



Mr. Gary Fletcher  
NIOSH  
944 Chestnut Ridge Road  
Morgantown, WV 26505

March 29, 1994

RE: GC/Mass Spectrometer Analysis of D.O.P. Samples.

Four samples of D.O.P. were analyzed, they were as follows:

1. New D.O.P. (no light, no heat)
2. New D.O.P. (exposed to light only)
3. New D.O.P. (heated to 170 deg. C., no light) (Light tan liquid)
4. Old D.O.P. (Brown liquid)

All samples were analyzed under the same instrument conditions.  
(GC) 50-325deg. at 15deg/min. Post 10min.  
(Mass Spec) EI 70EV.

Figure 1. shows the ion curve of sample #1, the New D.O.P.

Figure 2. shows the ion curve of Sample #2, exposed to light.

Figure 3. shows the ion curve of sample #3, exposed to heat.

Figure 4. shows the ion curve of sample #4, old D.O.P.

Figure 5. shows a comparison of sample 1 to sample 2.

Figure 6. shows a comparison of the mass spectra of D.O.P. in sample 1 to sample 4.

Tables 2 through 4 show a difference in the amount of D.O.P when compared to that of Table 1. (New D.O.P.)

The NIST/EPA Library search of the peaks observed indicated the formation of other phthalic compounds and their esters among them the possibility of isomers from the D.O.P.

Breakdown transitional compounds were unidentifiable, although they gave the characteristic of a base peak(149amu) and a peak at 167amu that are good indicators of plasticizers.

From the results of the analyses it should be noted that the D.O.P. does breakdown when exposed to light and heat. The samples analyzed showed sample 1 was 99.95% pure and each sample decreased in purity to only 94.36% for sample 4.





Data: NIOSH1.TI  
 04/20/94 13:08:00  
 Sample: DOP NEW NO LIGHT NO HEAT  
 Conds.: 30-325 AT 15DEG/MIN. POST 10MIN. DB-5 CAP COL. 25ML  
 Formula: Instrument: 4500 Weight: 0.000  
 Submitted by: GF Analyst: BS Acct. No:

TABLE 1.

New D.O.P.

AMOUNT=AREA \* REF AMNT/(REF AREA \* RESP FACT)  
 Resp. fac. from Library Entry

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
1	RIC	570	9:30	5	0.615	A BB	8608.	0.023	0.02
2	RIC	835	13:55	5	0.901	A BB	484.	0.001	0.00
3	RIC	839	13:59	5	0.905	A BB	92.	0.000	0.00
4	RIC	865	14:25	5	0.933	A BB	3606.	0.010	0.01
5	RIC	927	15:27	5	1.000	A BB	34902700.	100.000	99.95
6	RIC	962	16:02	5	1.038	A BB	4880.	0.014	0.01

Data: NIOSH2.TI  
 04/20/94 14:41:00  
 Sample: FRESH DOP NOT HEATED EXPOSED TO LIGHT  
 Conds.:  
 Formula: Instrument: 4500 Weight: 0.000  
 Submitted by: Analyst: Acct. No:

TABLE 2.

Exposed to Light

AMOUNT=AREA \* REF AMNT/(REF AREA \* RESP FACT)  
 Resp. fac. from Library Entry

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
1	RIC	556	9:16	3	0.542	A BB	2384.	0.004	0.00
2	RIC	659	10:59	3	0.643	A BB	2700.	0.005	0.00
3	RIC	1025	17:05	3	1.000	A BB	56484900.	100.000	99.94
4	RIC	1049	17:29	3	1.023	A BB	27216.	0.048	0.05

Data: NIOSH3.TI  
 04/20/94 15:54:00  
 Sample: NEW DOP HEATED 170DEG. CENT.  
 Conds.:  
 Formula: Instrument: 4500 Weight: 0.000  
 Submitted by: Analyst: Acct. No:

TABLE 3.

Exposed to Heat 170 Deg.

