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RESULTS OF PILOT COLUMN TESTING AT THE ST. LOUIS PARK GAC PLANT

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K.J

Prepared by

Calgon Carbon Corporation

City of St. Louis Park

Reilly Industries, Inc.

October, 1989

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INTRODUCTION

The granular activated carbon (GAC) treatment plant at St. Louis Park wells 10 and 15 started operation on July 9, 1986. The plant has operated successfully since them in terms of producing treated water that meets the specified drinking water criteria of 28 ng/l for carcinogenic PAH and 280 ng/l for other PAH. However, the carbon life and carbon utilization rate have been less than expected. The first carbon load lasted 10 1/2 months with a utilization rate of 0.16 lb PAH per 1000 lb carbon, and the second load lasted 9 1/2 months with a utilization rate of 0.25 lb/1000 lb (see Table 1)*. In contrast, the expected carbon life was greater than two years, with an expected utilization rate in the range of 2 to 3 lb PAH for 1000 lb carbon**.

In order to determine the cause of the shortened carbon life and possible means to improve it, Calgon Carbon Corporation, the City of St. Louis Park and Reilly Industries cooperated in developing and performing a pilot column testing program at the GAC plant. The testing was conducted in accordance with a plan submitted by Reilly on March 17, 1988 ("Plan for Conducting Pilot Column Testing at the St. Louis Park GAC Plant") and approved by the U.S. EPA and MPCA Project Managers on July 26, 1988 (letter from Erin Moran, U.S. EPA and Michael Vennewitz, MPCA, to the President of Reilly Tar & Chemical Corporation). This report presents the results of the pilot testing program, as required by the approved plan.

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* These carbon lives are based on breakthrough relative to the 175 ng/l advisory level. Actual run durations were two to three months longer.

** The background section in Reilly's March 1988 pilot column testing plan provides further details on actual vs. expected carbon lives.

TABLE 1

CARBON PERFORMANCE
DURING THE FIRST TWO LOADS

	FIRST LOAD	SECOND LOAD
Startup date	7/9/86	8/12/87
Date of first breakthrough [a]	5/26/87	5/25/88
No. of days on line	321	286
Total pumpage (millions of gallons) [b]	214	207
Average flow rate (gpm)	463	503
Avg. PAH concentration in feed (ug/l)	3.6 [c]	5.8 [d]
PAH in feed, startup to breakthrough (lbs)	6.4	10.0
Carbon use rate (lb PAH/lb GAC)	0.00016	0.00025

Notes:

(a) Date of samples first showing effluent concentrations greater than the advisory level (175 ng/l).

(b) From City pumpage records.

(c) Average of 7/15/86, 7/30/86, 10/7/86, 3/17/87 and 6/16/87 sample results by ERT and 8/26/86 result by CH2M Hill.

(d) Average of 9/15/87, 1/11/88, and 3/29/88 sample results by ERT; 12/21/87, 3/29/88 and 6/30/88 sample results by CH2M Hill; and 3/29/88 sample results by RMA.

TEST DESCRIPTION

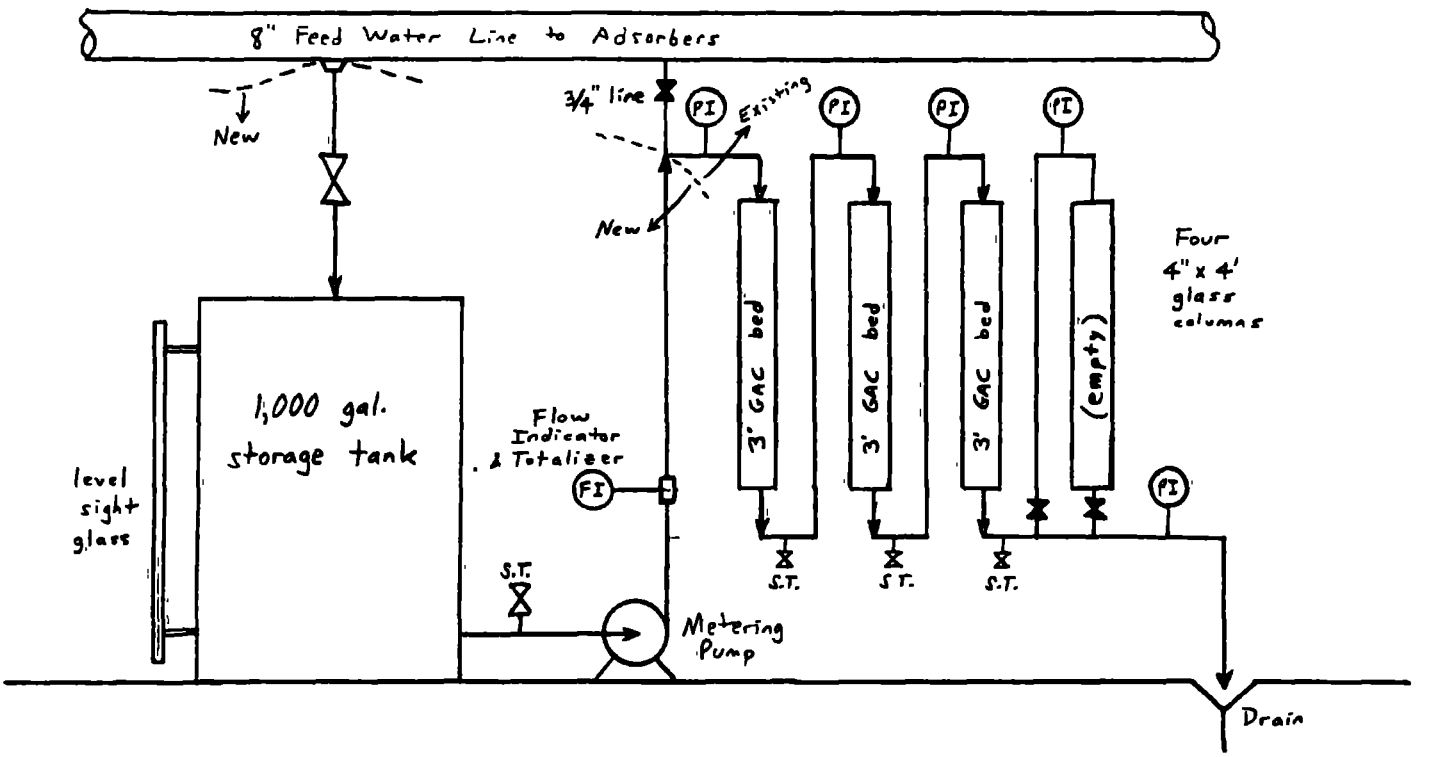
The basic design of the test was to operate the pilot-scale columns at the GAC plant in parallel with the operation of the full-scale columns. Both systems began operation on October 3, 1988 with fresh loads of Calgon Filtrasorb 300 activated carbon. Both systems treated the same feed water (viz., the effluent from the iron removal sand filters). However, the pilot system was operated at a constant feed rate 24 hours a day throughout the test, while the main plant was operated at varying flow rates as the City's water demand required. In particular, the main columns were operated in their historical pattern of full flow (at about 1200 gpm) for part of the day -- until the daily requirement of treated water was satisfied -- and no flow for the balance of the day. The two sytems were operated with these different flow patterns in order to test the effect of flow patterns on carbon life.

In order to operate the pilot columns at a constant flow rate, a 1000-gallon feed water storage tank and a metering pump were installed in the pilot column feed line. These were required because the well pumps were shut down during the daily periods of no flow to the main columns. Figure 1 shows a schematic flow diagram of the pilot column test equipment.

The pilot columns were loaded with Filtrasorb 300 carbon, inspected and tested by a Calgon engineer on September 28, 1988 (see Appendix A). The main columns were loaded with a new charge of Filtrasorb 300 carbon by Calgon on September 28 and 29, 1988. Both systems began operation on October 3, 1988. The pilot columns were shut down on May 22, 1989 when the first column inexplicably cracked and broke. The main columns continued operating through October 12, 1989.

FIGURE 1

SCHEMATIC FLOW DIAGRAM FOR PILOT COLUMN TESTING



The pilot columns were operated by personnel of the St. Louis Park Water Department in conjunction with their normal operating duties, and were inspected daily. The inspection logs for the pilot system are provided in Appendix B. Flow data logs for the main columns are provided in Appendix C.

Both the pilot and main columns were operated without major incident during the test. The pilot columns were backwashed when pressure drops built up (see Appendix B). No backwashing was required for the main columns, which is normal. Some mechanical difficulties were encountered with the pilot column flow meter after a few months, and it was later replaced (see Appendix B). Some fouling of the top portion of the first pilot column (probably from iron bacteria) was observed early in the test, but this did not progress further and had no apparent adverse effects.

Samples of the effluent from the first pilot column were collected at two-week intervals throughout the test. The feed water and main column effluent were sampled monthly throughout the test. The second and third pilot columns were sampled at irregular intervals. Field blanks were collected with each major sampling round. All samples were analyzed for PAH at the ng/l level by Enseco in accordance with the methods specified in the City's Sampling and Analysis Plan. Most samples were also analyzed for TOC by Enseco using EPA Method 415.1. All analytical reports are provided in Appendix D, arranged chronologically. The sampling program generally followed that outlined in the approved test plan, although some adjustments were made because of the longer than expected test duration.

TEST RESULTS

Table 2 summarizes the flow rate data for the pilot and main columns during the test. The pilot columns operated at an average flow rate of 0.44 gpm, with very little variation. This corresponds to a hydraulic loading rate of 5.1 gpm/ft^2 for the 4-inch diameter columns. The main columns operated at rates ranging from 9 million to 40 million gallons per month, corresponding to monthly average flow rates of from 200 to 1000 gpm. The average flow rate was 526 gpm, which corresponds to an average hydraulic loading rate of 3.35 gpm/ft^2 for the two 10-foot columns in parallel. However, the main columns actually operated by cycling between a flow rate near 1200 gpm (7.64 gpm/ft^2 hydraulic loading rate) and no flow. The variations in flow rates for the main GAC plant followed the expected pattern of low rates in the winter and high rates in the summer.

Table 3 summarizes the results of the PAH analyses for all samples collected. The most noteworthy aspects of these results are 1) that there was no sign of PAH breakthrough from the first pilot column after 231 days of operation and 2) that the main columns showed breakthrough after 269 days (where breakthrough is defined as exceeding the advisory level of 175 ng/l for other PAH). The average PAH concentration in the feed water was about 5,600 ng/l, with some indication of increasing PAH concentrations with higher pumping rates in the spring. There were sporadic indications of elevated PAH concentrations (>100 ng/l) in the pilot column effluents near the start of the test. These were not seen later in the test, however, and may have reflected initial equilibration of the system. Except for the initial samples, the effluents from the second and third pilot columns showed no signs of PAH breakthrough (compare column 2 and 3 effluents with field and method blank results

TABLE 2

Summary of Flow Rate Data

	Pilot Columns		Main Plant	
Month	Monthly pumpage, gallons	Average Monthly Flow Rate, gpm	Monthly Pumpage, gallons	Average Monthly Flow Rate, gpm
Oct. 1988	17,901	0.44	40,330,200	1,000
Nov.	18,971	0.44	12,846,300	297
Dec.	19,514	0.44	9,021,000	202
Jan. 1989	18,700(a)	0.42	16,296,600	365
Feb.	18,100(b)	0.45	13,156,000	326
March	20,100(c)	0.45	13,435,900	301
April	18,600(d)	0.43	24,675,800	571
May	8,387(e)	0.42(e)	33,885,200	759
June	0	0.00	39,471,200	914
Total	140,300	0.44(f)	203,118,200	526(g)

(a) Estimate - Flowmeter out of service for eight days

(b) Estimate - Flowmeter out of service for 17 days. Physical check of rate gave 0.45 gpm.

(c) Estimate - Flowmeter out of service all month. Daily physical checks gave 0.45 gpm.

(d) Estimate - Flowmeter replaced 4/5 and worked rest of month.

(e) Through May 22, when the first pilot column broke.

(f) Corresponds to hydraulic loading rate of 5.1 gpm/ft^2 for the three 4-inch diameter columns in series.

(g) Corresponds to hydraulic loading rate of 3.35 gpm/ft^2, with monthly range of 1.3 to 6.4 gpm/ft^2, for the two 10-foot diameter columns in parallel.

TABLE 3

TOTAL PAH CONCENTRATIONS, ng/l (a,b,c)

DATE	TEST DAY NO.	FEED	MAIN PLANT EFFL.	COLUMN 1 EFFLUENT	COLUMN 2 EFFLUENT	COLUMN 3 EFFLUENT	FIELD BLANK(s)	METHOD BLANK(s)
10/17/88	14	3,640	15.6/14.4	92.8			34.7/41.4	7.7
10/17/88(d)	14	6,041(e)		186.0				7.9(f)
10/31/88	28			18.7/19.5			17.7	9.5
10/31/88(d)	28			16.4(g)				8.6
11/14/88	42	2,018	30.9/28.6(h)	105.8(i)	258.5(j)		62.4(i)	13.5
11/28/88	56			42.2(k)	33.5(l)	204.2/13.1(m)	23.3(k)	19.9
12/12/88	70	2,343	24.2/19.9	45.7	9.8	20.1	37.3	6.0
12/27/88	85			26.7				15.9
1/9/89	98	4,560	24.2/18.9	ND(n)	470(o)	16.3	48.5	8.0/6.3
1/23/89	112			41.7/27.9(p)				30.2/12.1
2/6/89	126	6,350	35.8/73.2	57.0			71.7(q)	15.5
2/21/89	141			72.8(r)				12.3
3/7/89	155	9,550	85.7/71.2	32.5	20.7(s)	12.5(t)	66.4(u)	20.9(v)
3/20/89	168			46.1				12.5
4/4/89	183	7,265	49.6/67.3	36.2	4.7	2.4	7.5	1.6/9.1
4/17/89	196			67.4				12.1
5/1/89	210	8,798	152.1/158.9	16.3			14.9	6.1
5/22/89	231			65.7				25.7
6/29/89	269		189.7/193.4				24.3	9.4
7/31/89	301		873.7/338.3					
8/29/89	330	4,877	442.9/482.8				9.5	3.0

Notes to Table 3

(a) Total PAH concentrations equal noncarcinogenic PAH concentrations (i.e, no detectable carcinogenic PAH) unless otherwise noted.

(b) All analyses by Enseco's Rocky Mountain Analytical Laboratory unless otherwise noted.

(c) x/x indicates results from analyses of duplicate samples.

(d) Results of split samples analyses by ENSR's Wilmington, MA laboratory.

(e) Includes 44 ng/l carcinogenic PAH (quinoline, benz(a)anthracene and chrysene).

(f) Includes 1.4 ng/l carcinogenic PAH (benzofluoranthenes).

(g) Includes 1.3 ng/l carcinogenic PAH (indeno (1,2,3-cd) pyrene and dibenz(a,h) anthracene).

(h) Include 1.0/0.4 ng/l quinoline.

(i) Includes 0.9 ng/l quinoline.

(j) Average of two analyses of a single sample.

(k) Includes 0.8 ng/l quinoline.

(l) Includes 0.7 ng/l quinoline.

(m) First result is for column 3 effluent as reported; second result is for the matrix spike sample prepared from column 3 effluent water (excluding the results from spiked compounds).

(n) None detected, but detection limits were unduly high at about 100-200 ng/l per compound.

(o) Comprised solely of naphthalene. Detection limits were unduly high at about 100-200 ng/l per compound.

(p) Include 0/0.4 ng/l carcinogenic PAH (chrysene).

(q) Includes 1.6 ng/l quinoline.

(r) Includes 2.1 ng/l carcinogenic PAH (quinoline and chrysene).

(s) Includes 3.0 ng/l quinoline.

(t) Includes 1.6 ng/l quinoline.

(u) Includes 7.0 ng/l quinoline.

(v) Includes 1.9 ng/l quinoline.

for test days 70, 155 and 183). Finally, it should be noted that total PAH concentrations generally reflected the detection only of other PAH; carcinogenic PAH were detected in only a few samples at very low ng/l levels (see footnotes to Table 3).

Table 4 summarizes the results of all of the TOC analyses performed. The data show considerable scatter and no clear temporal trend. The average results indicate about 50% removal of TOC in the main columns (from 1.7 to 0.9 mg/l). The pilot column results indicate no removal in the first column (1.7 mg/l average effluent), while the effluents from the second two columns were comparable to that of the main plant.

The flow rate and PAH data from Tables 2 and 3 allow carbon utilization rates to be calculated and compared for the pilot and main columns. The main plant showed breakthrough (compared to the 175 ng/l advisory level) at day 269 after treating 202 million gallons of water with an average PAH concentration of 5.6 ug/l*. Since the two columns each contain 20,000 lbs of carbon, this translates to a utilization rate of 0.24 lb PAH per 1000 lb carbon. This is comparable to the utilization rates observed for the first two carbon loads (see Table 1). In contrast, the first pilot column showed no sign of breakthrough after treating 140,000 gallons of water. This column contained about 7.2 lbs of carbon (see Appendix A), so the utilization rate at breakthrough would be greater than 0.91 lb/1000 lb. This is about four times greater than the rate observed for the main plant. Since breakthrough was never seen at the first column, it is possible that the carbon utilization

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* To be precise, this should be a flow-weighted average. It turns out that a flow-weighted average, where the monthly feed analysis result is weighted by the total pumpage for that month, is also 5.6 ug/l.

TABLE

TOC CONCENTRATIONS, mg/l

DATE	TEST DAY NO.	FEED	MAIN PLANT EFFL.	COLUMN 1 EFFLUENT	COLUMN 2 EFFLUENT	COLUMN 3 EFFLUENT
10/17/88	14	0.8	0.8	1.0		
10/31/88	28					
11/14/88	42					
11/28/88	56			1.5	0.6	0.5
12/12/88	70	1.9	0.8	1.4	0.7	±.3
12/27/88	85			1.3		
1/9/89	98	1.7	0.8	1.4	0.9	0.8
1/23/89	112			1.5		
2/6/89	126	1.6	1.0	1.4		
2/21/89	141			1.9		
3/7/89	155	2.3	1.6	2.0	1.9	1.7
3/20/89	168			3.2		
4/4/89	183	1.5	0.7	1.6	1.2	0.9
4/17/89	196			1.5		
5/1/89	210	1.8	0.7	1.4		
5/22/89	231			2.4		
Averages		1.7	0.9	1.7	1.1	1.0

rate was greater than 0.91 lb/1000 lb.

The substantially greater carbon utilization rate in the pilot system must be attributed to the different flow rate patterns in the operation of the two systems, viz., the constant flow rate in the pilot system versus the daily on/off cycle in the main plant. In all other aspects the two systems operated similarly -- treating the same water, achieving similar TOC removals and operating at comparable hydraulic loading rates.

The adverse consequences of repeated on/off cycling on carbon utilization are consistent with adsorption theory. With constant flow rates, a mass transfer zone is established in the carbon bed and progresses steadily down the length of the bed as the carbon's adsorptive capacity is exhausted. The top of the mass transfer zone is defined by the point at which the carbon's adsorptive capacity is exhausted, and the bottom is defined by the point at which no adsorptive capacity has been used. Breakthrough occurs when the front end of the mass transfer zone reaches the bottom of the bed. (Only the initial toe of the mass transfer zone has to reach the bottom since breakthrough in this case is defined as only a small portion of the feed concentration -- viz., 175 vs. 5600 ng/l). With repeated on/off cycling, the mass transfer zone is disturbed every time the flow is stopped. Under stagnant conditions, PAH compounds -- especially the more soluble, lower molecular weight compounds -- begin to desorb and migrate down the column before re-adsorbing and re-equilibrating. (This effect would eventually lead to uniform PAH loadings throughout the bed). When flow is resumed, the original equilibrium adsorption front is re-established. However, the PAH that migrated lower in the bed under no-flow conditions

now equilibrate to contaminant-free water, which produces further desorption and broadening of the front of the mass transfer zone. The net result is that the mass transfer zone is lengthened a little bit every time the flow is stopped. When this is repeated every day, the lengthening becomes substantial and the initial toe of the mass transfer zone reaches the bottom of the bed much faster. In addition the adsorption capacity of the carbon is not used efficiently. The different progressions of the mass transfer zones when operating at a steady flow versus cyclic on/off flow are illustrated schematically in Figure 2.

CONCLUSIONS AND RECOMMENDATIONS

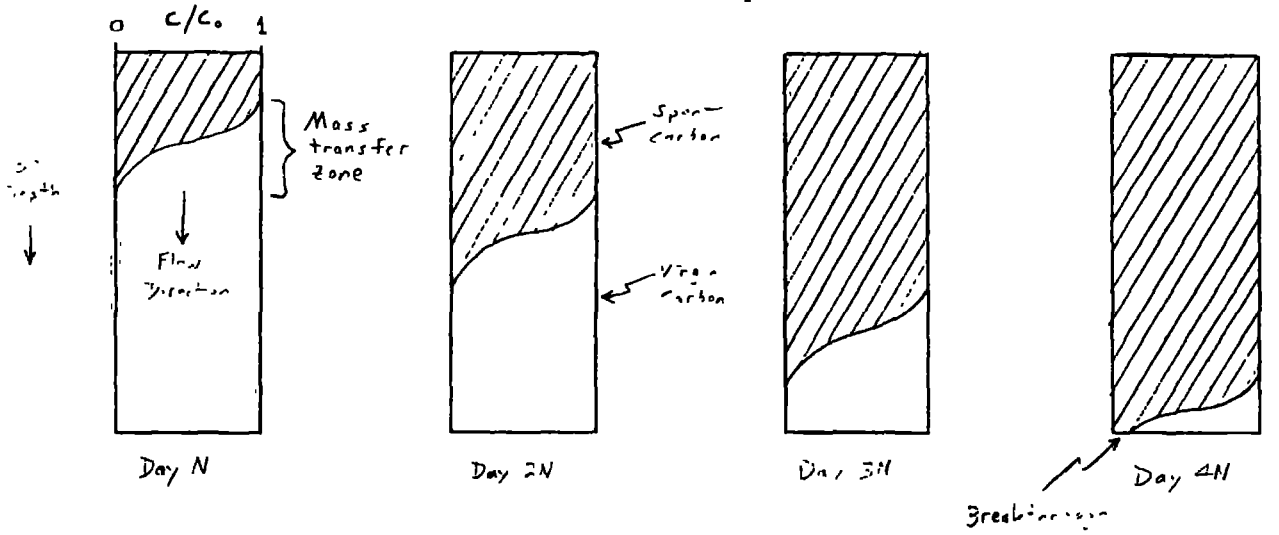
The pilot testing program conducted at the St. Louis Park GAC plant from October 1988 through May 1989 was successful in identifying the cause of shorter than expected carbon lives experienced in operating the GAC plant since July 1986. The pilot columns achieved a carbon utilization rate greater than 0.91 lb PAH/1000 lb carbon (how much greater is unknown, since the test had to be concluded before breakthrough occured). The main GAC plant achieved a utilization rate of 0.24 lb/1000 lb, which is comparable to those observed during previous carbon loads (0.16 and 0.25 lb/1000 lb). The substantially higher utilization rate achieved in the pilot columns is attributable to the different operating patterns between the two systems. The pilot columns were operated at a constant flow rate throughout the test (24 hours a day, 7 days a week), while the main columns were cycled on and off. The main plant was run at design capacity for a portion of each day (for however long required to meet the day's demand), and then shut down for the rest of the day. This has been the standard operating

Figure 2

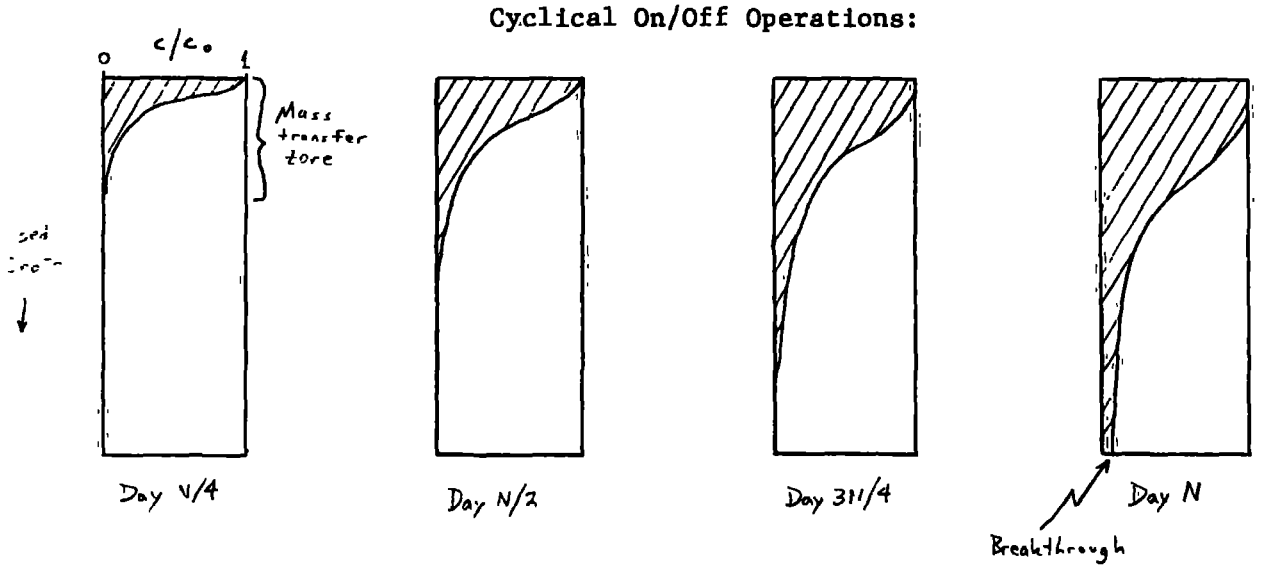
Schematic Representation Of

Different Carbon Adsorption Profiles

Constant Flow Rate Operation:



Cyclical On/Off Operations:



practice at the GAC plant since it began operation. This on/off cycling gradually lengthens the mass transfer zone in the carbon bed, which results in premature breakthrough and inefficient use of the carbon's adsorption capacity.

The clear recommendation resulting from this test program is that if the City of St. Louis Park wants to achieve substantially better carbon utilization and longer carbon lives, then it should operate the GAC plant (and hence wells 10 and 15) continuously at a relatively constant rate (which may vary seasonally). Changing the plant operation to a continuous mode (round the clock, day-in, day-out) should increase the carbon life by about a factor of four. The benefits of such a change on carbon utilization will have to be balanced, however, against the other constraints that the City faces in operating its water supply system. In this context, it is noteworthy that a recent report by an engineering consultant to the City recommended -- based on economic and operational considerations independent of the carbon plant -- that wells 10 and 15 should be operated continuously (Triangle Engineering, Inc., Load Management Study, March 1989).

Appendix A

Pilot Column Preparation Report

CALGON

CALGON CARBON CORPORATION

CALGON CARBON CORPORATION P.O. BOX 717 PITTSBURGH, PA 15230-0717 (412) 787-6700 TELEX 671 1837 CCC PGH

PANAFAX:412-787-6713

787-6825

October 6, 1988

Mr. John Craun
REILLY TAR & CHEMICAL CORP.
1510 Market Square Center
151 North Delaware St.
Indianapolis, IN 46204

Dear John:

Three columns in the pilot column rack were loaded with activated carbon and prepared for operation on September 28. A small leak was found in the first column in the series; however, this should not be significant. The fourth columnm in the series was cracked and would be unusable. The carbon loading in the columns was to depths of 35-1/4", 33-3/4", and 35-3/4", respectively. In 4" diameter columns, this would translate to a total weight of about 21.4 lbs. of Filtrasorb 300. The 8.73 ft. media depth will be approximately equal to the depth in each of the 10' diameter columns. Pilot flow rates should be set to approximate the continuous hydraulic loading rate (gpm/ft.^{2} cross-sectional area) in the full-scale operation, i.e., 300 gpm through each vessel would yield $\frac{300 \text{ gpm}}{78.5 \text{ ft.}^2}$ = 3.82 gpm/ft.^{2}; this would translate to 0.332 gpm in the pilot operation (3.82 gpm/ft.^{2} x .087 ft.^{2} = 0.322 gpm). By comparing the volume processed and weight of carbon, a direct correlation can be made with the field system.

During pilot operating, it will be important to insure the columns do not syphon dry. It will be necessary to apply a slight back pressure on the system either by partially shutting the final effluent valve or raising the discharge line to a high elevation. If the columns do develop air pockets over the carbon beds, they can be refilled by blocking the discharge line with the pump running until the pressure builds and repeating the procedure until the columns fill.

Please let me know if any problems arise.

Very truly yours,

CALGON CARBON CORPORATION

Alan J. Roy
Manager, Technical Services

AJR:ah

Appendix B
GAC Test Column Logs

318 10 02

CITY OF ST. LOUIS PARK
GAC TEST COLUMN

MONTH Oct
YEAR 88

DATE	TIME	INTERGATOR (43306)	PUMPAGE	PRESSURE C1	C2	C3	OPERATOR
31	0920	42705	586	4	0	6	SLA
30	0820	42119	551	4	0	6	MW
29	1100	41568	539	4	0	6	MW
28	1:05	41029	710	4	0	6	SLA
27	8:55	40319	588	3	0	6	SLA
26	8:51	39731	535	3	0	6	MZK
25	10:49	39196	694	3	0	6	MZK
24	8:35	38502	518	0-2	0	6	SLA
23	11:55	37984	696	0-2	0	6	SLA
22	9:45	37288	608	0-2	0	6	SLA
21	10:21	36680	718	0-2	0	6	MZK
20	900	35962	667	0-2	0	6	MZK
19	0902	35295	661	0-2	0	6	SLA
18	0904	34634	668	0-2	0	6	SLA
17	0905	33966	684	0-2	0	6	SLA
16	0900	33282	661	0-2	0	6	MW
15	0945	32621	700	0-2	0	6	MW
14	9:00	31921	700	0-2	0	6	SLA
13	9:00	31196	725	0-5	0	6	SLA
12	9:00	30509	687	0-5	0	5	MZK
11	9:00	29819	690	.5	0	0	MZK
10	9:00	29232	587	.5	0	0	MZK
9	9:00	28552	680	0	0	0	MZK
8	9:00	27924	628 ?	0	0	0	MZK
7	9:00	27290	634	0	0	0	MZK
6	9:00	26688	602	.5	0	0	MZK
5	9:00	26049	639	.5	0	0	MZK
4	9:00	25405	644	1	.5	0	MZK
3							
2							
1							

MONTHLY TOTAL 17,901
YEAR TO DATE 17,901

Avg. .44 gpm

CITY OF ST. LOUIS PARK
GAC TEST COLUMN

MONTH Nov
YEAR 1988

DATE	TIME	INTERGATOR	PUMPAGE	PRESSURE C1	PRESSURE C2	PRESSURE C3	OPERATOR
1	7:50	62277	636	2	0	7	SR
30	9:16	61641	609	1.5	0	7	MZR
29	7:48	60932	589	0	0	7	MZR
28	11:57	60343	930	0	0	7	MZR
27	[illegible]	59413	754	[illegible]	[illegible]	[illegible]	JT
26	0700	58659	[illegible]	0	0	7	JT
25	0940	58014	738	0-1	0	7	MW
24	0930	57276	738	1	0	7	MW
23	7:40	56538	579	3-5	2	7	[illegible] *
22	10:05	55959	667	4	2	7	SR
21	10:05	55292	715	4	2	7	SR
✓ 20	7:10	54577	409	2	1	7	SR
19	8:40	54168	498	2	1	7	SR
18	12:53	53670	672	2	0	6	SR
17	10:52	52998	700	1.5	0	6	MZR
16	8:38	52298	684	0	0	6	MZR
15	8:16	51614	606	0	0	6	MZR
14	11:05	51008	787	0	0	6	MZR
13	0735	50221	733	0	0	6	JT
12	0610	49488	673	0	0	6	JT
11	0610	48815	633	0	0	6	JT
10	8:40	48172	688	0	0	6	
9	8:35	47484	683	0	0	6	MZR
8	9:46	46801	664	0	0	6	MZR
7	7:51	46137	—	12	4	6	MZR *
6	11:39	46137	264	19	4	6	MZR
5	10:04	45873	629	10-15	1-2	6	MZR
4	8:20	45244	636	5-12	0-1	6	MZR
3	8:23	44608	643	5-10	0-1	6	MZR
2	8:34	43965	659	6-9	0-1	6	MZR
1	8:26	43306	601	5	0	6	MZR

.44 gpm Ave.

MONTHLY TOTAL 18971 ✓
YEAR TO DATE 36,872

* Backwashed C-1
High Pressure
No Flow
✓ broken hose on pump

CITY OF ST. LOUIS PARK
GAC TEST COLUMN

MONTH Dec
YEAR 85

DATE	TIME	INTERGATOR (81791)	PUMPAGE	PRESSURE C1	C2	C3	OPERATOR
31	9:45	81357	484	5	1	7	[illegible]
30	8:00	80635	672	2	0	6.5	[illegible]
29	1:00	80224	411	1-2	6	6.5	[illegible]
29	9:40	79501	723	1-2	0	6.5	[illegible]
27	1015	78865	636	1.2	5	6.5	JT
26	0955	78139	726	1-2	0	6.5	MW
25	0925	77455	684	1-2	0	6.5	MW
24	0900	76735	720	1-2	0	6.5	MW
23	10:57	76101	634	1	0	7	[illegible]
22	10:05	75463	638	9	1	7	[illegible]
21	10 05	74964	499	5	1	7	Sch
20	7:20	74304	660	4	1	7	Sch
19	11:33	73810	494	4	1	7	[illegible]
18	7:15	73208	602	4	1	7	Sch
17	10:15	72702	506	4	1	7	Sch
16	1:35	72174	528	4	1	7	[illegible]
15	1:16	71520	654	4	1	7	Om
14	1:33	70869	651	4	1	7	[illegible]
13	1:44	70105	764	4	1.5	7	Sch
12	200	69610	505	3	1	7	[illegible]
11	0830	68902	708	3	1	7	JT
10	0800	68247	655	2	1	7	[illegible]
9	10:30	67659	588	2	1	7	[illegible]
8	8:06	66939	720	2	1	7	[illegible]
7	12:59	66438	501	3.5	2	7	[illegible]
6	10:16	65667	771	3.5	2	7	[illegible]
5	1:14	65069	598	4	2	7	[illegible]
4	10:14	64291	778	2	0	7	[illegible] *
3	10:17	63607	684	2	0	7	[illegible]
2	8:17	62940	667	2	0	7	[illegible]
1	7.50	62277	663	2	0	7	Sch

MONTHLY TOTAL 19.514
YEAR TO DATE 56.386
Avg GPM .437

* Backwash C-1

CITY OF ST. LOUIS PARK
GAC TEST COLUMN

MONTH JAN
YEAR 1988

	DATE	TIME	INTERGATOR (95157)	PUMPAGE	PRESSURE C1	C2	C3	OPERATOR	
	31	10 30	94511	646	2-3	1	7	Sh	
BW	30	8:50	93941	563	6	1	7	[illegible]	
	29	0850	93542	406	5 5	2	7	MW	
	28	0900	92938	604	5	2	7	MW	
	27	11:15	92311	627	4.5	1	7	[illegible]	
	26	11:10	91781	530	4.5	1	7	[illegible]	
	25	10:00	91206	575	3	1	7	Sh	
DW	24	9:55	90715	491	3	1	7	Sh	.20
BW	23	10:35	90092	623	8	2	7	Sh	.18
	22	9:00	89341	751	6	1	7	Sh	
	21	8:20	88653	678	5	1	7	Sh	
	20	8:00	87988	665	5	1	7	Sh	
	19	9:00	87340	648	4	1	7	Sh	
	18	10:30	86828	650 EST	5	2	7	Sh	
BW *	17	9:30	86828	650	9	4	7	Sh	
*	16	0700	86828	650		2	7	JT	
*	15	0700	86828	650	5	3	7	JT	
*	14	0700	86828	650	5	2	5 5	JT	
*	13	8:15	86828	650 EST	3-4	0-1	6.5	[illegible]	
*	12	8:15	86828	650 EST	3-4	0-1	6.5	[illegible]	
*	11	8:10	86828	650 EST	3-4	0-1	6.5	[illegible]	
*	10	7:20	86737	91	4	2	7	Sh	
BW	9	10:12	86176	561	0-5	1	7	[illegible]	
	8	9:05	85961	315	1	0	6.5	[illegible]	*
BW	7	7:55	85403	558	7	2	7	Sh	
	6	8:37	84976	427	4	0	6.5	[illegible]	
	5	9:50	84386	570	3	0	6	Sh	
	4	8:37	83743	643	3-4	0-2	7	[illegible]	
	3	10:50	83093	650	3-4	0-2	7	[illegible]	
	2	12:10	82444	649	4	1-2	7	[illegible]	
	1	10:00	81791	653	5	1	7	[illegible]	

MONTHLY TOTAL 18,134 EST
YEAR TO DATE 55,006 EST

* Flow meter not working

BW Backwash C-1

Daily Avg. 584.9

est. should be 650
∴ Σ = 18,693
gc 7/11/89

CITY OF ST. LOUIS PARK
GAC TEST COLUMN

MONTH FEB
YEAR 1989

	DATE	TIME	INTERGATOR	PUMPAGE	PRESSURE C1	C2	C3	OPERATOR
	28	[illegible]	103087	650	0-5	0-1	6.5	[illegible]
	27	[illegible]	103087	650	8	0-1	6.5	[illegible]
	26	0920	103087	650	8	0-1	6.5	MW
	25	0955	103087	650	6	0	6.5	MW
	24	[illegible]30	103087	650	5	0	6.5	[illegible]
	23	11:05	103087	650	5	0	7	[illegible]
	22	7:00	103087	650	5	0	7	[illegible]
	21	9:50	103087	650	5	0	7	[illegible]
	20	9:35	103087	650	5	0	7	[illegible]
	19	1:30	103087	650	5	.5	7	[illegible]
	18	8:10	103087	650	5	5	6.5	[illegible]
*	17	10:10	103087	650	1-5	.5	6.5	[illegible]
*	16	10:15	103084	650	4-5	.5	6.5	[illegible]
*	15	8:40	102611	473	3	0	6.5	[illegible]
*	14	10:01	101939	672	1.5	0	6.5	[illegible]
SW	13	9:00	101520	419	5-7	0	7	[illegible]
	12	0700	101201	319	5-7	0	6	JT
	11	0700	101012	189	5	0	6	JT
	10	10:40	100433	579	4-8	0	6.5	[illegible]
*	9	10:45	99976	457	4-6	0	6.5	[illegible]
*	8	1:32	99741	235	2-4	0	6.5	[illegible]
	7	8:45	99018	723	0-1	0	6.5	[illegible]
Sample SW	6	1:30	98518	500	6-10	0-1	7	[illegible]
	5	9:47	97751	767	5-7	0	7	[illegible]
	4	9:00	97063	688	[illegible]	[illegible]	7	[illegible]
	3	9:45	96476	587	3-6	0	7	[illegible]
	2	10:00	95810	686	3-4	0	7	[illegible]
	1	10:45	95157	653	3-4	0	7	[illegible]

MONTHLY TOTAL	16397
YEAR TO DATE	34531

* Flow meter not working
physical check for pumpage .7 gal/2 min.

