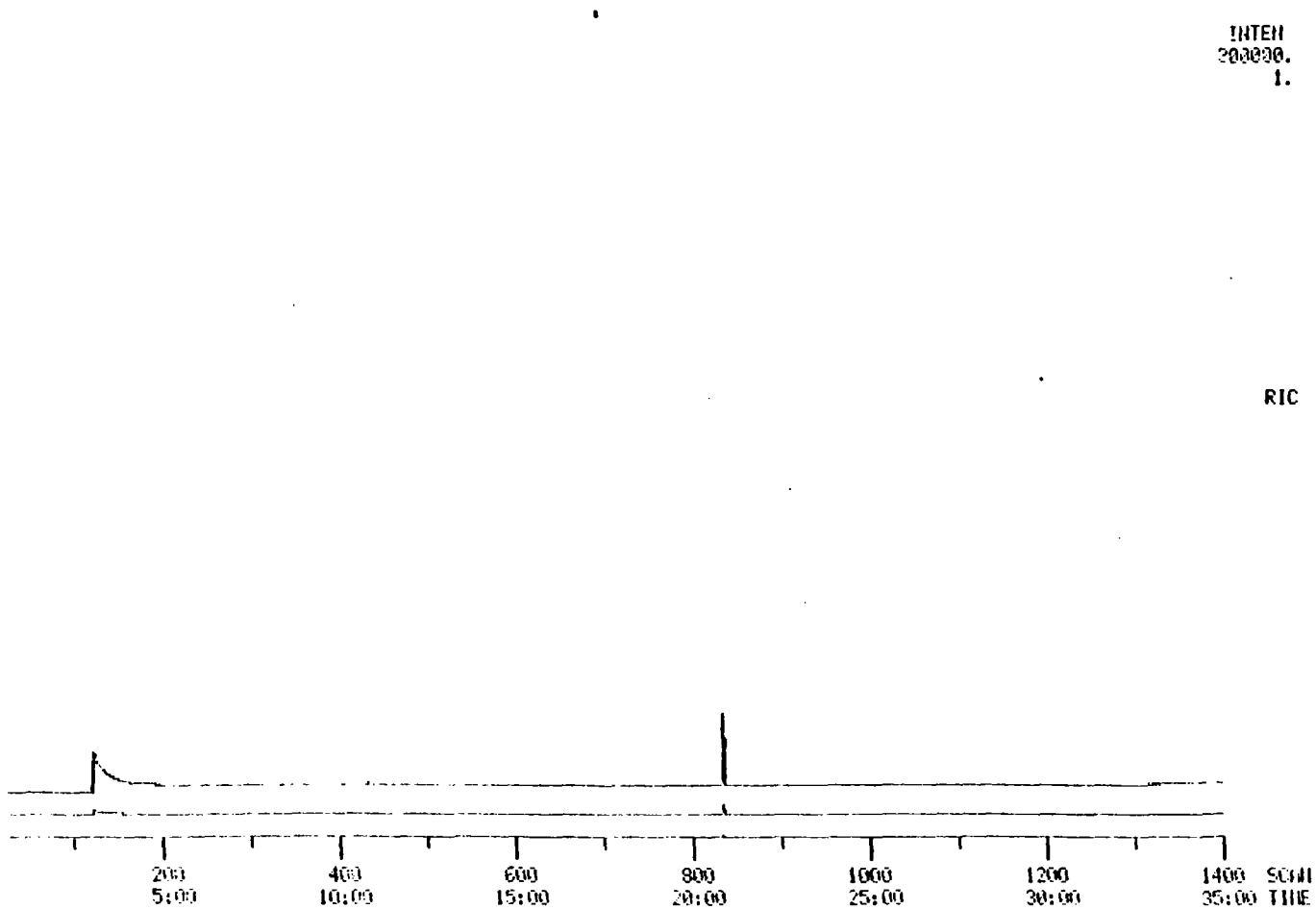


FIGURE 11

GC/MS TOTAL ION CHROMATOGRAM OF AE EXTRACT OF AR 63864, WATER SAMPLE T 21