AMOUNT=AREA \* REF AMNT/(REF AREA \* RESP FACT)  
 Resp. fac. from Library Entry

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
1	RIC	478	7:58	5	0.516	A BB	4968.	0.015	0.02
2	RIC	487	8:07	5	0.526	A BB	2607.	0.008	0.01
3	RIC	570	9:30	5	0.616	A BB	14670.	0.045	0.04
4	RIC	868	14:28	5	0.937	A BB	3394.	0.010	0.01
5	RIC	926	15:26	5	1.000	A BB	32588900.	100.000	99.88
6	RIC	939	15:39	5	1.014	A BB	3184.	0.010	0.01
7	RIC	944	15:44	5	1.019	A BB	2752.	0.008	0.01
8	RIC	951	15:51	5	1.027	A BB	3666.	0.011	0.01
9	RIC	963	16:03	5	1.040	A BB	2848.	0.009	0.01

Data: NIOSH4.TI  
 04/20/94 17:04:00  
 Sample: OLD DOP  
 Conds.:  
 Formula: Instrument: 4500 Weight: 0.000  
 Submitted by: Analyst: Acct. No:

TABLE 4.

Old D.O.P.

AMOUNT=AREA \* REF AMNT/(REF AREA \* RESP FACT)  
 Resp. fac. from Library Entry

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
1	RIC	464	7:44	14	0.465	A BB	15378.	0.074	0.07
2	RIC	690	11:30	14	0.691	A BV	3478.	0.017	0.02
3	RIC	699	11:39	14	0.700	A VB	6184.	0.030	0.03
4	RIC	714	11:54	14	0.715	A BB	904.	0.004	0.00
5	RIC	786	13:06	14	0.788	A BB	1852.	0.009	0.01
6	RIC	840	14:00	14	0.842	A BB	896.	0.004	0.00
7	RIC	864	14:24	14	0.866	A BB	2744.	0.013	0.01
8	RIC	867	14:27	14	0.869	A BB	3628.	0.018	0.02
9	RIC	874	14:34	14	0.876	A BB	2104.	0.010	0.01
10	RIC	888	14:48	14	0.890	A BB	24734.	0.120	0.11
11	RIC	913	15:13	14	0.915	A BB	3600.	0.017	0.02
12	RIC	922	15:22	14	0.924	A BB	34592.	0.167	0.16
13	RIC	947	15:47	14	0.949	A BB	8284.	0.040	0.04
14	RIC	998	16:38	14	1.000	A BB	20683100.	100.000	94.36
15	RIC	1004	16:44	14	1.006	A BB	137120.	0.663	0.63
16	RIC	1011	16:51	14	1.013	A BV	173680.	0.840	0.79
17	RIC	1016	16:56	14	1.018	A VV	104688.	0.506	0.48
18	RIC	1021	17:01	14	1.023	A VV	278400.	1.346	1.27
19	RIC	1031	17:11	14	1.033	A VV	399792.	1.933	1.82
20	RIC	1042	17:22	14	1.044	A VB	6288.	0.030	0.03
21	RIC	1046	17:26	14	1.048	A BB	4504.	0.022	0.02
22	RIC	1051	17:31	14	1.053	A BB	1512.	0.007	0.01
23	RIC	1059	17:39	14	1.061	A BB	13064.	0.063	0.06
24	RIC	1067	17:47	14	1.069	A BB	7978.	0.039	0.04

FIGURE 5.

Comparison of New D.O.P.  
and Old D.O.P.