CITY OF ST. LOUIS PARK
GAC TEST COLUMN

MONTH MAR
YEAR 1989

	DATE	TIME	INTERGATOR	PUMPAGE	PRESSURE C1	PRESSURE C2	PRESSURE C3	OPERATOR
	31	10:15	—	650	3.5	[illegible]	6	[illegible]
	30	8:30	—	650	[illegible]	1	6.5	[illegible]
BW	29	8:00	—	650	8-11	0-1	6.5	[illegible]
	28	8:00	—	650	7	1	6	[illegible]
	27	11:00	—	650	[illegible]	[illegible]	6.5	[illegible]
	26	0900	—	650	7	2	6.5	
	25	0920	—	650	5	2	6.5	[illegible]
	24	10:30	—	650	4.5	2	6	[illegible]
	23	10:53	—	650	3.5	0	6.5	[illegible]
BW	22	730	—	650	8	1.5	6	[illegible]
	21	10:30	—	650	5-8	1-5	6	[illegible]
	20	8:20	—	650	7-8	1-5	6	[illegible]
	19	9:40	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	18	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	
	17	8:00	—	[illegible]	4	0-1	6	[illegible]
	16	8:40	—	650	4.5	0-2	7	[illegible]
	15	11:07	—	650	4.5	0-2	7	[illegible]
BW	14	8:10		650	5	1	6	[illegible]
	13	1030	—	650	4	1	6	[illegible]
	12	0635	—	650	4	1	6	JT
	11	0830	—	650	3.5	1	6	JT
BW	10	8:30	—	650	6	0	6	[illegible]
	9	8:45	—	650	6	1	6	[illegible]
	8	10:20	—	650	5	1	6	[illegible]
	7	8:20	"	650	1-5	0	6.5	[illegible]
	6	8:15	"	650	[illegible]	[illegible]	6	[illegible]
	5	8:10	"	650	4.5	1	6.5	[illegible]
	4	10:00	"	650	2.5	1	6.5	[illegible]
	3	8:30	"	650	3.5	1	6.5	[illegible]
BW	2	8:30	"	650	[illegible]	[illegible]	6.5	[illegible]
	1	11:30	103087	650	0-8	0-1	6.5	[illegible]

MONTHLY TOTAL 20.150 EST
YEAR TO DATE 54.681 EST

Flow meter not working
physical ck Daily - .45 gpm
BW - Backwash C-1

CITY OF ST. LOUIS PARK
GAC TEST COLUMN

MONTH April
YEAR 89

	DATE	TIME	INTERGATOR	PUMPAGE	PRESSURE C1	PRESSURE C2	PRESSURE C3	OPERATOR
			118927					[illegible]
	30	9:30	118342	585	6-7	2.5	6.5	[illegible]
	29	11:15	117774	568	5-6	2.5	6.5	[illegible]
	28	11:00	117127	647	5	2.5	6.5	[illegible]
	27	10:40	116552	575	5	2	7	SL
	26	8:35	115854	698	5	0-2	6.5	[illegible]
	25	8:30	115214	640	5	0-2	6.5	[illegible]
BW	24	9:35	114671	543	8-12	3	6.5	[illegible]
	23	0900	114098	573	8-11	3	6.5	MW
	22	0840	113507	591	8	2.5	6.5	MW
	21	8:10	112937	570	6	2	7	[illegible]
	20	8:50	112336	601	6	2	7	SL
	19	8:30	111742	594	5	3	7	SL
	18	11:00	111120	622	5	2	7	SL
	17	9:00	110399	721	5-6	2	7	[illegible]
	16	8:30	109755	644	4	3	7	SL
	15	8:25	109173	582	3	2	6	SL
	14	8:16	108495	678	5	2	6.5	[illegible]
BW	13	8:00	107876	619	6-9	1-2	6.5	[illegible]
	12	8:15	107280	596	6-8	1-2	6.5	[illegible]
	11	9:00	106691	589	5-6	2	6	[illegible]
	10	10:30	106119	572	6	2	6	SL
	9	0930	105524	621	5.5	2	6	MW
	8	0920	104903	598	5	2	6	MW
	7	10:00	104305	702	4	0	6	[illegible]
	6	8:10	103603	516	5	0	1	SL
Flow meter replaced	5	1:10	103087	650	5	2	7	SL
	4	8:45	—	650	5	2	7	SL
	3	11:00	—	650	6	2	6	SL
	2	11:15	—	650	4	0	6	[illegible]
	1	10:20	—	650	2.5	0	6	[illegible]

MONTHLY TOTAL 19,090
YEAR TO DATE 73,771

Phy. check
4.5 gpm

4/6-5/1
118927
−103603
15,324 in 25 days
→ 0.93 gpm

CITY OF ST. LOUIS PARK
GAC TEST COLUMN

MONTH MAY
YEAR 1989

	DATE	TIME	INTERGATOR	PUMPAGE	PRESSURE C1	PRESSURE C2	PRESSURE C3	OPERATOR
*	22	10:30	131935		8-12	0-6	6.5	MJ
	21	09:45	131242	693	9-10	3-6	6.5	MW
	20	11:50	130699	543	6	3	6	S
	19	7:20	129896	803	5	0-2	6.5	MJ
	18	2:40	129472	424	6	2-4	6.5	MJ
	17	8:15	128676	796	5	1-2	6.5	MJ
1hr BW	16	7:45	128069	607	9.5	4	7	S
	15	8:40	127414	655	8.5	3	7	MJ
	14	8:50	126857	557	8	3	7	S
	13	9:25	126238	619	7	2	7	S
	12	10:10	125601	637	5	1	6	MJ
	11	8:45	124987	614	5	1.5	6	MJ
	10	8:52	124330	657	5	1.5	6	MJ
1hr BW	9	8:36	123613	717	6	2	6	MJ
	8	7:10	123045	568	6	0.5	6	SL
	7		122311	734	6	0-5	6	JT
	6		121583	728	6	3	6	JT
1hr BW	5	10:35	121074	409	6	3	6	MJ
	4	10:00	120605	469	5	2	6.5	MJ
	3	8:20	120003	602	4-8	2	6.5	MJ
	2	10:00	119474	529	9-10	1.5	6.5	MJ
	1	10:20	118927	547	5-8	1.5	6.5	MJ

MONTHLY TOTAL
YEAR TO DATE

* 5-22-89
Sampled C1 on Turned
OFF Tap C1 exploded

Appendix C
GAC Plant Flow Data Logs

CITY OF ST. LOUIS PARK
G A C PLANT # 1

9-30-88

Oct 88
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1			6	4	6	5	3139259	3118299	4543	5218225	2896092	FLUFF	—
2			6	4	6	5	3139259	3118299	4543	5218225	2896092	CARBON	—
3	✓		4	2.5	6	5	3139259	3118299	4543	5218225	2896092	98,300	109,400
4	✓		5.5	7	8	8	3139795	3118776	5526	5219319	2896092	-6800	1,368,000
5	✓		10.5	9	7	7	3146536	3125726	5594	5233009	2896092		1,489,400
6	✓		12	12.5	10	10	3153421	3132726	5594	5247903	2896092		1,703,100
7	✓		13	10	7.5	7.5	3161248	3140736	5594	5264934	2896092		1,593,400
8	✓		13	10	7	7	3165559	3148282	5594	5280868	2896092		1,608,400
9	✓		12	9	6	6	3175936	3155943	5594	5296952	2896092		1,596,100
10	✓		13.5	12.5	9.5	9.5	3183229	3163557	5594	5312913	2896092		1,829,200
11	✓		10.5	9.5	6.5	6.5	3191051	3171749	5594	5314581	2897262		1,387,100
12	✓		13.5	12.5	10	10	3197301	3178291	5594	5343908	2897262		1,802,600
13	✓		12.0	9.5	7	7	3205496	3186903	5594	5361934	2897262		1,590,600
14	✓		13.0	12	8	8	3212715	3194528	5594	5377840	2897262		1,509,600
15	✓		11.5	9	6	6	3219598	3201840	5594	5392936	2897262		1,540,900
16	✓		14	13	10	10	3226528	3209243	5594	5408345	2897262		1,572,800
17	✓		12	10	8	8	3233503	3216709	5594	5424073	2897262		1,593,500
18	✓		12	10	8	8	3240690	3224456	5594	5440008	2897262		1,347,500
19	✓		10	8	6	6	3246652	3230909	5594	5453483	2897262		1,311,100
20	✓		15	13	10	10	3252511	3237294	5594	5466594	2897262		735,600
21	✓		12.5	10	7	7	3256039	3241144	5594	5473950	2897262		1,461,900
22	✓		12	10	7	7	3262601	3248413	5594	5488569	2897262		1,700,500
23	✓		14	13	10	10	3270118	3256618	5594	5505574	2897262		704,300
24	✓	✓	12	10	7	7	3273556	3260405	5594	5512617	2897262		1,871,600
25	✓		13.5	12	9	9	3281432	3268962	5594	5530107	2898488		1,458,300
26	✓		14.5	13.5	10	10	3287921	3276088	5594	5544690	2898488		1,205,700
27	✓		10	8	6	6	3293181	3281717	5594	5556747	2898488		1,555,500
28	✓			12.5	9	9	3300575	3289724	5594	5572302	2898488		1,406,200
29	✓		14.5	13.5	10	10	3306939	3296655	5594	5586364	2898488		855,900
30	✓		12	10.5	7.5	7	3310848	3300918	5594	5594923	2898488		1,613,700
31	✓		12	10	8	8	3318030	3308805	5594	5611060	2898480		807,300
							3321584	3312670	5594	5619062	2898551		

TOTAL MONTHLY PUMPAGE 40,330,200

YEAR TO DATE 251,477,500

CITY OF ST. LOUIS PARK
G A C PLANT # 1

Nov 1988
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1	✓		12.5	10	7	7	3321584	3312670	5594	5619062	2898551		1,641,100
2	✓		14	12	9	9	3328780	3320554	5594	5635473	2898551		1,503,100
3	✓		9.5	9.5	9.5	9.5	3335442	3327908	5594	5650504	2898551		—
4	✓	✓	5	4	4	4	3335442	3327909	5594	5650504	2898551		279300
5		✓	7	6	6	6	3336307	3328838	5594	5651818	2900038	342 5500	—
6		✓	4	2	2	2	3336307	3328838	5594	5651818	2900038		518.500
7		✓	8	6	6	6	3338089	3331439	5594	5651818	2905223		831.600
8		✓	8	6	6	6	3342770	3335894	5594	5651818	2913539		534.300
9		✓	8	6	6	6	3345267	3338614	5594	5651818	2918882		589900
10		✓	8	6	6	6	3347963	3341547	5594	5651818	2924781	2984500	510,200
11		✓	7	9	7	7	3350293	3344086	5594	5651818	2929883		902100
12		✓	7	9	7	7	3354446	3348608	5594	5651818	2938904		872,500
13		✓	7	9	7	7	3358215	3352719	5594	5651818	2947129		772.600
14		✓	5.5	5	5	5	3361765	3356597	5594	5651818	2954855		132,400
15		✓	10	7.5	4	4	3362369	3357253	5594	5651818	2956179	2986100	296,500
16	✓	✓	4.5	4	4	4	3363238	3358194	5594	5653285	2957577		—
17		✓	4	3	3	3	3363238	3358194	5594	5653285	2957577		282.800
18		✓	6	5	5	5	3364559	3359632	5594	5653285	2960405		—
19		✓	7	6	5	5	3364559	3359632	5594	5653285	2960405		116,600
20		✓	7	5	5	5	3364559	3359632	5594	5653285	2961571	399400	—
21		✓	6	5	4	4	3364559	3359632	5594	5653285	2961571		439,900
22		✓	7	5	4	4	3366580	3361837	5594	5653285	2965970		—
23		✓	4	3	3	3	3366580	3361837	5594	5653285	2965970		591.000
24		✓	6	5	5	5	3369298	3364805	5594	5653285	2971880		47.200
25		✓	7	6	6	6	3369298	3364805	5594	5653285	2972352	1108300	30.200
26			7	5	4	4	3369298	3364805	5594	5653285	2972352		—
27		✓	6	4	6	6	3370816	3366459	5594	5653285	2972352		640.500
28		✓		4.5	4.5	4.5	3372271	3368643	5594	5653285	2979059		582,600
29	✓	✓	12	10	7	7	3375077	3371092	5594	5653285	2984885		721.500
30		✓	7	6	6	6	3377944	3374203	5594	5654923	2990462	2014500	69.900
31							3378217	3374449	5594	5654923	2991161		

TOTAL MONTHLY PUMPAGE 12846300
YEAR TO DATE 264,323,8[illegible]

CITY OF ST. LOUIS PARK
G A C PLANT # 1

DEC 88
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1		✓	12	10	7	7	3378219	3374501	5594	5654923	2991162		17.800
2		✓	6	5.5	5	5	3378255	3374539	5594	5654923	2991339		—
3		✓	7	6	6	6	3378255	3374539	5594	5654923	2991339		—
4		✓	7	6	6	6	3378255	3374539	5594	5654923	2991339		341.100
5		✓	11.5	10	7	7	3379771	3376186	5594	5654923	2994750	.4778	120.900
6		✓	5.5	5	5	5	3380257	3376718	5594	5654923	2995959		1056.100
7		✓	10	8	5	5	3385444	3382370	5594	5654923	3006520		1.312.600
8	✓	✓	12.5	11	8	8	3391631	3389096	5594	5656718	3017851		90.500
9		✓	10	9	5	5	3392117	3389679	5594	5656718	3018756		273.600
10		✓	6	6.5	6	6	3393558	3391192	5594	5656718	3021486	3.1775	445300
11		✓	7.5	6.5	6.5	6.5	3393558	3391192	5594	5656718	3021486		758.500
12		✓	9.5	7	7	7	3395618	3393442	5594	5656718	3033524		119.400
13		✓	6	4	4	4	3395953	3393789	5594	5656718	3034718		346300
14		✓	5	4	4	4	3397505	3395505	5594	5656718	3038181		346,900
15		✓	6	5	5	5	3399110	3397260	5594	5656718	3041650	1.5711	—
16		✓	6	5	5	5	3399110	3397260	5594	5656718	3041650		213600
17		✓	6	5	5	5	3399110	3397260	5594	5656718	3041650		278,800
18		✓	6	5	5	5	3401674	3400069	5594	5656737	3046555		316.500
19		✓	5	4	4	4	3403408	3401641	5594	5656737	3049720		473,700
20		✓	7	6	6	6	3405328	3404082	5594	5656737	3054457	1.8762	593600
21	✓	✓	6	5	5	5	3407496	3406463	5594	5657982	3059148		72.400
22		✓	9	8	4	4	3407920	3406926	5594	5657982	3059872		263400
23		✓	6	5	5	5	3409044	3408165	5594	5657982			324800
24		✓	8	6.5	6.5	6.5	3409044	3408165	5594	5657982	3065755		1.000
25		✓	7	6	6.5	6.5	3409044	3408165	5594	5657982	3065765	.6617	—
26		✓	7	6	6.5	6.5	3409044	3408165	5594	5657982	3065765		—
27		✓	7	6	6	6	3409171	3408295	5594	5657982	3065765		402.00
28		✓	10	9	4	4	3409242	3408372	5594	5657982	3066167		22.100
29		✓	6	5	5	5	3409351	3408490	5594	5657982	3066388		—
30		✓	6	5	5	5	3409351	3408490	5594	5657982	3066388		142.700
31		✓	8.5	8.5	5	5	3410079	3409297	5594	5657982	3067815	1.2547	1049.700
							3415223	3415027		5657982	3078312		

TOTAL MONTHLY PUMPAGE 9.021.000
YEAR TO DATE 273.3[illegible]800

CITY OF ST. LOUIS PARK
G A C PLANT # 1

JAN 89
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1		✓	7.5	6.5	6.5	6.5	3415223	3415027	5594	5657982	3078312		477,500
2		✓	5.5	4	4	4	3417533	3417590	5594	5657982	3083087		1,357,200
3		✓	12	10	7	7	3424201	3425000	5594	5657982	3096659		1,135,000
4	✓	✓	12	10	6	6	3428926	3430235	5594	5659463	3106332		275,500
5		✓	6.5	5	5	5	3430849	3432374	5594	5659463	3109287		72,700
6		✓	9.5	8	4.5	4.5	3431271	3432841	5594	5659463	3110014		220,900
7		✓	11	6	5	5	3432311	3433993	5594	5659463	3112223		—
8		✓	5.5	5	5	5	3432311	3433993	5594	5659463	3112223		31,500
9		✓	5.5	5	5	5	3432423	3434126	5594	5659463	3112538		258,900
10		✓	5.5	5	5	5	3433637	3435465	5594	5659463	3115127		130,000
11		✓	4.5	4	4	4	3433701	3435535	5594	5659486	3115234		1,105,200
12		✓	10	8.5	5	5	3435983	3441486	5594	5659486	3126286		1,175,200
13	✓	✓	9.5	8	4	4	3444427	3447459	5594	5660509	3137015		812,100
14		✓	5.5	4.5	3	5	3448601	3452166	5594	5660509	3145136		1,124,700
15		✓	6	5	5	5	3453961	3458100	5594	5660509	3156383		730,400
16		✓	9	8	5	5	3457525	3462059	5594	5660509	3163687		1,100,500
17		✓	8	7	3	3	3463195	3468366	5594	5660509	3174692		1,127,200
18		✓	10	7	4	4	3468653	3474289	5594	5660528	3185945		71,100
19		✓	10	9	5	5	3469041	3474626	5594	5660528	3186656		932,700
20		✓	8	7	5	5	3473635	3479653	5594	5660528	3195983		827,000
21		✓	5	4	4	4	3477727	3484135	5594	5660528	3204253		—
22		✓	5	5	4	4	3477727	3484135	5594	5660528	3204253		482,700
23	✓	✓	12	10	5	5	3479461	3486031	5594	5661921	3207687		48,500
24		✓	5	4	3	3	3479671	3486261	5594	5661921	3208172		107,200
25		✓	12	10	5	5	3480200	3486834	5594	5661921	3209244		760,400
26		✓	9	8	4	4	3484256	3491172	5594	5661921	3216848		843,700
27		✓	4	3	3	3	3488948	3495203	5594	5661921	3225285		797,500
28		✓	2	2	3	3	3492775	3499884	5594	5661921	3233260		—
29		✓	3	2	3.5	3.5	3492775	3499884	5594	5661921	3233260		—
30		✓	3.5	2.5	3	3	3492775	3499389	5594	5661921	3233260		233,400
31	✓	✓		9	5	5	3493171	3500311	5594	5662798	3234717		174,900
							3494008	3501219	5594	5662992	3236272		

TOTAL MONTHLY PUMPAGE 16,296,600

YEAR TO DATE 16,2[illegible]600

CITY OF ST. LOUIS PARK
G A C PLANT # 1

FEB 89
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1		✓	11.5	10	6	6	3494008	3501219	5594	5662992	3236272		14.900
2	✓	✓	6	5	5	5	3494043	3501259	5594	5662992	3236421		67,800
3	✓		8	5	5	5	3496839	3504257	5594	5668294	3237797		576.800
4	✓		7	5	5	5	3499693	3507400	5594	5674062	3237797		324.400
5	✓		7	5	5	5	3501334	3509881	5594	5677306	3237797		533 300
6	✓		9	7.5	4	4	3504151	3512336	5594	5682639	[illegible]		470.000
7	✓		6	[illegible]	5	5	3506143	3514401	5594	5687339	3237797		—
8	✓		2.5	2.5	2.5	2.5	3506143	3514401	5594	5687339	[illegible]		427.500
9	✓		9.5	7.5	4	4	3508244	3516680	5594	5691614	[illegible]		780.000
10	✓		11	6	6	6	3512058	3520817	5594	5699414	[illegible]		157.200
11	✓		7	6	6	6	3513486	3524534	5595	5706156	3258627		776.700
12	✓		3	4	3	3	3519375	[illegible]	5595	5713923	3243986		879.900
13	✓		5	4	4	1	[illegible]	3533415	[illegible]	5722722	3243986		674.900
14	✓		9	7.5	4	4	3527125	3537095	5595	5729471	3243986		1,009,600
15	✓	✓	9	8	4	4	3532158	3542562	5595	5739567	3243986		1.422.400
16	✓		10.5	9.5	6	6	3538544	3549572	5595	5752314	3245463		29,100
17	✓		12.5	12	8	8	3538580	3549571	5595	5752605	3245463		68,300
18	✓		10	8	6	6	3538742	3549753	5595	5753288	3245463		426,800
19	✓		10	8	6	6	3540843	3551994	5595	5757556	3245463		48,000
20	✓		10	8	5	5	3541108	3552281	5595	5758036	3245463		1,070,500
21	✓		0	8	6	6	3545839	3557152	5595	5761941	3245463		692,200
22	✓		5	4	4	4	3545839	[illegible]	5595	5775863	3245463		—
23	✓		5	4	4	4	3548242	3560056	5595	5768941	3245463		—
24	✓		9.5	8	4	4	[illegible]	[illegible]	5595	5768941	3245463		637 400
25	✓		5.5	2	2	2	3550172	3562171	5595	5782237	[illegible]		1700
26	✓		4	3	4	4	3550177	3562176	5595	5782254	3245463		641,100
27	✓		4	2	3.5	3.5	3550177	[illegible]	5595	5782254	[illegible]		205,500
28	✓	✓	11.5	10	7	7	3552603	[illegible]	5595	5787344	3246784		
29	✓	✓	5	4	3	3	3553008	3565256	5595	5788740	3247443		
30													
31													

✓ TOTAL MONTHLY PUMPAGE 13,156,000

YEAR TO DATE 29,457,600

CITY OF ST. LOUIS [illegible]

G A C PLANT # 1

MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1	✓	✓	5	4	3	3	3553008	3565256	5595	5788740	3247443		27.000
2	✓	✓	5	4	3	3	3553125	3565351	5595	5789010	3247443		1.774.000
3	✓		12	MJ	6	6	3561064	3573833	5595	5806750	3247443		748.800
4	✓		8	6.5	6	6	[illegible]	3577421	5595	5814238	3247443		939.700
5	✓		9	7	6	6	[illegible]	3581583	5595	5823635	3247443	4.6889	1,199,400
6	✓		11.5	10	6.5	6.5	3573215	3587086	5595	5835629	3247443		1,603.700
7	✓		7.5	10.5	7	7	3579788	3593834	5595	5851666	3247443		1.365.200
8	✓		3	2	2	2	3581225	3595849	5595	5865318	3247443		—
9	✓		3	2	2	2	3581225	3595849	5595	5865318	3247443		305.800
10	✓		4	5	5	5	3581741	3596414	5595	5868376	3247443	3.4510	176,300
11	✓		7.5	6.5	6	6	3581908	3596596	5595	5870139	3247443		—
12	✓		5.5	5	5.5	5.5	3581908	3596596	5595	5870139	3247443		—
13	✓		5	5	4	4	3581908	3596596	5595	5870139	3247443		551.300
14	✓		3	3	3	3	3582906	3597685	5595	5882860	3250282		66.000
15	✓		2	2	2	2	3582146	3597947	5595	5889791	3250282	.6993	66.000
16	✓		3	3	3	3	3583511	3598115	5595	5902432	3250282		—
17	✓		3	3	4	4	3583579	3598415	5595	5902452	3250282		462,000
18	✓		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	5907115	3250282		64,700
19	✓		4	4	4	4	[illegible]	[illegible]	5595	5909749	3250282		
20	✓		6	[illegible]	5	5	[illegible]	[illegible]	[illegible]	[illegible]	3250282	1.1051	642,600
21	✓		7	7	5	5	3586212	3601337	5595	5915875	3250282		857,300
22	✓		10	7	7	7	3589772	3605205	5595	5924068	3250282		1045,800
23	✓		11	9.5	5.5	5.5	3592019	3607660	5595	5933159	3252029		267,500
24	✓	✓	6	5	4	4	3593226	3608990	5595	5935828	3252037		63,000
25	✓		7	6.5	6.5	6.5	3593449	3609234	5595	5938053	3252037		—
26	✓		5	5	5.5	5.5	3593449	3609234	5595	5938053	3252037	2.2336	—
27	✓		3	3	4.5	4.5	3593449	3609234	5595	5938053	3252037		557.900
28	✓		5	5	4	4	3595592	3611586	5595	5943632	[illegible]		—
29	✓		5	5	4	4	3595592	3611586	5595	5943632	3252037		—
30	✓		5	5	4	4	3595592	3611586	5595	5943632	3252037		113,400
31	✓	✓	12	11	7	7	3596532	3612611	5595	5946227	3252037	1.2337.50	562.400
							3597941	3614152	5595	5949179	3254709		

TOTAL MONTHLY PUMPAGE 13,435,900

YEAR TO DATE 42,888,500

CITY OF ST. LOUIS PARK
G A C PLANT # 1

APRIL 89
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1	✓		5	6	6	6	3597941	3614152	5595	5949179	3254709		—
2	✓		5.5	4.5	6	6	3597941	3614152	5595	5949179	3254709		—
3	✓		5	4	5	5	3597941	3614152	5595	5949179	3254709		52,000
4	✓		5	4	4	4	3598198	3614431	5595	5949699	3254709		719,900
5	✓		7	5	4	4	3602249	3618879	5595	5956898	3254709		766,400
6	✓		10	8	7	7	3606398	3623440	5595	5964562	3254709		976,400
7	✓		12	10	6	6	3611656	3629130	5595	5974326	3254709		702,200
8	✓		8	6	6	6	3615380	3633203	5595	5981348	3254709		568,800
9	✓		7	6	6	6	3618810	3636958	5595	5987036	3254709		652,800
10	✓		7	6	5	5	3622162	3640623	5595	5993564	3254709		887,200
11	✓	✓	12.5	12	8	8	3626794	3645714	5595	6002436	3254709		1,029,200
12	✓		14.5	14	8	8	3631509	3650904	5595	6010382	3257055		888,500
13	✓		14.5	14	9	9	3636225	3656117	5595	6019267	3257055		826,900
14	✓		8	6	6	6	3640712	3661066	5595	6027536	3257055		679,700
15	✓		7	6	6	6	3644245	3664957	5595	6034333	3257055		688,300
16	✓		7	6	6	6	3647847	3668929	5595	6041216	3257055		765,100
17	✓		12	10	6	6	3691760	3673243	5595	6048867	3257055		417,600
18	✓		12	10	6	6	3653864	3675550	5595	605343	3257055		1,007,800
19	✓		12	11	7	7	3658928	3681158	5595	6063121	3257055		541,400
20	✓		10	8	6	6	3661671	3684195	5595	6068535	3257055		802,300
21	✓	✓	9	7.5	7.5	7.5	3665716	3688687	5595	6076558	3257055		1,470,500
22	✓	✓	13	12	8	8	3672597	3696323	5595	6089722	3258596		1,244,600
23	✓		13.5	12.5	9	8.5	3679502	3703983	5595	6102168	3258596		1,297,700
24	✓		12	10.5	7	7	3686599	3711845	5595	6115145	3258596		1,223,100
25	✓		13.5	12	8	8	3693334	3719334	5595	6127376	3258596		1,194,300
26	✓		15	14	10	10	3699881	3726637	5595	6139319	3258596		1,534,600
27	✓		16	14	10	10	3706677	3734222	5595	6154665	3258596		1,291,400
28	✓		14.5	13	8.5	8.5	3712392	3740602	5595	6167579	3258596		723,900
29	✓		10.5	9	9	9	3715896	3744508	5595	6174818	3258596		402,100
30	✓		15.5	14	9.5	9.5	3718030	3746878	5595	6178839	3258596		1,321,100
31							3725210	3754848	5595	6192050	3258596		

TOTAL MONTHLY PUMPAGE 24,675,800
YEAR TO DATE 67,5[illegible],300

CITY OF ST. LOUIS PARK

G A C PLANT # 1

MAY 89

MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN (Plant)	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1	✓	·	14	12	8	8	3725210	3754848	5595	6192050	3258596		1,488,200
2	✓	✓	15	15	9.5	9.5	3732158	3762572	5595	6204930	3260598		1,199,600
3	✓		14	14	9	9	3738370	3769514	5595	6216926	3260598		1,645,100
4	✓		10	8.5	5	5	3745660	3776656	5595	6233377	3260598		1,598,800
5	✓		11.5	10	6.5	6.5	3752533	3785338	5595	6249365	3260598	7.2095	1,277,800
6	✓		11.5	10	6	6	3758181	3791653	5595	6262143	3260598		1,528,800
7	✓		12	10	6	6	3764866	3799177	5595	6277431	3260598		1,490,800
8	✓			9	5	5	3772250	3807504	5595	6292339	3260598		1,216,800
9	✓		10	8	4	4	3778409	3814494	5595	6304507	3260598		562,500
10	✓		12	9.5	6	6	3785427	3822486	5595	6315680	3262087	5.9293	1,130,400
11	✓		8	7	5	5	3790210	3827495	5595	6319984	3262051		310,800
12		✓	11	10	5	5	3790564	3828354	5595	6322419	3262725		179,300
13		✓	11	10	7	7	3791260	3829132	5595	—	3264518		—
14		✓	8	7	5	5	3791260	3829132	5595	—	—		—
15		✓	7	6	6	6	3791260	3829132	5595	6322419	3264518	.5848	94,600
16		✓	6	4	3	3	3791766	3829696	5595	6322422	3269554		1,322,900
17		✓	14.5	13	9	9	3798486	3837239	5595	6322422	3282783		1,702,500
18		✓	13.5	12	8	8	3806842	3846611	5595	6322422	3299808		966,200
19		✓	14	12	8	8	3811509	3851842	5595	6322422	3309470		1,626,100
20		✓	14	12	8	8	3819509	3860793	5595	6322422	3325731	6.819	1,201,300
21		✓	13.5	12	8	8	3825379	3867348	5595	6322422	3337744		1,847,800
22		✓	13.5	12	8	8	3833681	3876583	5595	6322422	3356172		1,146,000
23		✓	14	12	9	9	3839098	3882600	5595	6322422	3367632		1,386,100
24		✓	14	12	8	8	3846050	3890317	5595		3381493		1,362,900
25		✓	14	12	8	8	3852394	3897357	5595		3395122	73638	1,626,000
26		✓	13	16	8	8	3859484	3905227	5595		3411382		454,000
27		✓	14.5	12.5	9	9	3861653	3907617	5595	6322422	3415922		1,147,000
28		✓	12	10	10	10	3867055	3913581	5595	6322422	3427392		873,800
29		✓	11	9	9	9	3871257	3918207	5595	6322422	3436130		1,323,600
30		✓	9.5	9.5	9	9	3876203	3923652	5595	6322422	3449366		893,900
31		✓	10	8	8	8	3882014	3930058	5595	6322422	3458305	5.9788	1,286,500
							3888432	3937133	3595				

✓TOTAL MONTHLY PUMPAGE 33,885,200

YEAR TO DATE 101,449,[illegible]00

CITY OF ST. LOUIS PARK
G A C PLANT # 1

JUNE 1989
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1		✓	12	10	10	10	3888452	3937133	5595	6322422	3471170		1,292,900
2		✓	12.5	11	9	9	3875867	3945352	5595	6322422	3484099		1,149,500
3		✓	15	9	10	10	3901563	3951647	5595	6322422	3495594		1,236,700
4		✓	15.5	13	10	10	3907509	3958199	5595	6322422	3507961		1,223,700
5		✓	12.5	12	7	7	3913529	3964133	5595	6322422	3520198		1,474,000
6		✓	12	9	7	7	3920797	3972840	5595	6322422	3534938		1,379,900
7		✓	13	10	6	6	3927537	3980377	5595	6322422	3548737		1,363,100
8		✓	13	10	6	6	3934235	3987819	5595	6322422	3562368		1,300,900
9		✓	7	7	7	7	3940574	3994862	5595	6322422	3575377		1,402,300
10		✓	17	12	10	10	3945523	4000319	5595	6322422	3589940		1,394,800
11		✓	17	12	8	8	3952173	4007661	5595	6322422	3599748		1,407,600
12		✓	17	12	8	8	3958753	4014921	5595	6322422	3613824		1,437,700
13		✓	14.5	12	9	9	3971946	4029486	5595	6322422	3628197		1,447,600
14		✓	15.5	12	10	10	3979041	4037275	5595	6322422	3642673		1,361,300
15		✓	14	12	7	7	3985997	4044975	5595	6322422	3656286		1,432,800
16		✓	17	12	10	10	3992640	4052338	5595	6322422	3670664		1,451,900
17		✓	15	12	8	8	3999565	4060015	5595	6322422	3684496		1,451,900
18		✓	15	13	8	8	4006173	4067252	5595	6322422	3699015		1,402,700
19		✓	16	11	8	8	[illegible]	4075287	5595	6322422	3713042		1,575,500 -15593
20		✓	16	12	8	8	4020014	4082578	5595	6322422	3728792		1,389,300
21		✓	16	12	8	8	4025780	4089078	5595	6322422	3742690		1,226,800
22	✓	✓	14	12	8	8	4032198	4096062	5595	6322422	3755358		1,499,800
23		✓	13.5	13	9	9	4038316	4102755	5595	6322422	3768718		1,303,200
24		✓	15	14	10	10	4044514	4109500	5595	6322422	3781813		1,311,400
25		✓	14	12	10	10	40[illegible]701	4116231	5595	—	3794927		1,286,200
26		✓	9	8	8	8	4055984	4122010	5595	—	3807789		1,149,500
27		✓	14	12	8	9	4062406	4129012	5595	—	3819280		1,059,000
28		✓	13	11	10	10	4067371	4136582	5595	—	3829874		1,239,500
29		✓	13	10	9	9	4069371	4136582	5595	—	3842269		1,386,500
30		✓	14	13	10	10	4076371	4144217	5595	—	3864307		817,100
31		✓	18	13	10		4080884	4149134	5595				

TOTAL MONTHLY PUMPAGE 39.4712
YEAR TO DATE 140.92[illegible]9

CITY OF ST. LOUIS PARK
G A C PLANT # 1

July 89
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1		✓	19	13	10	10	4080884	4149134	5595	—	3864307		1,193,800
2		✓	8	8	8	8	4087180	4155986	5595	—	3876238		1,372,100
3	✓	✓	8	8	8	8	4093918	4163320	5595	—	3889959		1,399,700
4		✓	14.5	14	10	10	4100240	4170179	5595	6347603	3902289		1,441,700
5		✓	12	10.5	9	9	4107191	4177729	5595	—	3916706		1,797,500
6	✓	✓	16	13	9	9	4114283	4185396	5595	6359958	3922326		1,613,200
7		✓		13	9	9	4121842	4193586	5595	6376090	—		1,634,200
8		✓	12.5	15	11	11	4121503	4201896	5595	6392432	—		1,348,600
9		✓	17.5	14	10	10	4135893	4208817	5595	6405918	—		1,693,900
10	✓	✓	17	13.5	10	10	4143880	4217425	5595	6421115	3927040		1,375,000
11		✓	17.5	14	10	10	4151199	4225312	5595	6434865	3927090		1,472,100
12		✓	18	12.5	9	9	4158885	4233596	5595	6449589	3927090		1,507,800
13	✓	✓	20	10	9	9	4166474	4241710	5595	6463927	3927861		1,864,300
14	✓	✓	14	13	9	9	4174626	4250630	5595	6481172	3929259		1,208,600
15	✓		14.5	13.5	9.5	9.5	4180953	4257448	5595	6493258	3929259		1,333,300
16	✓		15.5	14	10	10	4187894	4264919	5595	6506591	3929259		1,501,500
17	✓		15	12.5	9	9	4195782	4273396	5595	6521606	3929259		1,208,800
18	✓		16.5	13.5	10	10	4202018	4280112	5595	6533694	3929259		1,416,400
19	✓		17.5	13.5	10	10	4209414	4288053	5595	6547858	3929259		1,063,100
20	✓		17.5	14	10	10	4214850	4293896	5595	6558489	3929259		261,900
21	✓	✓	9	8	7	7	4220934	4300417	5595	6561108	3929259		1,246,300
22	✓		15	15	10	10	4227528	4307804	5595	6572092	3930738		1,322,100
23	✓		14	13	9	9	4235809	4316385	5595	6585863	3930738		1,148,700
24	✓		15	13	10	10	4242702	4323785	5595	6597350	3930738		1,514,900
25	✓		15	12.5	9	9	4251679	4333456	5595	6612499	3930738		1,115,800
26	✓		17	13	9	9	4258412	4340696	5595	6623657	3930738		1,285,200
27	✓		16	12	9	9	4266051	4348921	5595	6636509	3930738		1,245,700
28	✓		18	13.5	10	10	4273255	4356698	5595	6648966	3930738		1,081,800
29	✓		10	10.5	10.0	10	— 9699	4363629	5595	6659784	3930738		1,207,300
30	✓		14	19	10	10	4287218	4371697	5595	6671857	3930738		828,000
31	✓		18	13	10	10	4292278	4377127	5595	6680137	3930738		1,157,800
							4297284	4384641	5595	6691715	3930738		

TOTAL MONTHLY PUMPAGE 40,915,700

YEAR TO DATE 181,856,700

CITY OF ST. LOUIS PARK
G A C PLANT # 1

Aug./87
MONTH/YEAR

DATE	WELL 10	WELL 15	PSI IN	PSI OUT	PSI V1	PSI V2	INTEGRATOR READING V1	INTEGRATOR READING V2	BACKWASH	WELL 10	WELL 15	BACKWASH	PUMPAGE TOTAL
1	✓		18	13	10	10	4299294	4384641	5595	6691715	3930735		1,244,800
2	✓		14.5	13	10	10	4306519	4392401	[illegible]	6704[illegible]	3930[illegible]		1,163,300
3	✓		15	13	10	10	4314403	4399746	5595	6715716	3930738		1,461,500
4	✓		16	14	9	9	4321765	4408808	5595	6730411	3930738		1,042,400
5	✓		16	14	10	10	4327764	4415261	5595	6740835	3930738		1,223,700
6	✓		16	15	10	10	4334715	4422725	5595	6753072	3930738		1,474,200
7	✓		15	15	10	10	4342907	4431506	5595	6767614	3930738		1,399,400
8	✓		15	14	9	9	4350492	4439651	5595	6781808	3930738		1,160,700
9	✓		16	14	10	10	4356741	4446391	5595	6793415	3930738		1,565,400
10	✓	✓	15	13	9	9	4365357	4455694	5595	6809069	3930738		1,394,300
11	✓		14	13	9	9	4372550	4463497	5595	6823012	3930738		1,186,800
12	✓		15	14	10	10	4379102	4470593	5595	6834880	3930738		1,324,300
13	✓		16	14.5	10.5	10.5	4386474	4478567	5595	6848123	3930738		1,389,600
14	✓		15	14	10	10	4393985	4486674	5595	6862038	3930738		1,394,100
15	✓		16.5	16	11	11	4401332	4499609	5595	6875[illegible]	3930738		1,553,700
16	✓		16	15	10	10	4409685	4503640	5595	6841457	3930735		1,111,200
17	✓		16	15	10	10	4415682	4510110	5595	6902611	3930738		1,282,200
18	✓		16	14.5	9.5	9.5	4422622	4517606	5595	6915481	3930738		1,343,200
19	✓		17	16	11	11	4430124	4525791	5595	6928863	3930738		1,311,300
20	✓		17.5	15	11	11	4437297	4533974	5595	6941926	3930738		1,290,300
21	✓		17	15	10	10	4444113	4540952	5595	6954879	3930738		1,321,000
22	✓		16.5	15	10	10	4450948	4548470	5595	6968[illegible]	3930738		1,297,800
23	✓		16.5	15	10	10	4457799	4555484	5595	6981[illegible]	3930738		1,140,100
24	✓		16.5	16	10	10	4463681	4562338	5595	6992468	3930738		1,622,900
25	✓		12	11	10	10	4471434	4570953	5595	7008117	3930738		1,330,200
26	✓		15	15	10	10	4477991	4578172	5595	7021449	3930738		1,452,300
27	✓		17	16	10	10	4485145	4586038	5595	7036522	3930738		1,3246
28	✓		17	16	10	10	4491876	4593395	5595	7049168	3930738		1,222,800
29	✓		17	15	10	10	4497888	4599969	5595	7061[illegible]	3930738		1,547,800
30	✓		16	13	8	8	4505549	4608408	5595	7077[illegible]	3930738		1,660,800
31	✓		18	13	10	10	4513671	4617448	5595	7094482	3930738		1,245,000
							4517656	4624125	5595	7106[illegible]	3930738		

TOTAL MONTHLY PUMPAGE 41,481,700

YEAR TO DATE 223,338,4[illegible]

Appendix D
Analytical Reports

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

December 8, 1988

Enseco - RMAL Project Number 002099

Introduction

Seven aqueous samples were received at Rocky Mountain Analytical Laboratory on October 18, 1988. The samples were logged in under RMAL project number 002099. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. All samples were analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH's).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below relative to Revision 3 of the QAPP.

PPT PAH

Due to concentrations of target compounds in samples 2046-04 and 05 in excess of the linear range of the calibration curve, the samples were analyzed at dilutions.

Due to an interference in the matrix of sample 2046-02, the recovery of D12 Chrysene exceeded the upper control limit. The sample was reanalyzed and showed the same effect. Since this interference is documented and limited to the surrogate, the report values for the target compounds are not affected. Both analyses are submitted.

Due to the dilutions performed on sample 2099-04 and 05, the surrogate recoveries could not be calculated.

Enseco Incorporated
4955 Yarrow Street
Arvada Colorado 80002
303/421 6611 Fax 303/431 7171

Samples 2046-01, 01Dup, 01MS, 02, 03, 05 and Blk-01 showed target compounds out of control limits for secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernable quantitation interference with the secondary ion.

This data package is in compliance with the terms and conditions of the 1988 Revision of the QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: _____ Date: _____
Tracy Giberson
Data Control Supervisor

Approved by: _____ Date: _____
Rebecca Williams
Client Service Representative

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
002099-0001-SA	GAC-SLP10T-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0001-DU	GAC-SLP10TD-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0001-MS	GAC-SLP10TMS-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0002-SA	GAC-SLP10FB-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0002-DU	GAC-SLP10FBD-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0003-SA	GAC-SLP10CL-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0004-SA	GAC-SLP10F-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0005-SA	GAC-SLP10DH-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0006-SA	GAC-SLP10FTOC-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0007-SA	GAC-SLP10TTOC-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0008-SA	GAC-SLP10CITOC-101788	AQUEOUS	17 OCT 88		18 OCT 88

TABLE OF CONTENTS
CASE: 2099

VOA

1. QC Summary Package.....N/A
2. Sample Data Package.....N/A
3. Standards Data Package.....N/A
4. Raw QC Data.....N/A
5. Blank Data.....N/A
6. Matrix Spike Data.....N/A
7. Matrix Spike Duplicate Data.....N/A

PAH

1. QC Summary Package.....00001
2. Sample Data Package.....00009
3. Standards Data Package.....00402
4. Raw QC Data.....N/A
5. Blank Data.....00920
6. Matrix Spike Data.....00969
7. Matrix Spike Duplicate Data.....N/A

PEST

1. QC Summary Package.....N/A
2. Sample Data Package.....N/A
3. Standards Data Package.....N/A
4. Pesticide Evaluation Standards.....N/A
5. Pesticide Individual Standards.....N/A
6. Pesticide Quantitation Standards.....N/A
7. Blank Data.....N/A
8. Matrix Spike Data.....N/A
9. Matrix Spike Duplicate Data.....N/A

SUMMARY DATA PACKAGE FOR

CITY OF ST. LOUIS PARK

RMA QC # 2099

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2099-01

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 2099-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X873

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/03/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	3.2	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	2.6	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.3	B
90-12-0	1-Methylnaphthalene	1.5	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.1	J
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	2.0	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.9	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2099-01DUP

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 2099-01DUP

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X875

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/03/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	2.8	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	2.2	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.9	B
90-12-0	1-Methylnaphthalene	1.3	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.4	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	3.6	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2099-01MS

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 2099-01MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X874

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/03/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	2.3	
95-13-6	1H-Indene	10.	SP
91-20-3	Naphthalene	9.9	SP B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	15.	SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	12.	SP B
90-12-0	1-Methylnaphthalene	1.8	B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.6	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	13.	SP
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	U
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	SP B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	15.	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	4.0	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2099-02

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 2099-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X876

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/03/88

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	2.5	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	7.9	B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	8.5	B
90-12-0	1-Methylnaphthalene	5.8	B
92-52-4	Biphenyl	2.5	J
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.4	
86-73-7	Fluorene	1.6	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	3.2	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.3	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2099-02RE

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 2099-02RE

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X911

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/08/88

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	3.3	
95-13-6	1H-Indene	1.3	
91-20-3	Naphthalene	11.	B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	9.4	B
90-12-0	1-Methylnaphthalene	5.7	B
92-52-4	Biphenyl	2.6	J
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	2.2	
86-73-7	Fluorene	1.5	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	3.2	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.2	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2099-03

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 2099-03

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X878

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/03/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	3.5	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	1.7	J B
4565-32-6	Benzo(B)Thiophene	2.3	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.8	B
90-12-0	1-Methylnaphthalene	1.9	B
92-52-4	Biphenyl	6.5	
208-96-8	Acenaphthylene	4.1	
83-32-9	Acenaphthene	12.	
132-64-9	Dibenzofuran	14.	
86-73-7	Fluorene	22.	
132-65-0	Dibenzothiophene	2.7	
85-01-8	Phenanthrene	7.2	B
120-12-7	Anthracene	2.6	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.5	J
206-44-0	Fluoranthene	4.9	
129-00-0	Pyrene	4.1	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2099-04(1%)

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 2099-04(1%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X896

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/07/88

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 12.5

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	510.	U
496-11-7	2,3-Dihydroindene	700.	
95-13-6	1H-Indene	90.	U
91-20-3	Naphthalene	650.	U
4565-32-6	Benzo(B)Thiophene	250.	
91-22-5	Quinoline	140.	U
120-72-9	1H-Indole	250.	U
91-57-6	2-Methylnaphthalene	90.	U
90-12-0	1-Methylnaphthalene	160.	U
92-52-4	Biphenyl	200.	J
208-96-8	Acenaphthylene	340.	
83-32-9	Acenaphthene	630.	
132-64-9	Dibenzofuran	370.	
86-73-7	Fluorene	650.	
132-65-0	Dibenzothiophene	110.	U
85-01-8	Phenanthrene	200.	B
120-12-7	Anthracene	110.	U
260-94-6	Acridine	290.	U
86-74-8	Carbazole	190.	U
206-44-0	Fluoranthene	160.	
129-00-0	Pyrene	140.	B
56-55-3	Benzo(A)Anthracene	250.	U
218-01-9	Chrysene	280.	U
205-99-2	Benzo(B)Fluoranthene	250.	U
207-08-9	Benzo(K)Fluoranthene	230.	U
57-97-6	7,12-Dimethylbenzanthracene	280.	U
192-97-2	Benzo(E)Pyrene	190.	U
50-32-8	Benzo(A)Pyrene	230.	U
198-55-0	Perylene	250.	U
56-49-5	3-Methylcholanthrene	350.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	210.	U
53-70-3	Dibenz(A,H)Anthracene	160.	U
191-24-2	Benzo(G,H,I)Perylene	280.	U
215-58-7	Dibenz(A,C)Anthracene	160.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2099-05(1%)

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: - SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 2099-05(1%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X885

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/04/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 12.5

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	510.	U
496-11-7	2,3-Dihydroindene	1400.	
95-13-6	1H-Indene	90.	U
91-20-3	Naphthalene	650.	U
4565-32-6	Benzo(B)Thiophene	430.	
91-22-5	Quinoline	140.	U
120-72-9	1H-Indole	250.	U
91-57-6	2-Methylnaphthalene	90.	U
90-12-0	1-Methylnaphthalene	130.	J B
92-52-4	Biphenyl	370.	J
208-96-8	Acenaphthylene	670.	
83-32-9	Acenaphthene	1100.	
132-64-9	Dibenzofuran	590.	
86-73-7	Fluorene	1000.	
132-65-0	Dibenzothiophene	110.	
85-01-8	Phenanthrene	360.	B
120-12-7	Anthracene	120.	
260-94-6	Acridine	290.	U
86-74-8	Carbazole	190.	U
206-44-0	Fluoranthene	330.	
129-00-0	Pyrene	360.	B
56-55-3	Benzo(A)Anthracene	250.	U
218-01-9	Chrysene	280.	U
205-99-2	Benzo(B)Fluoranthene	250.	U
207-08-9	Benzo(K)Fluoranthene	230.	U
57-97-6	7,12-Dimethylbenzanthracene	280.	U
192-97-2	Benzo(E)Pyrene	190.	U
50-32-8	Benzo(A)Pyrene	230.	U
198-55-0	Perylene	250.	U
56-49-5	3-Methylcholanthrene	350.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	210.	U
53-70-3	Dibenz(A,H)Anthracene	160.	U
191-24-2	Benzo(G,H,I)Perylene	280.	U
215-58-7	Dibenz(A,C)Anthracene	160.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.:

Lab Code: ENSECO Case No.: 2099 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2099X872

Level: (low/med) LOW Date Received: 10/18/88

% Moisture: not dec. dec. Date Extracted: 10/24/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/03/88

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	2.2	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.0	
90-12-0	1-Methylnaphthalene	1.2	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.0	J
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.3	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2099 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	2099-01	58	91	83
2	2099-01DUP	53	72	71
3	2099-01MS	48	60	66
4	2099-02	66	284*	87
5	2099-02RE	69	289*	92
7	2099-03	39	56	41
8	2099-04(1%)	D	D	D
9	2099-05(1%)	D	D	D
10	BLK-01	51	68	102

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2099 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 2099-01

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	20	0.0	10.	100
Naphthalene	20	2.6	9.9	36
Quinolene	20	0.0	15.	75
2-Methylnaphthalene	20	2.3	12.	48
Fluorene	20	1.0	13.	60
Chrysene	20	0.0	15.	75
Benzo(E)Pyrene	20	0.0	4.0	20

COMMENTS:

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2099 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 2099-01

COMPOUND	SAMPLE CONCENTRATION (ug/L)	DUPLICATE CONCENTRATION (ug/L)	% RPD
2,3-Dihydroindene	3.2	2.8	13
Naphthalene	2.6	2.2	17
2-Methylnaphthalene	2.3	1.9	19
1-Methylnaphthalene	1.5	1.3	14
Acenaphthene	1.1	1.4	24
Fluorene	1.0	ND	NC
Phenanthrene	2.0	1.2	50
Pyrene	1.9	3.6	62

COMMENTS:

ND = Not found
NC = Not calculated

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2099 SAS No.: N/A SDG No.: N/A

Lab File ID: S2099X872 Lab Sample ID: BLK-01

Date Extracted: 10/24/88 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 11/03/88 Time Analyzed: 10:32

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	2099-01	2099-01	S2099X873	11/03/88
2	2099-01DUP	2099-01DUP	S2099X875	11/03/88
3	2099-01MS	2099-01MS	S2099X874	11/03/88
4	2099-02	2099-02	S2099X876	11/03/88
5	2099-02RE	2099-02RE	S2099X911	11/08/88
7	2099-03	2099-03	S2099X878	11/03/88
8	2099-04(1%)	2099-04(1%)	S2099X896	11/07/88
9	2099-05	2099-05	S2099X880	11/03/88
10	2099-05(1%)	2099-05(1%)	S2099X885	11/04/88

COMMENTS:

Analytical Laboratory

RECEIVED
MAR 13 1989
CITY OF ST. LOUIS PARK

Enseco

March 8, 1989

Jim Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear Jim:

Enclosed are copies of the TOC data sheets for project 2099 which you had requested in our telephone conversation of 3/8/89.

Please call if I can be of further assistance.

Sincerely,

Rebecca A. Williams

Rebecca A. Williams
Program Administrator

RAW/heg
Enclosures

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Ensec

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
002099-0001-SA	GAC-SLP10T-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0001-DU	GAC-SLP10TD-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0001-MS	GAC-SLP10TMS-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0002-SA	GAC-SLP10FB-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0002-DU	GAC-SLP10FBD-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0003-SA	GAC-SLP10CL-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0004-SA	GAC-SLP10F-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0005-SA	GAC-SLP10DH-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0006-SA	GAC-SLP10FTOC-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0007-SA	GAC-SLP10TTOC-101788	AQUEOUS	17 OCT 88		18 OCT 88
002099-0008-SA	GAC-SLP10CITOC-101788	AQUEOUS	17 OCT 88		18 OCT 88

Ensec

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10FTOC-101788
Lab ID: 002099-0006-SA Enseco ID: 1016831
Matrix: AQUEOUS Sampled: 17 OCT 88 Received: 18 OCT 88
Authorized: 19 OCT 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.8	mg/L	0.1	415.1	08 NOV 88

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill

Approved By: Kimberly Conroy

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10TTOC-101788
Lab ID: 002099-0007-SA Enseco ID: 1016832
Matrix: AQUEOUS Sampled: 17 OCT 88 Received: 18 OCT 88
Authorized: 19 OCT 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.8	mg/L	0.1	415.1	08 NOV 88

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill

Approved By: Kimberly Conroy

Ensec

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10CITOC-101788
Lab ID: 002099-0008-SA Enseco ID: 1017034
Matrix: AQUEOUS Sampled: 17 OCT 88 Received: 18 OCT 88
Authorized: 19 OCT 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.0	mg/L	0.1	415.1	08 NOV 88

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Kimberly Conroy

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
002099-0006-SA	AQUEOUS	TOC-A	08 NOV 88-A
002099-0007-SA	AQUEOUS	TOC-A	08 NOV 88-A
002099-0008-SA	AQUEOUS	TOC-A	08 NOV 88-A

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 08 NOV 88-A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.8	24.8	99	99	91-109	0.0	20

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

December 22, 1988

Enseco - RMAL Project Number 002314

Introduction

Five aqueous samples were received at Rocky Mountain Analytical Laboratory on November 1, 1988. The samples were logged in under RMAL project number 002314. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. All samples were analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons.

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below relative to Revision 3 of the QAPP.

PPT PAH

Sample 2314-01MS showed target compounds out of control limits for secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the seondary ion.

This data package is in compliance with the terms and conditions of the QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Audrey Verniero Date: 12-28-88
Audrey Verniero
Data Control

Approved by: Rebecca Williams Date: 12-28-88
Rebecca Williams
Client Service Representative

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303/431-7171

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
002314-0001-SA	GAC-SLP10CI-103188	AQUEOUS	31 OCT 88		01 NOV 88
002314-0001-DU	GAC-SLP10CID-103188	AQUEOUS	31 OCT 88		01 NOV 88
002314-0001-MS	GAC-SLP10CIMS-103188	AQUEOUS	31 OCT 88		01 NOV 88
002314-0002-DU	GAC-SLP10CIFBD-103188	AQUEOUS	31 OCT 88		01 NOV 88
002314-0002-SA	GAC-SLP10CIFB-103188	AQUEOUS	31 OCT 88		01 NOV 88

TABLE OF CONTENTS
CASE: 2314

PPT PAH

1. QC Summary Package.....00001
2. Sample Data Package.....00007
3. Standards Data Package.....00153
4. Raw QC Data.....N/A
5. Blank Data.....00498
6. Matrix Spike Data.....00547
7. Matrix Spike Duplicate Data.....N/A

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC # 2314

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2314-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2314-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2314X065

Level: (low/med) LOW Date Received: 11/01/88

% Moisture: not dec. dec. Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/29/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	2.0	B
95-13-6	1H-Indene	1.1	B
91-20-3	Naphthalene	3.2	J B
4565-32-6	Benzo(B)Thiophene	1.5	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.2	B
90-12-0	1-Methylnaphthalene	1.2	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	
86-73-7	Fluorene	1.4	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	U
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.5	
129-00-0	Pyrene	3.6	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2314-01DUP

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2314-01DUP

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2314X066

Level: (low/med) LOW Date Received: 11/01/88

% Moisture: not dec. dec. Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/29/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	B
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	2.0	J B
4565-32-6	Benzo(B)Thiophene	1.4	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.6	B
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	1.2	J
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.2	J
132-64-9	Dibenzofuran	1.9	
86-73-7	Fluorene	2.0	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.2	J
120-12-7	Anthracene	1.1	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.5	
129-00-0	Pyrene	3.0	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2314-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2314-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2314X067

Level: (low/med) LOW Date Received: 11/01/88

% Moisture: not dec. dec. Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/29/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: UG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.[illegible]	[illegible]
496-11-7	2,3-Dihydroindene	[illegible]	
95-13-6	1H-Indene	1	
91-20-3	Naphthalene	5.[illegible]	
4565-32-6	Benzo(B)Thiophene	0.9	
91-22-5	Quinoline	1.4	
120-72-9	1H-Indole	2.5	[illegible]
91-57-6	2-Methylnaphthalene	4.4	B
90-12-0	1-Methylnaphthalene	2.7	B
92-52-4	Biphenyl	1.5	J
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	U
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2314-01MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2314-01MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2314X069

Level: (low/med) LOW Date Received: 11/01/88

% Moisture: not dec. dec. Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/29/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.5	B
95-13-6	1H-Indene	12.	SP B
91-20-3	Naphthalene	14.	SP B
4565-32-6	Benzo(B)Thiophene	1.4	
91-22-5	Quinoline	15.	SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	14.	SP B
90-12-0	1-Methylnaphthalene	1.3	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	
132-64-9	Dibenzofuran	1.9	
86-73-7	Fluorene	17.	SP
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	
120-12-7	Anthracene	1.3	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.7	
129-00-0	Pyrene	3.7	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	13.	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	2.1	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	2314-01	52	69	57
2	2314-01DUP	45	56	46
3	2314-01MS	55	74	52
4	2314-02	56	82	65
5	BLK-01	53	62	70

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 2314-01

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	20	1.1	12.	54
Naphthalene	20	3.2	14.	54
Quinolene	20	0.0	15.	75
2-Methylnaphthalene	20	2.2	14.	59
Fluorene	20	1.4	17.	78
Chrysene	20	0.0	13.	65
Benzo(E)Pyrene	20	0.0	2.1	10

COMMENTS:

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 2314-01

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	2.0	1.4	35
1H-Indene	1.1	ND	NC
Naphthalene	3.2	2.0	46
Benzo(B)Thiophene	1.5	1.4	7
2-Methylnaphthalene	2.2	1.6	32
1-Methylnaphthalene	1.2	ND	NC
Biphenyl	ND	1.2	NC
Acenaphthene	ND	1.2	NC
Dibenzofuran	1.0	1.9	62
Fluorene	1.4	2.0	35
Phenanthrene	ND	1.2	NC
Anthracene	ND	1.1	NC
Fluoranthene	1.5	1.5	0
Pyrene	3.6	3.0	18

COMMENTS:

ND = Not found
NC = Not calculated

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

Lab File ID: S2314X064 Lab Sample ID: BLK-01

Date Extracted: 11/07/88 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 11/29/88 Time Analyzed: 17:51

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	2314-01	2314-01	S2314X065	11/29/88
2	2314-01DUP	2314-01DUP	S2314X066	11/29/88
3	2314-01MS	2314-01MS	S2314X069	11/29/88
4	2314-02	2314-02	S2314X067	11/29/88

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2314X064

Level: (low/med) LOW Date Received: 11/01/88

% Moisture: not dec. dec. Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/29/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.6	
95-13-6	1H-Indene	1.1	
91-20-3	Naphthalene	3.5	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.1	
90-12-0	1-Methylnaphthalene	1.2	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	U
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

ENSR

Formerly ERT

ENSR Consulting
and Engineering

4500 Park Glen Road
Suite 210
St Louis Park, MN 55416
(612) 924-0117

January 31, 1989

Reilly Industries, Inc.
Mr. John Craun
1500 South Tibbs Avenue
P.O. Box 41076
Indianapolis, Indiana 46241

Re: Analytical Results for Pilot Column Study

Dear John:

Enclosed is the lab report for the split samples from the GAC plant that were analyzed by ENSR. I am interested to know how these results compare to those of RMAL. Please let me know.

Please call if you have any questions regarding these data.

Sincerely,

William M. Gregg

William M. Gregg
Project Manager

Enclosures

Ref No. 5660-002-810

WMG/pb

ENSR

Formerly ERT

ENSR Consulting
and Engineering

33 Industrial Way
Wilmington, MA 01887
(508) 657-4290

January 26, 1989

Mr. Bill Gregg
ENSR Consulting & Engineering
4500 Park Glen Road
Suite 210
Saint Louis Park, MN 55416

REFERENCE: Project No. : 8500-087-660, 660A
(5660-002-270)
Project Name : Reilly Tar & Chemical
Date Received: October 19, 1988
November 1, 1988

Dear Bill:

Enclosed are the results of analyses performed at your request on the project submission referenced above. Please feel free to contact us if you have any questions concerning the enclosed data.

Sincerely yours,

Karen A. Perito
Laboratory Project Mgr.
(508) 657-4290

Martha S. Sparlin
Laboratory QA Manager

Marilyn Hoyt
Laboratory Manager

RECEIVED
JAN 3 0 1989

LABORATORY ANALYTICAL REPORT

I. INTRODUCTION

This report represents the results of analyses conducted on ENSR Project No. 8500-087-660, 660A (5660-002-200), received by the Wilmington Laboratory on October 19 and November 1, 1988. Upon receipt by the laboratory, the samples were inspected for condition, Chain of Custody field identification accountability, and individual sample analytical requirements. The submitted samples were entered into the computerized Laboratory Information Management data base and unique laboratory identification numbers were assigned to each sample. The sample I.D. number is subsequently used throughout the laboratory to provide positive sample accountability in accordance with recommended USEPA sample management protocol. Table I summarizes the field identification, laboratory sample numbers, and analytical methodologies performed for this project.

TABLE 1

PROJECT SAMPLE SUMMARY

PROJECT NO. 8500-087-660,660A
PROJECT NAME: REILLY TAR & CHEMICAL

FIELD ID	SAMPLE NUMBER	SAMPLE MATRIX	ANALYTICAL METHOD AND REFERENCE
GAC-SLP-10-F-101788	62827	WATER	SAM-002 PPT/PAH
GAC-SLP-10-C-101788	62828	WATER	SAM-002 PPT/PAH
COLUMN 1 EFFLUENT 10/31/88	63413	WATER	SAM-002 PPT/PAH

II. QUALITY ASSURANCE AND QUALITY CONTROL

As an indication of the overall quality of the data generated by the ENSR Laboratory for this report, one or more of the following types of Quality Control analyses may be included in this report as required by the analytical methodology referenced in the project summary contained in TABLE I.

1. Method Blanks (MB)
2. Sample Duplicate Analyses
3. Laboratory Control Samples (LCS)
4. Matrix Spikes and Duplicates (MS/MSD)
5. Surrogate Compound Recoveries

Results of the quality control and quality assurance samples analyzed concurrently with the submitted samples for this project were within acceptable ranges. Quality control analyses and criteria for all methodologies performed by this laboratory are established by regulatory agencies and are constantly monitored as part of the laboratory's formal QA/QC program. Appendix I contains descriptions of the various types of QA/QC requirements which may have been required in this project.

III. ANALYTICAL RESULTS AND DISCUSSION

The results of analyses included in this report have been reviewed by the appropriate analytical department managers, the Laboratory Quality Assurance Manager, and the Laboratory Project Manager for accuracy and completeness. Method descriptions and summaries of procedures used in this project are included for reference. Appendix II contains general references to analytical procedures used by this laboratory.

The method blanks have some trace contamination present. It is difficult to determine if these reportable compounds are due to sample prep carryover, residual contamination in solvents or glassware, or GC/MS system contamination. These values have been reported for the method blanks; samples are reported with no blank corrections made.

The method detection limit (MDL) values are included on the report sheets. These values were determined by ENSR for this analysis and were used by this laboratory to report results. Results reported as less than (<) the MDL are present at trace levels above the 95% confidence interval of the MDL, but quantitation may not be accurate.

Results for Phenanthrene and Anthracene are reported as total. These compounds co-elute on the GC column and appear integrated as one peak.

Although samples were analyzed beyond the recommended 40 day holding time, the laboratory maintains confidence in the data a: all surrogate recoveries except one are within control limits.

APPENDIX I

QUALITY CONTROL AND ASSURANCE PROCEDURES

1. Method Blanks (MB) - Analytical control consisting of all reagents, internal standards, and surrogate compounds carried through an analytical procedure to check for laboratory or instrumental contamination.

2. Surrogates - Isotope labelled compounds added to analyses used to evaluate analytical efficiency by measuring recovery.

3. Duplicate Analysis - A quality assurance check on the integrity of sample preparation as well as sample collection and shipping. Field duplicates and laboratory duplicates may be analyzed for each submission of samples when requested and where sample volumes permit. A laboratory duplicate is an aliquot of a field sample.

4. Laboratory Control Sample (LCS) - A standard control matrix spiked with a group of target compounds representative of the method analytes. The LCS is used to monitor the day-to-day accuracy of routine analytical methods within defined QC limits. An LCS has been established for most routine analytical methods. Control limits are defined by the most recent six months of LCS data for the appropriate methodology with an acceptable range for each analyte of the mean plus or minus 3 standard deviations.

5. Matrix Spike and Matrix Spike Duplicate (MS/MSD) - An aliquot of the sample matrix spiked with known quantities of specific compounds and subjected to the entire analytical procedure in order to evaluate the effect of sample matrix on measurable analyte recovery. The MSD is a duplicate analysis of the matrix used to measure method precision.

APPENDIX II

ANALYTICAL PROCEDURE REFERENCES

1. "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act", 40 CFR, Part 136; Federal Register, Vol.49, No.209, 1984.

2. US EPA. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. (SW 846) Washington, D.C., April, 1984.

3. US EPA. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020. Cincinnati, OH, March, 1983.

4. American Public Health Association, American Water Works Association, Water Pollution Control Federation. Standard Methods for the Examination of Water and Wastewater, 15th & 16th Ed., Washington, D.C., April, 1985.

5. 1984 Annual Book of ASTM Standards Section 4: Construction, Vol. 04.08: Soil & Rock; Building Stones.

6. 1984 Book of ASTM Standards, Part 31: Water.

7. Manuals of Soil Laboratory Testing, Vol. 1: Soil Classification and Compaction Tests, K.H. Head, 1980.

8. US EPA. Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water. Cincinnati, OH, Sep 1986.

9. Methods of Soil Analysis Agronomy No. 9, Part 2: Chemical and Microbiological Properties, 1965.

10. Current EPA Contract Laboratory Program (CLP) Invitation for Bid protocols for analysis of organic and inorganic hazardous substances.

11. ENSR/ERT developed and validated screening methods and specialized techniques for parameters not covered by published EPA protocols.

ENSR CONSULTING AND ENGINEERING
SUMMARY OF ANALYTICAL RESULTS
PPT-PAH RESULTS IN WATER

ENSR NO : 63413
FIELD NO : COLUMN 1 EFFLUENT
CLIENT : REILLY TAR
SAMPLING SITE : ST LOUIS PARK,MN
PROJECT NO : 8500-087-660

DATE SAMPLED : 10/31/88
DATE RECEIVED : 11/01/88
DATE EXTRACTED : 11/03/88
DATE ANALYZED : 12/15/88

PARAMETER	RESULT (NG/L)	MDL
QUINOLINE	ND	2.60
BENZO(A)ANTHRACENE	ND	4.30
CHRYSENE	ND	2.60
BENZOFLUORANTHENES	<1.4	1.40
BENZO(A)PYRENE	ND	2.90
INDENO(1,2,3-CD)PYRENE	0.71	0.67
DIBENZO(A,H)ANTHRACENE	0.57	0.42
BENZO(G,H,I)PERYLENE	ND	0.67
2,3-BENZOFURAN	ND	2.00
2,3-DIHYDROINDENE	ND	2.80
INDENE	ND	1.90
NAPHTHALENE	ND	2.00
BENZO(B)THIOPHENE	1.2	1.20
INDOLE	ND	0.92
2-METHYLNAPHTHALENE	ND	1.60
1-METHYLNAPHTHALENE	ND	1.30
BIPHENYL	ND	1.30
ACENAPHTHYLENE	<1.00	1.00
ACENAPHTHENE	1.3	1.20
DIBENZOFURAN	1.5	0.69
FLUORENE	2.2	0.64
DIBENZOTHIOPHENE	ND	0.55
TOTAL PHENANTHRENE/ANTHRACENE	ND	3.40
ACRIDINE	ND	1.50
CARBAZOLE	ND	1.80
FLUORANTHENE	3.9	0.97
PYRENE	5.0	0.74
BENZO(E)PYRENE	ND	4.00
PERYLENE	ND	1.20

SURROGATE	RECOVERY,%	RECOVERY LIMITS,%
NAPHTHALENE-D8	34	14-108
FLUORENE-D10	69	41-162
CHRYSENE-D12	71	10-118

ND = CONCENTRATION <95% CONFIDENCE INTERVAL OF MDL
* = OUTSIDE CONTROL LIMITS

REVIEWED BY: MW QC BY: M.M.

ENSR CONSULTING AND ENGINEERING
SUMMARY OF ANALYTICAL RESULTS
PPT-PAH RESULTS IN WATER

ENSR NO : 62929
FIELD NO : MB881014
CLIENT : REILLY TAR
SAMPLING SITE : ENSR, WILMINGTON,MA
PROJECT NO : 8500-087-660

DATE SAMPLED : 10/21/88
DATE RECEIVED : NOT APPLICABLE
DATE EXTRACTED : 10/21/88
DATE ANALYZED : 12/19/88

PARAMETER	RESULT (NG/L)	MDL
QUINOLINE	<2.60	2.60
BENZO(A)ANTHRACENE	ND	4.30
CHRYSENE	ND	2.60
BENZOFLUORANTHENES	ND	1.40
BENZO(A)PYRENE	ND	2.90
INDENO(1,2,3-CD)PYRENE	ND	0.67
DIBENZO(A,H)ANTHRACENE	ND	0.42
BENZO(G,H,I)PERYLENE	ND	0.67
2,3-BENZOFURAN	ND	2.00
2,3-DIHYDROINDENE	ND	2.80
INDENE	ND	1.90
NAPHTHALENE	5.0	2.00
BENZO(B)THIOPHENE	ND	1.20
INDOLE	ND	0.92
2-METHYLNAPHTHALENE	2.3	1.60
1-METHYLNAPHTHALENE	1.3	1.30
BIPHENYL	ND	1.30
ACENAPHTHYLENE	ND	1.00
ACENAPHTHENE	ND	1.20
DIBENZOFURAN	ND	0.69
FLUORENE	ND	0.64
DIBENZOTHIOPHENE	ND	0.55
TOTAL PHENANTHRENE/ANTHRACENE	ND	3.40
ACRIDINE	ND	1.50
CARBAZOLE	ND	1.80
FLUORANTHENE	ND	0.97
PYRENE	ND	0.74
BENZO(E)PYRENE	ND	4.00
PERYLENE	ND	1.20

SURROGATE	RECOVERY,%	RECOVERY LIMITS,%
NAPHTHALENE-D8	61	14-108
FLUORENE-D10	128	41-162
CHRYSENE-D12	90	10-118

ND = CONCENTRATION <95% CONFIDENCE INTERVAL OF MDL
* = OUTSIDE CONTROL LIMITS

REVIEWED BY: MW QC BY: K.M.

ENSR CONSULTING AND ENGINEERING
SUMMARY OF ANALYTICAL RESULTS
QUALITY CONTROL CHECK SAMPLES
PPT-PAH RESULTS IN WATER

ENSR NO : 62942 CLIENT : REILLY TAR

LAB FORT NO : LF880956 PROJECT NO : 8500-087-660

EXTRACTION DATE : 10/21/88 ANALYSIS DATE : 12/15/88

COMPOUND	SPIKED CONC. (NG)	SAMPLE CONC. (NG)	RECOVERY (%)
INDENE	159.2	144.2	91
QUINOLINE	160.8	195.6	122
2-METHYLNAPHTHALENE	159.2	157.2	99
FLUORENE	159.2	118.2	74
CHRYSENE	160.0	94.1	59
BENZO(E)PYRENE	160.0	189.0	118
NAPHTHALENE	798.4	568.1	71
BENZO(ghi)PERYLENE	160.8	50.0	31

SURROGATES	EXP. CONC. (NG/L)	OBS. CONC. (NG/L)	RECOVERY (%)
NAPHTHALENE, D8	80.0	43.8	55
FLUORENE, D10	80.0	118.2	148
CHRYSENE, D12	80.0	64.2	80

REVIEWED BY: MW QC BY: H.M.

ENSR CONSULTING AND ENGINEERING
SUMMARY OF ANALYTICAL RESULTS
PPT-PAH RESULTS IN WATER

ENSR NO : 62827
FIELD NO : GAC-SLP-10-F101788
CLIENT : REILLY TAR
SAMPLING SITE : ST LOUIS PARK,MN
PROJECT NO : 8500-087-660

DATE SAMPLED : 10/17/88
DATE RECEIVED : 10/19/88
DATE EXTRACTED : 10/21/88
DATE ANALYZED : 12/15/88

PARAMETER	RESULT (NG/L)	MDL
QUINOLINE	26.	2.60
BENZO(A)ANTHRACENE	10.	4.30
CHRYSENE	8.1	2.60
BENZOFLUORANTHENES	ND	1.40
BENZO(A)PYRENE	ND	2.90
INDENO(1,2,3-CD)PYRENE	ND	0.67
DIBENZO(A,H)ANTHRACENE	ND	0.42
BENZO(G,H,I)PERYLENE	ND	0.67
2,3-BENZOFURAN	ND	2.00
2,3-DIHYDROINDENE	1000.	2.80
INDENE	40.	1.90
NAPHTHALENE	15.	2.00
BENZO(B)THIOPHENE	310.	1.20
INDOLE	ND	0.92
2-METHYLNAPHTHALENE	57.	1.60
1-METHYLNAPHTHALENE	120.	1.30
BIPHENYL	260.	1.30
ACENAPHTHYLENE	540.	1.00
ACENAPHTHENE	1000.	1.20
DIBENZOFURAN	460.	0.69
FLUORENE	940.	0.64
DIBENZOTHIOPHENE	130.	0.55
TOTAL PHENANTHRENE/ANTHRACENE	480.	3.40
ACRIDINE	ND	1.50
CARBAZOLE	55.	1.80
FLUORANTHENE	300.	0.97
PYRENE	290.	0.74
BENZO(E)PYRENE	ND	4.00
PERYLENE	ND	1.20
	~6000	

SURROGATE	RECOVERY,%	RECOVERY LIMITS,%
NAPHTHALENE-D8	115*	14-108
FLUORENE-D10	125	41-162
CHRYSENE-D12	77	10-118

ND = CONCENTRATION <95% CONFIDENCE INTERVAL OF MDL
* = OUTSIDE CONTROL LIMITS-SAMPLE WAS NOT REANALYZED

REVIEWED BY: MW QC BY: K.M.

ENSR CONSULTING AND ENGINEERING
SUMMARY OF ANALYTICAL RESULTS
PPT-PAH RESULTS IN WATER

ENSR NO : 62828
FIELD NO : GAC-SLP-10-C1-101788
CLIENT : REILLY TAR
SAMPLING SITE : ST LOUIS PARK,MN
PROJECT NO : 8500-087-660

DATE SAMPLED : 10/17/88
DATE RECEIVED : 10/19/88
DATE EXTRACTED : 10/21/88
DATE ANALYZED : 12/15/88

PARAMETER	RESULT (NG/L)	MDL
QUINOLINE	ND	2.60
BENZO(A)ANTHRACENE	ND	4.30
CHRYSENE	ND	2.60
BENZOFLUORANTHENES	ND	1.40
BENZO(A)PYRENE	ND	2.90
INDENO(1,2,3-CD)PYRENE	ND	0.67
DIBENZO(A,H)ANTHRACENE	ND	0.42
BENZO(G,H,I)PERYLENE	ND	0.67
2,3-BENZOFURAN	ND	2.00
2,3-DIHYDROINDENE	6.5	2.80
INDENE	ND	1.90
NAPHTHALENE	3.0	2.00
BENZO(B)THIOPHENE	2.5	1.20
INDOLE	ND	0.92
2-METHYLNAPHTHALENE	1.7	1.60
1-METHYLNAPHTHALENE	2.9	1.30
BIPHENYL	10.	1.30
ACENAPHTHYLENE	9.0	1.00
ACENAPHTHENE	25.	1.20
DIBENZOFURAN	24.	0.69
FLUORENE	51.	0.64
DIBENZOTHIOPHENE	7.7	0.55
TOTAL PHENANTHRENE/ANTHRACENE	21.	3.40
ACRIDINE	1.7	1.50
CARBAZOLE	3.3	1.80
FLUORANTHENE	9.8	0.97
PYRENE	6.9	0.74
BENZO(E)PYRENE	ND	4.00
PERYLENE	ND	1.20
	~185	

SURROGATE	RECOVERY,%	RECOVERY LIMITS,%
NAPHTHALENE-D8	48	14-108
FLUORENE-D10	118	41-162
CHRYSENE-D12	64	10-118

ND = CONCENTRATION <95% CONFIDENCE INTERVAL OF MDL
* = OUTSIDE CONTROL LIMITS

REVIEWED BY: MW QC BY: [illegible]

ENSR CONSULTING AND ENGINEERING
SUMMARY OF ANALYTICAL RESULTS
QUALITY CONTROL CHECK SAMPLES
PPT-PAH RESULTS IN WATER

ENSR NO : 65580 CLIENT : REILLY TAR

LAB FORT NO : LF881003 PROJECT NO : 8500-087-660

EXTRACTION DATE : 11/03/88 ANALYSIS DATE : 12/20/88

COMPOUND	SPIKED CONC. (NG)	SAMPLE CONC. (NG)	RECOVERY (%)
INDENE	159.2	63.9	40
QUINOLINE	160.8	104.5	65
2-METHYLNAPHTHALENE	159.2	70.4	44
FLUORENE	159.2	102.9	65
CHRYSENE	160.0	66.8	42
BENZO(E)PYRENE	160.0	66.9	42
NAPHTHALENE	798.4	244.7	31
BENZO(ghi)PERYLENE	160.8	114.3	71

SURROGATES	EXP. CONC. (NG/L)	OBS. CONC. (NG/L)	RECOVERY (%)
NAPHTHALENE, D8	80.0	27.9	35
FLUORENE, D10	80.0	72.9	91
CHRYSENE, D12	80.0	48.8	61

REVIEWED BY: MW QC BY: K. M.

ENSR CONSULTING AND ENGINEERING
POLYAROMATIC HYDROCARBONS
METHOD DETECTION LIMITS

CARCINOGENIC PAH'S

PARAMETERS	MDL	95% CONFIDENCE INTERVAL OF MDL
QUINOLINE	2.60	1.70
BENZO(A)ANTHRACENE	4.30	2.80
CHRYSENE	2.60	1.70
BENZOFLUORANTHENES	1.40	0.90
BENZO(A)PYRENE	2.90	1.90
INDENO(1,2,3-CD)PYRENE	0.67	0.43
DIBENZ(A,H)ANTHRACENE	0.42	0.27
BENZO(G,H,I)PERYLENE	0.67	0.43

OTHER PAH'S

2,3-BENZOFURAN	2.00	1.30
2,3-DIHYDROINDENE	2.80	1.80
INDENE	1.90	1.20
NAPHTHALENE	2.00	1.30
BENZO(B)THIOPHENE	1.20	0.77
INDOLE	0.92	0.59
2-METHYLNAPHTHALENE	1.60	1.00
1-METHYLNAPHTHALENE	1.30	0.83
BIPHENYL	1.30	0.83
ACENAPHTHYLENE	1.00	0.64
ACENAPHTHENE	1.20	0.77
DIBENZOFURAN	0.69	0.44
FLUORENE	0.64	0.41
DIBENZOTHIOPHENE	0.55	0.35
PHENANTHRENE	3.70	2.40
ANTHRACENE	3.10	2.00
ACRIDINE	1.50	0.96
CARBAZOLE	1.80	1.20
FLUORANTHENE	0.97	0.62
PYRENE	0.74	0.47
BENZO(E)PYRENE	4.00	2.40
PERYLENE	1.20	0.77

CHAIN OF CUSTODY SHEETS

AND

SAMPLE RECEIVING CHECKLISTS

8500-087-66C

CHAIN OF CUSTODY RECORD

Client/Project Name: Reilly Tar & Chemical	Project Location: St. Louis Park, MN
Project No.: 5660-002-270	Field Logbook No.: —
Sampler: (Signature) Martha Jagucki	Chain of Custody Tape No.: 25696

ANALYSES

Sample No / Identification	Date	Time	Lab Sample Number	Type of Sample	PAH						REMARKS
GRC-SLP-ID-F101788	10/17/88	15:00	62827	water	X						6 jars/sample
GRC-SLP-ID-C1-101788	10/17/88	17:00	62828	water	X						6 jars/sample

	Date	Time		Date	Time
Relinquished by: (Signature) Martha Jagucki to Fed-Ex	10/17/88	18:00	Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received for Laboratory: (Signature) Scott Gerade	10-19-88	1045
Sample Disposal Method.			Disposed of by: (Signature)		

SAMPLE COLLECTOR
David Jaeger
Martha Jagucki

ANALYTICAL LABORATORY
Environmental Research and Technology, Inc.
33 Industrial Way
Wilmington, MA 01887
617-657-4290

ERT

№ 22283

1974-3-84

ERT LABORATORIES
SAMPLE RECEIPT CHECKLIST

CLIENT Reilly Tar + Chemical PROJECT NO. 8500-067-660 AUTHORIZATION NUMBER 5860-002-270

1. ✓ shipped — NOTES: Fed Ex 190861844 5
   ___ hand-delivered

2. ✓ COC present on receipt — NOTES:
   ___ no COC

3. ✓ COC tape on shipping container — NOTES: 25696
   ___ no COC tape

4. ___ samples broken/leaking — NOTES:
   ✓ samples intact of receipt
   ___ other, see notes

5. ___ ambient on receipt — NOTES:
   ✓ chilled on receipt

6. ✓ samples preserved correctly — NOTES:
   ___ improper preservatives
   ___ N/A, no recommended preservatives
   ___ other, see notes

7. ✓ received within holding time — NOTES:
   ___ not received within holding times
   ___ N/A, no recommended holding time
   ___ other, see notes

8. ___ COC tapes on samples — NOTES:
   ✓ no COC tapes

9. ___ discrepancies between COC and sample labels — NOTES:
   ✓ no discrepancies noted
   ___ N/A, no COC received

10. Storage Location A7
Additional comments:

8500-087-660A

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
Reilly Tar & Chemical	St. Louis Park Gas Plant
Project No.	**Field Logbook No.**
5660-002-200	
Sampler: (Signature)	**Chain of Custody Tape No.**
David T. Tyler	23050

ANALYSES

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	PP+ PAH						REMARKS
Column 1 Effluent	10-31-88	1325	63413	water							Zeatra liters in case of breakage

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
William M. Hegg	10-31-88	1355			
Relinquished by: (Signature)	**Date**	**Time**	**Received by: (Signature)**	**Date**	**Time**
Relinquished by: (Signature)	**Date**	**Time**	**Received for Laboratory: (Signature)**	**Date**	**Time**
			Scott Gerade	11-1-88	1005
Sample Disposal Method:	**Disposed of by: (Signature)**			**Date**	**Time**

SAMPLE COLLECTOR

ANALYTICAL LABORATORY

Environmental Research and Technology, Inc.
33 Industrial Way
Wilmington, MA 01887
617-657-4290

ERT

№ 21883

1974 3-84

ERT LABORATORIES
SAMPLE RECEIPT CHECKLIST

CLIENT Reilly Tar + Chemical PROJECT NO. 8500-087-660A AUTHORIZATION NUMBER 5660-002-200

1. ✓ shipped
   ___ hand-delivered
   NOTES: -Fed Ex 9187742432

2. ✓ COC present on receipt
   ___ no COC
   NOTES:

3. ✓ COC tape on shipping container
   ___ no COC tape
   NOTES: 23050

4. ___ samples broken/leaking
   ✓ samples intact of receipt
   ___ other, see notes
   NOTES:

5. ___ ambient on receipt
   ✓ chilled on receipt
   NOTES:

6. ✓ samples preserved correctly
   ___ improper preservatives
   ___ N/A, no recommended preservatives
   ___ other, see notes
   NOTES:

7. ✓ received within holding time
   ___ not received within holding times
   ___ N/A, no recommended holding time
   ___ other, see notes
   NOTES:

8. ___ COC tapes on samples
   ✓ no COC tapes
   NOTES:

9. ___ discrepancies between COC and sample labels
   ✓ no discrepancies noted
   ___ N/A, no COC received
   NOTES:

10. Storage Location R7
Additional comments:

Samples inspected and logged in by: [illegible]

Rocky Mountain
Analytical Laboratory

Rec'd 1/6/89

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

December 30, 1988

Enseco - RMAL Project Number 002551

Introduction

Five aqueous samples were received at Rocky Mountain Analytical Laboratory on November 15, 1988. The samples were logged in under RMAL project number 002551. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. All samples were analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH's).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below relative to Revision 3 of the QAPP.

PPT PAH

Due to an interference in the matrix of sample 2551-02, the recovery of D12-Chrysene exceeded the upper control limit. The sample was reanalyzed and showed the same effect. Since this interference is documented and limited to the surrogate, the report values for the target compounds are not affected. Both analyses are submitted.

Due to concentrations of target compounds in samples 2551-02 and 03 in excess of the linear range of the calibration curve, the samples were analyzed at dilutions.

Surrogate recoveries for 2551-03 could not be calculated due to the dilution performed on the sample.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

This data package is in compliance with the terms and conditions of the QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Audrey Verniero Date: 12-30-88
Audrey Verniero
Data Control

Approved by: for Date: 12-30-88
Rebecca Williams
Client Service Representative

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
002551-0001-SA	GAC-SLP C1-111488	AQUEOUS	14 NOV 88		15 NOV 88
002551-0002-SA	GAC-SLP C2-111488	AQUEOUS	14 NOV 88		15 NOV 88
002551-0003-SA	GAC-SLP F-111488	AQUEOUS	14 NOV 88		15 NOV 88
002551-0004-SA	GAC-SLP FB-111488	AQUEOUS	14 NOV 88		15 NOV 88
002551-0004-DU	GAC-SLP FBD-111488	AQUEOUS	14 NOV 88		15 NOV 88
002551-0005-SA	GAC-SLP T-111488	AQUEOUS	14 NOV 88	13:30	15 NOV 88
002551-0005-DU	GAC-SLP TD-111488	AQUEOUS	14 NOV 88		15 NOV 88
002551-0005-MS	GAC-SLP TMS-111488	AQUEOUS	14 NOV 88		15 NOV 88

Enseco

TABLE OF CONTENTS
CASE: 2551

PAH

1. QC Summary Package.....00001
2. Sample Data Package.....00008
3. Standards Data Package.....00351
4. Raw QC Data.....N/A
5. Blank Data.....00757
6. Matrix Spike Data.....00807

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC #2551

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2551-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2551-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2551X128

Level: (low/med) LOW Date Received: 11/15/88

% Moisture: not dec. dec. Date Extracted: 11/21/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	4.3	B
95-13-6	1H-Indene	0.9	J B
91-20-3	Naphthalene	3.3	J B
4565-32-6	Benzo(B)Thiophene	3.2	
91-22-5	Quinoline	0.9	J
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.8	B
90-12-0	1-Methylnaphthalene	2.5	B
92-52-4	Biphenyl	6.0	
208-96-8	Acenaphthylene	7.5	
83-32-9	Acenaphthene	17.	
132-64-9	Dibenzofuran	12.	
86-73-7	Fluorene	23.	B
132-65-0	Dibenzothiophene	2.6	
85-01-8	Phenanthrene	6.3	B
120-12-7	Anthracene	2.6	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	0.7	J
206-44-0	Fluoranthene	4.7	B
129-00-0	Pyrene	5.5	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2551-02(25%)

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2551-02(25%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2551X142

Level: (low/med) LOW Date Received: 11/15/88

% Moisture: not dec. dec. Date Extracted: 11/21/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/09/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.500

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	20.	U
496-11-7	2,3-Dihydroindene	11.	B
95-13-6	1H-Indene	3.6	U
91-20-3	Naphthalene	26.	U
4565-32-6	Benzo(B)Thiophene	4.2	
91-22-5	Quinoline	5.6	U
120-72-9	1H-Indole	5.2	J
91-57-6	2-Methylnaphthalene	3.6	U
90-12-0	1-Methylnaphthalene	4.4	J B
92-52-4	Biphenyl	16.	J
208-96-8	Acenaphthylene	21.	
83-32-9	Acenaphthene	50.	
132-64-9	Dibenzofuran	34.	
86-73-7	Fluorene	66.	B
132-65-0	Dibenzothiophene	5.8	
85-01-8	Phenanthrene	13.	B
120-12-7	Anthracene	6.1	
260-94-6	Acridine	12.	U
86-74-8	Carbazole	2.7	J
206-44-0	Fluoranthene	11.	B
129-00-0	Pyrene	8.3	B
56-55-3	Benzo(A)Anthracene	10.	U
218-01-9	Chrysene	11.	U
205-99-2	Benzo(B)Fluoranthene	10.	U
207-08-9	Benzo(K)Fluoranthene	9.2	U
57-97-6	7,12-Dimethylbenzanthracene	11.	U
192-97-2	Benzo(E)Pyrene	7.6	U
50-32-8	Benzo(A)Pyrene	9.2	U
198-55-0	Perylene	10.	U
56-49-5	3-Methylcholanthrene	14.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	8.4	U
53-70-3	Dibenz(A,H)Anthracene	6.4	U
191-24-2	Benzo(G,H,I)Perylene	11.	U
215-58-7	Dibenz(A,C)Anthracene	6.4	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2551-02RE(25%)

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2551-02RE(25%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2551X144

Level: (low/med) LOW Date Received: 11/15/88

% Moisture: not dec. dec. Date Extracted: 11/21/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/09/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.500

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	20.	U
496-11-7	2,3-Dihydroindene	11.	B
95-13-6	1H-Indene	3.6	U
91-20-3	Naphthalene	3.6	J B
4565-32-6	Benzo(B)Thiophene	4.8	
91-22-5	Quinoline	5.6	U
120-72-9	1H-Indole	5.3	J -
91-57-6	2-Methylnaphthalene	2.8	J B
90-12-0	1-Methylnaphthalene	5.2	J B
92-52-4	Biphenyl	16.	J
208-96-8	Acenaphthylene	20.	
83-32-9	Acenaphthene	48.	
132-64-9	Dibenzofuran	34.	
86-73-7	Fluorene	62.	B
132-65-0	Dibenzothiophene	5.9	
85-01-8	Phenanthrene	14.	B
120-12-7	Anthracene	6.3	
260-94-6	Acridine	12.	U
86-74-8	Carbazole	7.6	U
206-44-0	Fluoranthene	11.	B
129-00-0	Pyrene	8.4	B
56-55-3	Benzo(A)Anthracene	10.	U
218-01-9	Chrysene	11.	U
205-99-2	Benzo(B)Fluoranthene	10.	U
207-08-9	Benzo(K)Fluoranthene	9.2	U
57-97-6	7,12-Dimethylbenzanthracene	11.	U
192-97-2	Benzo(E)Pyrene	7.6	U
50-32-8	Benzo(A)Pyrene	9.2	U
198-55-0	Perylene	10.	U
56-49-5	3-Methylcholanthrene	14.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	8.4	U
53-70-3	Dibenz(A,H)Anthracene	6.4	U
191-24-2	Benzo(G,H,I)Perylene	11.	U
215-58-7	Dibenz(A,C)Anthracene	6.4	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2551-03(1%)

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2551-03(1%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2551X145

Level: (low/med) LOW Date Received: 11/15/88

% Moisture: not dec. dec. Date Extracted: 11/21/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/09/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 12.5

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	510.	U
496-11-7	2,3-Dihydroindene	670.	B
95-13-6	1H-Indene	90.	U
91-20-3	Naphthalene	650.	U
4565-32-6	Benzo(B)Thiophene	90.	U
91-22-5	Quinoline	140.	U
120-72-9	1H-Indole	68.	J
91-57-6	2-Methylnaphthalene	90.	U
90-12-0	1-Methylnaphthalene	160.	U
92-52-4	Biphenyl	100.	J
208-96-8	Acenaphthylene	260.	
83-32-9	Acenaphthene	450.	
132-64-9	Dibenzofuran	80.	J
86-73-7	Fluorene	270.	B
132-65-0	Dibenzothiophene	110.	U
85-01-8	Phenanthrene	130.	U
120-12-7	Anthracene	110.	U
260-94-6	Acridine	290.	U
86-74-8	Carbazole	190.	U
206-44-0	Fluoranthene	140.	U
129-00-0	Pyrene	120.	J B
56-55-3	Benzo(A)Anthracene	250.	U
218-01-9	Chrysene	280.	U
205-99-2	Benzo(B)Fluoranthene	250.	U
207-08-9	Benzo(K)Fluoranthene	230.	U
57-97-6	7,12-Dimethylbenzanthracene	280.	U
192-97-2	Benzo(E)Pyrene	470.	U
50-32-8	Benzo(A)Pyrene	230.	U
198-55-0	Perylene	250.	U
56-49-5	3-Methylcholanthrene	350.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	210.	U
53-70-3	Dibenz(A,H)Anthracene	160.	U
191-24-2	Benzo(G,H,I)Perylene	280.	U
215-58-7	Dibenz(A,C)Anthracene	160.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2551-04

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2551-04

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2551X131

Level: (low/med) LOW Date Received: 11/15/88

% Moisture: not dec. dec. Date Extracted: 11/21/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	1.1	J
496-11-7	2,3-Dihydroindene	8.1	B
95-13-6	1H-Indene	1.8	B
91-20-3	Naphthalene	9.3	B
4565-32-6	Benzo(B)Thiophene	1.2	
91-22-5	Quinoline	0.9	J
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	8.4	B
90-12-0	1-Methylnaphthalene	5.1	B
92-52-4	Biphenyl	2.4	J
208-96-8	Acenaphthylene	3.6	
83-32-9	Acenaphthene	5.9	
132-64-9	Dibenzofuran	2.4	
86-73-7	Fluorene	4.8	B
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	4.2	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	B
129-00-0	Pyrene	1.8	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2551-05

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2551-05

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2551X132

Level: (low/med) LOW Date Received: 11/15/88

% Moisture: not dec. dec. Date Extracted: 11/21/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	6.5	B
95-13-6	1H-Indene	1.8	B
91-20-3	Naphthalene	4.0	J B
4565-32-6	Benzo(B)Thiophene	0.7	J
91-22-5	Quinoline	1.0	J
120-72-9	1H-Indole	2.5	U –
91-57-6	2-Methylnaphthalene	2.7	B
90-12-0	1-Methylnaphthalene	1.7	B
92-52-4	Biphenyl	1.1	J
208-96-8	Acenaphthylene	1.4	
83-32-9	Acenaphthene	3.1	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	2.3	B
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	2.1	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.3	J B
129-00-0	Pyrene	1.2	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

27.9/1.0

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2551-05DUP

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2551-05DUP

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2551X133

Level: (low/med) LOW Date Received: 11/15/88

% Moisture: not dec. dec. Date Extracted: 11/21/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	6.1	B
95-13-6	1H-Indene	1.3	B SP
91-20-3	Naphthalene	3.9	J B SP
4565-32-6	Benzo(B)Thiophene	0.6	J
91-22-5	Quinoline	0.4	J
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	3.0	B SP
90-12-0	1-Methylnaphthalene	1.8	B
92-52-4	Biphenyl	1.1	J
208-96-8	Acenaphthylene	1.5	
83-32-9	Acenaphthene	3.0	
132-64-9	Dibenzofuran	0.9	J
86-73-7	Fluorene	2.1	B SP
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.5	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	0.6	J B
129-00-0	Pyrene	0.8	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

28.2/2

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	2551-01	97	134	62
2	2551-02(25%)	77	98	154 *
3	2551-02RE(25%)	78	99	155 *
3	2551-03(1%)	D	D	D
4	2551-04	92	142	74
5	2551-05	84	114	51
6	2551-05DUP	83	104	52
7	2551-05MS	91	118	55
8	BLK-01	76	95	104

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

3C
WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 2551-05

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	20	1.8	19.	86
Naphthalene	20	4.0	23.	95
Quinolene	20	1.0	24.	115
2-Methylnaphthalene	20	2.7	25.	112
Fluorene	20	2.3	26.	118
Chrysene	20	0.0	14.	70
Benzo(E)Pyrene	20	0.0	4.7	24

COMMENTS:

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 2551-05

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	6.5	6.1	6
1H-Indene	1.8	1.3	32
Naphthalene	4.0	3.9	2
Benzo(B)Thiophene	0.7	0.6	12
Quinoline	1.0	0.4	79
2-Methylnaphthalene	2.7	3.0	10
1-Methylnaphthalene	1.7	1.8	6
Biphenyl	1.1	1.1	0
Acenaphthylene	1.4	1.5	7
Acenaphthene	3.1	3.0	3
Dibenzofuran	0.0	0.9	*
Fluorene	2.3	2.1	9
Phenanthrene	2.1	1.5	33
Fluoranthene	1.3	0.6	68
Pyrene	1.2	0.8	36

COMMENTS: * = Cannot be calculated

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Lab File ID: S2551X127 Lab Sample ID: BLK-01

Date Extracted: 11/21/88 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 12/08/88 Time Analyzed: 12:53

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1 2551-01	2551-01	S2551X128	12/08/88
2 2551-02(25%)	2551-02(25%)	S2551X142	12/09/88
3 2551-02RE(25%)	2551-02RE(25%)	S2551X144	12/09/88
3 2551-03(1%)	2551-03(1%)	S2551X145	12/09/88
4 2551-04	2551-04	S2551X131	12/08/88
5 2551-05	2551-05	S2551X132	12/08/88
6 2551-05DUP	2551-05DUP	S2551X133	12/08/88
7 2551-05MS	2551-05MS	S2551X134	12/08/88

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2551 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2551X127

Level: (low/med) LOW Date Received: 11/15/88

% Moisture: not dec. dec. Date Extracted: 11/21/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.3	J
95-13-6	1H-Indene	0.8	J
91-20-3	Naphthalene	2.9	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.5	
90-12-0	1-Methylnaphthalene	1.4	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	0.9	J
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	2.2	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	0.6	J
129-00-0	Pyrene	0.9	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 2551 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX126	12/08/88	11:03
BLK-01	S2551X127	12/08/88	12:53
2551-01	S2551X128	12/08/88	13:47
2551-04	S2551X131	12/08/88	17:33
2551-05	S2551X132	12/08/88	18:21
2551-05DUP	S2551X133	12/08/88	19:08
2551-05MS	S2551X134	12/08/88	19:56

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 2551 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX141	12/09/88	11:25
2551-02(25%)	S2551X142	12/09/88	13:11
2551-02RE(25%)	S2551X144	12/09/88	15:59
2551-03(1%)	S2551X145	12/09/88	16:47

Rocky Mountain
Analytical Laboratory

Enseco

January 16, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, Minnesota 55416

Dear Jim:

Enclosed are the complete data packages for the part-per-trillion polynuclear aromatic hydrocarbon and inorganics analysis for the four aqueous samples received at Rocky Mountain Analytical on November 29, 1988.