**\*\*Note\*\*** The retention time  
difference is because the  
data collected started late.

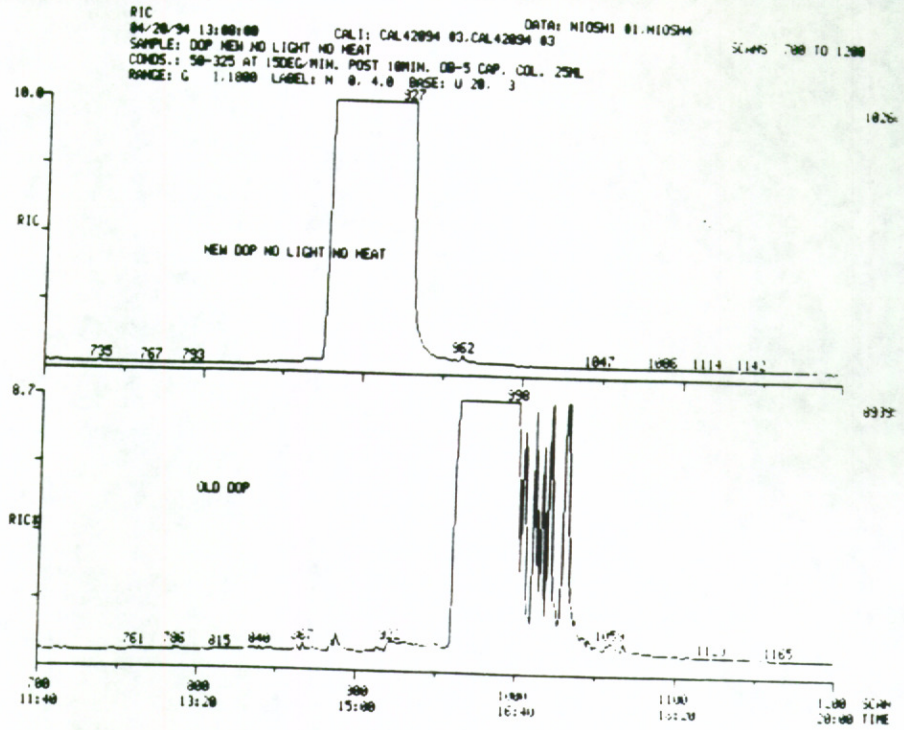
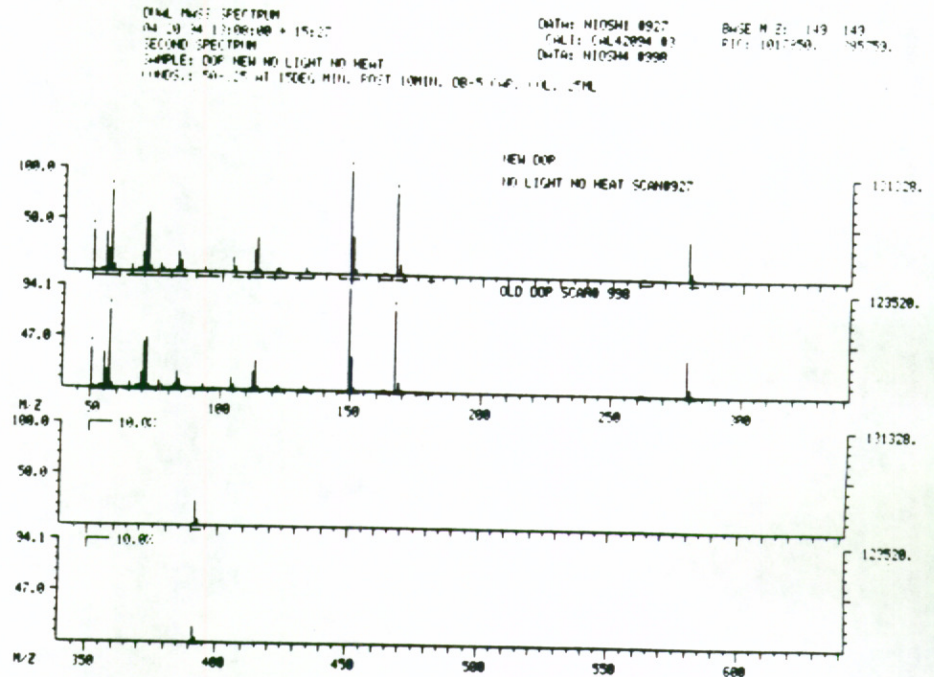


FIGURE 6.

Comparison of Mass Spectra  
between New D.O.P. and Old  
D.O.P.



I have enclosed the hard data collected from the analyses.