Please call if you have any questions.

Sincerely,

Rebecca A. Williams

Rebecca Willaims
Client Service Representative

RW/av
Enclosures

RMAL #002731

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303/431-7171

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

January 16, 1989

Enseco - RMAL Project Number 002731

Introduction

Four aqueous samples were received at Rocky Mountain Analytical Laboratory on November 29, 1988. The samples were logged in under RMAL project number 002731. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. The samples were analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH's).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the sample and corrective actions taken have been summarized below relative to Revision 3 of the QAPP.

PPT PAH

Sample 002731-0003 was inadvertantly contaminated during the sample preparation by the addition of an extraction solvent from another sample. Accordingly, no results have been reported for this sample. Sample 002731-003 DUP was therefore used as the sample and is reported as such in this report. There is no "duplicate" analyses reported. The extraction sample 002731-0003 DUP was analyzed twice, initially at a 100% dilution. The initial analysis indicated the presence of several target compounds in concentrations in excess of the linear calibration range. Accordingly, the sample was reanalyzed at a 10% dilution to achieve quantitative data for those compounds. The recovery of the surrogate d-12 chrysene in the 100% analysis of this sample was within control limits with a recovery of 102%. However, the recovery for the d-12 chrysene in the diluted sample exceeds the upper control limit. This high recovery resulted from an interference present in the sample which did not affect the recovery in the undiluted analysis but which did have an impact in the diluted analysis.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303/431-7171

A comparison of the results between the 002731-003 DUP and the 002731-003MS indicates that several compounds were present in much higher concentrations in the sample than in the matrix spike. The sample was analyzed twice with comparable results. As noted above, the sample had to be diluted in order to get the compounds on scale. The results from the matrix spike are within control limits for those compounds which were not present in the sample, indicating that the extraction, concentration and analysis were done properly. At this time, the reason for the differences between these two samples cannot be explained. It appears to be related to the samples themselves and not to any analytical problems encountered.

This data package is in compliance with the terms and conditions of the 1988 Revision of the QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Gyberson Date: 1/16/89
Tracy Gyberson
Data Control Supervisor

Approved by: Rebecca A. Williams Date: 1/16/89
Rebecca Williams
Client Service Representative

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
002731-0001-SA	GAC-SLP15C1-112888, GAC-SLP15C	AQUEOUS	28 NOV 88		29 NOV 88
002731-0002-SA	GAC-SLP15C2-112888, GAC-SLP15C	AQUEOUS	28 NOV 88		29 NOV 88
002731-0003-SA	GAC-SLP15C3-112888, GAC-SLP15C	AQUEOUS	28 NOV 88		29 NOV 88
002731-0003-DU	GAC-SLP15C3D-112888	AQUEOUS	28 NOV 88		29 NOV 88
002731-0003-MS	GAC-SLP15C3MS-112888	AQUEOUS	28 NOV 88		29 NOV 88
002731-0004-SA	GAC-SLP15C3FB-112888	AQUEOUS	28 NOV 88		29 NOV 88
002731-0004-DU	GAC-SLP15C3FBD-112888	AQUEOUS	28 NOV 88		29 NOV 88

TABLE OF CONTENTS
CASE: 2731

PAH

1. QC Summary Package.....00001
2. Sample Data Package.....00007
3. Standards Data Package.....00206
4. Raw QC Data.....N/A
5. Blank Data.....00612
6. Matrix Spike Data.....00663

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC # 2731

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2731-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2731-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2731X166

Level: (low/med) LOW Date Received: 11/29/88

% Moisture: not dec. dec. Date Extracted: 12/02/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/13/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	4.0	B
95-13-6	1H-Indene	2.4	B
91-20-3	Naphthalene	8.6	B
4565-32-6	Benzo(B)Thiophene	1.0	B
91-22-5	Quinoline	0.8	J
120-72-9	1H-Indole	0.9	J
91-57-6	2-Methylnaphthalene	6.9	B
90-12-0	1-Methylnaphthalene	3.6	B
92-52-4	Biphenyl	1.2	J B
208-96-8	Acenaphthylene	1.5	B
83-32-9	Acenaphthene	2.3	
132-64-9	Dibenzofuran	1.2	
86-73-7	Fluorene	2.6	B
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	2.3	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.0	J B
129-00-0	Pyrene	1.9	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2731-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2731-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2731X167

Level: (low/med) LOW Date Received: 11/29/88

% Moisture: not dec. dec. Date Extracted: 12/02/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/13/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	3.9	B
95-13-6	1H-Indene	2.5	B
91-20-3	Naphthalene	8.3	B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	0.7	J
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	6.6	B
90-12-0	1-Methylnaphthalene	3.5	B
92-52-4	Biphenyl	1.2	J B
208-96-8	Acenaphthylene	1.1	J B
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.9	B
132-65-0	Dibenzothiophene	0.4	J
85-01-8	Phenanthrene	2.2	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.2	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2731-03DUP(10%)

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2731-03DUP(10%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2731X173

Level: (low/med) LOW Date Received: 11/29/88

% Moisture: not dec. dec. Date Extracted: 12/02/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/14/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 1.25

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	51.	U
496-11-7	2,3-Dihydroindene	61.	B
95-13-6	1H-Indene	19.	B
91-20-3	Naphthalene	74.	B
4565-32-6	Benzo(B)Thiophene	6.8	J B
91-22-5	Quinoline	5.8	J
120-72-9	1H-Indole	5.1	J
91-57-6	2-Methylnaphthalene	6.0	J B
90-12-0	1-Methylnaphthalene	8.2	J B
92-52-4	Biphenyl	3.9	J B
208-96-8	Acenaphthylene	14.	U
83-32-9	Acenaphthene	13.	U
132-64-9	Dibenzofuran	10.	U
86-73-7	Fluorene	10.	U
132-65-0	Dibenzothiophene	11.	U
85-01-8	Phenanthrene	13.	U
120-12-7	Anthracene	11.	U
260-94-6	Acridine	29.	U
86-74-8	Carbazole	5.1	J
206-44-0	Fluoranthene	14.	U
129-00-0	Pyrene	9.3	J B
56-55-3	Benzo(A)Anthracene	25.	U
218-01-9	Chrysene	28.	U
205-99-2	Benzo(B)Fluoranthene	25.	U
207-08-9	Benzo(K)Fluoranthene	23.	U
57-97-6	7,12-Dimethylbenzanthracene	28.	U
192-97-2	Benzo(E)Pyrene	19.	U
50-32-8	Benzo(A)Pyrene	23.	U
198-55-0	Perylene	25.	U
56-49-5	3-Methylcholanthrene	35.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	21.	U
53-70-3	Dibenz(A,H)Anthracene	16.	U
191-24-2	Benzo(G,H,I)Perylene	28.	U
215-58-7	Dibenz(A,C)Anthracene	16.	U

1B

EPA SAMPLE NO.

2731-04

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2731-04

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2731X170

Level: (low/med) LOW Date Received: 11/29/88

% Moisture: not dec. dec. Date Extracted: 12/02/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/13/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	2.7	B
95-13-6	1H-Indene	1.2	B
91-20-3	Naphthalene	6.5	B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	0.8	J
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	5.0	B
90-12-0	1-Methylnaphthalene	3.0	B
92-52-4	Biphenyl	0.8	J B
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	0.6	J
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.8	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	0.9	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

2731-03MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2731-03MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2731X172

Level: (low/med) LOW Date Received: 11/29/88

% Moisture: not dec. dec. Date Extracted: 12/02/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/14/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	4.7	B
95-13-6	1H-Indene	20.	SP B
91-20-3	Naphthalene	25.	SP B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	23.	SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	27.	SP B
90-12-0	1-Methylnaphthalene	4.3	B
92-52-4	Biphenyl	0.9	J B
208-96-8	Acenaphthylene	0.8	J B
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	21.	SP B
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.7	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	0.7	J B
56-55-3	Benzo(A)Anthracene	15.	U
218-01-9	Chrysene	16.	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	6.4	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S2731X165

Level: (low/med) LOW Date Received: 11/29/88

% Moisture: not dec. dec. Date Extracted: 12/02/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/13/88

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	2.1	
95-13-6	1H-Indene	1.3	
91-20-3	Naphthalene	5.8	J
4565-32-6	Benzo(B)Thiophene	0.4	J
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U -
91-57-6	2-Methylnaphthalene	4.5	
90-12-0	1-Methylnaphthalene	2.6	
92-52-4	Biphenyl	0.7	J
208-96-8	Acenaphthylene	0.7	J
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	0.5	J
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	U
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	0.5	J
129-00-0	Pyrene	0.8	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #	
1	2731-01	85	96	68	
2	2731-02	81	119	53	
3	2731-03DUP(10%)	92	109	142	*
4	2731-03MS	93	89	56	
5	2731-04	41	53	35	
6	BLK-01	84	98	91	

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

3C

[redacted]IVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 2731-03Dup

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	20	19.	20.	5.
Naphthalene	20	74.	25.	-245
Quinolene	20	5.8	23.	86
2-Methylnaphthalene	20	6.0	27.	105
Fluorene	20	0.0	21.	105
Chrysene	20	0.0	16.	80
Benzo(E)Pyrene	20	0.0	6.4	32

COMMENTS:

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2731 SAS No.: N/A SDG No.: N/A

Lab File ID: S2731X165 Lab Sample ID: BLK-01

Date Extracted: 12/02/88 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 12/13/88 Time Analyzed: 16:06

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	2731-01	2731-01	S2731X166	12/13/88
2	2731-02	2731-02	S2731X167	12/13/88
3	2731-03DUP(10%)	2731-03DUP(10%)	S2731X173	12/14/88
4	2731-03MS	2731-03MS	S2731X172	12/14/88
5	2731-04	2731-04	S2731X179	12/13/88

COMMENTS:

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 2731 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX162	12/13/88	10:09
BLK-01	S2731X165	12/13/88	16:06
2731-01	S2314X166	12/13/88	16:55
2731-02	S2314X167	12/13/88	17:44
2731-04	S2314X170	12/13/88	20:09

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 2731 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX171	12/14/88	10:59
2731-03MS	S2731X172	12/14/88	12:39
2731-03DUP(10%)	S2314X173	12/14/88	13:27

FORM V 1/87 Rev.

Rocky Mountain
Analytical Laboratory

Enseco

January 3, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the three aqueous samples received at Rocky Mountain Analytical Laboratory on November 29, 1988.

If you have any questions the Client Service Representative assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Client Service Rep.

RMAL #2731

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
002731-0001-SA	GAC-SLP15C1-112888, GAC-SLP15C	AQUEOUS	28 NOV 88		29 NOV 88
002731-0002-SA	GAC-SLP15C2-112888, GAC-SLP15C	AQUEOUS	28 NOV 88		29 NOV 88
002731-0003-SA	GAC-SLP15C3-112888, GAC-SLP15C	AQUEOUS	28 NOV 88		29 NOV 88
002731-0003-DU	GAC-SLP15C3D-112888	AQUEOUS	28 NOV 88		29 NOV 88
002731-0003-MS	GAC-SLP15C3MS-112888	AQUEOUS	28 NOV 88		29 NOV 88
002731-0004-SA	GAC-SLP15C3FB-112888	AQUEOUS	28 NOV 88		29 NOV 88
002731-0004-DU	GAC-SLP15C3FBD-112888	AQUEOUS	28 NOV 88		29 NOV 88

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C1-112888, GAC-SLP15C1TOC-112888
Lab ID: 002731-0001-SA Enseco ID: 1022347
Matrix: AQUEOUS Sampled: 28 NOV 88 Received: 29 NOV 88
Authorized: 29 NOV 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.5	mg/L	0.1	415.1	21 DEC 88

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C2-112888, GAC-SLP15C2TOC-112888
Lab ID: 002731-0002-SA Enseco ID: 1022348
Matrix: AQUEOUS Sampled: 28 NOV 88 Received: 29 NOV 88
Authorized: 29 NOV 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.6	mg/L	0.1	415.1	21 DEC 88

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C3-112888, GAC-SLP15C3TOC-112888
Lab ID: 002731-0003-SA Enseco ID: 1022349
Matrix: AQUEOUS Sampled: 28 NOV 88 Received: 29 NOV 88
Authorized: 29 NOV 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.5	mg/L	0.1	415.1	21 DEC 88

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
002731-0001-SA	AQUEOUS	TOC-A	881221B
002731-0002-SA	AQUEOUS	TOC-A	881221B
002731-0003-SA	AQUEOUS	TOC-A	881221B

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 881221B								
Concentration Units: mg/L								
Total Organic Carbon	25	24.6	24.3	98	97	91-109	1.0	20

Rocky Mountain
Analytical Laboratory

Enseco

January 17, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, Minnesota 55416

Dear Jim:

Enclosed are the complete data packages for the part-per-trillion polynuclear aromatic hydrocarbon and inorganics analysis for the nine aqueous samples received at Rocky Mountain Analytical on December 13, 1988.

Please call if you have any questions.

Sincerely,

Rebecca Willaims
Client Service Representative

RW/av
Enclosures

RMAL #003022

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

January 12, 1989

Enseco - RMAL Project Number 003022

Introduction

Nine aqueous samples were received at Rocky Mountain Analytical Laboratory on December 13, 1988. The samples were logged in under RMAL project number 003022. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. All samples were analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH's).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below relative to Revision 3 of the QAPP.

PPT PAH

Due to the concentration of target compounds in sample 3022-04 in excess of the linear range of the calibration curve the sample was analyzed at a 1% dilution. All surrogate recoveries were diluted out in the sample.

Samples 3022-01DUP, 01MS, 02, 03 and 05 showed target compounds out of control limits for secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303/431-7171

This data package is in compliance with the terms and conditions of the 1988 Revision of the QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: _____ **Date:** _____
Audrey Verniero
Data Control

Approved by: _____ **Date:** _____
Rebecca Williams
Client Service Representative

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003022-0001-SA	GAC-SLP15T-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0001-DU	GAC-SLP15TD-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0001-MS	GAC-SLP15MS-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0002-DU	GAC-SLP15FBD-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0002-SA	GAC-SLP15FB-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0003-SA	GAC-SLP15C1-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0004-SA	GAC-SLP15F-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0005-SA	GAC-SLP15C2-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0006-SA	GAC-SLP15C3-121288	AQUEOUS	12 DEC 88		13 DEC 88

legend:
T = treated (main column)
MS = matrix spike
FB = field blank
F = feed
CX = column X effluent
D = duplicate

Enseco

TABLE OF CONTENTS
CASE: 3022

PAH

1. QC Summary Package.....00001
2. Sample Data Package.....00008
3. Standards Data Package.....00351
4. Raw QC Data.....N/A
5. Blank Data.....00755
6. Matrix Spike Data.....00804

12/12/88
SAMPLES

SUMMARY DATA PACKAGE FOR

CITY OF ST. LOUIS PARK

RMA QC# 3022

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3022-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3022-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X228

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/03/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	8.2	
95-13-6	1H-Indene	0.8	J
91-20-3	Naphthalene	3.2	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.3	B
90-12-0	1-Methylnaphthalene	1.3	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.3	J
83-32-9	Acenaphthene	2.6	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.4	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	0.9	J
129-00-0	Pyrene	0.9	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3022-01DUP

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3022-01DUP

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X229

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/03/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	6.8	
95-13-6	1H-Indene	0.8	J
91-20-3	Naphthalene	2.6	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.9	B
90-12-0	1-Methylnaphthalene	1.1	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.0	J
83-32-9	Acenaphthene	2.0	
132-64-9	Dibenzofuran	0.6	J
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.0	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	0.7	J
129-00-0	Pyrene	1.4	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3022-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3022-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X235

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/03/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	3.9	
95-13-6	1H-Indene	1.8	
91-20-3	Naphthalene	8.4	B
4565-32-6	Benzo(B)Thiophene	1.1	
91-22-5	Quinoline	0.8	J
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	6.9	B
90-12-0	1-Methylnaphthalene	4.6	
92-52-4	Biphenyl	1.4	J B
208-96-8	Acenaphthylene	0.6	J
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	
86-73-7	Fluorene	1.4	
132-65-0	Dibenzothiophene	0.6	J
85-01-8	Phenanthrene	3.3	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.5	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3022-03

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3022-03

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X231

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/03/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	10.	
95-13-6	1H-Indene	0.8	J
91-20-3	Naphthalene	2.0	J B
4565-32-6	Benzo(B)Thiophene	1.8	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.9	B
90-12-0	1-Methylnaphthalene	1.2	J
92-52-4	Biphenyl	2.1	J B
208-96-8	Acenaphthylene	4.4	
83-32-9	Acenaphthene	8.4	
132-64-9	Dibenzofuran	1.9	
86-73-7	Fluorene	5.5	
132-65-0	Dibenzothiophene	0.8	J
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	
129-00-0	Pyrene	2.3	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3022-04(1%)

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3022-04(1%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X237

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/04/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 12.5

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	510.	U
496-11-7	2,3-Dihydroindene	710.	
95-13-6	1H-Indene	90.	U
91-20-3	Naphthalene	650.	U
4565-32-6	Benzo(B)Thiophene	82.	J
91-22-5	Quinoline	140.	U
120-72-9	1H-Indole	250.	U
91-57-6	2-Methylnaphthalene	90.	U
90-12-0	1-Methylnaphthalene	160.	U
92-52-4	Biphenyl	110.	J B
208-96-8	Acenaphthylene	260.	
83-32-9	Acenaphthene	590.	
132-64-9	Dibenzofuran	110.	
86-73-7	Fluorene	290.	
132-65-0	Dibenzothiophene	110.	U
85-01-8	Phenanthrene	130.	U
120-12-7	Anthracene	110.	U
260-94-6	Acridine	290.	U
86-74-8	Carbazole	81.	J
206-44-0	Fluoranthene	140.	U
129-00-0	Pyrene	110.	J
56-55-3	Benzo(A)Anthracene	250.	U
218-01-9	Chrysene	280.	U
205-99-2	Benzo(B)Fluoranthene	250.	U
207-08-9	Benzo(K)Fluoranthene	230.	U
57-97-6	7,12-Dimethylbenzanthracene	280.	U
192-97-2	Benzo(E)Pyrene	190.	U
50-32-8	Benzo(A)Pyrene	230.	U
198-55-0	Perylene	250.	U
56-49-5	3-Methylcholanthrene	350.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	210.	U
53-70-3	Dibenz(A,H)Anthracene	160.	U
191-24-2	Benzo(G,H,I)Perylene	280.	U
215-58-7	Dibenz(A,C)Anthracene	160.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3022-05

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3022-05

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X233

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/03/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.1	J
95-13-6	1H-Indene	1.0	J
91-20-3	Naphthalene	2.0	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.6	B
90-12-0	1-Methylnaphthalene	1.0	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	0.7	J
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.2	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3022-06

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3022-06

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X234

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/03/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	4.0	
95-13-6	1H-Indene	0.9	
91-20-3	Naphthalene	2.2	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	0.6	J
91-57-6	2-Methylnaphthalene	1.6	B
90-12-0	1-Methylnaphthalene	1.0	J
92-52-4	Biphenyl	1.3	J B
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.6	
132-64-9	Dibenzofuran	1.9	
86-73-7	Fluorene	2.5	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.4	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.1	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3022-01MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3022-01MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X230

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/03/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	6.6	
95-13-6	1H-Indene	14.	SP
91-20-3	Naphthalene	18.	SP B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	19.	SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	19.	SP B
90-12-0	1-Methylnaphthalene	1.5	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.9	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	20.	SP
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	U
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	18.	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	6.1	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	0.9	J
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3022-01	77	110	55
2	3022-01DUP	64	80	54
3	3022-01MS	83	90	64
4	3022-02	76	97	66
5	3022-03	71	87	53
6	3022-04(1%)	D	D	D
7	3022-05	68	80	55
8	3022-06	68	69	40
9	BLK-01	75	92	67

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

3C

WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 3022-01

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	20	0.8	14.	66
Naphthalene	20	3.2	18.	74
Quinolene	20	0.0	19.	95
2-Methylnaphthalene	20	2.3	19.	84
Fluorene	20	1.4	20.	93
Chrysene	20	0.0	18.	90
Benzo(E)Pyrene	20	0.0	6.1	30

COMMENTS:

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 3022-01

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	8.2	6.8	19
1H-Indene	0.8	0.8	0
Naphthalene	3.2	2.6	21
2-Methylnaphthalene	2.3	1.9	19
1-Methylnaphthalene	1.3	1.1	17
Acenaphthylene	1.3	1.0	26
Acenaphthene	2.6	2.0	26
Dibenzofuran	0.0	0.6	*
Fluorene	1.4	0.0	*
Phenanthrene	1.3	1.0	26
Fluoranthene	0.9	0.7	25
Pyrene	0.9	1.4	115

COMMENTS: * = Cannot be calculated.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Lab File ID: S3022X227 Lab Sample ID: BLK-01

Date Extracted: 12/19/88 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 01/03/89 Time Analyzed: 13:45

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3022-01	3022-01	S3022X228	01/03/89
2	3022-01DUP	3022-01DUP	S3022X229	01/03/89
3	3022-01MS	3022-01MS	S3022X230	01/03/89
4	3022-02	3022-02	S3022X235	01/03/89
5	3022-03	3022-03	S3022X231	01/03/89
6	3022-04(1%)	3022-04(1%)	S3022X237	01/04/89
7	3022-05	3022-05	S3022X233	01/03/89
8	3022-06	3022-06	S3022X234	01/03/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3022 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3022X227

Level: (low/med) LOW Date Received: 12/13/88

% Moisture: not dec. dec. Date Extracted: 12/19/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/03/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	2.5	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.6	
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	0.8	J
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.1	J
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3022 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX226	01/03/89	12:17
BLK-01	S3022X227	01/03/89	13:45
3022-01	S3022X228	01/03/89	14:59
3022-01DUP	S3022X229	01/03/89	15:48
3022-01MS	S3022X230	01/03/89	16:37
3022-03	S3022X231	01/03/89	17:26
3022-05	S3022X233	01/03/89	19:05
3022-06	S3022X234	01/03/89	19:54
3022-02	S3022X235	01/03/89	20:43

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3022 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX236	01/04/89	09:43
3022-04(1%)	S3022X237	01/04/89	11:41

FORM V 1/87 Rev.

Rocky Mountain
Analytical Laboratory

Enseco

January 6, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the six aqueous samples received at Rocky Mountain Analytical Laboratory on December 13, 1988.

Enclosed are the TOC analyses for RMAL #3022-01 and 03 thru 06.

If you have any questions the Client Service Representative assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Client Service Rep.

RMAL #3022

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003022-0001-SA	GAC-SLP15T-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0001-DU	GAC-SLP15TD-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0001-MS	GAC-SLP15MS-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0002-DU	GAC-SLP15FBD-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0002-SA	GAC-SLP15FB-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0003-SA	GAC-SLP15C1-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0004-SA	GAC-SLP15F-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0005-SA	GAC-SLP15C2-121288	AQUEOUS	12 DEC 88		13 DEC 88
003022-0006-SA	GAC-SLP15C3-121288	AQUEOUS	12 DEC 88		13 DEC 88

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15T-121288
Lab ID: 003022-0001-SA Enseco ID: 1023931
Matrix: AQUEOUS Sampled: 12 DEC 88 Received: 13 DEC 88
Authorized: 13 DEC 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.8	mg/L	0.1	415.1	31 DEC 88

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C1-121288
Lab ID: 003022-0003-SA Enseco ID: 1023936
Matrix: AQUEOUS Sampled: 12 DEC 88 Received: 13 DEC 88
Authorized: 13 DEC 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.4	mg/L	0.1	415.1	31 DEC 88

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15F-121288
Lab ID: 003022-0004-SA Enseco ID: 1023937
Matrix: AQUEOUS Sampled: 12 DEC 88 Received: 13 DEC 88
Authorized: 13 DEC 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.9	mg/L	0.1	415.1	31 DEC 88

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C2-121288
Lab ID: 003022-0005-SA Enseco ID: 1023938
Matrix: AQUEOUS Sampled: 12 DEC 88 Received: 13 DEC 88
Authorized: 13 DEC 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.7	mg/L	0.1	415.1	31 DEC 88

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C3-121288
Lab ID: 003022-0006-SA Enseco ID: 1023939
Matrix: AQUEOUS Sampled: 12 DEC 88 Received: 13 DEC 88
Authorized: 13 DEC 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.3	mg/L	0.1	415.1	31 DEC 88

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003022-0001-SA	AQUEOUS	TOC-A	881231A
003022-0003-SA	AQUEOUS	TOC-A	881231A
003022-0004-SA	AQUEOUS	TOC-A	881231A
003022-0005-SA	AQUEOUS	TOC-A	881231A
003022-0006-SA	AQUEOUS	TOC-A	881231A

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 881231A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.7	24.6	99	98	91-109	1.0	20

Rocky Mountain
Analytical Laboratory

Enseco

January 24, 1989

Jim Grube
City of St. Louis Park
5005 Minnetonka
St. Louis Park MO 80002

Dear Jim:

Enclosed is the report for one aqueous sample received at Rocky Mountain Analytical Laboratory on December 28, 1988.

RMAL samples 3180-03 and 04 were cancelled as per client request.

This data package is in compliance with the terms and conditions of the 1988 Revision of the QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Client Service Representative assigned to this project is Rebecca Williams.

Sincerely,

Tracy Giberson

Tracy Giberson
Data Control Supervisor

Enclosures

cc: Rebecca Williams, Client Service Rep.

RMAL #003180

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

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The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003180-0001-SA	IGV-W105FB-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0001-DU	IGV-W105FBD-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0002-SA	GAC-SLP15C1-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-SA	IGV-W105-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-DU	IGV-W105D-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-MS	IGV-W105MS-122788	AQUEOUS	27 DEC 88		28 DEC 88

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C1-122788
Lab ID: 003180-0002-SA Enseco ID: 1025165
Matrix: AQUEOUS Sampled: 27 DEC 88 Received: 28 DEC 88
Authorized: 28 DEC 88 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.3	mg/L	0.1	415.1	04 JAN 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Dee Kettula

The cover letter is an integral part of this report.
Rev 230787

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003180-0002-SA	AQUEOUS	TOC-A	890104A

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 890104A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.8	24.0	99	96	91-109	3.1	20

Enseco

CASE NARRATIVE

FOR

City of ST. Louis Park

January 26, 1989

Enseco - RMAL Project Number 003180

Introduction

Eight aqueous samples were received at Rocky Mountain Analytical Laboratory on December 28, 1988. As requested per Jim Grube on January 6, 1989 all tests for samples GAC-SLP15C2-122788 and GAC-SLP15C3-122788 were cancelled. The remaining six samples were logged in under RMAL project number 003180. A cross reference associating the RMAL sample numbers to actual field sample numbers is included.

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below relative to Revision 3 of the QAPP.

PPT PAH

Due to concentrations of target compounds in sample 3180-05, 05DUP and 05MS in excess of the linear range of the calibration curve, the samples were analyzed at 1% dilutions. Due to the dilutions performed on the above samples, the surrogate recoveries could not be calculated.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303/431-7171

Sample 3180-01 showed target compounds out of control limits for secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as quantitation interference with the secondary ion.

This data package is in compliance with the terms and conditions of the 1988 Revision of the QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Audrey Verniero **Date:** 1/26/89
Audrey Verniero
Data Control

Approved by: [illegible] **Date:** [illegible]
Rebecca Williams
Client Service Representative

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003180-0001-SA	IGV-W105FB-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0001-DU	IGV-W105FBD-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0002-SA	GAC-SLP15C1-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-SA	IGV-W105-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-DU	IGV-W105D-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-MS	IGV-W105MS-122788	AQUEOUS	27 DEC 88		28 DEC 88

Enseco

TABLE OF CONTENTS
CASE: 3180

PAH

1. QC Summary Package.....00001
2. Sample Data Package.....00007
3. Standards Data Package.....00205
4. Raw QC Data.....N/A
5. Blank Data.....00610
6. Matrix Spike Data.....00660

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003180-0001-SA	IGV-W105FB-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0001-DU	IGV-W105FBD-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0002-SA	GAC-SLP15C1-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-SA	IGV-W105-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-DU	IGV-W105D-122788	AQUEOUS	27 DEC 88		28 DEC 88
003180-0005-MS	IGV-W105MS-122788	AQUEOUS	27 DEC 88		28 DEC 88

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC # 3180

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3180-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3180-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3180X244

Level: (low/med) LOW Date Received: 12/28/88

% Moisture: not dec. dec. Date Extracted: 12/29/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/04/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	2.0	B
95-13-6	1H-Indene	2.7	B
91-20-3	Naphthalene	12.	B
4565-32-6	Benzo(B)Thiophene	0.6	J
91-22-5	Quinoline	0.8	J
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	7.2	B
90-12-0	1-Methylnaphthalene	4.9	B
92-52-4	Biphenyl	1.6	J
208-96-8	Acenaphthylene	1.5	
83-32-9	Acenaphthene	0.9	J
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.9	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	6.5	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	3.0	
129-00-0	Pyrene	3.4	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	0.7	J
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3180-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3180-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3180X251

Level: (low/med) LOW Date Received: 12/28/88

% Moisture: not dec. dec. Date Extracted: 12/29/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/06/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	2.9	B
95-13-6	1H-Indene	2.6	B
91-20-3	Naphthalene	6.8	B
4565-32-6	Benzo(B)Thiophene	1.1	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	3.7	B
90-12-0	1-Methylnaphthalene	2.4	B
92-52-4	Biphenyl	0.7	J
208-96-8	Acenaphthylene	1.5	
83-32-9	Acenaphthene	1.6	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.1	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.5	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	0.8	J
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3180-05(1%)

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3180-05(1%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3180X248

Level: (low/med) LOW Date Received: 12/28/88

% Moisture: not dec. dec. Date Extracted: 12/29/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/06/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 12.5

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	510.	U
496-11-7	2,3-Dihydroindene	350.	B
95-13-6	1H-Indene	300.	B
91-20-3	Naphthalene	470.	J B
4565-32-6	Benzo(B)Thiophene	150.	
91-22-5	Quinoline	140.	U
120-72-9	1H-Indole	250.	U
91-57-6	2-Methylnaphthalene	80.	J B
90-12-0	1-Methylnaphthalene	200.	B
92-52-4	Biphenyl	430.	U
208-96-8	Acenaphthylene	81.	J
83-32-9	Acenaphthene	170.	
132-64-9	Dibenzofuran	100.	U
86-73-7	Fluorene	100.	U
132-65-0	Dibenzothiophene	110.	U
85-01-8	Phenanthrene	190.	B
120-12-7	Anthracene	110.	U
260-94-6	Acridine	290.	U
86-74-8	Carbazole	190.	U
206-44-0	Fluoranthene	130.	J
129-00-0	Pyrene	140.	B
56-55-3	Benzo(A)Anthracene	250.	U
218-01-9	Chrysene	280.	U
205-99-2	Benzo(B)Fluoranthene	250.	U
207-08-9	Benzo(K)Fluoranthene	230.	U
57-97-6	7,12-Dimethylbenzanthracene	280.	U
192-97-2	Benzo(E)Pyrene	190.	U
50-32-8	Benzo(A)Pyrene	230.	U
198-55-0	Perylene	250.	U
56-49-5	3-Methylcholanthrene	350.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	210.	U
53-70-3	Dibenz(A,H)Anthracene	160.	U
191-24-2	Benzo(G,H,I)Perylene	280.	U
215-58-7	Dibenz(A,C)Anthracene	160.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3180-05DUP(1%)

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3180-05DUP(1%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3180X250

Level: (low/med) LOW Date Received: 12/28/88

% Moisture: not dec. dec. Date Extracted: 12/29/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/06/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 12.5

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	510.	U
496-11-7	2,3-Dihydroindene	390.	B
95-13-6	1H-Indene	350.	B
91-20-3	Naphthalene	530.	J B
4565-32-6	Benzo(B)Thiophene	200.	
91-22-5	Quinoline	140.	U
120-72-9	1H-Indole	250.	U
91-57-6	2-Methylnaphthalene	90.	U
90-12-0	1-Methylnaphthalene	230.	B
92-52-4	Biphenyl	430.	U
208-96-8	Acenaphthylene	83.	J
83-32-9	Acenaphthene	190.	
132-64-9	Dibenzofuran	100.	
86-73-7	Fluorene	81.	J
132-65-0	Dibenzothiophene	110.	U
85-01-8	Phenanthrene	210.	B
120-12-7	Anthracene	110.	U
260-94-6	Acridine	290.	U
86-74-8	Carbazole	190.	U
206-44-0	Fluoranthene	130.	J
129-00-0	Pyrene	120.	J B
56-55-3	Benzo(A)Anthracene	250.	U
218-01-9	Chrysene	280.	U
205-99-2	Benzo(B)Fluoranthene	250.	U
207-08-9	Benzo(K)Fluoranthene	230.	U
57-97-6	7,12-Dimethylbenzanthracene	280.	U
192-97-2	Benzo(E)Pyrene	190.	U
50-32-8	Benzo(A)Pyrene	230.	U
198-55-0	Perylene	250.	U
56-49-5	3-Methylcholanthrene	350.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	210.	U
53-70-3	Dibenz(A,H)Anthracene	160.	U
191-24-2	Benzo(G,H,I)Perylene	280.	U
215-58-7	Dibenz(A,C)Anthracene	160.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3180-05MS(1%)

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3180-05MS(1%)

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3180X249

Level: (low/med) LOW Date Received: 12/28/88

% Moisture: not dec. dec. Date Extracted: 12/29/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/06/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 12.5

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	510.	U
496-11-7	2,3-Dihydroindene	450.	B
95-13-6	1H-Indene	370.	B
91-20-3	Naphthalene	580.	J B
4565-32-6	Benzo(B)Thiophene	220.	
91-22-5	Quinoline	140.	U
120-72-9	1H-Indole	250.	U
91-57-6	2-Methylnaphthalene	78.	J B
90-12-0	1-Methylnaphthalene	270.	B
92-52-4	Biphenyl	430.	U
208-96-8	Acenaphthylene	91.	J
83-32-9	Acenaphthene	220.	
132-64-9	Dibenzofuran	100.	
86-73-7	Fluorene	110.	
132-65-0	Dibenzothiophene	110.	U
85-01-8	Phenanthrene	240.	B
120-12-7	Anthracene	110.	U
260-94-6	Acridine	290.	U
86-74-8	Carbazole	190.	U
206-44-0	Fluoranthene	160.	
129-00-0	Pyrene	140.	B
56-55-3	Benzo(A)Anthracene	250.	U
218-01-9	Chrysene	280.	U
205-99-2	Benzo(B)Fluoranthene	250.	U
207-08-9	Benzo(K)Fluoranthene	230.	U
57-97-6	7,12-Dimethylbenzanthracene	280.	U
192-97-2	Benzo(E)Pyrene	190.	U
50-32-8	Benzo(A)Pyrene	230.	U
198-55-0	Perylene	250.	U
56-49-5	3-Methylcholanthrene	350.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	210.	U
53-70-3	Dibenz(A,H)Anthracene	160.	U
191-24-2	Benzo(G,H,I)Perylene	280.	U
215-58-7	Dibenz(A,C)Anthracene	160.	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3180-01	58	134	78
2	3180-02	69	70	55
3	3180-05(1%)	D	D	D
4	3180-05DUP(1%)	D	D	D
5	3180-05MS(1%)	D	D	D
	BLK-01	67	83	66

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

3C

WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 3180-05(1%)

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	20	300.	370.	*
Naphthalene	20	470.	580.	*
Quinolene	20	ND	ND	*
2-Methylnaphthalene	20	80.	78.	*
Fluorene	20	ND	110.	*
Chrysene	20	ND	ND	*
Benzo(E)Pyrene	20	ND	ND	*

COMMENTS: Spiked compounds are diluted out. Percent recovery could not be calculated.

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 3180-05(1%)

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	350.	390.	11
1H-Indene	300.	350.	15
Naphthalene	470.	530.	12
Benzo(B)Thiophene	150.	200.	28
1-Methylnaphthalene	200.	230.	14
Acenaphthene	170.	190.	11
Phenanthrene	190.	210.	10
Fluoranthene	130.	130.	0
Pyrene	140.	120.	15

COMMENTS:

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

Lab File ID: S3180X243 Lab Sample ID: BLK-01

Date Extracted: 12/29/88 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 01/04/89 Time Analyzed: 17:19

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3180-01	3180-01	S3180X244	01/04/89
2	3180-02	3180-02	S3180X251	01/06/89
3	3180-05(1%)	3180-05(1%)	S3180X248	01/06/89
4	3180-05DUP(1%)	3180-05DUP(1%)	S3180X250	01/06/89
5	3180-05MS(1%)	3180-05MS(1%)	S3180X249	01/06/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3180 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3180X243

Level: (low/med) LOW Date Received: 12/28/88

% Moisture: not dec. dec. Date Extracted: 12/29/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/04/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.1	J
95-13-6	1H-Indene	1.7	
91-20-3	Naphthalene	5.2	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	3.1	
90-12-0	1-Methylnaphthalene	1.8	
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.7	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.3	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3180 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX236	01/04/89	09:43
BLK-01	S3180X243	01/04/89	17:19
3180-01	S3180X244	01/04/89	18:08

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3180 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX247	01/06/89	09:26
3180-05(1%)	S3180X248	01/06/89	11:12
3180-05MS(1%)	S3180X249	01/06/89	12:20
3180-05DUP(1%)	S3180X250	01/06/89	13:13
3180-02	S3180X251	01/06/89	14:16

Rocky Mountain
Analytical Laboratory

Enseco

February 10, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the three aqueous samples received at Rocky Mountain Analytical Laboratory on January 10, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Client Service Representative assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Client Service Rep.

RMAL #3278

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax. 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003278-0001-SA	GAC-SLP15C2TOC-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003278-0002-SA	GAC-SLP15FTOC-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003278-0003-SA	GAC-SLP15C1TOC-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C2TOC-010989
Lab ID: 003278-0001-SA Enseco ID: 1025786
Matrix: AQUEOUS Sampled: 09 JAN 89 Received: 10 JAN 89
Authorized: 10 JAN 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.9	mg/L	0.1	415.1	18 JAN 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Toni Lusk

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15FTOC-010989
Lab ID: 003278-0002-SA Enseco ID: 1025787
Matrix: AQUEOUS Sampled: 09 JAN 89 Received: 10 JAN 89
Authorized: 10 JAN 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.7	mg/L	0.1	415.1	18 JAN 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Toni Lusk

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C1TOC-010989
Lab ID: 003278-0003-SA Enseco ID: 1025788
Matrix: AQUEOUS Sampled: 09 JAN 89 Received: 10 JAN 89
Authorized: 10 JAN 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.4	mg/L	0.1	415.1	18 JAN 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Toni Lusk

The cover letter is an integral part of this report.
Rev 230787

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003278-0001-SA	AQUEOUS	TOC-A	890118A
003278-0002-SA	AQUEOUS	TOC-A	890118A
003278-0003-SA	AQUEOUS	TOC-A	890118A

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 890118A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.9	24.6	100	98	91-109	2.0	20

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

February 10, 1989

Enseco - RMAL Project Number 003278

Introduction

Three aqueous samples were received at Rocky Mountain Analytical Laboratory on January 10, 1988. The samples were logged in under RMAL project number 003278. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. All samples were analyzed for medium level part-per-trillion (PPT) polynuclear aromatic hydrocarbons (PAH's).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below per the 1989 QAPP.

PPT PAH

Due to an an interference in the matrix of sample 3278-03, the recovery of D8-Naphthalene is outside of control limits The presence of this interference has been confirmed by evaluating chromatographic peak shapes and ion intensities of the surrogate. Since this interference is specific to the surrogate, it has not affected the quantitation of target compounds.

Samples 3278-01 and 02 showed target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I).

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax. 303/431-7171

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Giberson **Date:** 2/10/89
Tracy Giberson
Data Control Supervisor

Approved by: Rebecca A. Williams **Date:** 2/10/89
Rebecca Williams
Client Service Representative

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003278-0001-SA	GAC-SLP15C2-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003278-0002-SA	GAC-SLP15F-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003278-0003-SA	GAC-SLP15C1-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC# 3278

PPT/PAH

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3278-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3278 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3278-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S3278X274

Level: (low/med) MED Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/17/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	408.	U
496-11-7	2,3-Dihydroindene	112.	U
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	470.	J *
4565-32-6	Benzo(B)Thiophene	72.	U
91-22-5	Quinoline	112.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	128.	U
92-52-4	Biphenyl	344.	U
208-96-8	Acenaphthylene	112.	U
83-32-9	Acenaphthene	104.	U
132-64-9	Dibenzofuran	80.	U
86-73-7	Fluorene	80.	U
132-65-0	Dibenzothiophene	88.	U
85-01-8	Phenanthrene	104.	U
120-12-7	Anthracene	88.	U
260-94-6	Acridine	232.	U
86-74-8	Carbazole	152.	U
206-44-0	Fluoranthene	112.	U
129-00-0	Pyrene	112.	U
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	224.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	184.	U
57-97-6	7,12-Dimethylbenzanthracene	224.	U
192-97-2	Benzo(E)Pyrene	152.	U
50-32-8	Benzo(A)Pyrene	184.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	168.	U
53-70-3	Dibenz(A,H)Anthracene	128.	U
191-24-2	Benzo(G,H,I)Perylene	224.	U
215-58-7	Dibenz(A,C)Anthracene	128.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3278-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3278 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3278-02

Sample wt/vol: 500 (g/ml) ML Lab File ID: S3278X275

Level: (low/med) MED Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/17/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	408.	U
496-11-7	2,3-Dihydroindene	1300.	
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	240.	J
4565-32-6	Benzo(B)Thiophene	300.	
91-22-5	Quinoline	112.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	128.	U
92-52-4	Biphenyl	220.	J
208-96-8	Acenaphthylene	540.	
83-32-9	Acenaphthene	980.	
132-64-9	Dibenzofuran	180.	
86-73-7	Fluorene	660.	
132-65-0	Dibenzothiophene	88.	U
85-01-8	Phenanthrene	104.	U
120-12-7	Anthracene	88.	U
260-94-6	Acridine	232.	U
86-74-8	Carbazole	152.	U
206-44-0	Fluoranthene	112.	U
129-00-0	Pyrene	140.	*
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	224.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	184.	U
57-97-6	7,12-Dimethylbenzanthracene	224.	U
192-97-2	Benzo(E)Pyrene	152.	U
50-32-8	Benzo(A)Pyrene	184.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	168.	U
53-70-3	Dibenz(A,H)Anthracene	128.	U
191-24-2	Benzo(G,H,I)Perylene	224.	U
215-58-7	Dibenz(A,C)Anthracene	128.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3278-03

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3278 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3278-03

Sample wt/vol: 500 (g/ml) ML Lab File ID: S3278X288

Level: (low/med) MED Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	408.	U
496-11-7	2,3-Dihydroindene	112.	U
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	72.	U
91-22-5	Quinoline	112.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	128.	U
92-52-4	Biphenyl	344.	U
208-96-8	Acenaphthylene	112.	U
83-32-9	Acenaphthene	104.	U
132-64-9	Dibenzofuran	80.	U
86-73-7	Fluorene	80.	U
132-65-0	Dibenzothiophene	88.	U
85-01-8	Phenanthrene	104.	U
120-12-7	Anthracene	88.	U
260-94-6	Acridine	232.	U
86-74-8	Carbazole	152.	U
206-44-0	Fluoranthene	112.	U
129-00-0	Pyrene	112.	U
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	224.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	184.	U
57-97-6	7,12-Dimethylbenzanthracene	224.	U
192-97-2	Benzo(E)Pyrene	152.	U
50-32-8	Benzo(A)Pyrene	184.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	168.	U
53-70-3	Dibenz(A,H)Anthracene	128.	U
191-24-2	Benzo(G,H,I)Perylene	224.	U
215-58-7	Dibenz(A,C)Anthracene	128.	U

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3278 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3278-01	98	134	102
2	3278-02	108	143	103
3	3278-03	116 *	137	118
4	BLK-01	100	121	113

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3278 SAS No.: N/A SDG No.: N/A

Lab File ID: S3284X292 Lab Sample ID: BLK-01

Date Extracted: 01/11/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 01/20/89 Time Analyzed: 13:06

Matrix: (soil/water) WATER Level: (low/med) MED

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3278-01	3278-01	S3278X274	01/17/89
2	3278-02	3278-02	S3278X275	01/17/89
3	3278-03	3278-03	S3278X288	01/18/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3278 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S3284X292

Level: (low/med) MED Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/20/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	408.	U
496-11-7	2,3-Dihydroindene	112.	U
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	72.	U
91-22-5	Quinoline	112.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	128.	U
92-52-4	Biphenyl	344.	U
208-96-8	Acenaphthylene	112.	U
83-32-9	Acenaphthene	104.	U
132-64-9	Dibenzofuran	80.	U
86-73-7	Fluorene	80.	U
132-65-0	Dibenzothiophene	88.	U
85-01-8	Phenanthrene	104.	U
120-12-7	Anthracene	88.	U
260-94-6	Acridine	232.	U
86-74-8	Carbazole	152.	U
206-44-0	Fluoranthene	112.	U
129-00-0	Pyrene	112.	U
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	224.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	184.	U
57-97-6	7,12-Dimethylbenzanthracene	224.	U
192-97-2	Benzo(E)Pyrene	152.	U
50-32-8	Benzo(A)Pyrene	184.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	168.	U
53-70-3	Dibenz(A,H)Anthracene	128.	U
191-24-2	Benzo(G,H,I)Perylene	224.	U
215-58-7	Dibenz(A,C)Anthracene	128.	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3278 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX269	01/17/89	09:46
3278-01	S3278X274	01/17/89	15:52
3278-02	S3278X275	01/17/89	16:41

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3278 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX277	01/18/89	08:31
3278-03	S3278X288	01/18/89	18:15

FORM V 1/87 Rev.