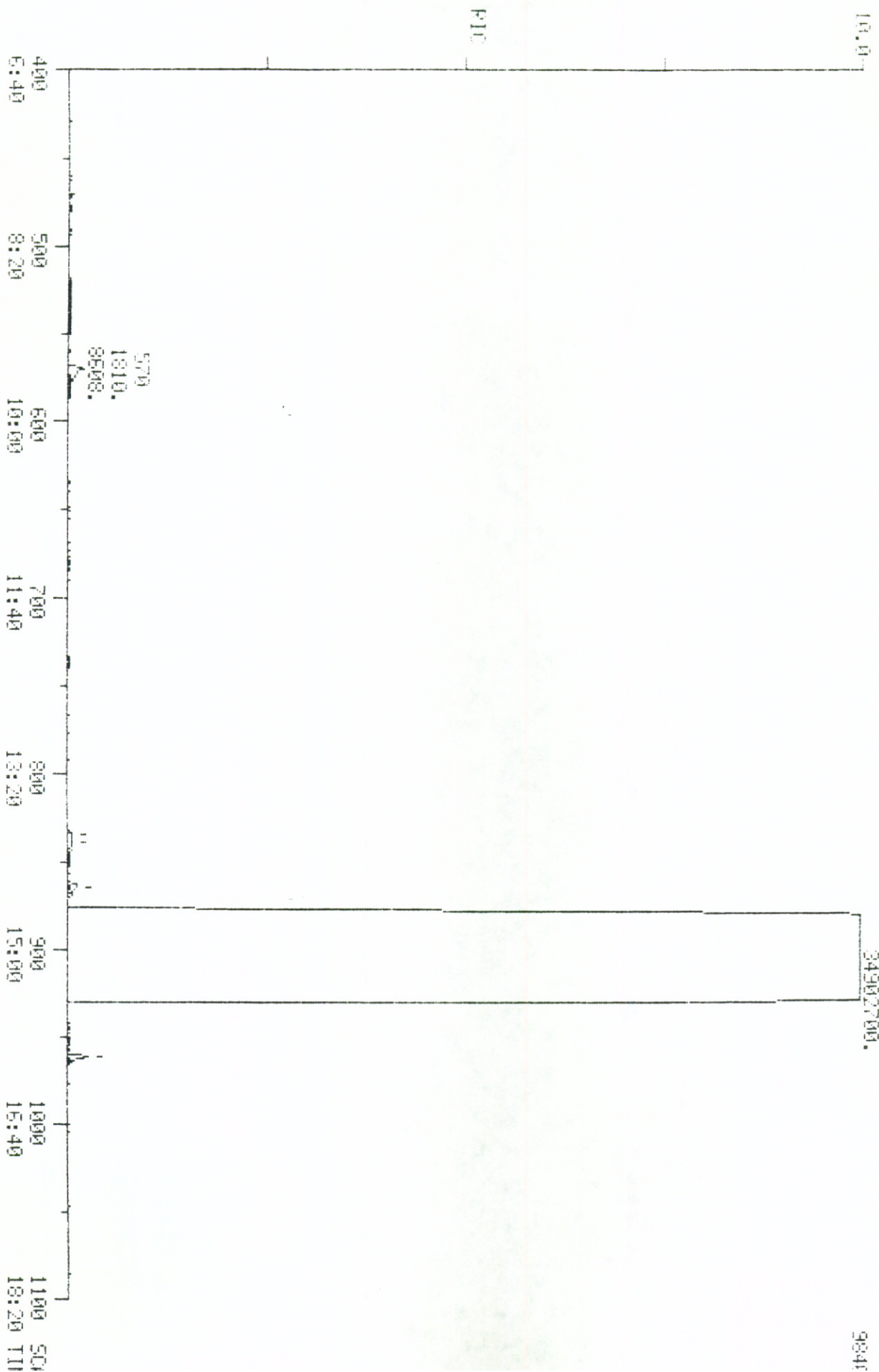
If there are questions concerning the analyses, please give me a call at 293-5970.

Robert R. Smith

  
Mgr/Mass Spectrometry Center

FID  
 04/20/94 13:08:00  
 SAMPLE: DOP NEM NO LIGHT NO HEAT  
 COND.: 50-325 AT 150EG/MIN. POST 10MIN. DB-5 CAP. COL. 25ML  
 RANGE: 6 1.1800 LABEL: N 2. 4.0 QUAN: 4 2. 4.0 J 0 BUSSE: U 20. 8

DATA: NIOSHI #1  
 CALL: CAL42694 #3  
 SCANS 400 TO 1100



984F

Quantitation Report File: B1GUANLIST

Data: NIOSH1.TI

04/20/94 13:08:00

Sample: DOP NEW NO LIGHT NO HEAT

Conds.: 50-325 AT 15DEG/MIN. POST 10MIN. DB-5 CAP. COL. 25ML

Formula: Instrument: 4500 Weight: 0.000

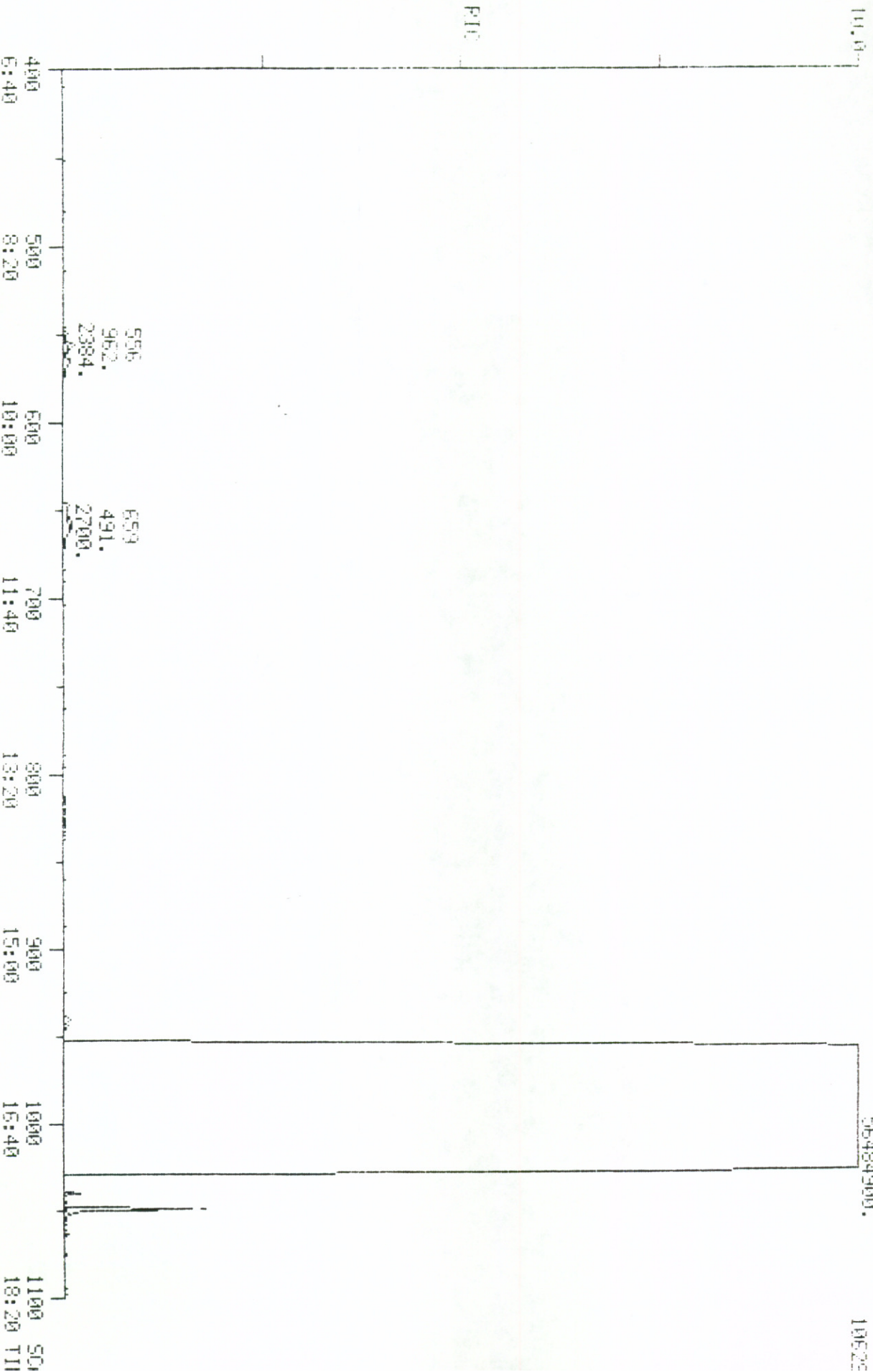
Submitted by: GF Analyst: BS Acct. No.:

AMOUNT=AREA \* REF AMNT/(REF AREA \* RESP FACT)

Resp. fac. from Library Entry

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
1	RIC	570	9:30	5	0.615	A BB	8608.	0.025	0.02
2	RIC	835	13:55	5	0.901	A BB	484.	0.001	0.00
3	RIC	839	13:59	5	0.905	A BB	92.	0.000	0.00
4	RIC	865	14:25	5	0.933	A BB	3606.	0.010	0.01
5	RIC	927	15:27	5	1.000	A BB	34902700.	100.000	59.95
6	RIC	962	16:02	5	1.038	A BB	4880.	0.014	0.01