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3278 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX291	01/20/89	09:44
BLK-01	S3284X292	01/20/89	13:06

FORM V 1/87 Rev.

INITIAL CALIBRATION
PAH COMPOUNDS

CASE NO: 3278
CONTRACTOR: RMAL
CONTRACT NO: N/A

INSTRUMENT ID: X
CALIBRATION DATE: 1-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS 35%

LABORATORY ID: STDX268 STDX266 STDX264 STDX265 STDX267

COMPOUND	RF	2. RF	4. RF	24. RF	120. RF	480.	AVG RF	%RSD	CCS
2,3-BENZOFURAN	1.182	1.186	0.982	0.929	1.007	1.057	11.2		
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904	0.988	14.5		
1H-INDENE	1.875	1.762	1.463	1.400	1.535	1.607	12.6		
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033	2.214	15.6		
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432	1.524	13.1		
QUINOLINE	0.733	0.677	0.680	0.784	0.939	0.762	14.1		
1H-INDOLE	0.872	0.907	0.826	0.926	1.075	0.921	10.2		
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016	1.086	14.1		
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030	1.110	14.6		
BIPHENYL	1.798	1.739	1.370	1.332	1.419	1.532	14.3		
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663	1.616	9.3		
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045	1.092	11.8		
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487	1.601	15.6		
FLUORENE	1.311	1.375	1.145	1.146	1.247	1.245	8.1		
DIBENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950	1.008	11.8		
PHENANTHRENE	1.153	1.113	0.904	0.890	0.966	1.005	12.0		
ANTHRACENE	0.962	1.049	0.869	0.884	0.984	0.950	7.7		
ACRIDINE	0.810	0.812	0.549	0.652	0.738	0.712	15.7		
CARBAZOLE	0.955	1.009	0.764	0.793	0.889	0.882	11.7		
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013	1.068	13.6		
PYRENE	1.398	1.258	0.932	0.903	0.978	1.094	20.1		
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990	1.131	16.6		
CHRYSENE	1.643	1.468	1.057	1.014	0.966	1.230	24.8		
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014	1.151	22.2		
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292	1.488	15.7		
7,12-DIMETHYLBENZANTHRACENE	0.620	0.628	0.471	0.411	0.460	0.518	19.1		
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048	1.362	29.5		
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976	1.089	16.8		
PERYLENE	1.239	1.157	0.914	0.929	0.961	1.040	14.2		
3-METHYLCHOLANTHRENE #	0.000	0.538	0.423	0.444	0.469	0.469	10.7		
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130	1.240	17.0		
DIBENZ(A,C)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977	19.7		
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977	19.7		
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986	1.112	18.1		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCS - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VI

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3273
CONTRACTOR: RMAL
CONTRACT NO: N/A
INSTRUMENT ID: X

CALIBRATION DATE: 1-17-~~88~~ 89
TIME: 09:46
LABORATORY ID: STDX269 AV 1/20/89
INITIAL CALIBRATION DATE: 1-16-~~88~~ 89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.037	1.8		
2,3-DIHYDROINDENE	0.988	0.997	-0.9		
1H-INDENE	1.607	1.529	4.8		
NAPHTHALENE	2.214	2.198	0.7		
BENZO(B)THIOPHENE	1.524	1.426	6.3		
QUINOLINE	0.762	0.558	26.7		
1H-INDOLE	0.921	0.637	30.8		
2-METHYLNAPHTHALENE	1.086	1.042	4.0		
1-METHYLNAPHTHALENE	1.110	1.062	4.3		
BIPHENYL	1.532	1.354	11.5		
ACENAPHTHYLENE	1.616	1.398	13.4		
ACENAPHTHENE	1.092	1.002	8.2		
DIBENZOFURAN	1.601	1.338	16.4		
FLUORENE	1.245	1.121	9.9		
DIBENZOTHIOPHENE	1.008	0.876	13.0		
PHENANTHRENE	1.005	0.885	11.9		
ANTHRACENE	0.950	0.790	16.8		
ACRIDINE	0.712	0.515	27.7		
CARBAZOLE	0.882	0.647	26.6		
FLUORANTHENE	1.068	0.921	13.6		
PYRENE	1.094	1.001	8.5		
BENZO(A)ANTHRACENE	1.131	0.916	19.0		
CHRYSENE	1.230	1.181	3.9		
BENZO(B)FLUORANTHENE	1.151	0.965	16.1		
BENZO(K)FLUORANTHENE	1.488	1.208	18.7		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.406	21.5		
BENZO(E)PYRENE	1.362	1.304	4.2		
BENZO(A)PYRENE	1.089	0.824	24.3		
PERYLENE	1.040	0.818	21.3		
3-METHYLCHOLANTHRENE	0.469	0.227	51.5		
INDENO(1,2,3-CD)PYRENE	1.240	0.924	25.4		
DIBENZ(A,C)ANTHRACENE	0.977	0.669	31.5		
DIBENZ(A,H)ANTHRACENE	0.977	0.669	31.5		
BENZO(G,H,I)PERYLENE	1.112	0.946	14.9		

JJK 1-25-89

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3278
CONTRACTOR: RMAL
CONTRACT NO: --NA--
INSTRUMENT ID: X

CALIBRATION DATE: 1-18-89
TIME: 08:31
LABORATORY ID: STDX277
INITIAL CALIBRATION DATE: 1-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.033	2.2		
2,3-DIHYDROINDENE	0.988	0.967	2.1		
1H-INDENE	1.607	1.562	2.7		
NAPHTHALENE	2.214	2.469	-11.4		
BENZO(B)THIOPHENE	1.524	1.461	4.1		
QUINOLINE	0.762	0.719	5.7		
1H-INDOLE	0.921	0.849	7.7		
2-METHYLNAPHTHALENE	1.086	1.051	3.2		
1-METHYLNAPHTHALENE	1.110	1.049	5.4		
BIPHENYL	1.532	1.446	5.5		
ACENAPHTHYLENE	1.616	1.460	9.6		
ACENAPHTHENE	1.092	1.003	8.1		
DIBENZOFURAN	1.601	1.549	3.2		
FLUORENE	1.245	1.089	12.5		
DIBENZOTHIOPHENE	1.008	0.908	9.8		
PHENANTHRENE	1.005	0.908	9.6		
ANTHRACENE	0.950	0.827	12.8		
ACRIDINE	0.712	0.663	6.9		
CARBAZOLE	0.882	0.818	7.3		
FLUORANTHENE	1.068	0.941	11.8		
PYRENE	1.094	0.966	11.6		
BENZO(A)ANTHRACENE	1.131	0.979	13.5		
CHRYSENE	1.230	1.060	13.7		
BENZO(B)FLUORANTHENE	1.151	0.951	17.3		
BENZO(K)FLUORANTHENE	1.488	1.184	20.4		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.445	13.9		
BENZO(E)PYRENE	1.362	1.220	10.4		
BENZO(A)PYRENE	1.089	0.881	19.0		
PERYLENE	1.040	0.827	20.5		
3-METHYLCHOLANTHRENE	0.469	0.314	32.9		
INDENO(1,2,3-CD)PYRENE	1.240	0.904	27.0		
DIBENZ(A,C)ANTHRACENE	0.977	0.696	28.7		
DIBENZ(A,H)ANTHRACENE	0.977	0.696	28.7		
BENZO(G,H,I)PERYLENE	1.112	0.864	22.2		

JJK 1-25-89

AVG RF - AVERAGE RESPONSE FACTOR
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*)
SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
- NOT DETECTABLE AT LOW LEVEL

Form VII

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3278
CONTRACTOR: RMAL
CONTRACT NO: -NA-
INSTRUMENT ID: X

CALIBRATION DATE: 1-20-89
TIME: 09:44
LABORATORY ID: STDX291
INITIAL CALIBRATION DATE: 1-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.214	-14.8		
2,3-DIHYDROINDENE	0.988	1.087	-9.9		
1H-INDENE	1.607	1.832	-14.0		
NAPHTHALENE	2.214	2.347	-5.9		
BENZO(B)THIOPHENE	1.524	1.601	-5.0		
QUINOLINE	0.762	0.947	-24.1		
1H-INDOLE	0.921	1.158	-25.7		
2-METHYLNAPHTHALENE	1.086	1.045	3.7		
1-METHYLNAPHTHALENE	1.110	1.049	5.5		
BIPHENYL	1.532	1.455	5.0		
ACENAPHTHYLENE	1.616	1.615	0.0		
ACENAPHTHENE	1.092	1.131	-3.6		
DIBENZOFURAN	1.601	1.545	3.5		
FLUORENE	1.245	1.215	2.3		
DIBENZOTHIOPHENE	1.008	0.985	2.2		
PHENANTHRENE	1.005	0.998	0.7		
ANTHRACENE	0.950	0.944	0.6		
ACRIDINE	0.712	0.721	-1.2		
CARBAZOLE	0.882	0.962	-9.0		
FLUORANTHENE	1.068	0.953	10.7		
PYRENE	1.094	0.967	11.6		
BENZO(A)ANTHRACENE	1.131	1.264	-11.6		
CHRYSENE	1.230	1.289	-4.8		
BENZO(B)FLUORANTHENE	1.151	1.048	8.9		
BENZO(K)FLUORANTHENE	1.488	1.561	-4.9		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.515	0.5		
BENZO(E)PYRENE	1.362	1.275	6.4		
BENZO(A)PYRENE	1.089	1.002	7.9		
PERYLENE	1.040	0.944	9.2		
3-METHYLCHOLANTHRENE	0.469	0.403	14.0		
INDENO(1,2,3-CD)PYRENE	1.240	0.950	23.3		
DIBENZ(A,C)ANTHRACENE	0.977	0.730	25.2		
DIBENZ(A,H)ANTHRACENE	0.977	0.730	25.2		
BENZO(G,H,I)PERYLENE	1.112	0.906	18.5		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3278 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX269 Date Analyzed: 01/17/89

Instrument ID: X TIme Analyzed: 09:46:00

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	33913.	57260.	31621.
UPPER LIMIT	67826.	114520.	63242.
LOWER LIMIT	16956.	28630.	15810.
SAMPLE NO.			
3278-01	29843.	51534.	35099.
3278-02	29843.	50389.	32570.

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3278 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX277 Date Analyzed: 01/18/89

Instrument ID: X TIme Analyzed: 08:31:00

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	66305.	114238.	72657.
UPPER LIMIT	132610.	228476.	145314.
LOWER LIMIT	33152.	57119.	36328.
SAMPLE NO.			
3278-03	56359.	95960.	55219.

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

FORM VIII SV-2

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3278 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX291 Date Analyzed: 01/20/89

Instrument ID: X TIme Analyzed: 09:44:00

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	109775.	184944.	73592.
UPPER LIMIT	219550.	369888.	147184.
LOWER LIMIT	54887.	92472.	36796.
SAMPLE NO.			
BLK-01	109775.	184944.	73592.

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

FORM VIII SV-2

Enseco

February 9, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN. 55416

Dear Jim:

Enclosed is the report for the two aqueous samples received at Rocky Mountain Analytical Laboratory on January 10, 1989. The samples were analyzed for total organic carbon.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Client Service Representative assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Client Service Rep.

RMAL #3277

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003277-0001-SA	GAC-SLP15C3TOC-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0002-SA	GAC-SLP15FB-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0002-DU	GAC-SLP15FBD-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0003-SA	GAC-SLP15TTOC-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0003-DU	GAC-SLP15TD-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0003-MS	GAC-SLP15MS-010989	AQUEOUS	09 JAN 89	13:00	10 JAN 89

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C3TOC-010989
Lab ID: 003277-0001-SA Enseco ID: 1025789
Matrix: AQUEOUS Sampled: 09 JAN 89 Received: 10 JAN 89
Authorized: 10 JAN 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.8	mg/L	0.1	415.1	18 JAN 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Toni Lusk

The cover letter is an integral part of this report.
Rev 230787

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15TTOC-010989
Lab ID: 003277-0003-SA Enseco ID: 1025792
Matrix: AQUEOUS Sampled: 09 JAN 89 Received: 10 JAN 89
Authorized: 10 JAN 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.8	mg/L	0.1	415.1	18 JAN 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Toni Lusk

The cover letter is an integral part of this report.
Rev 230787

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003277-0001-SA	AQUEOUS	TOC-A	890118A
003277-0003-SA	AQUEOUS	TOC-A	890118A

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 890118A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.9	24.6	100	98	91-109	2.0	20

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

February 9, 1989

Enseco - RMAL Project Number 003277

Introduction

Six aqueous samples were received at Rocky Mountain Analytical Laboratory on January 10, 1989. The samples were logged in under RMAL project number 003277. Sample GAC-SLP15FBD-010989 was extracted and held per the 1989 QAPP. This sample is a field blank duplicate. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. All samples were analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons.

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below per the 1989 QAPP.

PPT PAH

Samples 3277-01, 02, 03, Blk 1/11 and Blk 1/23 showed compounds out of control limits for secondary ion confirmation. In some instances a compound may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I).

During the extraction of sample 3277-03MS, the spiked compounds were inadvertantly added at twice the required concentration. The sample was reextracted and reanalyzed using corrected concentrations, however, the reextraction took place outside of holding times. Since the original extraction took place within the holding time it has been included in the data package. All spike recoveries are within control limits.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Gilberson **Date:** 2/9/89
Tracy Gilberson
Data Control Supervisor

Approved by: Rebecca A. Williams **Date:** 2/9/89
Rebecca Williams
Client Service Representative

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003277-0001-SA	GAC-SLP15C3-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0002-SA	GAC-SLP15FB-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0002-DU	GAC-SLP15FBD-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0003-SA	GAC-SLP15T-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0003-DU	GAC-SLP15TD-010989	AQUEOUS	09 JAN 89	13:30	10 JAN 89
003277-0003-MS	GAC-SLP15MS-010989	AQUEOUS	09 JAN 89	13:00	10 JAN 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC # 3277

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3277-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3277-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3277X282

Level: (low/med) LOW Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q	
271-89-6	2,3-Benzofuran	5.1	U	
496-11-7	2,3-Dihydroindene	1.8		
95-13-6	1H-Indene	0.9	U	
91-20-3	Naphthalene	5.1	J	B
4565-32-6	Benzo(B)Thiophene	0.9	U	
91-22-5	Quinoline	1.4	U	
120-72-9	1H-Indole	2.5	U	
91-57-6	2-Methylnaphthalene	3.4		B
90-12-0	1-Methylnaphthalene	1.8		B
92-52-4	Biphenyl	4.3	U	
208-96-8	Acenaphthylene	1.4	U	
83-32-9	Acenaphthene	1.3	U	
132-64-9	Dibenzofuran	1.0	U	
86-73-7	Fluorene	1.5		
132-65-0	Dibenzothiophene	1.1	U	
85-01-8	Phenanthrene	1.7		B *
120-12-7	Anthracene	1.1	U	
260-94-6	Acridine	2.9	U	
86-74-8	Carbazole	1.9	U	
206-44-0	Fluoranthene	1.4	U	
129-00-0	Pyrene	1.0	J	
56-55-3	Benzo(A)Anthracene	2.5	U	
218-01-9	Chrysene	2.8	U	
205-99-2	Benzo(B)Fluoranthene	2.5	U	
207-08-9	Benzo(K)Fluoranthene	2.3	U	
57-97-6	7,12-Dimethylbenzanthracene	2.8	U	
192-97-2	Benzo(E)Pyrene	1.9	U	
50-32-8	Benzo(A)Pyrene	2.3	U	
198-55-0	Perylene	2.5	U	
56-49-5	3-Methylcholanthrene	3.5	U	
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U	
53-70-3	Dibenz(A,H)Anthracene	1.6	U	
191-24-2	Benzo(G,H,I)Perylene	2.8	U	
215-58-7	Dibenz(A,C)Anthracene	1.6	U	

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3277-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3277-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3277X283

Level: (low/med) LOW Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	4.6	
95-13-6	1H-Indene	1.4	
91-20-3	Naphthalene	12.	B *
4565-32-6	Benzo(B)Thiophene	1.0	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	11.	B *
90-12-0	1-Methylnaphthalene	6.4	B
92-52-4	Biphenyl	1.9	J
208-96-8	Acenaphthylene	1.1.	J
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	2.4	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	5.0	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.7	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3277-03

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3277-03

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3277X284

Level: (low/med) LOW Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	8.8	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	3.1	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.4	B *
90-12-0	1-Methylnaphthalene	1.3	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	
83-32-9	Acenaphthene	2.8	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.6	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.6	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.2	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3277-03DUP

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3277-03DUP

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3277X286

Level: (low/med) LOW Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	5.3	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	4.7	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.3	B
90-12-0	1-Methylnaphthalene	1.3	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.8	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.1	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.4	J
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.0	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3277-03MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3277-03MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3277X285

Level: (low/med) LOW Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	5.5	
95-13-6	1H-Indene	15.	SP
91-20-3	Naphthalene	19.	B SP
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	24.	SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	20.	B SP
90-12-0	1-Methylnaphthalene	1.8	B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.0	J
83-32-9	Acenaphthene	1.6	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	22.	SP
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.6	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.2	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	16.	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	4.1	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3277-03MS RE

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3277-03MS RE

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3277X327

Level: (low/med) LOW Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/23/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/26/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	13.	
95-13-6	1H-Indene	7.3	SP
91-20-3	Naphthalene	8.8	B SP
4565-32-6	Benzo(B)Thiophene	1.1	
91-22-5	Quinoline	9.9	SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	8.9	B SP
90-12-0	1-Methylnaphthalene	1.4	J
92-52-4	Biphenyl	1.7	J
208-96-8	Acenaphthylene	2.6	
83-32-9	Acenaphthene	4.5	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	11.	SP
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	11.	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	4.1	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 2314 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3277-01	39	62	36
2	3277-02	52	44 #	48
3	3277-03	41	84	41
4	3277-03DUP	38	78	38
5	3277-03MS	38	49	36
6	3277-03MS RE	70	80	92
7	BLK-01	37	52	50
8	BLK-02	65	70 #	78

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

= Quantitation of the secondary ion used to measure the recovery of D10-Fluorene as per the 1989 QAPP

* Values outside of contract required QC limits

D Surrogates diluted out

3C

WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 3277-03

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	20	0.0	15.	75
Naphthalene	20	3.1	19.	80
Quinolene	20	0.0	24.	120
2-Methylnaphthalene	20	2.4	20.	88
Fluorene	20	1.6	22.	102
Chrysene	20	0.0	16.	80
Benzo(E)Pyrene	20	0.0	4.1	20

COMMENTS: from 1/11/89 extraction

3C

WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 3277-03

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	10	0.0	7.3	73
Naphthalene	10	3.1	8.8	58
Quinolene	10	0.0	9.9	99
2-Methylnaphthalene	10	2.4	8.9	63
Fluorene	10	1.6	11.	97
Chrysene	10	0.0	11.	106
Benzo(E)Pyrene	10	0.0	4.1	41

COMMENTS: From 1/23/89 extraction

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 3277-03

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	8.8	5.3	50
Naphthalene	3.1	4.7	41
2-Methylnaphthalene	2.4	2.3	4
1-Methylnaphthalene	1.3	1.3	0
Acenaphthene	2.8	1.8	43
Phenanthrene	1.6	1.1	37
Pyrene	1.2	1.0	18

COMMENTS:

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Lab File ID: S3277X281 Lab Sample ID: BLK-01

Date Extracted: 01/11/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 01/18/89 Time Analyzed: 12:40

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3277-01	3277-01	S3277X282	01/18/89
2	3277-02	3277-02	S3277X283	01/18/89
3	3277-03	3277-03	S3277X284	01/18/89
4	3277-03DUP	3277-03DUP	S3277X286	01/18/89
	3277-03MS	3277-03MS	S3277X285	01/18/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3277X281

Level: (low/med) LOW Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/11/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q	
271-89-6	2,3-Benzofuran	5.1	U	
496-11-7	2,3-Dihydroindene	1.4	U	
95-13-6	1H-Indene	0.9	U	
91-20-3	Naphthalene	2.6	J	*
4565-32-6	Benzo(B)Thiophene	0.9	U	
91-22-5	Quinoline	1.4	U	
120-72-9	1H-Indole	2.5	U	
91-57-6	2-Methylnaphthalene	2.7		
90-12-0	1-Methylnaphthalene	1.4	J	
92-52-4	Biphenyl	4.3	U	
208-96-8	Acenaphthylene	1.4	U	
83-32-9	Acenaphthene	1.3	U	
132-64-9	Dibenzofuran	1.0	U	
86-73-7	Fluorene	1.0	U	
132-65-0	Dibenzothiophene	1.1	U	
85-01-8	Phenanthrene	1.3		*
120-12-7	Anthracene	1.1	U	
260-94-6	Acridine	2.9	U	
86-74-8	Carbazole	1.9	U	
206-44-0	Fluoranthene	1.4	U	
129-00-0	Pyrene	1.4	U	
56-55-3	Benzo(A)Anthracene	2.5	U	
218-01-9	Chrysene	2.8	U	
205-99-2	Benzo(B)Fluoranthene	2.5	U	
207-08-9	Benzo(K)Fluoranthene	2.3	U	
57-97-6	7,12-Dimethylbenzanthracene	2.8	U	
192-97-2	Benzo(E)Pyrene	1.9	U	
50-32-8	Benzo(A)Pyrene	2.3	U	
198-55-0	Perylene	2.5	U	
56-49-5	3-Methylcholanthrene	3.5	U	
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U	
53-70-3	Dibenz(A,H)Anthracene	1.6	U	
191-24-2	Benzo(G,H,I)Perylene	2.8	U	
215-58-7	Dibenz(A,C)Anthracene	1.6	U	

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Lab File ID: S3277X328 Lab Sample ID: BLK-02

Date Extracted: 01/23/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 01/26/89 Time Analyzed: 19:25

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3277-03MS RE	3277-03 RE	S3277X327	01/26/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3277 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3277X328

Level: (low/med) LOW Date Received: 01/10/89

% Moisture: not dec. dec. Date Extracted: 01/23/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/26/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	1.8	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.3	*
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	*
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.9	*
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3277 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX277	01/18/89	08:31
BLK-01	S3277X281	01/18/89	12:40
3277-01	S3277X282	01/18/89	13:28
3277-02	S3277X283	01/18/89	14:16
3277-03	S3277X284	01/18/89	15:04
3277-03MS	S3277X285	01/18/89	15:52
3277-03DUP	S3277X286	01/18/89	16:39

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3277 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX326	01/26/89	15:41
3277-03MS RE	S3277X327	01/26/89	18:37
BLK-02	S3277X328	01/26/89	19:25

FORM V 1/87 Rev.

INITIAL CALIBRATION
PAH COMPOUNDS

CASE NO: 3297
CONTRACTOR: RMAL
CONTRACT NO: ---

INSTRUMENT ID: X
CALIBRATION DATE: 1-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS 35%

LABORATORY ID: STDX268 STDX266 STDX264 STDX265 STDX267

COMPOUND	RF	2. RF	4. RF	24. RF	120. RF	480.	AVG RF	%RSD	CCSF
2,3-BENZOFURAN	1.182	1.186	0.982	0.929	1.007		1.057	11.2	
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904		0.988	14.5	
1H-INDENE	1.875	1.762	1.463	1.400	1.535		1.607	12.6	
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033		2.214	15.6	
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432		1.524	13.1	
QUINOLINE	0.733	0.677	0.680	0.784	0.939		0.762	14.1	
1H-INDOLE	0.872	0.907	0.826	0.926	1.075		0.921	10.2	
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016		1.086	14.1	
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030		1.110	14.6	
BIPHENYL	1.798	1.739	1.370	1.332	1.419		1.532	14.3	
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663		1.616	9.3	
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045		1.092	11.8	
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487		1.601	15.6	
FLUORENE	1.311	1.375	1.145	1.146	1.247		1.245	8.1	
BENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950		1.008	11.8	
PHENANTHRENE	1.153	1.113	0.904	0.890	0.966		1.005	12.0	
ANTHRACENE	0.962	1.049	0.869	0.884	0.984		0.950	7.7	
ACRIDINE	0.810	0.812	0.549	0.652	0.738		0.712	15.7	
CARBAZOLE	0.955	1.009	0.764	0.793	0.889		0.882	11.7	
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013		1.068	13.6	
PYRENE	1.398	1.258	0.932	0.903	0.978		1.094	20.1	
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990		1.131	16.6	
CHRYSENE	1.643	1.468	1.057	1.014	0.966		1.230	24.8	
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014		1.151	22.2	
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292		1.488	15.7	
7,12-DIMETHYLBENZANTHRACENE	0.620	0.628	0.471	0.411	0.460		0.518	19.1	
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048		1.362	29.5	
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976		1.089	16.8	
PERYLENE	1.239	1.157	0.914	0.929	0.961		1.040	14.2	
3-METHYLCHOLANTHRENE #	0.000	0.538	0.423	0.444	0.469		0.469	10.7	
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130		1.240	17.0	
DIBENZ(A,C)ANTHRACENE	0.943	1.318	0.852	0.869	0.905		0.977	19.7	
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905		0.977	19.7	
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986		1.112	18.1	

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VI

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3277
CONTRACTOR: RMAL
CONTRACT NO: --NA
INSTRUMENT ID: X

CALIBRATION DATE: 01-26-89
TIME: ~~18:14~~ 15:41 AM 1/31/89
LABORATORY ID: STDX326
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.012	4.2		
2,3-DIHYDROINDENE	0.988	0.921	6.8		
1H-INDENE	1.607	1.585	1.3		
NAPHTHALENE	2.214	2.440	-10.1		
BENZO(B)THIOPHENE	1.524	1.460	4.1		
QUINOLINE	0.762	0.906	-18.8		
1H-INDOLE	0.921	1.072	-16.3		
2-METHYLNAPHTHALENE	1.086	1.110	-2.2		
1-METHYLNAPHTHALENE	1.110	1.134	-2.0		
BIPHENYL	1.532	1.465	4.3		
ACENAPHTHYLENE	1.616	1.650	-2.1		
ACENAPHTHENE	1.092	1.050	3.7		
DIBENZOFURAN	1.601	1.391	13.1		
FLUORENE	1.245	1.129	9.3		
DIBENZOTHIOPHENE	1.008	0.987	2.0		
PHENANTHRENE	1.005	1.071	-6.5		
ANTHRACENE	0.950	0.978	-3.0		
ACRIDINE	0.712	0.627	11.9		
CARBAZOLE	0.882	0.915	-3.6		
FLUORANTHENE	1.068	0.954	10.6		
PYRENE	1.094	1.136	-3.8		
BENZO(A)ANTHRACENE	1.131	1.113	1.6		
CHRYSENE	1.230	1.062	13.6		
BENZO(B)FLUORANTHENE	1.151	1.245	-8.1		
BENZO(K)FLUORANTHENE	1.488	1.255	15.6		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.363	29.9		
BENZO(E)PYRENE	1.362	1.157	15.0		
BENZO(A)PYRENE	1.089	1.053	3.3		
PERYLENE	1.040	1.041	-0.0		
3-METHYLCHOLANTHRENE	0.469	0.313	33.1		
INDENO(1,2,3-CD)PYRENE	1.240	1.486	-19.8		
DIBENZ(A,C)ANTHRACENE	0.977	1.066	-9.0		
DIBENZ(A,H)ANTHRACENE	0.977	1.066	-9.0		
BENZO(G,H,I)PERYLENE	1.112	1.236	-11.1		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(*
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3277
CONTRACTOR: RMAL
CONTRACT NO: ----
INSTRUMENT ID: X

CALIBRATION DATE: 1-18-89
TIME: 08:31
LABORATORY ID: STDX277
INITIAL CALIBRATION DATE: 1-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.033	2.2		
2,3-DIHYDROINDENE	0.988	0.967	2.1		
1H-INDENE	1.607	1.562	2.7		
NAPHTHALENE	2.214	2.469	-11.4		
BENZO(B)THIOPHENE	1.524	1.461	4.1		
QUINOLINE	0.762	0.719	5.7		
1H-INDOLE	0.921	0.849	7.7		
2-METHYLNAPHTHALENE	1.086	1.051	3.2		
1-METHYLNAPHTHALENE	1.110	1.049	5.4		
BIPHENYL	1.532	1.446	5.5		
ACENAPHTHYLENE	1.616	1.460	9.6		
ACENAPHTHENE	1.092	1.003	8.1		
DIBENZOFURAN	1.601	1.549	3.2		
FLUORENE	1.245	1.089	12.5		
DIBENZOTHIOPHENE	1.008	0.908	9.8		
PHENANTHRENE	1.005	0.908	9.6		
ANTHRACENE	0.950	0.827	12.8		
ACRIDINE	0.712	0.663	6.9		
CARBAZOLE	0.882	0.818	7.3		
FLUORANTHENE	1.068	0.941	11.8		
PYRENE	1.094	0.966	11.6		
BENZO(A)ANTHRACENE	1.131	0.979	13.5		
CHRYSENE	1.230	1.060	13.7		
BENZO(B)FLUORANTHENE	1.151	0.951	17.3		
BENZO(K)FLUORANTHENE	1.488	1.184	20.4		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.445	13.9		
BENZO(E)PYRENE	1.362	1.220	10.4		
BENZO(A)PYRENE	1.089	0.881	19.0		
PERYLENE	1.040	0.827	20.5		
3-METHYLCHOLANTHRENE	0.469	0.314	32.9		
INDENO(1,2,3-CD)PYRENE	1.240	0.904	27.0		
DIBENZ(A,C)ANTHRACENE	0.977	0.696	28.7		
DIBENZ(A,H)ANTHRACENE	0.977	0.696	28.7		
BENZO(G,H,I)PERYLENE	1.112	0.864	22.2		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

DJK 1-30-89

Form VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3277 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX326 Date Analyzed: 01/26/89

Instrument ID: X TIme Analyzed: 15:41

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	24358	33552	17726
UPPER LIMIT	48716	67104	35452
LOWER LIMIT	12179	16776	8863
SAMPLE NO.			
3277-03MS RE	26794	44624	19853
BLK-02	33127	57709	24994

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

1/87 Rev.

FORM VIII SV-2

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3277 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX277 Date Analyzed: 01/18/89

Instrument ID: X TIme Analyzed: 08:31

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	66305	114238	72657
UPPER LIMIT	132610	228476	145314
LOWER LIMIT	33152	57119	36328
SAMPLE NO.			
3277-01	62327	107384	66118
3277-02	57022	94818	63938
3277-03	54370	90248	55946
3277-03MS	58348	95960	65391
3277-03DUP	55696	92533	62485
BLK-01	56359	97102	61758

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

Rocky Mountain
Analytical Laboratory

Enseco

March 9, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the one aqueous sample received at Rocky Mountain Analytical Laboratory on January 24, 1989.

This data package is in compliance with the terms and condition of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Program Administrator

RMAL #3429

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003429-0001-SA	GAC-SLP15C1TOC-012389	AQUEOUS	23 JAN 89	13:30	24 JAN 89

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C1TOC-012389
Lab ID: 003429-0001-SA Enseco ID: 1026880
Matrix: AQUEOUS Sampled: 23 JAN 89 Received: 24 JAN 89
Authorized: 24 JAN 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.5	mg/L	0.1	415.1	26 JAN 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Kimberly Conroy

Ensec

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003429-0001-SA	AQUEOUS	TOC-A	890126B

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 890126B								
Concentration Units: mg/L								
Total Organic Carbon	25	25.1	24.5	100	98	91-109	2.0	20

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

March 9, 1989

Enseco - RMAL Project Number 003429

Introduction

Two aqueous samples were received at Rocky Mountain Analytical Laboratory on January 24, 1989. The samples were logged in under RMAL project number 003429. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. Sample GAC-SLP15C1-012389 was analyzed for part-per-trillion (PPT) polynuclear aromatic hydrocarbons (PAH's). Sample GAC-SLP15C1D-012389 was extracted and held per instructions on the chain of custody.

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below per the 1989 QAPP.

PPT PAH

Sample 3429-01 was originally extracted within the holding time, however, due to contamination of the associated blank it was necessary to re-extract and reanalyze the sample (per 1989 QAPP). The re-extraction took place outside of holding times. Both analyses are submitted.

Sample 3429-01RE and BLK-02 showed target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I).

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Audrey Verniero **Date:** 3/9/89
Audrey Verniero
Data Control

Approved by: Tracy Hibson for **Date:** 3/9/89
Rebecca Williams
Client Service Representative

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003429-0001-SA	GAC-SLP15C1-012389	AQUEOUS	23 JAN 89	13:30	24 JAN 89
003429-0001-DU	GAC-SLP15C1D-012389	AQUEOUS	23 JAN 89	13:30	24 JAN 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC # 3429

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3429-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3429 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3429-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3429X348

Level: (low/med) LOW Date Received: 01/24/89

% Moisture: not dec. dec. Date Extracted: 01/30/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/03/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	7.4	B
95-13-6	1H-Indene	2.1	B
91-20-3	Naphthalene	7.0	B
4565-32-6	Benzo(B)Thiophene	6.2	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	4.5	B
90-12-0	1-Methylnaphthalene	2.4	B
92-52-4	Biphenyl	0.7	J B
208-96-8	Acenaphthylene	1.6	
83-32-9	Acenaphthene	3.2	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.1	B
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	2.5	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.2	J B
129-00-0	Pyrene	1.8	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3429-01RE

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3429 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3429-01RE

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3429X397

Level: (low/med) LOW Date Received: 01/24/89

% Moisture: not dec. dec. Date Extracted: 02/07/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.7	B
95-13-6	1H-Indene	2.0	
91-20-3	Naphthalene	3.1	J B *
4565-32-6	Benzo(B)Thiophene	9.5	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.1	B *
90-12-0	1-Methylnaphthalene	1.3	J B *
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.2	
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	0.7	J B
132-65-0	Dibenzothiophene	0.5	J
85-01-8	Phenanthrene	2.6	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.3	J B
129-00-0	Pyrene	1.5	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	0.4	J
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3429 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3429-01	86	105	86
2	3429-01RE	82	100	101
3	BLK-01	100	110	90
4	BLK-02	82	53	35

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3429 SAS No.: N/A SDG No.: N/A

Lab File ID: S3429X347 Lab Sample ID: BLK-01

Date Extracted: 01/30/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 02/03/89 Time Analyzed: 15:22

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3429-01	3429-01	S3429X348	02/03/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3429 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3429X347

Level: (low/med) LOW Date Received: 01/24/89

% Moisture: not dec. dec. Date Extracted: 01/30/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/03/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	3.3	
95-13-6	1H-Indene	1.2	
91-20-3	Naphthalene	8.5	
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	5.3	
90-12-0	1-Methylnaphthalene	3.3	
92-52-4	Biphenyl	0.8	J
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	4.7	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.0	J
129-00-0	Pyrene	1.1	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3429 SAS No.: N/A SDG No.: N/A

Lab File ID: S3429X398 Lab Sample ID: BLK-02

Date Extracted: 02/07/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 02/20/89 Time Analyzed: 10:28

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3429-01RE	3429-01RE	S3429X397	02/20/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3429 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3329X398

Level: (low/med) LOW Date Received: 01/24/89

% Moisture: not dec. dec. Date Extracted: 02/07/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q	
271-89-6	2,3-Benzofuran	5.1	U	
496-11-7	2,3-Dihydroindene	1.5		
95-13-6	1H-Indene	0.9	U	
91-20-3	Naphthalene	3.1	J	*
4565-32-6	Benzo(B)Thiophene	0.9	U	
91-22-5	Quinoline	1.4	U	
120-72-9	1H-Indole	2.5	U	
91-57-6	2-Methylnaphthalene	2.2		*
90-12-0	1-Methylnaphthalene	1.2	J	
92-52-4	Biphenyl	4.3	U	
208-96-8	Acenaphthylene	1.4	U	
83-32-9	Acenaphthene	1.3	U	
132-64-9	Dibenzofuran	1.0	U	
86-73-7	Fluorene	0.4	J	*
132-65-0	Dibenzothiophene	1.1	U	
85-01-8	Phenanthrene	1.9		
120-12-7	Anthracene	1.1	U	
260-94-6	Acridine	2.9	U	
86-74-8	Carbazole	1.9	U	
206-44-0	Fluoranthene	0.8	J	*
129-00-0	Pyrene	1.0	J	*
56-55-3	Benzo(A)Anthracene	2.5	U	
218-01-9	Chrysene	2.8	U	
205-99-2	Benzo(B)Fluoranthene	2.5	U	
207-08-9	Benzo(K)Fluoranthene	2.3	U	
57-97-6	7,12-Dimethylbenzanthracene	2.8	U	
192-97-2	Benzo(E)Pyrene	1.9	U	
50-32-8	Benzo(A)Pyrene	2.3	U	
198-55-0	Perylene	2.5	U	
56-49-5	3-Methylcholanthrene	3.5	U	
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U	
53-70-3	Dibenz(A,H)Anthracene	1.6	U	
191-24-2	Benzo(G,H,I)Perylene	2.8	U	
215-58-7	Dibenz(A,C)Anthracene	1.6	U	

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3429 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX346	02/03/89	13:49
BLK-01	S3429X347	02/03/89	15:22
3429-01	S3429X348	02/03/89	16:10

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3429 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX396	02/20/89	07:59
3429-01RE	S3429X397	02/20/89	09:40
BLK-02	S3429X398	02/20/89	10:28

INITIAL CALIBRATION
-PAH COMPOUNDS

CASE NO: 3429
ONTRACTOR: RMAL
ONTRACT NO: N/A

INSTRUMENT ID: X
CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS 35%

LABORATORY ID: STDX268 STDX266 STDX338
STDX265 STDX267

COMPOUND	RF	2. RF	4. RF	24. RF	120. RF	480.	AVG RF	%RSD	CC
2,3-BENZOFURAN	1.182	1.186	0.982	0.929	1.007		1.057	11.2	
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904		0.988	14.5	
1H-INDENE	1.875	1.762	1.463	1.400	1.535		1.607	12.6	
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033		2.214	15.6	
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432		1.524	13.1	
QUINOLINE	0.733	0.677	0.680	0.784	0.939		0.762	14.1	
1H-INDOLE	0.872	0.907	0.826	0.926	1.075		0.921	10.2	
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016		1.086	14.1	
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030		1.110	14.6	
BIPHENYL	1.798	1.739	1.370	1.332	1.419		1.532	14.3	
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663		1.616	9.3	
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045		1.092	11.8	
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487		1.601	15.6	
FLUORENE	1.311	1.375	1.145	1.146	1.247		1.245	8.1	
DIBENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950		1.008	11.8	
PHENANTHRENE	1.153	1.113	0.904	0.890	0.966		1.005	12.0	
ANTHRACENE	0.962	1.049	0.869	0.884	0.984		0.950	7.7	
ACRIDINE	0.810	0.812	0.549	0.652	0.738		0.712	15.7	
CARBAZOLE	0.955	1.009	0.764	0.793	0.889		0.882	11.7	
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013		1.068	13.6	
PYRENE	1.398	1.258	0.932	0.903	0.978		1.094	20.1	
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990		1.131	16.6	
CHRYSENE	1.643	1.468	1.057	1.014	0.966		1.230	24.8	
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014		1.151	22.2	
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292		1.488	15.7	
7,12-DIMETHYLBENZANTHRACENE	0.620	0.628	0.471	0.411	0.460		0.518	19.1	
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048		1.362	29.5	
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976		1.089	16.8	
PERYLENE	1.239	1.157	0.914	0.929	0.961		1.040	14.2	
3-METHYLCHOLANTHRENE #	0.000	0.538	0.423	0.444	0.469		0.469	10.7	
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130		1.240	17.0	
DIBENZ(A,C)ANTHRACENE	0.943	1.318	0.852	0.869	0.905		0.977	19.7	
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905		0.977	19.7	
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986		1.112	18.1	

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(*
SD - PERCENT RELATIVE STANDARD DEVIATION
C - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VI

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

'SE NO: 3429
NTRACTOR RMAL
CONTRACT NO: --N/A
INSTRUMENT ID: X

CALIBRATION DATE: 02-03-89
TIME: 13.49
LABORATORY ID: STDX346
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0 050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1 057	1 083	-2.4		
2,3-DIHYDROINDENE	0 988	0 938	5.0		
1H-INDENE	1.607	1.583	1.4		
NAPHTHALENE	2.214	2.272	-2.5		
BENZO(B)THIOPHENE	1 524	1.449	4.9		
QUINOLINE	0 762	0.930	-22.0		
1H-INDOLE	0 921	1.026	-11.3		
2-METHYLNAPHTHALENE	1 086	1 112	-2.4		
1-METHYLNAPHTHALENE	1.110	1.035	6.7		
BIPHENYL	1 532	1.503	1.8		
ACENAPHTHYLENE	1.616	1.576	2.5		
ACENAPHTHENE	1 092	0.990	9.3		
DIBENZOFURAN	1 601	1.648	-2.9		
FLUORENE	1 245	1.155	7.1		
DIBENZOTHIOPHENE	1 008	0.905	10.2		
PHENANTHRENE	1.005	0.966	3.8		
ANTHRACENE	0.950	0.878	7.5		
ACRIDINE	0.712	0.580	18.5		
CARBAZOLE	0 882	0.936	-6.0		
FLUORANTHENE	1 068	0.907	15.0		
PYRENE	1.094	0.906	17.1		
BENZO(A)ANTHRACENE	1 131	1.195	-5.6		
CHRYSENE	1 230	1.189	3.2		
BENZO(B)FLUORANTHENE	1 151	1.221	-6.0		
BENZO(K)FLUORANTHENE	1 488	1.145	23.0		
7,12-DIMETHYLBENZANTHRACENE	0 518	0.455	12.1		
BENZO(E)PYRENE	1 362	1.119	17.8		
BENZO(A)PYRENE	1.089	0.868	20.3		
PERYLENE	1 040	0.873	16.0		
3-METHYLCHOLANTHRENE	0.469	0.362	22.7		
INDENO(1,2,3-CD)PYRENE	1 240	0.982	20.8		
DIBENZ(A,C)ANTHRACENE	0 977	0.842	13.8		
DIBENZ(A,H)ANTHRACENE	0.977	0.842	13.8		
BENZO(G,H,I)PERYLENE	1.112	0.931	16.2		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
"RSD - PERCENT RELATIVE STANDARD DEVIATION
C - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3429
CONTRACTOR: RMAL
CONTRACT NO: --N/A
INSTRUMENT ID: X

CALIBRATION DATE: 02-20-89
TIME: 07:59
LABORATORY ID: STDX396
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 25%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.094	-3.5		
2,3-DIHYDROINDENE	0.988	0.974	1.3		
1H-INDENE	1.607	1.591	0.9		
NAPHTHALENE	2.214	2.653	-19.8		
BENZO(B)THIOPHENE	1.524	1.479	2.9		
QUINOLINE	0.762	0.794	-4.1		
1H-INDOLE	0.921	0.864	6.1		
2-METHYLNAPHTHALENE	1.086	1.024	5.7		
1-METHYLNAPHTHALENE	1.110	1.073	3.3		
BIPHENYL	1.532	1.720	-12.3		
ACENAPHTHYLENE	1.616	1.405	13.0		
ACENAPHTHENE	1.092	0.976	10.6		
DIBENZOFURAN	1.601	1.503	6.1		
FLUORENE	1.245	1.127	9.4		
DIBENZOTHIOPHENE	1.008	0.902	10.5		
PHENANTHRENE	1.005	0.918	8.6		
ANTHRACENE	0.950	0.775	18.3		
ACRIDINE	0.712	0.509	28.4		
CARBAZOLE	0.882	0.860	2.4		
FLUORANTHENE	1.068	0.902	15.4		
PYRENE	1.094	0.894	18.2		
BENZO(A)ANTHRACENE	1.131	1.183	-4.5		
CHRYSENE	1.230	1.276	-3.7		
BENZO(B)FLUORANTHENE	1.151	1.343	-16.6		
BENZO(K)FLUORANTHENE	1.488	1.387	6.8		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.504	2.7		
BENZO(E)PYRENE	1.362	1.414	-3.7		
BENZO(A)PYRENE	1.089	0.964	11.5		
PERYLENE	1.040	0.902	13.3		
3-METHYLCHOLANTHRENE	0.469	0.314	32.9		
INDENO(1,2,3-CD)PYRENE	1.240	0.992	19.9		
DIBENZ(A,C)ANTHRACENE	0.977	0.843	13.7		
DIBENZ(A,H)ANTHRACENE	0.977	0.843	13.7		
BENZO(G,H,I)PERYLENE	1.112	0.941	15.3		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3429 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX346 Date Analyzed: 02/03/89

Instrument ID: X TIme Analyzed: 13:49

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	159426	262248	128843
UPPER LIMIT	318852	524496	257686
LOWER LIMIT	79713	131124	64421
SAMPLE NO.			
BLK-01	156960	262248	128843
3429-01	142292	233266	121994

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3429 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX396 Date Analyzed: 02/20/89

Instrument ID: X TIme Analyzed: 07:59

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	401605	654561	341364
UPPER LIMIT	803210	1309122	682728
LOWER LIMIT	200802	327280	170682
SAMPLE NO.			
3429-01RE	348000	563000	340000
BLK-02	341000	550000	358000

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

1/87 Rev.