P10  
 04/20/94 14:41:00 DATA: H105H2 #1 SCANS 400 TO 1100  
 SAMPLE: FRESH DOP NOT HEATED EXPOSED TO LIGHT CALI: CAL42094 #3  
 CONDOS: :  
 PULSE: 0 1.1300 LABEL: 11 2. 4.0 QUANT: 4 2. 4.0 J 0 BATT: 0.26 3





Quantitation Report      File: B1QUANLIST

Data: NIOSH2.TI

04/20/94 14:41:00

Sample: FRESH DOP NOT HEATED EXPOSED TO LIGHT

Conds.:

Formula:

Instrument: 4500

Weight: 0.000

Submitted by:

Analyst:

Acct. No.:

AMOUNT=AREA \* REF AMNT/(REF AREA \* RESP FACT)

Resp. fac. from Library Entry

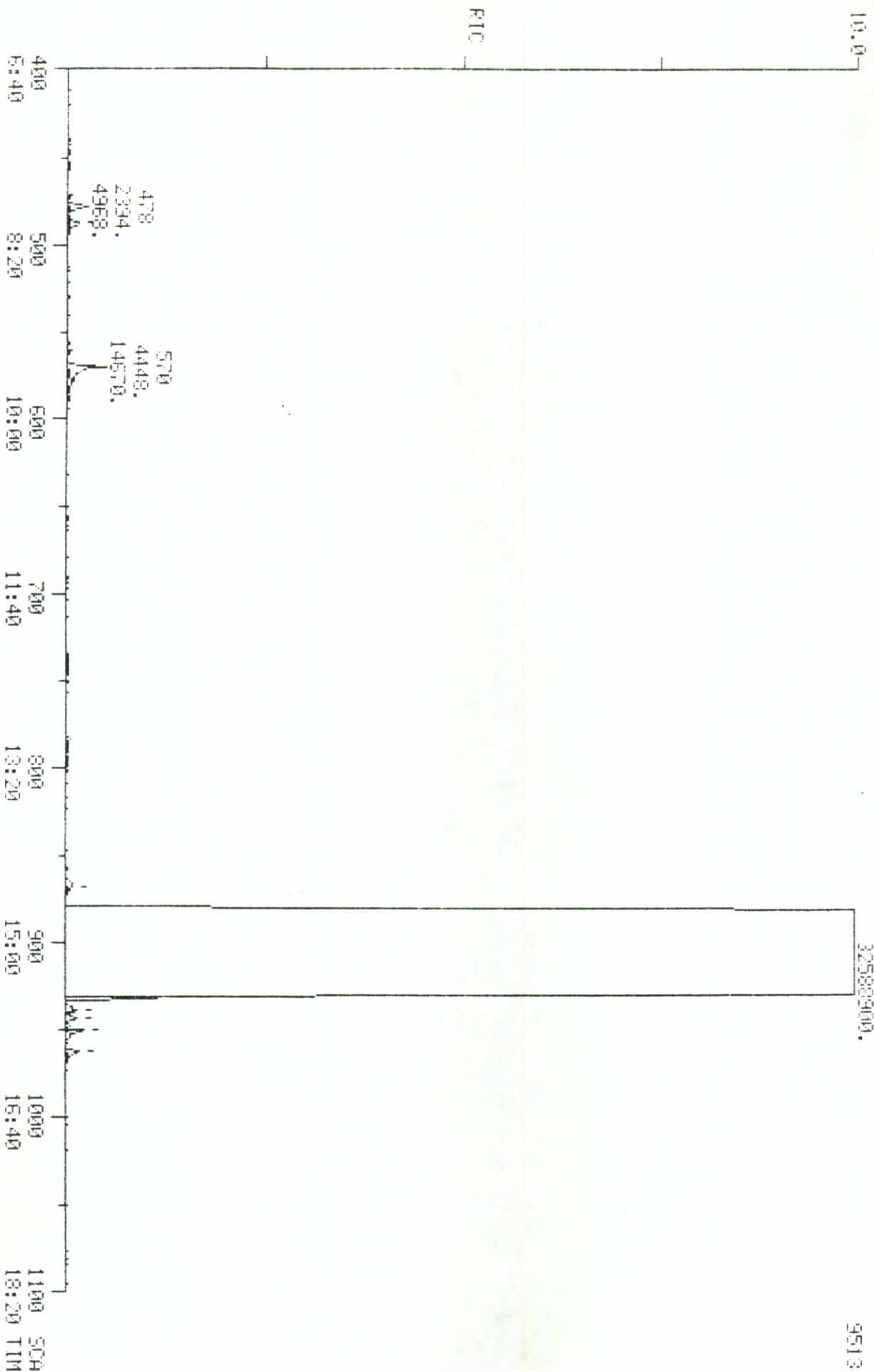
No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
1	RIC	556	9:16	3	0.542	A BB	2384.	0.004	0.00
2	RIC	659	10:59	3	0.643	A BB	2700.	0.005	0.00
3	RIC	1025	17:05	3	1.000	A BB	56484900.	100.000	99.94
4	RIC	1049	17:29	3	1.023	A BB	27216.	0.048	0.05

PTC  
04/20/94 15:54:00  
SAMPLE: NEW DOP HEATED 170DEG. CENT.  
CONDOS.:

DATA: NICH3 #1  
CALI: CAL42094 #3

SCANS 400 TO 1100

PAIPE: 6 1.1200 LABEL: N 2, 4.0 QUAN: N 2, 4.0 J 9 BRGE: 11 20, 3



9513

Quantitation Report      File: B1QUANLIST

Data: NIDH3.TI

04/20/94 15:54:00

Sample: NEW DOP HEATED 170DEG. CENT.

Conds.:

Formula:

Instrument: 4500

Weight: 0.000

Submitted by:

Analyst:

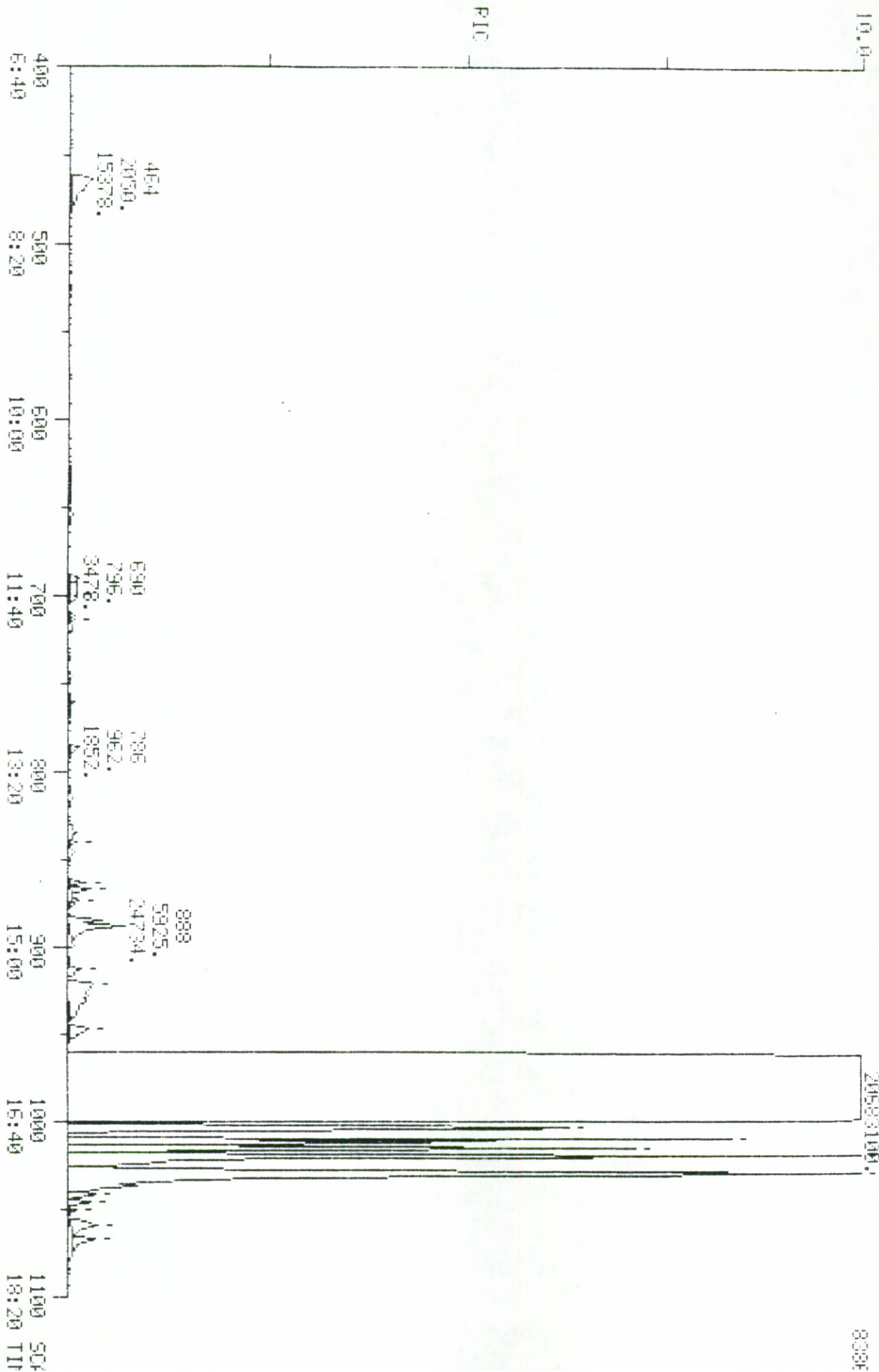
Acct. No.