FORM VIII SV-2

Enseco

March 7, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the two aqueous samples received at Rocky Mountain Analytical Laboratory on February 7, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Program Administrator

RMAL #3557

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003557-0001-SA	GAC SLP10T TOC-020689	AQUEOUS	06 FEB 89	13:45	07 FEB 89
003557-0002-SA	GAC SLP10C1 TOC-020689	AQUEOUS	06 FEB 89	13:45	07 FEB 89

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC SLP10T TOC-020689
Lab ID: 003557-0001-SA Enseco ID: 1027812
Matrix: AQUEOUS Sampled: 06 FEB 89 Received: 07 FEB 89
Authorized: 07 FEB 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.0	mg/L	0.1	415.1	13 FEB 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Toni Lusk

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC SLP10C1 TOC-020689
Lab ID: 003557-0002-SA Enseco ID: 1027815
Matrix: AQUEOUS Sampled: 06 FEB 89 Received: 07 FEB 89
Authorized: 07 FEB 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.4	mg/L	0.1	415.1	13 FEB 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Toni Lusk

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003557-0001-SA	AQUEOUS	TOC-A	13 FEB 89-C
003557-0002-SA	AQUEOUS	TOC-A	13 FEB 89-C

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 13 FEB 89-C								
Concentration Units: mg/L								
Total Organic Carbon	25	23.7	23.5	95	94	91-109	1.1	20

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

March 13, 1989

Enseco - RMAL Project Number 003557

Introduction

Six aqueous samples were received at Rocky Mountain Analytical Laboratory on February 7, 1989. The samples were logged in under RMAL project number 003557. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. Sample GAC-SLP10FBD-020689 was extracted and held per the 1989 QAPP. All other samples were analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons.

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below per the 1989 QAPP.

PPT PAH

Due to an interference in the matrix of sample 3557-03, the recovery of D8-Naphthalene exceeded the upper control limit. The presence of this interference has been confirmed by evaluating chromatographic peak shapes and ion intensities of the surrogate. Since this interference is specific to the surrogate, it has not affected the quantitation of target compounds.

Samples 3557-01, 01DUP, 02, 03, 01MS and Blk 2/08 showed compounds out of control limits for secondary ion confirmation. In some instances a compound may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I).

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Audrey Verniero Date: 3/13/89
Audrey Verniero
Data Control

Approved by: Rebecca A. Williams Date: 3/13/89
Rebecca Williams
Client Service Representative

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003557-0001-SA	GAC SLP10T-020689	AQUEOUS	06 FEB 89	13:45	07 FEB 89
003557-0001-DU	GAC-SLP10TD-020689	AQUEOUS	06 FEB 89	14:00	07 FEB 89
003557-0001-MS	GAC SLP10TMS-020689	AQUEOUS	06 FEB 89	13:45	07 FEB 89
003557-0002-SA	GAC SLP10C1-020689	AQUEOUS	06 FEB 89	13:45	07 FEB 89
003557-0003-SA	GAC-SLP10FB-020689	AQUEOUS	06 FEB 89	13:30	07 FEB 89
003557-0003-DU	GAC SLP10FBD-020689	AQUEOUS	06 FEB 89	13:30	07 FEB 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC# 3557

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3557-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 2611-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3557X402

Level: (low/med) LOW Date Received: 02/07/89

% Moisture: not dec. dec. Date Extracted: 02/08/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q	
271-89-6	2,3-Benzofuran	5.1	U	
496-11-7	2,3-Dihydroindene	9.7	B	
95-13-6	1H-Indene	1.1	B	
91-20-3	Naphthalene	3.7	B	*
4565-32-6	Benzo(B)Thiophene	1.0		
91-22-5	Quinoline	1.4	U	
120-72-9	1H-Indole	2.5	U	
91-57-6	2-Methylnaphthalene	2.9	B	
90-12-0	1-Methylnaphthalene	1.7	B	
92-52-4	Biphenyl	1.5	J	*
208-96-8	Acenaphthylene	1.8		
83-32-9	Acenaphthene	3.8		
132-64-9	Dibenzofuran	1.0	U	
86-73-7	Fluorene	2.7		
132-65-0	Dibenzothiophene	1.1	U	
85-01-8	Phenanthrene	2.9	B	
120-12-7	Anthracene	1.1	U	
260-94-6	Acridine	2.9	U	
86-74-8	Carbazole	1.9	U	
206-44-0	Fluoranthene	1.5	B	
129-00-0	Pyrene	1.5	B	
56-55-3	Benzo(A)Anthracene	2.5	U	
218-01-9	Chrysene	2.8	U	
205-99-2	Benzo(B)Fluoranthene	2.5	U	
207-08-9	Benzo(K)Fluoranthene	2.3	U	
57-97-6	7,12-Dimethylbenzanthracene	2.8	U	
192-97-2	Benzo(E)Pyrene	1.9	U	
50-32-8	Benzo(A)Pyrene	2.3	U	
198-55-0	Perylene	2.5	U	
56-49-5	3-Methylcholanthrene	3.5	U	
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U	
53-70-3	Dibenz(A,H)Anthracene	1.6	U	
191-24-2	Benzo(G,H,I)Perylene	2.8	U	
215-58-7	Dibenz(A,C)Anthracene	1.6	U	

* = Compound does not meet secondary ion confirmation criteria.

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3557-01DUP

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3557-01DUP

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3557X403

Level: (low/med) LOW Date Received: 02/07/89

% Moisture: not dec. dec. Date Extracted: 02/08/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	24.	B
95-13-6	1H-Indene	1.5	B
91-20-3	Naphthalene	4.5	J B *
4565-32-6	Benzo(B)Thiophene	2.5	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	3.0	B
90-12-0	1-Methylnaphthalene	2.4	B
92-52-4	Biphenyl	2.6	J *
208-96-8	Acenaphthylene	5.0	
83-32-9	Acenaphthene	11.	
132-64-9	Dibenzofuran	1.6	*
86-73-7	Fluorene	7.1	
132-65-0	Dibenzothiophene	0.8	J
85-01-8	Phenanthrene	3.1	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	2.1	B
129-00-0	Pyrene	2.0	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

* = Compound does not meet secondary ion comfirmation criteria.

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3557-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3557-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3557X405

Level: (low/med) LOW Date Received: 02/07/89

% Moisture: not dec. dec. Date Extracted: 02/08/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	17.	B
95-13-6	1H-Indene	2.5	B
91-20-3	Naphthalene	3.7	J B *
4565-32-6	Benzo(B)Thiophene	8.2	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	3.0	*
91-57-6	2-Methylnaphthalene	2.8	B *
90-12-0	1-Methylnaphthalene	1.5	J B
92-52-4	Biphenyl	0.8	J
208-96-8	Acenaphthylene	2.4	
83-32-9	Acenaphthene	6.5	
132-64-9	Dibenzofuran	1.5	*
86-73-7	Fluorene	2.2	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	2.2	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.3	J B
129-00-0	Pyrene	1.4	B *
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

* = Compound does not meet secondary ion confirmation criteria.

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3557-03

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3557-03

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3557X406

Level: (low/med) LOW Date Received: 02/07/89

% Moisture: not dec. dec. Date Extracted: 02/08/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q	
271-89-6	2,3-Benzofuran	5.1	U	
496-11-7	2,3-Dihydroindene	7.9	B	
95-13-6	1H-Indene	2.3	B	*
91-20-3	Naphthalene	15.	B	*
4565-32-6	Benzo(B)Thiophene	0.9	U	
91-22-5	Quinoline	1.6		
120-72-9	1H-Indole	1.5	J	*
91-57-6	2-Methylnaphthalene	13.	B	*
90-12-0	1-Methylnaphthalene	7.3	B	
92-52-4	Biphenyl	2.5	J	*
208-96-8	Acenaphthylene	1.5		*
83-32-9	Acenaphthene	0.6	J	
132-64-9	Dibenzofuran	2.0		*
86-73-7	Fluorene	2.6		
132-65-0	Dibenzothiophene	1.2		
85-01-8	Phenanthrene	7.1	B	
120-12-7	Anthracene	1.1	U	
260-94-6	Acridine	2.9	U	
86-74-8	Carbazole	1.9		*
206-44-0	Fluoranthene	1.6	B	
129-00-0	Pyrene	2.1	B	*
56-55-3	Benzo(A)Anthracene	2.5	U	
218-01-9	Chrysene	2.8	U	
205-99-2	Benzo(B)Fluoranthene	2.5	U	
207-08-9	Benzo(K)Fluoranthene	2.3	U	
57-97-6	7,12-Dimethylbenzanthracene	2.8	U	
192-97-2	Benzo(E)Pyrene	1.9	U	
50-32-8	Benzo(A)Pyrene	2.3	U	
198-55-0	Perylene	2.5	U	
56-49-5	3-Methylcholanthrene	3.5	U	
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U	
53-70-3	Dibenz(A,H)Anthracene	1.6	U	
191-24-2	Benzo(G,H,I)Perylene	2.8	U	
215-58-7	Dibenz(A,C)Anthracene	1.6	U	

* = Compound does not meet secondary ion confirmation criteria.

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3557-01MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3557-01MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3557X404

Level: (low/med) LOW Date Received: 02/07/89

% Moisture: not dec. dec. Date Extracted: 02/08/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	14.	B
95-13-6	1H-Indene	9.6	B SP
91-20-3	Naphthalene	12.	B SP
4565-32-6	Benzo(B)Thiophene	1.5	*
91-22-5	Quinoline	14.	SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	14.	B SP
90-12-0	1-Methylnaphthalene	2.1	B
92-52-4	Biphenyl	1.4	J
208-96-8	Acenaphthylene	2.8	
83-32-9	Acenaphthene	6.3	
132-64-9	Dibenzofuran	1.5	*
86-73-7	Fluorene	16.	SP
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	2.7	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.7	B
129-00-0	Pyrene	1.7	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	9.9	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	2.4	SP *
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

* = Compound does not meet secondary ion confirmation criteria.

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3557-01	91	108	67
2	3557-01DUP	107	116	84
3	3557-01MS	88	110	82
4	3557-02	98	116	80
5	3557-03	110 *	127	95
	BLK-01	92	57	11

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

3C
WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 3557-01

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	10	1.1	9.6	85
Naphthalene	10	3.7	12.	83
Quinolene	10	0.0	14.	140
2-Methylnaphthalene	10	2.9	14.	110
Fluorene	10	2.7	16.	130
Chrysene	10	0.0	9.9	99
Benzo(E)Pyrene	10	0.0	2.4	24

COMMENTS:

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 3557-01

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	9.7	24.	85
1H-Indene	1.1	1.5	31
Naphthalene	3.7	4.5	20
Benzo(B)Thiophene	1.0	2.5	86
2-Methylnaphthalene	2.9	3.0	3.4
1-Methylnaphthalene	1.7	2.4	34
Biphenyl	1.5	2.6	54
Acenaphthene	3.8	11.	97
Fluorene	2.7	7.1	90
Phenanthrene	2.9	3.1	6.7
Fluoranthene	1.5	2.1	33
Pyrene	1.5	2.0	28

COMMENTS:

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

Lab File ID: S3557X401 Lab Sample ID: BLK-01

Date Extracted: 02/08/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 02/20/89 Time Analyzed: 12:56

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3557-01	3557-01	S3557X402	02/20/89
2	3557-01DUP	3557-01DUP	S3557X403	02/20/89
3	3557-01MS	3557-01MS	S3557X404	02/20/89
4	3557-02	3557-02	S3557X405	02/20/89
5	3557-03	3557-03	S3557X406	02/20/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3557 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3557X401

Level: (low/med) LOW Date Received: 02/07/89

% Moisture: not dec. dec. Date Extracted: 02/08/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q	
271-89-6	2,3-Benzofuran	5.1	U	
496-11-7	2,3-Dihydroindene	2.2		
95-13-6	1H-Indene	1.0		
91-20-3	Naphthalene	4.2	J	*
4565-32-6	Benzo(B)Thiophene	0.9	U	
91-22-5	Quinoline	1.4	U	
120-72-9	1H-Indole	2.5	U	
91-57-6	2-Methylnaphthalene	2.7		
90-12-0	1-Methylnaphthalene	1.5	J	
92-52-4	Biphenyl	4.3	U	
208-96-8	Acenaphthylene	1.4	U	
83-32-9	Acenaphthene	1.3	U	
132-64-9	Dibenzofuran	1.0	U	
86-73-7	Fluorene	1.0	U	
132-65-0	Dibenzothiophene	1.1	U	
85-01-8	Phenanthrene	2.0		
120-12-7	Anthracene	1.1	U	
260-94-6	Acridine	2.9	U	
86-74-8	Carbazole	1.9	U	
206-44-0	Fluoranthene	0.9	J	
129-00-0	Pyrene	1.0	J	
56-55-3	Benzo(A)Anthracene	2.5	U	
218-01-9	Chrysene	2.8	U	
205-99-2	Benzo(B)Fluoranthene	2.5	U	
207-08-9	Benzo(K)Fluoranthene	2.3	U	
57-97-6	7,12-Dimethylbenzanthracene	2.8	U	
192-97-2	Benzo(E)Pyrene	1.9	U	
50-32-8	Benzo(A)Pyrene	2.3	U	
198-55-0	Perylene	2.5	U	
56-49-5	3-Methylcholanthrene	3.5	U	
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U	
53-70-3	Dibenz(A,H)Anthracene	1.6	U	
191-24-2	Benzo(G,H,I)Perylene	2.8	U	
215-58-7	Dibenz(A,C)Anthracene	1.6	U	

* = Compound does not meet secondary ion confirmation criteria.

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3557 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX396	02/20/89	07:59:00
BLK-01	S3557X401	02/20/89	12:56:00
3557-01	S3557X402	02/20/89	13:46:00
3557-01DUP	S3557X403	02/20/89	14:36:00
3557-01MS	S3557X404	02/20/89	15:26:00
3557-02	S3557X405	02/20/89	16:15:00
3557-03	S3557X406	02/20/89	17:04:00

INITIAL CALIBRATION
PAH COMPOUNDS

CASE NO. 3557
CONTRACTOR: RMAL
CONTRACT NO: 15b

INSTRUMENT ID X
CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS 35%

LABORATORY ID:	STDX268	STDX266	STDX338	STDX265	STDX267			
COMPOUND	RF	2. RF	4. RF	24. RF	120. RF	480.	AVG RF	%RSD CCS
2,3-BENZOFURAN	1.182	1.186	0.983	0.929	1.007	1.057	11.2	
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904	0.968	14.5	
1H-INDENE	1.875	1.762	1.463	1.400	1.535	1.607	12.6	
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033	2.214	15.6	
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432	1.524	13.1	
QUINOLINE	0.733	0.677	0.680	0.784	0.939	0.762	14.1	
1H-INDOLE	0.872	0.907	0.825	0.926	1.075	0.921	10.2	
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016	1.086	14.1	
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030	1.110	14.6	
BIPHENYL	1.798	1.739	1.370	1.332	1.419	1.532	14.3	
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663	1.616	9.3	
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045	1.092	11.8	
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487	1.601	15.6	
FLUORENE	1.311	1.375	1.145	1.146	1.247	1.245	8.1	
DIBENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950	1.008	11.8	
PHENANTHRENE	1.153	1.113	0.904	0.890	0.966	1.005	12.0	
ANTHRACENE	0.962	1.049	0.869	0.884	0.984	0.950	7.7	
ACRIDINE	0.810	0.812	0.549	0.652	0.738	0.712	15.7	
CARBAZOLE	0.955	1.009	0.764	0.793	0.889	0.882	11.7	
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013	1.068	13.6	
PYRENE	1.398	1.258	0.932	0.903	0.978	1.094	20.1	
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990	1.131	16.6	
CHRYSENE	1.643	1.468	1.057	1.014	0.966	1.230	24.8	
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014	1.151	22.2	
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292	1.488	15.7	
7,12-DIMETHYLBENZANTHRACENE	0.620	0.628	0.471	0.411	0.460	0.518	19.1	
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048	1.362	29.5	
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976	1.089	16.8	
PERYLENE	1.239	1.157	0.914	0.929	0.961	1.040	14.2	
3-METHYLCHOLANTHRENE #	0.000	0.538	0.423	0.444	0.469	0.469	10.7	
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130	1.240	17.0	
DIBENZ(A,C)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977	19.7	
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977	19.7	
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986	1.112	18.1	

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VI

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3557
CONTRACTOR: RMAL
CONTRACT NO: N/A
STRUMENT ID: X

CALIBRATION DATE: 02-20-89
TIME: 07:59
LABORATORY ID: STDX396
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 25%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.094	-3.5		
2,3-DIHYDROINDENE	0.988	0.974	1.3		
1H-INDENE	1.607	1.591	0.9		
NAPHTHALENE	2.214	2.653	-19.8		
BENZO(B)THIOPHENE	1.524	1.479	2.9		
QUINOLINE	0.762	0.794	-4.1		
1H-INDOLE	0.921	0.864	6.1		
2-METHYLNAPHTHALENE	1.086	1.024	5.7		
1-METHYLNAPHTHALENE	1.110	1.073	3.3		
BIPHENYL	1.532	1.720	-12.3		
ACENAPHTHYLENE	1.616	1.405	13.0		
ACENAPHTHENE	1.092	0.976	10.6		
DIBENZOFURAN	1.601	1.503	6.1		
FLUORENE	1.245	1.127	9.4		
DIBENZOTHIOPHENE	1.008	0.902	10.5		
PHENANTHRENE	1.005	0.918	8.6		
ANTHRACENE	0.950	0.775	18.3		
ACRIDINE	0.712	0.509	28.4		
CARBAZOLE	0.882	0.860	2.4		
FLUORANTHENE	1.068	0.902	15.4		
PYRENE	1.094	0.894	18.2		
BENZO(A)ANTHRACENE	1.131	1.183	-4.5		
CHRYSENE	1.230	1.276	-3.7		
BENZO(B)FLUORANTHENE	1.151	1.343	-16.6		
BENZO(K)FLUORANTHENE	1.488	1.387	6.8		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.504	2.7		
BENZO(E)PYRENE	1.362	1.414	-3.7		
BENZO(A)PYRENE	1.089	0.964	11.5		
PERYLENE	1.040	0.902	13.3		
3-METHYLCHOLANTHRENE	0.469	0.314	32.9		
INDENO(1,2,3-CD)PYRENE	1.240	0.992	19.9		
DIBENZ(A,C)ANTHRACENE	0.977	0.843	13.7		
DIBENZ(A,H)ANTHRACENE	0.977	0.843	13.7		
BENZO(G,H,I)PERYLENE	1.112	0.941	15.3		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**)
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form I

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3557 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX396 Date Analyzed: 02/20/89

Instrument ID: X TIme Analyzed: 07:59:00

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	401605	654561	341364
UPPER LIMIT	803210	1309122	682728
LOWER LIMIT	200802	327280	170682
SAMPLE NO.			
BLK-01	344000	534000	359000
3557-01	300000	476000	365000
3557-01DUP	290000	452000	342000
3557-01MS	313000	504000	353000
3557-02	314000	491000	366000
3557-03	335000	529000	400000

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

1/87 Rev.

FORM VIII SV-2

Rocky Mountain
Analytical Laboratory

Enseco

March 7, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the one aqueous sample received at Rocky Mountain Analytical Laboratory on February 7, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Program Administrator

RMAL #3558

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003558-0001-SA	GAC SLP10F TOC-020689	AQUEOUS	06 FEB 89	13:30	07 FEB 89

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC SLP10F TOC-020689
Lab ID: 003558-0001-SA Enseco ID: 1027811
Matrix: AQUEOUS Sampled: 06 FEB 89 Received: 07 FEB 89
Authorized: 07 FEB 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.6	mg/L	0.1	415.1	13 FEB 89

ND=Not Detected
NA=Not Applicable

Reported By: Roxanne Sullivan Approved By: Toni Lusk

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003558-0001-SA	AQUEOUS	TOC-A	13 FEB 89-C

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 13 FEB 89-C								
Concentration Units: mg/L								
Total Organic Carbon	25	23.7	23.5	95	94	91-109	1.1	20

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

March 7, 1989

Enseco - RMAL Project Number 003558

Introduction

One aqueous sample was received at Rocky Mountain Analytical Laboratory on February 7, 1989. The sample was logged in under RMAL project number 003558. A cross reference associating the RMAL sample number to the actual field sample number is included. The sample was analyzed for medium level part-per-trillion (ppt) polynuclear aromatic hydrocarbons.

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below per the 1989 QAPP.

PPT PAH

No problems were encountered in the polynuclear aromatic hydrocarbon analysis.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Audrey Verniero **Date:** 3/7/89
Audrey Verniero
Data Control

Approved by: Rebecca A. Williams **Date:** 3/7/89
Rebecca Williams
Client Service Representative

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003558-0001-SA	GAC-SLP10F-020689	AQUEOUS	06 FEB 89	13:30	07 FEB 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC # 3558

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3558-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3558 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3558-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S3558X399

Level: (low/med) MED Date Received: 02/07/89

% Moisture: not dec. dec. Date Extracted: 02/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	410.	U
496-11-7	2,3-Dihydroindene	1400.	
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	300.	
91-22-5	Quinoline	110.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	120.	J
92-52-4	Biphenyl	310.	J
208-96-8	Acenaphthylene	610.	
83-32-9	Acenaphthene	1300.	
132-64-9	Dibenzofuran	370.	
86-73-7	Fluorene	1200.	
132-65-0	Dibenzothiophene	110.	
85-01-8	Phenanthrene	150.	
120-12-7	Anthracene	88.	U
260-94-6	Acridine	230.	U
86-74-8	Carbazole	150.	U
206-44-0	Fluoranthene	250.	
129-00-0	Pyrene	230.	
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	220.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	180.	U
57-97-6	7,12-Dimethylbenzanthracene	220.	U
192-97-2	Benzo(E)Pyrene	150.	U
50-32-8	Benzo(A)Pyrene	180.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	170.	U
53-70-3	Dibenz(A,H)Anthracene	130.	U
191-24-2	Benzo(G,H,I)Perylene	220.	U
215-58-7	Dibenz(A,C)Anthracene	130.	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3558 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3558-01	92	100	97
2	BLK-01	94	99	75

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3558 SAS No.: N/A SDG No.: N/A

Lab File ID: S3558X400 Lab Sample ID: BLK-01

Date Extracted: 02/09/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 02/20/89 Time Analyzed: 12:06

Matrix: (soil/water) WATER Level: (low/med) MED

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3558-01	3558-01	S3558X399	02/20/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3558 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S3558X400

Level: (low/med) MED Date Received: 02/07/89

% Moisture: not dec. dec. Date Extracted: 02/09/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/20/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	410.	U
496-11-7	2,3-Dihydroindene	110.	U
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	72.	U
91-22-5	Quinoline	110.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	130.	U
92-52-4	Biphenyl	340.	U
208-96-8	Acenaphthylene	110.	U
83-32-9	Acenaphthene	100.	U
132-64-9	Dibenzofuran	80.	U
86-73-7	Fluorene	80.	U
132-65-0	Dibenzothiophene	88.	U
85-01-8	Phenanthrene	100.	U
120-12-7	Anthracene	88.	U
260-94-6	Acridine	230.	U
86-74-8	Carbazole	150.	U
206-44-0	Fluoranthene	110.	U
129-00-0	Pyrene	110.	U
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	220.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	180.	U
57-97-6	7,12-Dimethylbenzanthracene	220.	U
192-97-2	Benzo(E)Pyrene	150.	U
50-32-8	Benzo(A)Pyrene	180.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	170.	U
53-70-3	Dibenz(A,H)Anthracene	130.	U
191-24-2	Benzo(G,H,I)Perylene	220.	U
215-58-7	Dibenz(A,C)Anthracene	130.	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3558 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX396	02/20/89	07:59:00
3558-01	S3558X399	02/20/89	11:17:00
BLK-01	S3558X400	02/20/89	12:06:00

FORM V 1/87 Rev.

INITIAL CALIBRATION
PAH COMPOUNDS

CASE NO: 3558
CONTRACTOR: RMAL
CONTRACT NO: N/A

INSTRUMENT ID: X
CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS ~~25%~~ 35%
N 1/22/89

LABORATORY ID: STDX268 STDX266 STDX338 STDX265 STDX267

COMPOUND	RF	2. RF	4. RF	24. RF	120. RF	480.	AVG RF	%RSD	CCS
2,3-BENZOFURAN	1.182	1.186	0.982	0.929	1.007	1.057		11.2	
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904	0.988		14.5	
1H-INDENE	1.875	1.762	1.463	1.400	1.535	1.607		12.6	
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033	2.214		15.6	
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432	1.524		13.1	
QUINOLINE	0.733	0.677	0.680	0.784	0.939	0.762		14.1	
1H-INDOLE	0.872	0.907	0.826	0.926	1.075	0.921		10.2	
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016	1.086		14.1	
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030	1.110		14.6	
BIPHENYL	1.798	1.739	1.370	1.332	1.419	1.532		14.3	
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663	1.616		9.3	
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045	1.092		11.8	
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487	1.601		15.6	
FLUORENE	1.311	1.375	1.145	1.146	1.247	1.245		8.1	
DIBENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950	1.008		11.8	
PHENANTHRENE	1.153	1.113	0.904	0.890	0.966	1.005		12.0	
ANTHRACENE	0.962	1.049	0.869	0.884	0.984	0.950		7.7	
ACRIDINE	0.810	0.812	0.549	0.652	0.738	0.712		15.7	
CARBAZOLE	0.955	1.009	0.764	0.793	0.889	0.882		11.7	
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013	1.068		13.6	
PYRENE	1.398	1.258	0.932	0.903	0.978	1.094		20.1	
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990	1.131		16.6	
CHRYSENE	1.643	1.468	1.057	1.014	0.966	1.230		24.8	
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014	1.151		22.2	
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292	1.488		15.7	
7,12-DIMETHYLBENZANTHRACENE	0.620	0.628	0.471	0.411	0.460	0.518		19.1	
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048	1.362		29.5	
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976	1.089		16.8	
PERYLENE	1.239	1.157	0.914	0.929	0.961	1.040		14.2	
3-METHYLCHOLANTHRENE #	0.000	0.538	0.423	0.444	0.469	0.469		10.7	
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130	1.240		17.0	
DIBENZ(A,C)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977		19.7	
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977		19.7	
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986	1.112		18.1	

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3558
CONTRACTOR: RMAL
CONTRACT NO: DA
TRUMENT ID: X

CALIBRATION DATE: 02-20-89
TIME: 07:59
LABORATORY ID: STDX396
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS ~~25%~~ 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.094	-3.5		
2,3-DIHYDROINDENE	0.988	0.974	1.3		
1H-INDENE	1.607	1.591	0.9		
NAPHTHALENE	2.214	2.653	-19.8		
BENZO(B)THIOPHENE	1.524	1.479	2.9		
QUINOLINE	0.762	0.794	-4.1		
1H-INDOLE	0.921	0.864	6.1		
2-METHYLNAPHTHALENE	1.086	1.024	5.7		
1-METHYLNAPHTHALENE	1.110	1.073	3.3		
BIPHENYL	1.532	1.720	-12.3		
ACENAPHTHYLENE	1.616	1.405	13.0		
ACENAPHTHENE	1.092	0.976	10.6		
DIBENZOFURAN	1.601	1.503	6.1		
FLUORENE	1.245	1.127	9.4		
DIBENZOTHIOPHENE	1.008	0.902	10.5		
PHENANTHRENE	1.005	0.918	8.6		
ANTHRACENE	0.950	0.775	18.3		
ACRIDINE	0.712	0.509	28.4		
CARBAZOLE	0.882	0.860	2.4		
FLUORANTHENE	1.068	0.902	15.4		
PYRENE	1.094	0.894	18.2		
BENZO(A)ANTHRACENE	1.131	1.183	-4.5		
CHRYSENE	1.230	1.276	-3.7		
BENZO(B)FLUORANTHENE	1.151	1.343	-16.6		
BENZO(K)FLUORANTHENE	1.488	1.387	6.8		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.504	2.7		
BENZO(E)PYRENE	1.362	1.414	-3.7		
BENZO(A)PYRENE	1.089	0.964	11.5		
PERYLENE	1.040	0.902	13.3		
3-METHYLCHOLANTHRENE	0.469	0.314	32.9		
INDENO(1,2,3-CD)PYRENE	1.240	0.992	19.9		
DIBENZ(A,C)ANTHRACENE	0.977	0.843	13.7		
DIBENZ(A,H)ANTHRACENE	0.977	0.843	13.7		
BENZO(G,H,I)PERYLENE	1.112	0.941	15.3		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**)
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3558 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX396 Date Analyzed: 02/20/89

Instrument ID: X TIme Analyzed: 07:59:00

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	401614	654561	341363
UPPER LIMIT	803228	1309122	682726
LOWER LIMIT	200807	327280	170681
SAMPLE NO.			
3558-01	327000	562000	307000
BLK-01	316000	505000	304000

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

Rocky Mountain
Analytical Laboratory

Enseco

March 10, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the one aqueous sample received at Rocky Mountain Analytical Laboratory on February 22, 1989.

This data package is in compliance with the terms and condition of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Program Administrator

RMAL #3677

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Results
- Quality Control Report

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The discussion below describes the format, content and organization for the three components of this report.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Quality Control Results

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. These QC checks include analysis of blanks, laboratory control samples (LCS) and surrogate control samples. Results from these analyses are presented along with the control limits.

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003677-0001-SA	SLP10GACC1-TOC-022189	AQUEOUS	21 FEB 89		22 FEB 89

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: SLP10GACC1-TOC-022189
Lab ID: 003677-0001-SA Enseco ID: 1028562
Matrix: AQUEOUS Sampled: 21 FEB 89 Received: 22 FEB 89
Authorized: 22 FEB 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.9	mg/L	0.1	415.1	03 MAR 89

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Toni Stovall

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003677-0001-SA	AQUEOUS	TOC-A	03 MAR 89-A

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 03 MAR 89-A								
Concentration Units: mg/L								
Total Organic Carbon	25	25.5	24.6	102	98	91-109	4.0	20

Rocky Mountain
Analytical Laboratory

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

March 10, 1989

Enseco - RMAL Project Number 003677

Introduction

One aqueous sample was received at Rocky Mountain Analytical Laboratory on February 22, 1989. The sample was logged in under RMAL project number 003677. A cross reference associating the RMAL sample number to the actual field sample number is included. The sample was analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons.

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below per the 1989 QAPP.

PPT PAH

Sample 3677-01 and the associated blank showed compounds out of control limits for secondary ion confirmation. In some instances a compound may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I).

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Audrey Verniero Date: 3/20/89
Audrey Verniero
Data Control

Approved by: Rebecca A. Williams Date: 3/21/89
Rebecca Williams
Client Service Representative

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003677-0001-SA	SLP10GACC1-022189	AQUEOUS	21 FEB 89		22 FEB 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC #3677

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3677-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3677 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3677-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3677X430

Level: (low/med) LOW Date Received: 02/22/89

% Moisture: not dec. dec. Date Extracted: 02/22/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/24/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	3.6	B
95-13-6	1H-Indene	2.1	B
91-20-3	Naphthalene	5.4	J B *
4565-32-6	Benzo(B)Thiophene	11.	
91-22-5	Quinoline	1.6	
120-72-9	1H-Indole	0.6	J
91-57-6	2-Methylnaphthalene	4.3	B *
90-12-0	1-Methylnaphthalene	1.9	B
92-52-4	Biphenyl	0.6	J
208-96-8	Acenaphthylene	1.8	
83-32-9	Acenaphthene	6.2	
132-64-9	Dibenzofuran	1.1	*
86-73-7	Fluorene	1.4	*
132-65-0	Dibenzothiophene	1.0	J
85-01-8	Phenanthrene	1.3	B
120-12-7	Anthracene	1.0	J
260-94-6	Acridine	2.1	J *
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	8.3	B
129-00-0	Pyrene	17.	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	0.5	J
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3677 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3677-01	92	116	88
2	BLK-01	89	80	58

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3677 SAS No.: N/A SDG No.: N/A

Lab File ID: S3677X429 Lab Sample ID: BLK-01

Date Extracted: 02/22/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 02/24/89 Time Analyzed: 13:41

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3677-01	3677-01	S3677X430	02/24/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3677 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3377X429

Level: (low/med) LOW Date Received: 02/22/89

% Moisture: not dec. dec. Date Extracted: 02/22/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 02/24/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q	
271-89-6	2,3-Benzofuran	5.1	U	
496-11-7	2,3-Dihydroindene	1.9		
95-13-6	1H-Indene	0.8	J	
91-20-3	Naphthalene	4.0	J	*
4565-32-6	Benzo(B)Thiophene	0.9	U	
91-22-5	Quinoline	1.4	U	
120-72-9	1H-Indole	2.5	U	
91-57-6	2-Methylnaphthalene	2.4		*
90-12-0	1-Methylnaphthalene	1.3	J	
92-52-4	Biphenyl	4.3	U	
208-96-8	Acenaphthylene	1.4	U	
83-32-9	Acenaphthene	1.3	U	
132-64-9	Dibenzofuran	1.0	U	
86-73-7	Fluorene	1.0	U	
132-65-0	Dibenzothiophene	1.1	U	
85-01-8	Phenanthrene	0.7	J	*
120-12-7	Anthracene	1.1	U	
260-94-6	Acridine	2.9	U	
86-74-8	Carbazole	1.9	U	
206-44-0	Fluoranthene	0.4	J	
129-00-0	Pyrene	0.8	J	*
56-55-3	Benzo(A)Anthracene	2.5	U	
218-01-9	Chrysene	2.8	U	
205-99-2	Benzo(B)Fluoranthene	2.5	U	
207-08-9	Benzo(K)Fluoranthene	2.3	U	
57-97-6	7,12-Dimethylbenzanthracene	2.8	U	
192-97-2	Benzo(E)Pyrene	1.9	U	
50-32-8	Benzo(A)Pyrene	2.3	U	
198-55-0	Perylene	2.5	U	
56-49-5	3-Methylcholanthrene	3.5	U	
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U	
53-70-3	Dibenz(A,H)Anthracene	1.6	U	
191-24-2	Benzo(G,H,I)Perylene	2.8	U	
215-58-7	Dibenz(A,C)Anthracene	1.6	U	

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3677 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX427	02/24/89	11:18
BLK-01	S3677X429	02/24/89	13:41
3677-01	S3677X430	02/24/89	14:28

FORM V 1/87 Rev.

INITIAL CALIBRATION
PAH COMPOUNDS

CASE NO: 3677
CONTRACTOR: RMAL
CONTRACT NO: --Nh

INSTRUMENT ID: X
CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS 35%

LABORATORY ID:	STDX268	STDX265	STDX266	STDX267	STDX338		
COMPOUND	RF 2.	RF 4.	RF 24.	RF 120.	RF 480.	AVG RF	%RSD CCS
2,3-BENZOFURAN	1.182	1.186	0.982	0.929	1.007	1.057	11 2
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904	0.988	14 5
1H-INDENE	1.875	1.762	1.463	1.400	1.535	1.607	12.6
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033	2.214	15.6
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432	1.524	13.1
QUINOLINE	0.733	0.677	0.680	0.784	0.939	0.762	14 1
1H-INDOLE	0.872	0.907	0.826	0.926	1.075	0.921	10 2
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016	1.086	14.1
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030	1.110	14.6
BIPHENYL	1.798	1.739	1.370	1.332	1.419	1.532	14.3
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663	1.616	9.3
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045	1.092	11.9
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487	1.601	15.6
FLUORENE	1.311	1.375	1.145	1.146	1.247	1.245	8.1
'ENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950	1.008	11.8
.NANTHRENE	1.153	1.113	0.904	0.890	0.966	1.005	12.0
ANTHRACENE	0.962	1.049	0.869	0.884	0.984	0.950	7 7
ACRIDINE	0.810	0.812	0.549	0.652	0.738	0.712	15.7
CARBAZOLE	0.955	1.009	0.764	0.793	0.889	0.882	11 7
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013	1.068	13.6
PYRENE	1.398	1.258	0.932	0.903	0 978	1.094	20 1
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990	1.131	16.6
CHRYSENE	1.643	1.468	1.057	1.014	0.966	1.230	24.9
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014	1.151	22.2
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292	1.488	15.7
7,12-DIMETHYLBENZANTHRACENE	0.620	0.628	0.471	0.411	0.460	0.518	19.1
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048	1.362	29.5
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976	1.089	16.8
PERYLENE	1.239	1.157	0.914	0.929	0.961	1.040	14.2
3-METHYLCHOLANTHRENE #	0.000	0.538	0.423	0.444	0.469	0.469	10.7
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130	1.240	17 0
DIBENZ(A,C)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977	19.7
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977	19.7
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986	1.112	18.1

'G RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
)D - PERCENT RELATIVE STANDARD DEVIATION
.C - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VI

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: 3637
CONTRACTOR: RMAL
CONTRACT NO: --NA
INSTRUMENT ID: X

CALIBRATION DATE. 02-24-89
TIME: 11:18
LABORATORY ID: STDX427
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	0.984	6.8		
2,3-DIHYDROINDENE	0.988	0.837	15.2		
1H-INDENE	1.607	1.472	8.3		
NAPHTHALENE	2.214	1.901	14.1		
BENZO(B)THIOPHENE	1.524	1.330	12.7		
QUINOLINE	0.762	0.751	1.5		
1H-INDOLE	0.921	0.972	-5.5		
2-METHYLNAPHTHALENE	1.086	0.868	20.0		
1-METHYLNAPHTHALENE	1.110	0.887	20.1		
BIPHENYL	1.532	1.332	13.0		
ACENAPHTHYLENE	1.616	1.501	7.1		
ACENAPHTHENE	1.092	1.023	6.2		
DIBENZOFURAN	1.601	1.287	19.6		
FLUORENE	1.245	1.049	15.7		
DIBENZOTHIOPHENE	1.008	0.866	14.0		
PHENANTHRENE	1.005	0.935	6.9		
ANTHRACENE	0.950	0.881	7.2		
IDINE	0.712	0.663	6.9		
BAZOLE	0.882	0.893	-1.1		
FLUORANTHENE	1.068	0.929	12.9		
PYRENE	1.094	0.905	17.2		
BENZO(A)ANTHRACENE	1.131	1.309	-15.7		
CHRYSENE	1.230	1.285	-4.4		
BENZO(B)FLUORANTHENE	1.151	1.193	-3.5		
BENZO(K)FLUORANTHENE	1.488	1.315	11.6		
7,12-DIMETHYLBENZANTHRACENE	0.518	0.500	3.5		
BENZO(E)PYRENE	1.362	1.294	5.0		
BENZO(A)PYRENE	1.089	0.947	13.0		
PERYLENE	1.040	0.925	11.0		
3-METHYLCHOLANTHRENE	0.469	0.389	16.9		
INDENO(1,2,3-CD)PYRENE	1.240	0.865	30.2		
DIBENZ(A,C)ANTHRACENE	0.977	0.682	30.1		
DIBENZ(A,H)ANTHRACENE	0.977	0.669	31.5		
BENZO(G,H,I)PERYLENE	1.112	0.825	25.8		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3677 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX427 Date Analyzed: 02/24/89

Instrument ID: X TIme Analyzed: 11:18:00

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	719286	1055980	490384
UPPER LIMIT	1438572	2111960	980768
LOWER LIMIT	359643	527990	245192
SAMPLE NO.			
BLK-01	361786	547372	248850
3677-01	405878	644347	356030

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

1/87 Rev.

FORM VIII SV-2

Rocky Mountain
Analytical Laboratory

Enseco

April 18, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the one aqueous sample received at Rocky Mountain Analytical Laboratory on March 8, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Program Administrator

RMAL #003831

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report
- Data Quality Assessment

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The first four sections below describes the format, content, and organization for the four corresponding separate components of this report. The fifth section provides an overall data quality assessment of the results.

Sample Description Information

The Sample Description Information lists all the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and where available and appropriate, dates sampled, received, authorized, prepared, and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method, and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content. Analytical data is corrected for blank contamination before it is reported.

Quality Control Reports

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. The QC checks include analysis of method blanks, laboratory control samples (LCS), and surrogate control samples (SCS). Results from these analyses are presented along with the control limits.

Method Blank Results: A method blank is a laboratory generated sample used to assess the degree to which laboratory operations and procedures cause false positive analytical results.

Laboratory Control Samples (LCS): An LCS consists of a standard control matrix that is spiked with a group of target analytes representative of the method analytes.

Surrogate Control Samples (SCS): An SCS is an additional control measure taken for organic analyses.