AMOUNT=AREA \* REF AMNT/(REF AREA \* RESP FACT)

Resp. fac. from Library Entry

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
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3	RIC	570	9:30	5	0.616	A BB	14670.	0.045	0.04
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6	RIC	939	15:39	5	1.014	A BB	3184.	0.010	0.01
7	RIC	944	15:44	5	1.019	A BB	2752.	0.008	0.01
8	RIC	951	15:51	5	1.027	A BB	3666.	0.011	0.01
9	RIC	963	16:03	5	1.040	A BB	2848.	0.009	0.01

PLOT DATA: NIOSH4 #1 SCANS 400 TO 1100  
 94/20/94 17:04:00 CALL: CAL42094 #3  
 SAMPLE: OLD DOP  
 COND5.:  
 PULSE: 5 1.1900 LABEL: 11 2, 4.0 QUAN: A 2, 4.0 J 0 BASE: 11 20, 3



Quantitation Report File: B1QUANLIST

Data: NIOSH4.TI  
 04/20/94 17:04:00  
 Sample: OLD DOP

Conds.:  
 Formula: Instrument: 4500 Weight: 0.000  
 Submitted by Analyst: Acct. No.:

AMOUNT=AREA \* REF AMNT/(REF AREA \* RESP FACT)  
 Resp. fac. from Library Entry

No	m/z	Scan	Time	Ref	RRT	Meth	Area(Hght)	Amount	%Tot
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4	RIC	714	11:54	14	0.715	A BB	904.	0.004	0.00
5	RIC	786	13:06	14	0.788	A BB	1852.	0.009	0.01
6	RIC	840	14:00	14	0.842	A BB	896.	0.004	0.00
7	RIC	864	14:24	14	0.866	A BB	2744.	0.013	0.01
8	RIC	867	14:27	14	0.869	A BB	3628.	0.018	0.02
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10	RIC	888	14:48	14	0.890	A BB	24734.	0.120	0.11
11	RIC	913	15:13	14	0.915	A BB	3600.	0.017	0.02
12	RIC	922	15:22	14	0.924	A BB	34592.	0.167	0.16
13	RIC	947	15:47	14	0.949	A BB	8284.	0.040	0.04
14	RIC	998	16:38	14	1.000	A BB	20683100.	100.000	74.36
15	RIC	1004	16:44	14	1.006	A BB	137120.	0.663	0.63
16	RIC	1011	16:51	14	1.013	A BV	173680.	0.840	0.79
17	RIC	1016	16:56	14	1.018	A VV	104688.	0.506	0.48
18	RIC	1021	17:01	14	1.023	A VV	278400.	1.346	1.27
19	RIC	1031	17:11	14	1.033	A VV	399792.	1.933	1.82
20	RIC	1042	17:22	14	1.044	A VB	6288.	0.030	0.03
21	RIC	1046	17:26	14	1.048	A BB	4504.	0.022	0.02
22	RIC	1051	17:31	14	1.053	A BB	1512.	0.007	0.01
23	RIC	1059	17:39	14	1.061	A BB	13064.	0.063	0.06
24	RIC	1067	17:47	14	1.069	A BB	7978.	0.039	0.04