Accuracy for LCS and SCS is measured by Percent Recovery

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for LCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{\text{Measured Concentration LCS1} - \text{Measured Concentration LCS2}}{(\text{Measured Concentration LCS1} + \text{Measured Concentration LCS2})/2}$$

Data Quality Assessment

The results contained in this report were reviewed relative to data acceptance criteria as specified in Enseco's Quality Assurance Project Plan for completeness, precision, accuracy, representiveness and defensibility of the data. Unless otherwise stated below, no quality control problems or technical difficulties were encountered.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003831-0001-SA	GAC-SLP10FTOC-030789	AQUEOUS	07 MAR 89		08 MAR 89

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10FTOC-030789
Lab ID: 003831-0001-SA Enseco ID: 1029696
Matrix: AQUEOUS Sampled: 07 MAR 89 Received: 08 MAR 89
Authorized: 08 MAR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	2.3	mg/L	0.1	415.1	17 MAR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Toni Lusk

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003831-0001-SA	AQUEOUS	TOC-A	16 MAR 89-A

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 16 MAR 89-A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.1	24.3	96	97	91-109	1.0	20

Rocky Mountain
Analytical Laboratory

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

April 18 1989

Enseco - RMAL Project Number 003831

Introduction

One aqueous sample was received at Rocky Mountain Analytical Laboratory on March 8, 1989. The sample was logged in under RMAL project number 003831. A cross reference associating the RMAL sample number to the actual field sample number is included. The sample was analyzed for medium level part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

Sample 3831-01 and the associated blank show target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I) as per the 1989 QAPP.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Giberson Date: April 18, 1989
Tracy Giberson
Data Control Supervisor

Approved by: Jean Zimmerman Date: April 18, 1989
Jean Zimmerman
Program Administrator

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003831-0001-SA	GAC-SLP10F-030789	AQUEOUS	07 MAR 89		08 MAR 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMAQC # 3831

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3831-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3831 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3831-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S3831X859

Level: (low/med) MED Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) N pH: 6.5 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	410.	U
496-11-7	2,3-Dihydroindene	2100.	
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	590.	
91-22-5	Quinoline	110.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	190.	
92-52-4	Biphenyl	540.	
208-96-8	Acenaphthylene	870.	
83-32-9	Acenaphthene	1700.	
132-64-9	Dibenzofuran	620.	*
86-73-7	Fluorene	1600.	
132-65-0	Dibenzothiophene	160.	
85-01-8	Phenanthrene	350.	
120-12-7	Anthracene	110.	
260-94-6	Acridine	230.	U
86-74-8	Carbazole	150.	U
206-44-0	Fluoranthene	390.	
129-00-0	Pyrene	330.	
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	220.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	180.	U
57-97-6	7,12-Dimethylbenzanthracene	220.	U
192-97-2	Benzo(E)Pyrene	150.	U
50-32-8	Benzo(A)Pyrene	180.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	170.	U
53-70-3	Dibenz(A,H)Anthracene	130.	U
191-24-2	Benzo(G,H,I)Perylene	220.	U
215-58-7	Dibenz(A,C)Anthracene	130.	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3831 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3831-01	88	101	92
2	BLK-01	77	87	80

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3831 SAS No.: N/A SDG No.: N/A

Lab File ID: S3831X858 Lab Sample ID: BLK-01

Date Extracted: 03/14/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/31/89 Time Analyzed: 11:28

Matrix: (soil/water) WATER Level: (low/med) MED

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3831-01	3831-01	S3831X859	03/31/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3831 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S3831X858

Level: (low/med) MED Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/14/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) N pH: 6.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	410.	U *
496-11-7	2,3-Dihydroindene	110.	U
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U *
4565-32-6	Benzo(B)Thiophene	72.	U
91-22-5	Quinoline	110.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	150.	
90-12-0	1-Methylnaphthalene	130.	U
92-52-4	Biphenyl	340.	U
208-96-8	Acenaphthylene	110.	U
83-32-9	Acenaphthene	100.	U
132-64-9	Dibenzofuran	80.	U
86-73-7	Fluorene	80.	U
132-65-0	Dibenzothiophene	88.	U
85-01-8	Phenanthrene	100.	U
120-12-7	Anthracene	88.	U
260-94-6	Acridine	230.	U
86-74-8	Carbazole	150.	U
206-44-0	Fluoranthene	110.	U
129-00-0	Pyrene	110.	U
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	220.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	180.	U
57-97-6	7,12-Dimethylbenzanthracene	220.	U
192-97-2	Benzo(E)Pyrene	150.	U
50-32-8	Benzo(A)Pyrene	180.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	170.	U
53-70-3	Dibenz(A,H)Anthracene	130.	U
191-24-2	Benzo(G,H,I)Perylene	220.	U
215-58-7	Dibenz(A,C)Anthracene	130.	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3831 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX855	03/31/89	08:54
BLK-01	S3831X858	03/31/89	11:28
3831-01	S3831X859	03/31/89	12:16

INITIAL CALIBRATION
PAH COMPOUNDS

CASE NO: ——— INSTRUMENT ID: X
CONTRACTOR: RMAL CALIBRATION DATE: 01-16-89
CONTRACT NO: ———

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS 35%

LABORATORY ID:	STDX443	STDX440	STDX444	STDX442	STDX441			
COMPOUND	RF	2. RF	4. RF	24. RF	120. RF	480.	AVG RF	%RSD CCS
2,3-BENZOFURAN	1.182	1.186	0.982	0.929	1.007		1.057	11.2
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904		0.988	14.5
1H-INDENE	1.875	1.762	1.463	1.400	1.535		1.607	12.6
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033		2.214	15.6
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432		1.524	13.1
QUINOLINE	0.733	0.677	0.680	0.784	0.939		0.762	14.1
1H-INDOLE	0.872	0.907	0.826	0.926	1.075		0.921	10.2
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016		1.086	14.1
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030		1.110	14.6
BIPHENYL	1.798	1.739	1.370	1.332	1.419		1.532	14.3
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663		1.616	9.3
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045		1.092	11.8
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487		1.601	15.6
FLUORENE	1.311	1.375	1.145	1.146	1.247		1.245	8.1
DIBENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950		1.008	11.8
PHENANTHRENE	1.153	1.113	0.904	0.890	0.966		1.005	12.0
ANTHRACENE	0.962	1.049	0.869	0.884	0.984		0.950	7.7
ACRIDINE	0.810	0.812	0.549	0.652	0.738		0.712	15.7
CARBAZOLE	0.955	1.009	0.764	0.793	0.889		0.882	11.7
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013		1.068	13.6
PYRENE	1.398	1.258	0.932	0.903	0.978		1.094	20.1
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990		1.131	16.6
CHRYSENE	1.643	1.468	1.057	1.014	0.966		1.230	24.8
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014		1.151	22.2
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292		1.488	15.7
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048		1.362	29.5
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976		1.089	16.8
PERYLENE	1.239	1.157	0.914	0.929	0.961		1.040	14.2
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130		1.240	17.0
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905		0.977	19.7
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986		1.112	18.1

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

FORM VI

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

ASE NO: ----
CONTRACTOR: RMAL
CONTRACT NO: -----
INSTRUMENT ID: X

CALIBRATION DATE: 03-31-89
TIME: 08:54
LABORATORY ID: STDX855
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.225	-15.8		
2,3-DIHYDROINDENE	0.988	1.040	-5.2		
1H-INDENE	1.607	1.641	-2.1		
NAPHTHALENE	2.214	2.233	-0.8		
BENZO(B)THIOPHENE	1.524	1.386	9.0		
QUINOLINE	0.762	0.557	26.9		
1H-INDOLE	0.921	0.759	17.6		
2-METHYLNAPHTHALENE	1.086	1.006	7.3		
1-METHYLNAPHTHALENE	1.110	1.017	8.4		
BIPHENYL	1.532	1.271	16.9		
ACENAPHTHYLENE	1.616	1.413	12.5		
ACENAPHTHENE	1.092	0.998	8.5		
DIBENZOFURAN	1.601	1.514	5.4		
FLUORENE	1.245	1.101	11.5		
DIBENZOTHIOPHENE	1.008	0.843	16.3		
PHENANTHRENE	1.005	0.876	12.8		
ANTHRACENE	0.950	0.771	18.7		
ACRIDINE	0.712	0.501	29.6		
CARBAZOLE	0.882	0.751	14.8		
FLUORANTHENE	1.068	0.925	13.3		
PYRENE	1.094	0.969	11.3		
BENZO(A)ANTHRACENE	1.131	1.107	2.1		
CHRYSENE	1.230	1.129	8.1		
BENZO(B)FLUORANTHENE	1.151	1.324	-14.9		
BENZO(K)FLUORANTHENE	1.488	1.517	-1.9		
BENZO(E)PYRENE	1.362	1.131	16.9		
BENZO(A)PYRENE	1.089	0.990	9.1		
PERYLENE	1.040	0.908	12.7		
INDENO(1,2,3-CD)PYRENE	1.240	1.012	18.4		
DIBENZ(A,H)ANTHRACENE	0.977	0.796	18.5		
BENZO(G,H,I)PERYLENE	1.112	0.912	17.9		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

gjk
4-7-89

FORM VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3831 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX855 Date Analyzed: 03/31/89

Instrument ID: 4500-X TIme Analyzed: 08:54_00

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	146925	251055	148573
UPPER LIMIT	293850	502110	297146
LOWER LIMIT	73462	125528	74286
SAMPLE NO.			
BLK-01	97400	152300	87600
3831-01	102600	160100	88400

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

pg 2 of 2

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 7811

Attn: _____

Enseco Client: City St. Louis Park
Project: _____
Sampling Co.: _____
Sampling Site: _____
Team Leader: M. Higgins

SAMPLE SAFE™ CONDITIONS

1. Packed by: M. Higgins Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	~~RMA #~~ Analysis Parameters	Remarks
3/7/89		GAC-SLP10C2-030789	Amber Liter	6	ppt- PAH	
		GAC-SLP10C3-030789	"	"	"	
		GAC-SLP10FTOC-030789	16oz Cl	1 3831-01	TOC	
		GAC-SLP10TTOC-030789	"	1	TOC	
		GAC-SLP10C1TOC-030789	"	1	TOC	
		GAC-SLP10C2TOC-030789	"	1	TOC	
3/7/89		GAC-SLP10C3TOC-030789	"	1	TOC	

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished by: (signed)	Received by: (signed)	Date	Time

SHIPPING DETAILS

Delivered to Shipper by: M. Higgins
Method of Shipment: Fed-X Airbill # 2865075662
Received for Lab: RMA Signed: [illegible] Date/Time 3/8/89 0815
Enseco Project No. 3831

White and Pink Copies — Yellow to Sampler — SS-001

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 7808

Attn: _____

Enseco Client: City St. Louis Park

Project: _____

Sampling Co.: _____

Sampling Site: _____

Team Leader: M. Higgins

SAMPLE SAFE™ CONDITIONS

1. Packed by: M. Higgins Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: Good °C
9. Condition of Contents: 10

Date	Time	Sample ID/Description	Sample Type	No. Containers	RMA #	Analysis Parameters	Remarks
3/7/89		GAC-SLP10F-030789	Liter Amber	6	3831-01	ppt-PAH	MEDIUM
3/7/89		GAC-SLP10FB-030789	"	"		"	
3/7/89		GAC-SLP10FBD-030789	"	"		"	

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1				
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: M. Higgins

Method of Shipment: Fed X Airbill # 2865075662

Received for Lab: RMA Signed: [illegible] Date/Time 3/8/89 0815

Enseco Project No. 3831

White and Pink Copies to Lab Yellow to Sampler

SS-001

Rocky Mountain
Analytical Laboratory

Enseco

April 14, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the five aqueous samples received at Rocky Mountain Analytical Laboratory on March 8, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Program Administrator

RMAL #003828

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003828-0002-SA	GAC-SLP10TTOC-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0003-SA	GAC-SLP10C1TOC-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0004-SA	GAC-SLP10C2TOC-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0005-SA	GAC-SLP10C3TOC-030789	AQUEOUS	07 MAR 89		08 MAR 89

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report
- Data Quality Assessment

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The first four sections below describes the format, content, and organization for the four corresponding separate components of this report. The fifth section provides an overall data quality assessment of the results.

Sample Description Information

The Sample Description Information lists all the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and where available and appropriate, dates sampled, received, authorized, prepared, and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method, and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content. Analytical data is corrected for blank contamination before it is reported.

Quality Control Reports

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. The QC checks include analysis of method blanks, laboratory control samples (LCS), and surrogate control samples (SCS). Results from these analyses are presented along with the control limits.

Method Blank Results: A method blank is a laboratory generated sample used to assess the degree to which laboratory operations and procedures cause false positive analytical results.

Laboratory Control Samples (LCS): An LCS consists of a standard control matrix that is spiked with a group of target analytes representative of the method analytes.

Surrogate Control Samples (SCS): An SCS is an additional control measure taken for organic analyses.

Accuracy for LCS and SCS is measured by Percent Recovery

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for LCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{\text{Measured Concentration LCS1} - \text{Measured Concentration LCS2}}{(\text{Measured Concentration LCS1} + \text{Measured Concentration LCS2})/2}$$

Data Quality Assessment

The results contained in this report were reviewed relative to data acceptance criteria as specified in Enseco's Quality Assurance Project Plan for completeness, precision, accuracy, representiveness and defensibility of the data. Unless otherwise stated below, no quality control problems or technical difficulties were encountered.

ANALYTICAL TEST REQUESTS
for
City of St. Louis Park

Lab ID: 003828	Group Code	Analysis Description	Custom Test?
0002 - 0005	A	Polynuclear Aromatic Hydrocarbons, SIM Prep - PAH/SIM by GC/MS Total Organic Carbon (TOC)	
0001	B	Polynuclear Aromatic Hydrocarbons, SIM Prep - PAH/SIM by GC/MS	

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10TTOC-030789
Lab ID: 003828-0002-SA Enseco ID: 1029697
Matrix: AQUEOUS Sampled: 07 MAR 89 Received: 08 MAR 89
Authorized: 08 MAR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.6	mg/L	0.1	415.1	16 MAR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C1TOC-030789
Lab ID: 003828-0003-SA Enseco ID: 1029773
Matrix: AQUEOUS Sampled: 07 MAR 89 Received: 08 MAR 89
Authorized: 08 MAR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	2.0	mg/L	0.1	415.1	16 MAR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C2TOC-030789
Lab ID: 003828-0004-SA Enseco ID: 1029774
Matrix: AQUEOUS Sampled: 07 MAR 89 Received: 08 MAR 89
Authorized: 08 MAR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.9	mg/L	0.1	415.1	16 MAR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C3TOC-030789
Lab ID: 003828-0005-SA Enseco ID: 1029775
Matrix: AQUEOUS Sampled: 07 MAR 89 Received: 08 MAR 89
Authorized: 08 MAR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.7	mg/L	0.1	415.1	16 MAR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003828-0002-SA	AQUEOUS	TOC-A	16 MAR 89-A
003828-0003-SA	AQUEOUS	TOC-A	16 MAR 89-A
003828-0004-SA	AQUEOUS	TOC-A	16 MAR 89-A
003828-0005-SA	AQUEOUS	TOC-A	16 MAR 89-A

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	LCS2	Limits	Precision(RPD) LCS	Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 16 MAR 89-A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.1	24.3	96	97	91-109	1.0	20

Rocky Mountain
Analytical Laboratory

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

April 14, 1989

Enseco - RMAL Project Number 003828

Introduction

Eight aqueous samples were received at Rocky Mountain Analytical Laboratory on March 8, 1989. Sample GAC SLP10FBD-030789 was extracted and held per the 1989 QAPP. The remaining samples were logged in under RMAL project number 003828. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. The samples were analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

During the extraction of samples 003828-02DUP and 02MS, the surrogate concentration required for a medium level analysis was inadvertently added to the samples. All surrogate recoveries for these samples are outside control limits.

All samples and the associated blank show target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I) as per the 1989 QAPP.

The method blank associated with these samples (BLK-01) shows phenanthrene at a concentration greater than five times the method detection limit. Corrective action taken in the preparation lab included thoroughly cleaning all related glassware prior to the extraction of any more samples.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303/431-7171

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Giberson **Date:** [illegible]
Tracy Giberson
Data Control Supervisor

Approved by: Rebecca A. Williams **Date:** 4/14/89
Rebecca Williams
Program Administrator

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003828-0001-SA	GAC-SLP10FB-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0001-DU	GAC-SLP10FBD-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0002-SA	GAC-SLP10T-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0002-DU	GAC-SLP10TD-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0002-MS	GAC-SLP10TMS-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0003-SA	GAC-SLP10C1-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0004-SA	GAC-SLP10C2-030789	AQUEOUS	07 MAR 89		08 MAR 89
003828-0005-SA	GAC-SLP10C3-030789	AQUEOUS	07 MAR 89		08 MAR 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC # 3828

PPT PAH

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3828-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3828-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3828X861

Level: (low/med) LOW Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	3.1	
95-13-6	1H-Indene	1.7	
91-20-3	Naphthalene	16.	B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	7.0	B *
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	11.	B *
90-12-0	1-Methylnaphthalene	6.6	B
92-52-4	Biphenyl	2.2	J
208-96-8	Acenaphthylene	1.5	*
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.9	*
86-73-7	Fluorene	2.3	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	8.3	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	2.2	B
129-00-0	Pyrene	2.6	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3828-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3828-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3828X862

Level: (low/med) LOW Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	31.	
95-13-6	1H-Indene	1.0	
91-20-3	Naphthalene	2.8	J B *
4565-32-6	Benzo(B)Thiophene	4.3	*
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.1	B *
90-12-0	1-Methylnaphthalene	2.4	B
92-52-4	Biphenyl	3.2	
208-96-8	Acenaphthylene	5.8	
83-32-9	Acenaphthene	13.	
132-64-9	Dibenzofuran	2.9	
86-73-7	Fluorene	8.5	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	3.5	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	2.9	B
129-00-0	Pyrene	2.3	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3828-02DUP

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3828-02DUP

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3557X403

Level: (low/med) LOW Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	27.	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	2.5	J B *
4565-32-6	Benzo(B)Thiophene	3.8	*
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.5	B *
90-12-0	1-Methylnaphthalene	1.9	B
92-52-4	Biphenyl	2.7	
208-96-8	Acenaphthylene	4.9	
83-32-9	Acenaphthene	11.	
132-64-9	Dibenzofuran	2.4	
86-73-7	Fluorene	6.7	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	2.5	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	2.2	B
129-00-0	Pyrene	2.1	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3828-03

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

COL 1

Matrix: (soil/water) WATER Lab Sample ID: 3828-03

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3828X865

Level: (low/med) LOW Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	1.2	
91-20-3	Naphthalene	2.0	J B *
4565-32-6	Benzo(B)Thiophene	14.	*
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.6	B *
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	2.1	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.7	B
120-12-7	Anthracene	1.2	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	3.6	B
129-00-0	Pyrene	5.1	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3828-04

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3828-04

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3828X866

Level: (low/med) LOW Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	3.0	J B *
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	3.0	B
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	3.1	B *
90-12-0	1-Methylnaphthalene	1.7	B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	5.9	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	2.0	B
129-00-0	Pyrene	2.0	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3828-05

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3828-05

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3828X867

Level: (low/med) LOW Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	1.9	J B *
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.6	B *
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.6	B *
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	3.8	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.8	B
129-00-0	Pyrene	1.8	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3828-02MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3828-02MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3828X864

Level: (low/med) LOW Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	50.	
95-13-6	1H-Indene	11.	SP
91-20-3	Naphthalene	14.	B SP
4565-32-6	Benzo(B)Thiophene	7.0	*
91-22-5	Quinoline	26.	B SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	15.	B SP
90-12-0	1-Methylnaphthalene	3.3	B *
92-52-4	Biphenyl	5.2	
208-96-8	Acenaphthylene	9.2	
83-32-9	Acenaphthene	20.	
132-64-9	Dibenzofuran	2.8	
86-73-7	Fluorene	29.	SP
132-65-0	Dibenzothiophene	1.5	
85-01-8	Phenanthrene	5.1	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	3.9	B
129-00-0	Pyrene	3.4	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	13.	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	5.6	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP)	#	S2 (FLU)	#	S3 (CHR)	#
1	3828-01	96		105		88	
2	3828-02	76		89		86	
3	3828-02DUP	7150	*	9250	*	6850	*
4	3828-02MS	5500	*	6800	*	5000	*
5	3828-03	60		80		70	
6	3828-04	90		97		68	
7	3828-05	80		85		71	
	BLK-01	84		64		11	

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3C

WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 3828-02

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	10	1.0	11.	100
Naphthalene	10	2.8	14.	110
Quinolene	10	0.0	26.	260
2-Methylnaphthalene	10	2.1	15.	130
Fluorene	10	8.5	29.	200
Chrysene	10	0.0	13.	130
Benzo(E)Pyrene	10	0.0	5.6	56

COMMENTS:

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 3828-02

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	31.	27.	14
1H-Indene	1.0	ND	NC
Naphthalene	2.8	2.5	11
Benzo(B)Thiophene	4.3	3.8	12
2-Methylnaphthalene	2.1	1.5	33
1-Methylnaphthalene	2.4	1.9	23
Biphenyl	3.2	2.7	17
Acenaphthylene	5.8	4.9	17
Acenaphthene	13.	11.	17
Dibenzofuran	2.9	2.4	19
Fluorene	8.5	6.7	24
Phenanthrene	3.5	2.5	23
Fluoranthene	2.9	2.2	27
Pyrene	2.3	2.1	9.1

COMMENTS:

ND = Not found
NC = Not calculated

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Lab File ID: S3828X860 Lab Sample ID: BLK-01

Date Extracted: 03/13/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 03/31/89 Time Analyzed: 13:07

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3828-01	3828-01	S3828X861	03/31/89
2	3828-02	3828-02	S3828X862	03/31/89
3	3828-02DUP	3828-02DUP	S3828X863	03/31/89
4	3828-02MS	3828-02MS	S3828X864	03/31/89
5	3828-03	3828-03	S3828X865	03/31/89
6	3828-04	3828-04	S3828X866	03/31/89
7	3828-05	3828-05	S3828X867	03/31/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3828 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S3828X860

Level: (low/med) LOW Date Received: 03/08/89

% Moisture: not dec. dec. Date Extracted: 03/13/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 03/31/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	2.5	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.9	
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.5	*
90-12-0	1-Methylnaphthalene	1.3	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	7.8	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	2.6	
129-00-0	Pyrene	2.3	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3828 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX855	03/31/89	08:54
BLK-01	S3828X860	03/31/89	13:07
3828-01	S3828X861	03/31/89	13:58
3828-02	S3828X862	03/31/89	14:48
3828-02DUP	S3828X863	03/31/89	15:38
3828-02MS	S3828X864	03/31/89	16:29
3828-03	S3828X865	03/31/89	17:19
3828-04	S3828X866	03/31/89	18:08
3828-05	S3828X867	03/31/89	18:58

INITIAL CALIBRATION
PAH COMPOUNDS

CASE NO: ----
CONTRACTOR: RMAL
CONTRACT NO: -----

INSTRUMENT ID: X
CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS 35%

LABORATORY ID:	STDX443	STDX440	STDX444	STDX442	STDX441			
COMPOUND	RF	2. RF	4. RF	24. RF	120. RF	480.	AVG RF	%RSD CCS
2,3-BENZOFURAN	1.182	1.186	0.982	0.929	1.007	1.057	11.2	
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904	0.988	14.5	
1H-INDENE	1.875	1.762	1.463	1.400	1.535	1.607	12.6	
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033	2.214	15.6	
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432	1.524	13.1	
QUINOLINE	0.733	0.677	0.680	0.784	0.939	0.762	14.1	
1H-INDOLE	0.872	0.907	0.826	0.926	1.075	0.921	10.2	
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016	1.086	14.1	
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030	1.110	14.6	
BIPHENYL	1.798	1.739	1.370	1.332	1.419	1.532	14.3	
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663	1.616	9.3	
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045	1.092	11.8	
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487	1.601	15.6	
FLUORENE	1.311	1.375	1.145	1.146	1.247	1.245	8.1	
DIBENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950	1.008	11.8	
PHENANTHRENE	1.153	1.113	0.904	0.890	0.966	1.005	12.0	
ANTHRACENE	0.962	1.049	0.869	0.884	0.984	0.950	7.7	
ACRIDINE	0.810	0.812	0.549	0.652	0.738	0.712	15.7	
CARBAZOLE	0.955	1.009	0.764	0.793	0.889	0.882	11.7	
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013	1.068	13.6	
PYRENE	1.398	1.258	0.932	0.903	0.978	1.094	20.1	
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990	1.131	16.6	
CHRYSENE	1.643	1.468	1.057	1.014	0.966	1.230	24.8	
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014	1.151	22.2	
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292	1.488	15.7	
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048	1.362	29.5	
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976	1.089	16.8	
PERYLENE	1.239	1.157	0.914	0.929	0.961	1.040	14.2	
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130	1.240	17.0	
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977	19.7	
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986	1.112	18.1	

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: ----
CONTRACTOR: RMAL
CONTRACT NO: -----
INSTRUMENT ID: X

CALIBRATION DATE: 03-31-89
TIME: 08:54
LABORATORY ID: STDX855
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.225	-15.8		
2,3-DIHYDROINDENE	0.988	1.040	-5.2		
1H-INDENE	1.607	1.641	-2.1		
NAPHTHALENE	2.214	2.233	-0.8		
BENZO(B)THIOPHENE	1.524	1.386	9.0		
QUINOLINE	0.762	0.557	26.9		
1H-INDOLE	0.921	0.759	17.6		
2-METHYLNAPHTHALENE	1.086	1.006	7.3		
1-METHYLNAPHTHALENE	1.110	1.017	8.4		
BIPHENYL	1.532	1.271	16.9		
ACENAPHTHYLENE	1.616	1.413	12.5		
ACENAPHTHENE	1.092	0.998	8.5		
DIBENZOFURAN	1.601	1.514	5.4		
FLUORENE	1.245	1.101	11.5		
DIBENZOTHIOPHENE	1.008	0.843	16.3		
PHENANTHRENE	1.005	0.876	12.8		
ANTHRACENE	0.950	0.771	18.7		
ACRIDINE	0.712	0.501	29.6		
CARBAZOLE	0.882	0.751	14.8		
FLUORANTHENE	1.068	0.925	13.3		
PYRENE	1.094	0.969	11.3		
BENZO(A)ANTHRACENE	1.131	1.107	2.1		
CHRYSENE	1.230	1.129	8.1		
BENZO(B)FLUORANTHENE	1.151	1.324	-14.9		
BENZO(K)FLUORANTHENE	1.488	1.517	-1.9		
BENZO(E)PYRENE	1.362	1.131	16.9		
BENZO(A)PYRENE	1.089	0.990	9.1		
PERYLENE	1.040	0.908	12.7		
INDENO(1,2,3-CD)PYRENE	1.240	1.012	18.4		
DIBENZ(A,H)ANTHRACENE	0.977	0.796	18.5		
BENZO(G,H,I)PERYLENE	1.112	0.912	17.9		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3828 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX855 Date Analyzed: 03/31/89

Instrument ID: 4500-X TIme Analyzed: 08:54

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	146926	251056	148573
UPPER LIMIT	293852	502112	297146
LOWER LIMIT	73463	125528	74286
SAMPLE NO.			
BLK-01	120900	202500	134700
3828-01	121900	214600	143000
3828-02	119700	208200	136500
3828-02DUP	110500	184600	125200
3828-02MS	123200	205100	147300
3828-03	125400	214300	143100
3828-04	120500	206600	146600
3828-05	116800	190900	130800

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

Rocky Mountain
Analytical Laboratory

Enseco

April 14, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear James:

Enclosed is the report for the one aqueous sample received at Rocky Mountain Analytical Laboratory on March 21, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Rebecca Williams.

Sincerely,

Ramona Power
Data Control

Enclosures

cc: Rebecca Williams, Program Administrator

RMAL #003987

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report
- Data Quality Assessment

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The first four sections below describes the format, content, and organization for the four corresponding separate components of this report. The fifth section provides an overall data quality assessment of the results.

Sample Description Information

The Sample Description Information lists all the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and where available and appropriate, dates sampled, received, authorized, prepared, and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method, and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content. Analytical data is corrected for blank contamination before it is reported.

Quality Control Reports

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. The QC checks include analysis of method blanks, laboratory control samples (LCS), and surrogate control samples (SCS). Results from these analyses are presented along with the control limits.

Method Blank Results: A method blank is a laboratory generated sample used to assess the degree to which laboratory operations and procedures cause false positive analytical results.

Laboratory Control Samples (LCS): An LCS consists of a standard control matrix that is spiked with a group of target analytes representative of the method analytes.

Surrogate Control Samples (SCS): An SCS is an additional control measure taken for organic analyses.

Accuracy for LCS and SCS is measured by Percent Recovery

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for LCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{\text{Measured Concentration LCS1} - \text{Measured Concentration LCS2}}{(\text{Measured Concentration LCS1} + \text{Measured Concentration LCS2})/2}$$

Data Quality Assessment

The results contained in this report were reviewed relative to data acceptance criteria as specified in Enseco's Quality Assurance Project Plan for completeness, precision, accuracy, representiveness and defensibility of the data. Unless otherwise stated below, no quality control problems or technical difficulties were encountered.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
003987-0001-SA	GAC-SLP10C1TOC-032089	AQUEOUS	20 MAR 89		21 MAR 89

ANALYTICAL TEST REQUESTS
for
City of St. Louis Park

Lab ID: 003987	Group Code	Analysis Description	Custom Test?
0001	A	Polynuclear Aromatic Hydrocarbons, SIM Prep - PAH/SIM by GC/MS Total Organic Carbon (TOC)	

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C1TOC-032089
Lab ID: 003987-0001-SA Enseco ID: 1030778
Matrix: AQUEOUS Sampled: 20 MAR 89 Received: 21 MAR 89
Authorized: 21 MAR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	3.2	mg/L	0.1	415.1	23 MAR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
003987-0001-SA	AQUEOUS	TOC-A	23 MAR 89-B

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 23 MAR 89-B								
Concentration Units: mg/L								
Total Organic Carbon	25	25.0	25.2	100	101	91-109	1.0	20

Rocky Mountain
Analytical Laboratory

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

April 14, 1989

Enseco - RMAL Project Number 003987

Introduction

One aqueous sample was received at Rocky Mountain Analytical Laboratory on March 21, 1989. The sample was logged in under RMAL project number 003987. A cross reference associating the RMAL sample number to actual field sample number is included. The sample was analyzed for part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the sample and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

Due to a preparation error in the original extraction of sample 3987-01, the sample required a reextraction. Limited sample volume was available for the reextraction and therefore reporting limits have been raised.

Sample 3987-01 and the associated blank show target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion.. These compounds are flagged with an asterisk (*) on the data sheets (FORM I) as per the 1989 QAPP.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax. 303/431-7171

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: _____ **Date:** _____
Tracy Giberson
Data Control Supervisor

Approved by: Rebecca A. Williams **Date:** 4/14/89
Rebecca Williams
Program Administrator

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID		Matrix	Sampled Date	Sampled Time	Received Date
003987-0001-SA	GAC-SLP10C1	-032089	AQUEOUS	20 MAR 89		21 MAR 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC# 3987

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3987-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3987 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 3987-01

Sample wt/vol: 2000 (g/ml) ML Lab File ID: S3987X879

Level: (low/med) LOW Date Received: 03/21/89

% Moisture: not dec. dec. Date Extracted: 03/27/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/03/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 0.250

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	10.2	U
496-11-7	2,3-Dihydroindene	2.8	U
95-13-6	1H-Indene	1.8	U
91-20-3	Naphthalene	3.7	BJ*
4565-32-6	Benzo(B)Thiophene	12.	*
91-22-5	Quinoline	2.8	U
120-72-9	1H-Indole	5.0	U
91-57-6	2-Methylnaphthalene	3.0	B *
90-12-0	1-Methylnaphthalene	3.2	U
92-52-4	Biphenyl	8.6	U
208-96-8	Acenaphthylene	2.8	U
83-32-9	Acenaphthene	3.0	*
132-64-9	Dibenzofuran	2.0	U
86-73-7	Fluorene	2.0	U
132-65-0	Dibenzothiophene	2.3	
85-01-8	Phenanthrene	3.0	B *
120-12-7	Anthracene	2.2	U
260-94-6	Acridine	5.8	U
86-74-8	Carbazole	3.8	U
206-44-0	Fluoranthene	7.1	
129-00-0	Pyrene	12.	
56-55-3	Benzo(A)Anthracene	5.0	U
218-01-9	Chrysene	5.6	U
205-99-2	Benzo(B)Fluoranthene	5.0	U
207-08-9	Benzo(K)Fluoranthene	4.6	U
57-97-6	7,12-Dimethylbenzanthracene	5.6	U
192-97-2	Benzo(E)Pyrene	3.8	U
50-32-8	Benzo(A)Pyrene	4.6	U
198-55-0	Perylene	5.0	U
56-49-5	3-Methylcholanthrene	7.0	U
193-39-5	Indeno(1,2,3-CD)Pyrene	4.2	U
53-70-3	Dibenz(A,H)Anthracene	3.2	U
191-24-2	Benzo(G,H,I)Perylene	5.6	U
215-58-7	Dibenz(A,C)Anthracene	3.2	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3987 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	3987-01	93	115	106
2	BLK-01	96	105	80

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 3987 SAS No.: N/A SDG No.: N/A

Lab File ID: S3987X882 Lab Sample ID: BLK-01

Date Extracted: 03/27/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 04/03/89 Time Analyzed: 15:17

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	3987-01	3987-01	S3987X879	04/03/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 3987 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 2000 (g/ml) ML Lab File ID: S3987X882

Level: (low/med) LOW Date Received: 03/21/89

% Moisture: not dec. dec. Date Extracted: 03/27/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/03/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 0.250

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	10.2	U
496-11-7	2,3-Dihydroindene	2.8	U
95-13-6	1H-Indene	1.8	U
91-20-3	Naphthalene	4.1	J
4565-32-6	Benzo(B)Thiophene	1.8	U
91-22-5	Quinoline	2.8	U
120-72-9	1H-Indole	5.0	U
91-57-6	2-Methylnaphthalene	3.1	*
90-12-0	1-Methylnaphthalene	2.6	J *
92-52-4	Biphenyl	8.6	U
208-96-8	Acenaphthylene	2.8	U
83-32-9	Acenaphthene	2.6	U
132-64-9	Dibenzofuran	2.0	U
86-73-7	Fluorene	2.0	U
132-65-0	Dibenzothiophene	2.2	U
85-01-8	Phenanthrene	2.7	
120-12-7	Anthracene	2.2	U
260-94-6	Acridine	5.8	U
86-74-8	Carbazole	3.8	U
206-44-0	Fluoranthene	2.8	U
129-00-0	Pyrene	2.8	U
56-55-3	Benzo(A)Anthracene	5.0	U
218-01-9	Chrysene	5.6	U
205-99-2	Benzo(B)Fluoranthene	5.0	U
207-08-9	Benzo(K)Fluoranthene	4.6	U
57-97-6	7,12-Dimethylbenzanthracene	5.6	U
192-97-2	Benzo(E)Pyrene	3.8	U
50-32-8	Benzo(A)Pyrene	4.6	U
198-55-0	Perylene	5.0	U
56-49-5	3-Methylcholanthrene	7.0	U
193-39-5	Indeno(1,2,3-CD)Pyrene	4.2	U
53-70-3	Dibenz(A,H)Anthracene	3.2	U
191-24-2	Benzo(G,H,I)Perylene	5.6	U
215-58-7	Dibenz(A,C)Anthracene	3.2	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 3987 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX877	04/03/89	10:28
3987-01	S3987X879	04/03/89	12:40
BLK-01	S3987X882	04/03/89	15:17

INITIAL CALIBRATION
PAH COMPOUNDS

CASE NO: ----
CONTRACTOR: RMAL
CONTRACT NO: -----

INSTRUMENT ID: X
CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM % RSD FOR CCC IS 35%

LABORATORY ID: STDX443 STDX444 STDX440 STDX442

COMPOUND	RF	2. RF	4. RF	24. RF	120. RF	480.	AVG RF	%RSD CCS
2,3-BENZOFURAN	1.182	1.186	0.982	0.929	1.007	1.057	11.2	
2,3-DIHYDROINDENE	1.159	1.127	0.902	0.848	0.904	0.988	14.5	
1H-INDENE	1.875	1.762	1.463	1.400	1.535	1.607	12.6	
NAPHTHALENE	2.597	2.578	1.994	1.871	2.033	2.214	15.6	
BENZO(B)THIOPHENE	1.737	1.742	1.376	1.331	1.432	1.524	13.1	
QUINOLINE	0.733	0.677	0.680	0.784	0.939	0.762	14.1	
1H-INDOLE	0.872	0.907	0.826	0.926	1.075	0.921	10.2	
2-METHYLNAPHTHALENE	1.272	1.230	0.973	0.938	1.016	1.086	14.1	
1-METHYLNAPHTHALENE	1.312	1.257	1.001	0.953	1.030	1.110	14.6	
BIPHENYL	1.798	1.739	1.370	1.332	1.419	1.532	14.3	
ACENAPHTHYLENE	1.774	1.733	1.459	1.453	1.663	1.616	9.3	
ACENAPHTHENE	1.237	1.223	0.993	0.961	1.045	1.092	11.8	
DIBENZOFURAN	1.858	1.886	1.373	1.401	1.487	1.601	15.6	
FLUORENE	1.311	1.375	1.145	1.146	1.247	1.245	8.1	
DIBENZOTHIOPHENE	1.149	1.123	0.924	0.892	0.950	1.008	11.8	
PHENANTHRENE	1.153	1.113	0.904	0.890	0.966	1.005	12.0	
ANTHRACENE	0.962	1.049	0.869	0.884	0.984	0.950	7.7	
ACRIDINE	0.810	0.812	0.549	0.652	0.738	0.712	15.7	
CARBAZOLE	0.955	1.009	0.764	0.793	0.889	0.882	11.7	
FLUORANTHENE	1.206	1.240	0.944	0.936	1.013	1.068	13.6	
PYRENE	1.398	1.258	0.932	0.903	0.978	1.094	20.1	
BENZO(A)ANTHRACENE	1.249	1.407	0.993	1.019	0.990	1.131	16.6	
CHRYSENE	1.643	1.468	1.057	1.014	0.966	1.230	24.8	
BENZO(B)FLUORANTHENE	1.201	1.579	0.991	0.972	1.014	1.151	22.2	
BENZO(K)FLUORANTHENE	1.568	1.860	1.400	1.321	1.292	1.488	15.7	
BENZO(E)PYRENE	1.870	1.728	1.106	1.059	1.048	1.362	29.5	
BENZO(A)PYRENE	1.301	1.280	0.954	0.936	0.976	1.089	16.8	
PERYLENE	1.239	1.157	0.914	0.929	0.961	1.040	14.2	
INDENO(1,2,3-CD)PYRENE	1.413	1.520	1.072	1.066	1.130	1.240	17.0	
DIBENZ(A,H)ANTHRACENE	0.943	1.318	0.852	0.869	0.905	0.977	19.7	
BENZO(G,H,I)PERYLENE	1.296	1.367	0.969	0.944	0.986	1.112	18.1	

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**)
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

FORM VI

CONTINUING CALIBRATION CHECK
PAH COMPOUNDS

CASE NO: ----
CONTRACTOR: RMAL
CONTRACT NO: -----
INSTRUMENT ID: X

CALIBRATION DATE: 04-03-89
TIME: 10:28
LABORATORY ID: STDX877
INITIAL CALIBRATION DATE: 01-16-89

MINIMUM RF FOR SPCC IS 0.050 MAXIMUM %D FOR CCC IS 35%

COMPOUND	AVG RF	RF 4.	% DIFF	CCC	SPCC
2,3-BENZOFURAN	1.057	1.130	-6.9		
2,3-DIHYDROINDENE	0.988	0.996	-0.8		
1H-INDENE	1.607	1.577	1.8		
NAPHTHALENE	2.214	2.322	-4.8		
BENZO(B)THIOPHENE	1.524	1.421	6.7		
QUINOLINE	0.762	0.842	-10.3		
1H-INDOLE	0.921	0.901	2.1		
2-METHYLNAPHTHALENE	1.086	1.027	5.4		
1-METHYLNAPHTHALENE	1.110	1.023	7.8		
BIPHENYL	1.532	1.335	12.8		
ACENAPHTHYLENE	1.616	1.603	0.8		
ACENAPHTHENE	1.092	1.002	8.1		
DIBENZOFURAN	1.601	1.648	-2.9		
FLUORENE	1.245	1.131	9.1		
DIBENZOTHIOPHENE	1.008	0.832	17.4		
PHENANTHRENE	1.005	0.891	11.3		
ANTHRACENE	0.950	0.800	15.7		
ACRIDINE	0.712	0.515	27.6		
CARBAZOLE	0.882	0.896	-1.5		
FLUORANTHENE	1.068	0.944	11.5		
PYRENE	1.094	1.014	7.2		
BENZO(A)ANTHRACENE	1.131	1.421	-25.5		
CHRYSENE	1.230	1.354	-10.1		
BENZO(B)FLUORANTHENE	1.151	1.405	-22.0		
BENZO(K)FLUORANTHENE	1.488	1.534	-3.1		
BENZO(E)PYRENE	1.362	1.255	7.9		
BENZO(A)PYRENE	1.089	1.112	-2.0		
PERYLENE	1.040	0.975	6.2		
INDENO(1,2,3-CD)PYRENE	1.240	0.980	20.9		
DIBENZ(A,H)ANTHRACENE	0.977	0.793	18.8		
BENZO(G,H,I)PERYLENE	1.112	0.897	19.3		

AVG RF - AVERAGE RESPONSE FACTOR SPCC - SYSTEM PERFORMANCE CHECK COMPOUND(**)
%RSD - PERCENT RELATIVE STANDARD DEVIATION
CCC - CALIBRATION CHECK COMPOUNDS(*) # - NOT DETECTABLE AT LOW LEVEL

Form VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 3987 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX877 Date Analyzed: 04/03/89

Instrument ID: 4500-X TIme Analyzed: 10:28:00

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	100545	183401	87571
UPPER LIMIT	201090	366802	175142
LOWER LIMIT	50272	91700	43786
SAMPLE NO.			
3987-01	89900	144900	85900
BLK-01	65700	112200	72400

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

Rocky Mountain
Analytical Laboratory

Enseco

April 28, 1989

Jim Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416-2209

Dear Jim:

Enclosed is the report for one aqueous sample received at Rocky Mountain Analytical Laboratory on April 5, 1989.

If you have any questions the Program Administrator assigned to this project is Jean Zimmerman.

Sincerely,

Tracy Giberson
Data Control Supervisor

Enclosures

cc: Jean Zimmerman, PA

RMAL #004191

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004191-0001-SA	GAC-SLP10F TOC-040489	AQUEOUS	04 APR 89	14:30	05 APR 89

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10F-040489, GAC-SLP10FTOC-040489
Lab ID: 004191-0001-SA Enseco ID: 1032358
Matrix: AQUEOUS Sampled: 04 APR 89 Received: 05 APR 89
Authorized: 05 APR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.5	mg/L	0.1	415.1	06 APR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	SCS
004191-0001-SA	AQUEOUS	TOC-A	06 APR 89-B	-

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 06 APR 89-B								
Concentration Units: mg/L								
Total Organic Carbon	25	24.8	25.3	99	101	91-109	2.0	20

Rocky Mountain
Analytical Laboratory

Enseco

CASE NARRATIVE

City of St. Louis Park

April 28 1989

Enseco - RMAL Project Number 004191

Introduction

One aqueous sample was received at Rocky Mountain Analytical Laboratory on April 5, 1989. The sample was logged in under RMAL project number 004191. A cross reference associating the RMAL sample number to the actual field sample number is included. The sample was analyzed for medium level part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

No problems were encountered in the PPT-PAH analysis.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: _____ **Date:** _____
Tracy Giberson
Data Control Supervisor

Approved by: _____ **Date:** _____
Jean Zimmerman
Program Administrator

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303 431-7171

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004191-0001-SA	GAC-SLP10F-040489	AQUEOUS	04 APR 89	14:30	05 APR 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA QC# 4191

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4191-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4191 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4191-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S4191X999

Level: (low/med) MED Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/07/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/14/89

GPC Cleanup: (Y/N) N pH: 6.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	410.	U
496-11-7	2,3-Dihydroindene	1800.	
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	340.	
91-22-5	Quinoline	110.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	92.	J
92-52-4	Biphenyl	370.	
208-96-8	Acenaphthylene	740.	
83-32-9	Acenaphthene	1500.	
132-64-9	Dibenzofuran	390.	
86-73-7	Fluorene	1400.	
132-65-0	Dibenzothiophene	120.	
85-01-8	Phenanthrene	100.	U
120-12-7	Anthracene	93.	
260-94-6	Acridine	230.	U
86-74-8	Carbazole	150.	U
206-44-0	Fluoranthene	200.	
129-00-0	Pyrene	220.	
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	220.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	180.	U
57-97-6	7,12-Dimethylbenzanthracene	220.	U
192-97-2	Benzo(E)Pyrene	150.	U
50-32-8	Benzo(A)Pyrene	180.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	170.	U
53-70-3	Dibenz(A,H)Anthracene	130.	U
191-24-2	Benzo(G,H,I)Perylene	220.	U
215-58-7	Dibenz(A,C)Anthracene	130.	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4191 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	4191-01	87	87	84
2	BLK-01	89	90	87

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4191 SAS No.: N/A SDG No.: N/A

Lab File ID: S4191X001 Lab Sample ID: BLK-01

Date Extracted: 04/07/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 04/14/89 Time Analyzed: 02:51

Matrix: (soil/water) WATER Level: (low/med) MED

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	4191-01	4191-01	S4191X999	04/14/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4191 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S4191X001

Level: (low/med) MED Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/07/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/14/89

GPC Cleanup: (Y/N) N pH: 6.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	410.	U
496-11-7	2,3-Dihydroindene	110.	U
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	72.	U
91-22-5	Quinoline	110.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	130.	U
92-52-4	Biphenyl	340.	U
208-96-8	Acenaphthylene	110.	U
83-32-9	Acenaphthene	100.	U
132-64-9	Dibenzofuran	80.	U
86-73-7	Fluorene	80.	U
132-65-0	Dibenzothiophene	88.	U
85-01-8	Phenanthrene	100.	U
120-12-7	Anthracene	88.	U
260-94-6	Acridine	230.	U
86-74-8	Carbazole	150.	U
206-44-0	Fluoranthene	110.	U
129-00-0	Pyrene	110.	U
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	220.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	180.	U
57-97-6	7,12-Dimethylbenzanthracene	220.	U
192-97-2	Benzo(E)Pyrene	150.	U
50-32-8	Benzo(A)Pyrene	180.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	170.	U
53-70-3	Dibenz(A,H)Anthracene	130.	U
191-24-2	Benzo(G,H,I)Perylene	220.	U
215-58-7	Dibenz(A,C)Anthracene	130.	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 4191 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX988	04/13/89	15:41
4191-01	S4191X999	04/14/89	01:57
BLK-01	S4191X001	04/14/89	02:51

INITIAL CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 4191

Instrument ID: 4500-X Calibration Date(s): 04/13/89

Minimum RF is 0.050 Maximum % RSD is 35%

Lab File ID: RRF = STDX986 RRF = STDX984
RRF = STDX987 RRF = STDX985 RRF = STDX983

COMPOUND	20 PPT RRF	40 PPT RRF	240PPT RRF	1200PPT RRF	4800PPT RRF	AVE RRF	%RSD
D8-Naphthalene	2.648	2.513	2.437	2.666	2.301	2.513	6.0
D10-Flourene	1.360	1.278	1.306	1.368	1.525	1.367	7.0
D12-Chrysene	1.806	1.706	1.525	1.683	1.696	1.683	6.0
2,3-Benzofuran	1.487	1.438	1.347	1.488	1.513	1.455	4.5
2,3-Dihydroindene	1.481	1.456	1.392	1.541	1.586	1.491	5.0
1H-Indene	1.789	1.797	1.695	1.928	1.885	1.819	5.0
Naphthalene	3.034	2.882	2.745	3.077	2.515	2.851	8.0
Benzo(B)Thiophene	2.359	2.243	2.161	2.410	2.161	2.267	5.0
Quinoline	1.161	1.079	1.173	1.371	1.571	1.271	15.7
1H-Indole	1.641	1.623	1.591	1.803	1.912	1.714	8.0
2-Methylnaphthalene	1.533	1.457	1.414	1.568	1.663	1.527	6.4
1-Methylnaphthalene	1.584	1.508	1.462	1.621	1.693	1.574	5.8
Biphenyl	2.453	2.028	1.954	2.084	2.033	2.110	9.3
Acenaphthylene	1.701	1.683	1.695	2.001	2.111	1.838	11.0
Acenaphthene	1.472	1.310	1.301	1.418	1.539	1.408	7.3
Dibenzofuran	2.268	2.143	2.086	2.222	2.198	2.183	3.2
Flourene	1.608	1.460	1.504	1.619	1.823	1.603	8.8
Dibenzothiophene	1.305	1.218	1.163	1.085	1.329	1.220	8.3
Phenanthrene	1.362	1.263	1.219	1.127	1.355	1.265	7.8
Anthracene	1.089	1.042	1.063	1.035	1.346	1.115	11.7
Acridine	0.805	0.727	0.881	0.883	1.236	0.906	21.5
Carbazole	1.177	1.121	1.091	0.994	1.285	1.134	9.5
Fluoranthene	1.435	1.264	1.276	1.139	1.422	1.307	9.4
Pyrene	1.777	1.361	1.262	1.105	1.394	1.380	18.0
Benzo(A)Anthracene	1.832	1.786	1.580	1.851	1.933	1.796	7.4
Chrysene	1.851	1.896	1.611	1.802	1.843	1.801	6.2
Benzo(B)Fluoranthene	1.938	1.924	1.614	1.911	1.878	1.853	7.3
Benzo(K)Fluoranthene	2.230	1.991	1.602	1.897	2.114	1.967	12.2
Benzo(E)Pyrene	1.780	1.827	1.678	1.867	1.872	1.805	4.4
Benzo(A)Pyrene	1.412	1.437	1.356	1.562	1.750	1.503	10.5
Perylene	1.514	1.429	1.361	1.589	1.813	1.541	11.3
Indeno(1,2,3-CD)Pyrene	1.477	1.466	1.417	1.628	1.646	1.527	6.8
Dibenz(A,H)Anthracene	1.167	1.273	1.199	1.355	1.362	1.271	7.0
Benzo(G,H,I)Perylene	1.480	1.316	1.253	1.434	1.357	1.368	6.6

CONTINUING CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 4191

Instrument ID: 4500-X Calibration Date(s): 04/13/89

Lab ID: STDX988 Calibration Time: 15:41

Minimum RF is 0.050 Maximum %RPD is 35%

COMPOUND	INITIAL AVE RRF	40 PPT RRF	%RPD
D8-Naphthalene	2.513	2.502	0.4
D10-Flourene	1.367	1.278	6.5
D12-Chrysene	1.683	1.520	9.7
2,3-Benzofuran	1.455	1.432	1.6
2,3-Dihydroindene	1.491	1.469	1.5
1H-Indene	1.819	1.765	3.0
Naphthalene	2.851	2.845	0.2
Benzo(B)Thiophene	2.267	2.183	3.7
Quinoline	1.271	1.023	19.5
1H-Indole	1.714	1.522	11.2
2-Methylnaphthalene	1.527	1.421	6.9
1-Methylnaphthalene	1.574	1.482	5.8
Biphenyl	2.110	1.901	9.9
Acenaphthylene	1.838	1.564	14.9
Acenaphthene	1.408	1.245	11.6
Dibenzofuran	2.183	2.023	7.3
Flourene	1.603	1.410	12.0
Dibenzothiophene	1.220	1.172	3.9
Phenanthrene	1.265	1.216	3.9
Anthracene	1.115	0.947	15.1
Acridine	0.906	0.639	29.5
Carbazole	1.134	1.019	10.1
Fluoranthene	1.307	1.239	5.2
Pyrene	1.380	1.273	7.8
Benzo(A)Anthracene	1.796	1.552	13.6
Chrysene	1.801	1.624	9.8
Benzo(B)Fluoranthene	1.853	1.677	9.5
Benzo(K)Fluoranthene	1.967	1.520	22.7
Benzo(E)Pyrene	1.805	1.626	9.9
Benzo(A)Pyrene	1.503	1.197	20.4
Perylene	1.541	1.315	14.7
Indeno(1,2,3-CD)Pyrene	1.527	1.306	14.5
Dibenz(A,H)Anthracene	1.271	1.082	14.9
Benzo(G,H,I)Perylene	1.368	1.213	11.3

FORM VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 4191 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX988 Date Analyzed: 04/13/89

Instrument ID: 4500-X TIme Analyzed: 15:41

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	65431	104005	64664
UPPER LIMIT	130862	208010	129328
LOWER LIMIT	32716	52002	32332
SAMPLE NO.			
4191-01	67600	116800	69900
BLK-01	59300	100400	65000

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 8357

Attn: _____

Enseco Client: City St. Louis Park

Project: _____

Sampling Co.: _____

Sampling Site: _____

Team Leader: S. Anderson

SAMPLE SAFE™ CONDITIONS

1. Packed by: SA Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: (Yes) No
8. Contents Temperature Upon Receipt by Lab: 11 °C
9. Condition of Contents: GOOD

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
8	1330	GAC-SLP10T-004	Lt Amber		-PAH	
		GAC-SLP10TD-008			du	
		-SLP10MS-040		0	S	

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished by: (signed)	Received by: (signed)	Date	Time

SHIPPING DETAILS

Delivered to Shipper by: S.A.

Method of Shipment: FedEx Airbill # 2865075710

Received for Lab: RMAL Signed: SCWyatt Date/Time 4/5/87 8:15

Enseco Project No. 4190

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 8316

Attn: _____

Enseco Client: St. Louis Park
Project: _____
Sampling Co.: _____
Sampling Site: _____
Team Leader: S. Anderson

SAMPLE SAFE™ CONDITIONS

1. Packed by: S A Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: (Yes) No
8. Contents Temperature Upon Receipt by Lab: 11 °C
9. Condition of Contents: Good

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
4/8	1300	G - SLP10FB - 0 0 8	Lt Amb	2	→ t-P	
		GAC - SLP 10FBD - 0 0		dw		
		GAC - SLP10 - 0 8	" enal per J. [illegible] 4/5/8			Tri Blank

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished by: (signed)	Received by. (signed)	Date	Time

SHIPPING DETAILS

Delivered to Shipper by: S.A.
Method of Shipment: FedEX Airbill # 2865075710
Received for Lab. RMAL Signed. [illegible] Date/Time 4/5/87 8:15
Enseco Project No. 41190

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 8315

Attn: _____

Enseco Client: City St. Louis Park

Project: _____

Sampling Co.: _____

Sampling Site: _____

Team Leader: S. Anderson

SAMPLE SAFE™ CONDITIONS

1. Packed by: S. Anderson Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory. (Yes) No
8. Contents Temperature Upon Receipt by Lab: 11 °C
9. Condition of Contents: 1 BROKEN 1 LITER GAC-SLP10C

Date	Time	Sample ID/Description	Sample Type	No. Containers	MA	Analysis Parameters	Remarks
4/8	1 00	C- LP1 C1 - 040 8	liter Amber	6	- 3	t- AH	
		-		-		-	
		GAC-SLP10C2 - 0 0 8		-	-0		
		-SLP10 3- 0 0 89			-0		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1				
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: S. Anderson

Method of Shipment: FEDEX Airbill # 2865075710

Received for Lab: RMAL Signed: SCWyatt Date/Time 4/5/89 8:15

Enseco Project No. 4190

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 8358

Attn: _____

Enseco Client: St. Louis Park

Project: _____

Sampling Co.: _____

Sampling Site: _____

Team Leader: Scott Anderson

SAMPLE SAFE™ CONDITIONS

1. Packed by: SA Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: (Yes) No
8. Contents Temperature Upon Receipt by Lab: 11 °C
9. Condition of Contents: GOOD

Date	Time	Sample ID/Description	Sample Type	No. Containers	LAB #	Analysis Parameters	Remarks
4/4/89	1430	GAC-SLP10F-040489	LTR AMBER	6		PPT-PAH	HIGH PPT-PAH
		GAC-SLP10FTOC-040489	1602 Cl.	1		TOC	
		GAC-SLP10TTOC-040489		-01			
		GAC-SLP10C1TOC-040489		-03			
		GAC-SLP10C2TOC-040489		-04			
		GAC-SLP10C3TOC-040489		-05			

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1				
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: SA

Method of Shipment: Fed Ex Airbill # 2865075710

Received for Lab: Alex Rejzer RMAL Signed: Alex Rejzer Date/Time 4/5/89 08:15

Enseco Project No 4190

White and Pink Copies to Lab Yellow to Sampler

SS-001

Rocky Mountain
Analytical Laboratory

Enseco

April 28, 1989

Jim Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416-2209

Dear Jim:

Enclosed is the report for four aqueous samples received at Rocky Mountain Analytical Laboratory on April 5, 1989.

If you have any questions the Program Administrator assigned to this project is Jean Zimmerman.

Sincerely,

Tracy Giberson
Data Control Supervisor

Enclosures

cc: Jean Zimmerman, PA

RMAL #004190

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004190-0001-SA	GAC-SLP10TTOC-040489	AQUEOUS	04 APR 89	14:30	05 APR 89
004190-0003-SA	GAC-SLP10C1TOC-040489	AQUEOUS	04 APR 89	14:30	05 APR 89
004190-0004-SA	GAC-SLP10C2TOC-040489	AQUEOUS	04 APR 89	14:30	05 APR 89
004190-0005-SA	GAC-SLP10C3TOC-040489	AQUEOUS	04 APR 89	14:30	05 APR 89

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10T-040489
Lab ID: 004190-0001-SA Enseco ID: 1032315
Matrix: AQUEOUS Sampled: 04 APR 89 Received: 05 APR 89
Authorized: 05 APR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.7	mg/L	0.1	415.1	06 APR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C1-040489
Lab ID: 004190-0003-SA Enseco ID: 1032317
Matrix: AQUEOUS Sampled: 04 APR 89 Received: 05 APR 89
Authorized: 05 APR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.6	mg/L	0.1	415.1	06 APR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C2-040489
Lab ID: 004190-0004-SA Enseco ID: 1032318
Matrix: AQUEOUS Sampled: 04 APR 89 Received: 05 APR 89
Authorized: 05 APR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.2	mg/L	0.1	415.1	06 APR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C3-040489
Lab ID: 004190-0005-SA Enseco ID: 1032319
Matrix: AQUEOUS Sampled: 04 APR 89 Received: 05 APR 89
Authorized: 05 APR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.9	mg/L	0.1	415.1	06 APR 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS	SCS
004190-0001-SA	AQUEOUS	TOC-A	06 APR 89-B	-
004190-0003-SA	AQUEOUS	TOC-A	06 APR 89-B	-
004190-0004-SA	AQUEOUS	TOC-A	06 APR 89-B	-
004190-0005-SA	AQUEOUS	TOC-A	06 APR 89-B	-

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured LCS1	Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Limits	Precision(RPD) LCS	Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 06 APR 89-B								
Concentration Units: mg/L								
Total Organic Carbon	25	24.8	25.3	99	101	91-109	2.0	20

Enseco

CASE NARRATIVE

City of St. Louis Park

April 28 1989

Enseco - RMAL Project Number 004190

Introduction

Eight aqueous samples were received at Rocky Mountain Analytical Laboratory on April 5, 1989. The samples were logged in under RMAL project number 004190. A cross reference associating the RMAL sample numbers to the actual field sample numbers is included. The samples were analyzed for low level part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

As requested per Jim Grube, a carbon filtered method blank as well as a DI blank was analyzed and reported with this set of samples.

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

Sample 4190-01MS did not meet secondary ion confirmation for quinoline. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I) as per the 1989 QAPP.

The surrogate recovery for D8-Napthalene was quantitated by using the secondary ion in sample 4190-04.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Giberson Date: 4/28/89
Tracy Giberson
Data Control Supervisor

Approved by: Jean Zimmerman FOR Date: 4/28/89
Jean Zimmerman
Program Administrator

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004190-0001-SA	GAC-SLP10T-040489	AQUEOUS	04 APR 89	14:30	05 APR 89
004190-0001-DU	GAC-SLP10TD-040489	AQUEOUS	04 APR 89	13:30	05 APR 89
004190-0001-MS	GAC-SLP10MS-040489	AQUEOUS	04 APR 89	13:30	05 APR 89
004190-0002-SA	GAC-SLP10FB-040489	AQUEOUS	04 APR 89	13:00	05 APR 89
004190-0002-DU	GAC-SLP10FBD-040489	AQUEOUS	04 APR 89	13:00	05 APR 89
004190-0003-SA	GAC-SLP10C1-040489	AQUEOUS	04 APR 89	14:30	05 APR 89
004190-0004-SA	GAC-SLP10C2-040489	AQUEOUS	04 APR 89	14:30	05 APR 89
004190-0005-SA	GAC-SLP10C3-040489	AQUEOUS	04 APR 89	14:30	05 APR 89

SUMMARY DATA PACKAGE FOR

City of St. Louis Park

RMA ac# 4190

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4190-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4190-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X991

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/13/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	16.	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	3.4	J B
4565-32-6	Benzo(B)Thiophene	1.5	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.4	B
90-12-0	1-Methylnaphthalene	1.6	B
92-52-4	Biphenyl	1.7	J
208-96-8	Acenaphthylene	3.8	
83-32-9	Acenaphthene	8.5	
132-64-9	Dibenzofuran	1.3	
86-73-7	Fluorene	5.4	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.2	J
129-00-0	Pyrene	1.5	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4190-01DUP

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4190-01DUP

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X992

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/13/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	24.	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	1.9	J B
4565-32-6	Benzo(B)Thiophene	2.4	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.1	B
90-12-0	1-Methylnaphthalene	1.2	J B
92-52-4	Biphenyl	2.6	J
208-96-8	Acenaphthylene	6.2	
83-32-9	Acenaphthene	13.	
132-64-9	Dibenzofuran	2.0	
86-73-7	Fluorene	8.4	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.5	
129-00-0	Pyrene	1.8	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4190-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4190-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X995

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/13/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	3.1	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.9	B
90-12-0	1-Methylnaphthalene	1.1	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.4	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4190-03

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4190-03

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X996

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/13/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	4.9	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	6.5	U
4565-32-6	Benzo(B)Thiophene	3.2	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.9	
91-57-6	2-Methylnaphthalene	0.9	U
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.8	
83-32-9	Acenaphthene	7.3	
132-64-9	Dibenzofuran	1.2	
86-73-7	Fluorene	2.4	
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	3.8	
129-00-0	Pyrene	7.5	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4190-04

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4190-04

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X997

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/14/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.0	J
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	1.4	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	0.9	U
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.1	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4190-05

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4190-05

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X998

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/14/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	6.5	U
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	0.9	U
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.1	J
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4190-01MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4190-01MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X993

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/13/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	15.	
95-13-6	1H-Indene	9.3	SP
91-20-3	Naphthalene	11.	B SP
4565-32-6	Benzo(B)Thiophene	1.5	
91-22-5	Quinoline	29.	* SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	11.	B SP
90-12-0	1-Methylnaphthalene	1.1	J B
92-52-4	Biphenyl	1.9	J
208-96-8	Acenaphthylene	4.0	
83-32-9	Acenaphthene	8.8	
132-64-9	Dibenzofuran	1.3	
86-73-7	Fluorene	17.	SP
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	
129-00-0	Pyrene	1.5	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	9.9	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	2.6	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X989

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/13/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	6.5	U
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	0.9	U
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.6	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

DI BLANK

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: DI BLANK

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4190X990

Level: (low/med) LOW Date Received: 04/05/89

% Moisture: not dec. dec. Date Extracted: 04/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 04/13/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	3.8	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.0	
90-12-0	1-Methylnaphthalene	1.5	J
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.8	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	4190-01	82	81	78
2	4190-01DUP	100	93	73
3	4190-01MS	86	90	84
5	4190-02	108	89	92
6	4190-03	77	83	86
7	4190-04	103 **	99	92
8	4190-05	92	89	76
9	BLK01	84	77	83
10	DI BLANK	94	99	96

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

** Surrogate quantitated from secondary ion

3C

WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 4190-01

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	10	0.0	9.3	93
Naphthalene	10	3.4	11.	76
Quinoline	10	0.0	29.	290
2-Methylnaphthalene	10	2.4	11.	86
Fluorene	10	5.4	17.	116
Chrysene	10	0.0	9.9	99
Benzo(E)Pyrene	10	0.0	2.6	26

COMMENTS:

3C

WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 4190-01

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	16.	24.	40
Naphthalene	3.4	1.9	57
Benzo(B)Thiophene	1.5	2.4	46
2-Methylnaphthalene	2.4	1.1	74
1-Methylnaphthalene	1.6	1.2	29
Biphenyl	1.7	2.6	42
Acenaphthylene	3.8	6.2	48
Acenaphthene	8.5	13.	42
Dibenzofuran	1.3	2.0	42
Fluorene	5.4	8.4	43
Phenanthrene	1.3	1.2	8
Fluoranthene	1.2	1.5	22
Pyrene	1.5	1.8	18

COMMENTS:

ND = Not found
NC = Not calculated

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4190 SAS No.: N/A SDG No.: N/A

Lab File ID: S4190X989 Lab Sample ID: BLK-01

Date Extracted: 04/06/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 04/13/89 Time Analyzed: 17:00

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	DI BLANK	DI BLANK	S4190X990	04/13/89
2	4190-01	4190-01	S4190X991	04/13/89
3	4190-01DUP	4190-01DUP	S4190X992	04/13/89
4	4190-01MS	4190-01MS	S4190X993	04/13/89
6	4190-02	4190-02	S4190X995	04/13/89
7	4190-03	4190-03	S4190X996	04/13/89
8	4190-04	4190-04	S4190X997	04/14/89
9	4190-05	4190-05	S4190X998	04/14/89

COMMENTS:

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 4190 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX988	04/13/89	15:41
BLK-01	S4190X989	04/13/89	17:00
DI BLANK	S4190X990	04/13/89	17:53
4190-01	S4190X991	04/13/89	18:46
4190-01DUP	S4190X992	04/13/89	19:40
4190-01MS	S4190X993	04/13/89	20:34
4190-02	S4190X995	04/13/89	22:22
4190-03	S4190X996	04/13/89	23:16
4190-04	S4190X997	04/14/89	00:10
4190-05	S4190X998	04/14/89	1:03

INITIAL CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: N/A

Instrument ID: 4500-X Calibration Date(s): 04/13/89

Minimum RF is 0.050 Maximum % RSD is 35%

Lab File ID: RRF = STDX986 RRF = STDX984
RRF = STDX987 RRF = STDX985 RRF = STDX983

COMPOUND	20 PPT RRF	40 PPT RRF	240PPT RRF	1200PPT RRF	4800PPT RRF	AVE RRF	%RSD
D8-Naphthalene	2.648	2.513	2.437	2.666	2.301	2.513	6.0
D10-Flourene	1.360	1.278	1.306	1.368	1.525	1.367	7.0
D12-Chrysene	1.806	1.706	1.525	1.683	1.696	1.683	6.0
2,3-Benzofuran	1.487	1.438	1.347	1.488	1.513	1.455	4.5
2,3-Dihydroindene	1.481	1.456	1.392	1.541	1.586	1.491	5.0
1H-Indene	1.789	1.797	1.695	1.928	1.885	1.819	5.0
Naphthalene	3.034	2.882	2.745	3.077	2.515	2.851	8.0
Benzo(B)Thiophene	2.359	2.243	2.161	2.410	2.161	2.267	5.0
Quinoline	1.161	1.079	1.173	1.371	1.571	1.271	15.7
1H-Indole	1.641	1.623	1.591	1.803	1.912	1.714	8.0
2-Methylnaphthalene	1.533	1.457	1.414	1.568	1.663	1.527	6.4
1-Methylnaphthalene	1.584	1.508	1.462	1.621	1.693	1.574	5.8
Biphenyl	2.453	2.028	1.954	2.084	2.033	2.110	9.3
Acenaphthylene	1.701	1.683	1.695	2.001	2.111	1.838	11.0
Acenaphthene	1.472	1.310	1.301	1.418	1.539	1.408	7.3
Dibenzofuran	2.268	2.143	2.086	2.222	2.198	2.183	3.2
Flourene	1.608	1.460	1.504	1.619	1.823	1.603	8.8
Dibenzothiophene	1.305	1.218	1.163	1.085	1.329	1.220	8.3
Phenanthrene	1.362	1.263	1.219	1.127	1.355	1.265	7.8
Anthracene	1.089	1.042	1.063	1.035	1.346	1.115	11.7
Acridine	0.805	0.727	0.881	0.883	1.236	0.906	21.5
Carbazole	1.177	1.121	1.091	0.994	1.285	1.134	9.5
Fluoranthene	1.435	1.264	1.276	1.139	1.422	1.307	9.4
Pyrene	1.777	1.361	1.262	1.105	1.394	1.380	18.0
Benzo(A)Anthracene	1.832	1.786	1.580	1.851	1.933	1.796	7.4
Chrysene	1.851	1.896	1.611	1.802	1.843	1.801	6.2
Benzo(B)Fluoranthene	1.938	1.924	1.614	1.911	1.878	1.853	7.3
Benzo(K)Fluoranthene	2.230	1.991	1.602	1.897	2.114	1.967	12.2
Benzo(E)Pyrene	1.780	1.827	1.678	1.867	1.872	1.805	4.4
Benzo(A)Pyrene	1.412	1.437	1.356	1.562	1.750	1.503	10.5
Perylene	1.514	1.429	1.361	1.589	1.813	1.541	11.3
Indeno(1,2,3-CD)Pyrene	1.477	1.466	1.417	1.628	1.646	1.527	6.8
Dibenz(A,H)Anthracene	1.167	1.273	1.199	1.355	1.362	1.271	7.0
Benzo(G,H,I)Perylene	1.480	1.316	1.253	1.434	1.357	1.368	6.6

CONTINUING CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 4190

Instrument ID: 4500-X Calibration Date(s): 04/13/89

Lab ID: STDX988 Calibration Time: 15:41

Minimum RF is 0.050 Maximum %RPD is 35%

COMPOUND	INITIAL AVE RRF	40 PPT RRF	%RPD
D8-Naphthalene	2.513	2.502	0.4
D10-Flourene	1.367	1.278	6.5
D12-Chrysene	1.683	1.520	9.7
2,3-Benzofuran	1.455	1.432	1.6
2,3-Dihydroindene	1.491	1.469	1.5
1H-Indene	1.819	1.765	3.0
Naphthalene	2.851	2.845	0.2
Benzo(B)Thiophene	2.267	2.183	3.7
Quinoline	1.271	1.023	19.5
1H-Indole	1.714	1.522	11.2
2-Methylnaphthalene	1.527	1.421	6.9
1-Methylnaphthalene	1.574	1.482	5.8
Biphenyl	2.110	1.901	9.9
Acenaphthylene	1.838	1.564	14.9
Acenaphthene	1.408	1.245	11.6
Dibenzofuran	2.183	2.023	7.3
Flourene	1.603	1.410	12.0
Dibenzothiophene	1.220	1.172	3.9
Phenanthrene	1.265	1.216	3.9
Anthracene	1.115	0.947	15.1
Acridine	0.906	0.639	29.5
Carbazole	1.134	1.019	10.1
Fluoranthene	1.307	1.239	5.2
Pyrene	1.380	1.273	7.8
Benzo(A)Anthracene	1.796	1.552	13.6
Chrysene	1.801	1.624	9.8
Benzo(B)Fluoranthene	1.853	1.677	9.5
Benzo(K)Fluoranthene	1.967	1.520	22.7
Benzo(E)Pyrene	1.805	1.626	9.9
Benzo(A)Pyrene	1.503	1.197	20.4
Perylene	1.541	1.315	14.7
Indeno(1,2,3-CD)Pyrene	1.527	1.306	14.5
Dibenz(A,H)Anthracene	1.271	1.082	14.9
Benzo(G,H,I)Perylene	1.368	1.213	11.3

FORM VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 4190 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX988 Date Analyzed: 04/13/89

Instrument ID: 4500-X TIme Analyzed: 15:41

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	65431	104005	64664
UPPER LIMIT	130862	208010	129328
LOWER LIMIT	32716	52002	32332
SAMPLE NO.			
4190-01	82100	129600	82600
4190-01DUP	68600	115600	79200
4190-01MS	71200	124900	86200
4190-02	68100	107700	70200
4190-02DUP	79100	137100	97700
4190-03	81000	137700	96100
4190-04	73400	119600	76400
4190-05	63300	106900	77000
BLK-01	87800	142200	92900
DI BLANK	78000	128900	90100

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

1/87 Rev.

FORM VIII SV-2

Rocky Mountain
Analytical Laboratory

Enseco

May 12, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear Mr. Grube:

Enclosed is the report for the one aqueous sample received at Rocky Mountain Analytical Laboratory on April 18, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Jean Zimmerman.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Jean Zimmerman, Program Administrator

RMAL #004475

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report
- Data Quality Assessment

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The first four sections below describes the format, content, and organization for the four corresponding separate components of this report. The fifth section provides an overall data quality assessment of the results.

Sample Description Information

The Sample Description Information lists all the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and where available and appropriate, dates sampled, received, authorized, prepared, and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method, and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content. Analytical data is corrected for blank contamination before it is reported.

Quality Control Reports

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. The QC checks include analysis of method blanks, laboratory control samples (LCS), and surrogate control samples (SCS). Results from these analyses are presented along with the control limits.

Method Blank Results: A method blank is a laboratory generated sample used to assess the degree to which laboratory operations and procedures cause false positive analytical results.

Laboratory Control Samples (LCS): An LCS consists of a standard control matrix that is spiked with a group of target analytes representative of the method analytes.

Surrogate Control Samples (SCS): An SCS is an additional control measure taken for organic analyses.

Accuracy for LCS and SCS is measured by Percent Recovery

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for LCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{\text{Measured Concentration LCS1} - \text{Measured Concentration LCS2}}{(\text{Measured Concentration LCS1} + \text{Measured Concentration LCS2})/2}$$

Data Quality Assessment

The results contained in this report were reviewed relative to data acceptance criteria as specified in Enseco's Quality Assurance Project Plan for completeness, precision, accuracy, representativeness and defensibility of the data. Unless otherwise stated below, no quality control problems or technical difficulties were encountered.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004475-0001-SA	GAC-SLP10C1-TOC-041789	AQUEOUS	17 APR 89	13:00	18 APR 89

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C1-TOC-041789
Lab ID: 004475-0001-SA Enseco ID: 1034454
Matrix: AQUEOUS Sampled: 17 APR 89 Received: 18 APR 89
Authorized: 18 APR 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.5	mg/L	0.1	415.1	01 MAY 89

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Kimberly Conroy

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
004475-0001-SA	AQUEOUS	TOC-A	01 MAY 89-B

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 01 MAY 89-B								
Concentration Units: mg/L								
Total Organic Carbon	25	24.9	24.6	100	98	91-109	1.2	20

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

May 12, 1989

Enseco - RMAL Project Number 004475

Introduction

One aqueous sample was received at Rocky Mountain Analytical Laboratory on April 18 1989. The sample was logged in under RMAL project number 004475. A cross reference associating the RMAL sample number to the actual field sample number is included. The sample was analyzed for medium level part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

Sample 4475-01 showed target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in a sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (FORM I) as per the 1989 QAPP.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Giberson **Date:** 5/12/89
Tracy Giberson
Data Control Supervisor

Approved by: Jean Zimmerman **Date:** May 12, 1989
Jean Zimmerman
Program Administrator

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004475-0001-SA	GAC-SLP10C1-041789	AQUEOUS	17 APR 89	13:00	18 APR 89

SUMMARY

DATA

PACKAGE

FOR

City of St. Louis Park

RMA QC# 4475

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4475-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4475 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4475-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4475X237

Level: (low/med) LOW Date Received: 04/18/89

% Moisture: not dec. dec. Date Extracted: 04/24/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/05/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.3	J B
95-13-6	1H-Indene	3.0	
91-20-3	Naphthalene	3.1	J B *
4565-32-6	Benzo(B)Thiophene	22.	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.5	B
90-12-0	1-Methylnaphthalene	1.6	B *
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	3.1	
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.9	*
85-01-8	Phenanthrene	1.2	J B
120-12-7	Anthracene	2.0	
260-94-6	Acridine	1.9	J *
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	8.8	
129-00-0	Pyrene	15.	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4475 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	4475-01	89	86	103
2	BLK01	80	78	69

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4475 SAS No.: N/A SDG No.: N/A

Lab File ID: S4475X236 Lab Sample ID: BLK01

Date Extracted: 04/24/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 05/05/89 Time Analyzed: 17:35

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	4475-01	4475-01	S4475X237	05/05/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4475 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4475X236

Level: (low/med) LOW Date Received: 04/18/89

% Moisture: not dec. dec. Date Extracted: 04/24/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/05/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.3	J
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	3.3	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.7	
90-12-0	1-Methylnaphthalene	1.6	
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.7	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.5	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 4475 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX235	05/05/89	15:50
BLK01	S4475X236	05/05/89	17:35
4475-01	S4475X237	05/05/89	18:28

INITIAL CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: N/A

Instrument ID: 4500-X Calibration Date(s): 04/13/89

Minimum RF is 0.050 Maximum % RSD is 35%

Lab File ID: RRF = STDX986 RRF = STDX984
RRF = STDX987 RRF = STDX985 RRF = STDX983

COMPOUND	20 PPT RRF	40 PPT RRF	240PPT RRF	1200PPT RRF	4800PPT RRF	AVE RRF	%RSD
D8-Naphthalene	2.648	2.513	2.437	2.666	2.301	2.513	6.0
D10-Flourene	1.360	1.278	1.306	1.368	1.525	1.367	7.0
D12-Chrysene	1.806	1.706	1.525	1.683	1.696	1.683	6.0
2,3-Benzofuran	1.487	1.438	1.347	1.488	1.513	1.455	4.5
2,3-Dihydroindene	1.481	1.456	1.392	1.541	1.586	1.491	5.0
1H-Indene	1.789	1.797	1.695	1.928	1.885	1.819	5.0
Naphthalene	3.034	2.882	2.745	3.077	2.515	2.851	8.0
Benzo(B)Thiophene	2.359	2.243	2.161	2.410	2.161	2.267	5.0
Quinoline	1.161	1.079	1.173	1.371	1.571	1.271	15.7
1H-Indole	1.641	1.623	1.591	1.803	1.912	1.714	8.0
2-Methylnaphthalene	1.533	1.457	1.414	1.568	1.663	1.527	6.4
1-Methylnaphthalene	1.584	1.508	1.462	1.621	1.693	1.574	5.8
Biphenyl	2.453	2.028	1.954	2.084	2.033	2.110	9.3
Acenaphthylene	1.701	1.683	1.695	2.001	2.111	1.838	11.0
Acenaphthene	1.472	1.310	1.301	1.418	1.539	1.408	7.3
Dibenzofuran	2.268	2.143	2.086	2.222	2.198	2.183	3.2
Flourene	1.608	1.460	1.504	1.619	1.823	1.603	8.8
Dibenzothiophene	1.305	1.218	1.163	1.085	1.329	1.220	8.3
Phenanthrene	1.362	1.263	1.219	1.127	1.355	1.265	7.8
Anthracene	1.089	1.042	1.063	1.035	1.346	1.115	11.7
Acridine	0.805	0.727	0.881	0.883	1.236	0.906	21.5
Carbazole	1.177	1.121	1.091	0.994	1.285	1.134	9.5
Fluoranthene	1.435	1.264	1.276	1.139	1.422	1.307	9.4
Pyrene	1.777	1.361	1.262	1.105	1.394	1.380	18.0
Benzo(A)Anthracene	1.832	1.786	1.580	1.851	1.933	1.796	7.4
Chrysene	1.851	1.896	1.611	1.802	1.843	1.801	6.2
Benzo(B)Fluoranthene	1.938	1.924	1.614	1.911	1.878	1.853	7.3
Benzo(K)Fluoranthene	2.230	1.991	1.602	1.897	2.114	1.967	12.2
Benzo(E)Pyrene	1.780	1.827	1.678	1.867	1.872	1.805	4.4
Benzo(A)Pyrene	1.412	1.437	1.356	1.562	1.750	1.503	10.5
Perylene	1.514	1.429	1.361	1.589	1.813	1.541	11.3
Indeno(1,2,3-CD)Pyrene	1.477	1.466	1.417	1.628	1.646	1.527	6.8
Dibenz(A,H)Anthracene	1.167	1.273	1.199	1.355	1.362	1.271	7.0
Benzo(G,H,I)Perylene	1.480	1.316	1.253	1.434	1.357	1.368	6.6

CONTINUING CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 4475

Instrument ID: 4500-X Calibration Date(s): 05/05/89

Lab ID: STDX235 Calibration Time: 15:50

Minimum RF is 0.050 Maximum %RPD is 35%

COMPOUND	INITIAL AVE RRF	40 PPT RRF	%RPD
D8-Naphthalene	2.513	2.388	5.0
D10-Flourene	1.367	1.265	7.5
D12-Chrysene	1.683	1.746	-3.7
2,3-Benzofuran	1.455	1.343	7.7
2,3-Dihydroindene	1.491	1.430	4.1
1H-Indene	1.819	1.684	7.4
Naphthalene	2.851	2.794	2.0
Benzo(B)Thiophene	2.267	2.142	5.5
Quinoline	1.271	0.973	23.4
1H-Indole	1.714	1.484	13.4
2-Methylnaphthalene	1.527	1.508	1.2
1-Methylnaphthalene	1.574	1.465	6.9
Biphenyl	2.110	1.969	6.7
Acenaphthylene	1.838	1.830	0.4
Acenaphthene	1.408	1.354	3.8
Dibenzofuran	2.183	2.032	6.9
Flourene	1.603	1.502	6.3
Dibenzothiophene	1.220	1.107	9.3
Phenanthrene	1.265	1.233	2.5
Anthracene	1.115	1.015	9.0
Acridine	0.906	0.664	26.7
Carbazole	1.134	1.054	7.1
Fluoranthene	1.307	1.134	13.2
Pyrene	1.380	1.119	18.9
Benzo(A)Anthracene	1.796	1.676	6.7
Chrysene	1.801	1.921	-6.7
Benzo(B)Fluoranthene	1.853	1.815	2.1
Benzo(K)Fluoranthene	1.967	1.612	18.0
Benzo(E)Pyrene	1.805	1.821	-0.9
Benzo(A)Pyrene	1.503	1.358	9.6
Perylene	1.541	1.289	16.4
Indeno(1,2,3-CD)Pyrene	1.527	1.314	13.9
Dibenz(A,H)Anthracene	1.271	1.070	15.8
Benzo(G,H,I)Perylene	1.368	1.301	4.9

FORM VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 4475 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX235 Date Analyzed: 05/05/89

Instrument ID: 4500-X Time Analyzed: 15:50

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	203496	333604	140068
UPPER LIMIT	406992	667208	972050
LOWER LIMIT	101748	166802	70034
SAMPLE NO.			
4475-01	178200	298700	128200
BLK01	162000	264400	309500

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

1/87 Rev.

FORM VIII SV-2

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile 303/431 7171

CHAIN OF CUSTODY

No. 8318

Attn: _____

Enseco Client: CITY OF ST LOUIS PARK
Project: _____
Sampling Co: SAME
Sampling Site: SAME
Team Leader: M Higgins

SAMPLE SAFE™ CONDITIONS

1 Packed by: M Higgins Seal # _____
2 Seal Intact Upon Receipt by Sampling Co Yes No
3 Condition of Contents _____
4 Sealed for Shipping by _____
5 Initial Contents Temp _____ °C Seal # _____
6 Sampling Status Done Continuing Until _____
7 Seal Intact Upon Receipt by Laboratory (Yes) No
8 Contents Temperature Upon Receipt by Lab 10.9 °C
9 Condition of Contents OK

	Date	Time	Sample ID/Description	Sample Type	No Containers	Analysis Parameters	Remarks
01	4-17-89	1300	GAC-SLP10 C1-041789	1XL AMBER	6	PPC PAH	
01	4-17-89		GAC-SLP10 C1 TOC-041789	1 16oz Cl.	1	TOC	

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by (signed)	Received by (signed)	Date	Time
1	M Higgins		4-17-89	1430
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: M Higgins
Method of Shipment: Federal Exp. Airbill # 2865075732
Received for Lab: RMA Signed: [illegible] Date/Time: 4/18/89
Enseco Project No: 4475 0810

White and Pink Copies to Lab Yellow to Sampler

SS 001

Enseco

May 25, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear Mr. Grube:

Enclosed is the report for the two aqueous samples received at Rocky Mountain Analytical Laboratory on May 2, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Jean Zimmerman.

Sincerely,

Ramona Power
Data Control

Enclosures

cc: Jean Zimmerman, Program Administrator

RMAL #004703

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax. 303/431-7171

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004703-0004-SA	GAC-SLP10TTOC-050189	AQUEOUS	01 MAY 89		02 MAY 89
004703-0005-SA	GAC-SLP10C1TOC-050189	AQUEOUS	01 MAY 89		02 MAY 89

Enseco

ANALYTICAL TEST REQUESTS
for
City of St. Louis Park

Lab ID: 004703	Group Code	Analysis Description	Custom Test?
0004 - 0005	C	Total Organic Carbon (TOC)	

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10TTOC-050189
Lab ID: 004703-0004-SA Enseco ID: 1036477
Matrix: AQUEOUS Sampled: 01 MAY 89 Received: 02 MAY 89
Authorized: 02 MAY 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	0.7	mg/L	0.2	415.1	11 MAY 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP10C1TOC-050189
Lab ID: 004703-0005-SA Enseco ID: 1036478
Matrix: AQUEOUS Sampled: 01 MAY 89 Received: 02 MAY 89
Authorized: 02 MAY 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.4	mg/L	0.2	415.1	11 MAY 89

ND=Not Detected
NA=Not Applicable

Reported By: Cheryl Jones Approved By: Kimberly Conroy

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
004703-0004-SA	AQUEOUS	TOC-A	11 MAY 89-A
004703-0005-SA	AQUEOUS	TOC-A	11 MAY 89-A

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 11 MAY 89-A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.5	24.6	98	98	91-109	0.4	20

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

May 25, 1989

Enseco - RMAL Project Number 004703

Introduction

Six aqueous samples were received at Enseco Rocky Mountain Analytical Laboratory on May 2, 1989. Sample GAC-SLP10FBD-050189 was extracted and held as per the QAPP. The remaining samples were logged in under RMAL project number 004703. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. The samples were analyzed for low level part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

All samples show target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in the sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with an asterisk (*) on the data sheets (Form I) as per the 1989 QAPP.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax. 303/431-7171

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: _____ **Date:** _____
Tracy Giberson
Data Control Supervisor

Approved by: _____ **Date:** 5/25/89
Jean Zimmerman
Program Administrator

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004703-0001-SA	GAC-SLP10T-050189	AQUEOUS	01 MAY 89		02 MAY 89
004703-0001-DU	GAC-SLP10TD-050189	AQUEOUS	01 MAY 89		02 MAY 89
004703-0001-MS	GAC-SLP10MS-050189	AQUEOUS	01 MAY 89		02 MAY 89
004703-0002-SA	GAC-SLP10FB-050189	AQUEOUS	01 MAY 89		02 MAY 89
004703-0002-DU	GAC-SLP10FBD-050189	AQUEOUS	01 MAY 89		02 MAY 89
004703-0003-SA	GAC-SLP10C1-050189	AQUEOUS	01 MAY 89		02 MAY 89

SUMMARY

DATA

PACKAGE

FOR

City of St. Louis Park

RMA QC# 4703

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4703-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4703-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4703X318

Level: (low/med) LOW Date Received: 05/02/89

% Moisture: not dec. dec. Date Extracted: 05/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/14/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	53.	
95-13-6	1H-Indene	1.8	
91-20-3	Naphthalene	3.6	J
4565-32-6	Benzo(B)Thiophene	8.4	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.7	
90-12-0	1-Methylnaphthalene	3.5	B
92-52-4	Biphenyl	6.4	
208-96-8	Acenaphthylene	9.2	*
83-32-9	Acenaphthene	28.	
132-64-9	Dibenzofuran	6.8	
86-73-7	Fluorene	16.	
132-65-0	Dibenzothiophene	1.6	
85-01-8	Phenanthrene	3.6	B
120-12-7	Anthracene	1.1	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	3.8	B
129-00-0	Pyrene	3.6	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

4703-01DUP

ab Name: RMAL Contract No.: N/A

ode: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

atrix: (soil/water) WATER Lab Sample ID: 4703-01DUP

ample wt/vol: 4000 (g/ml) ML Lab File ID: S4703X319

evel: (low/med) LOW Date Received: 05/02/89

Moisture: not dec. dec. Date Extracted: 05/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/14/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	54.	
95-13-6	1H-Indene	1.7	
91-20-3	Naphthalene	2.1	J
4565-32-6	Benzo(B)Thiophene	8.7	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.1	
90-12-0	1-Methylnaphthalene	3.3	B
92-52-4	Biphenyl	6.2	
208-96-8	Acenaphthylene	14.	*
83-32-9	Acenaphthene	29.	
132-64-9	Dibenzofuran	7.0	
86-73-7	Fluorene	17.	
132-65-0	Dibenzothiophene	1.7	
85-01-8	Phenanthrene	3.7	B
120-12-7	Anthracene	1.1	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	4.3	B *
129-00-0	Pyrene	4.0	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2 8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4703-01MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4703-01MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4703X320

Level: (low/med) LOW Date Received: 05/02/89

% Moisture: not dec. dec. Date Extracted: 05/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/15/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	53.	
95-13-6	1H-Indene	9.4	SP
91-20-3	Naphthalene	10.	SP
4565-32-6	Benzo(B)Thiophene	8.5	
91-22-5	Quinoline	10.	SP
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	9.4	SP
90-12-0	1-Methylnaphthalene	3.3	B
92-52-4	Biphenyl	6.4	
208-96-8	Acenaphthylene	13.	*
83-32-9	Acenaphthene	29.	
132-64-9	Dibenzofuran	6.8	
86-73-7	Fluorene	25.	SP
132-65-0	Dibenzothiophene	1.5	
85-01-8	Phenanthrene	3.1	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	3.8	B
129-00-0	Pyrene	3.7	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	7.2	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	2.2	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

4703-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4703-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4703X321

Level: (low/med) LOW Date Received: 05/02/89

% Moisture: not dec. dec. Date Extracted: 05/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/15/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	4.9	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.7	
90-12-0	1-Methylnaphthalene	1.6	B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.4	*
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.6	B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.3	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4703-03

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4703-03

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4703X337

Level: (low/med) LOW Date Received: 05/02/89

% Moisture: not dec. dec. Date Extracted: 05/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/16/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	6.8	
91-20-3	Naphthalene	4.1	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.7	*
90-12-0	1-Methylnaphthalene	1.4	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.3	B *
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.4	U
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	4703-01	67	60	79
2	4703-02	75	67	64
3	4703-03	49	47	11
4	4703-01DUP	82	68	84
5	4703-01MS	76	68	63
6	BLK01	56	60	50

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 4703-01

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	10	1.8	9.4	76
Naphthalene	10	3.6	10.	64
Quinoline	10	0.0	10.	100
2-Methylnaphthalene	10	1.7	9.4	77
Fluorene	10	16.	25.	90
Chrysene	10	0.0	7.2	72
Benzo(E)Pyrene	10	0.0	2.2	22

COMMENTS:

3C
WATER SEMIVOLATILE DUPLICATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

EPA Sample No.: 4703-01

COMPOUND	SAMPLE CONCENTRATION (ng/L)	DUPLICATE CONCENTRATION (ng/L)	% RPD
2,3-Dihydroindene	53.	54.	2
1H-Indene	1.8	1.7	6
Naphthalene	3.6	2.1	53
Benzo(B)Thiophene	8.4	8.7	4
2-Methylnaphthalene	1.7	1.1	43
1-Methylnaphthalene	3.5	3.3	6
Biphenyl	6.4	6.2	3
Acenaphthylene	9.2	14.	41
Acenaphthene	28.	29.	4
Dibenzofuran	6.8	7.0	3
Fluorene	16.	17.	6
Dibenzothiophene	1.6	1.7	6
Phenanthrene	3.6	3.7	3
Anthracene	1.1	1.1	0
Fluoranthene	3.8	4.3	12
Pyrene	3.6	4.0	11

COMMENTS:

ND = Not found
NC = Not calculated

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

Lab File ID: S4703X323 Lab Sample ID: BLK01

Date Extracted: 05/06/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 05/15/89 Time Analyzed: 02:47

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	4703-01	4703-01	S4703X318	05/14/89
2	4703-02	4703-02	S4703X321	05/15/89
3	4703-03	4703-03	S4703X337	05/16/89
4	4703-01MS	4703-01MS	S4703X320	05/15/89
5	4703-01DUP	4703-01DUP	S4703X319	05/14/89

COMMENTS:

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4703 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S4703X323

Level: (low/med) LOW Date Received: 05/02/89

% Moisture: not dec. dec. Date Extracted: 05/06/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/15/89

GPC Cleanup: (Y/N) pH: 6.5 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	6.5	U
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	0.9	U
90-12-0	1-Methylnaphthalene	1.7	
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.8	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.2	J
129-00-0	Pyrene	1.4	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 4703 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX314	05/14/89	18:01
4703-01	S4703X318	05/14/89	22:25
4703-02	S4703X321	05/15/89	01:02
4703-01MS	S4703X320	05/15/89	00:10
4703-01DUP	S4703X319	05/14/89	23:18
BLK01	S4703X323	05/15/89	02:47

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 4703 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX334	05/15/89	23:41
4703-03	S4703X337	05/16/89	07:49

Rocky Mountain
Analytical Laboratory

Enseco

May 25, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear Mr. Grube:

Enclosed is the report for the one aqueous sample received at Rocky Mountain Analytical Laboratory on May 2, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions the Program Administrator assigned to this project is Jean Zimmerman.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Jean Zimmerman, Program Administrator

RMAL #004706

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax 303/431-7171

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004706-0001-SA	GAC SLP10FTOC-050189	AQUEOUS	01 MAY 89		02 MAY 89

Enseco

ANALYTICAL TEST REQUESTS
for
City of St. Louis Park

Lab ID: 004706	Group Code	Analysis Description	Custom Test?
0001	A	Total Organic Carbon (TOC)	

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC SLP10FTOC-050189
Lab ID: 004706-0001-SA Enseco ID: 1036479
Matrix: AQUEOUS Sampled: 01 MAY 89 Received: 02 MAY 89
Authorized: 02 MAY 89 Prepared: NA Analyzed: NA

Parameter	Result	Units	Reporting Limit	Analytical Method	Analyzed Date
Total Organic Carbon	1.8	mg/L	0.1	415.1	03 MAY 89

ND=Not Detected
NA=Not Applicable

Reported By: Kurt Ill Approved By: Kimberly Conroy

Ensecc

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	Test	QC Lot Number LCS
004706-0001-SA	AQUEOUS	TOC-A	03 MAY 89-A

Enseco

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Concentration Measured LCS1	Concentration Measured LCS2	Accuracy(%) LCS1	Accuracy(%) LCS2	Accuracy(%) Limits	Precision(RPD) LCS	Precision(RPD) Limits
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 03 MAY 89-A								
Concentration Units: mg/L								
Total Organic Carbon	25	24.6	24.9	98	100	91-109	1.2	20

Rocky Mountain
Analytical Laboratory

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

May 25, 1989

Enseco - RMAL Project Number 004706

Introduction

One aqueous sample was received at Enseco Rocky Mountain Analytical Laboratory on May 2, 1989. The sample was logged in under RMAL project number 004706. A cross reference associating the RMAL sample numbers to actual field sample numbers is included. The sample was analyzed for medium level part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

There were no problems encountered in the medium level ppt-PAH analysis.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Giberson Date: 5/23/89
Tracy Giberson
Data Control Supervisor

Approved by: Jean Zimmerman Date: 5/25/89
Jean Zimmerman
Program Administrator

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax. 303/431-7171

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
004706-0001-SA	GAC-SLP10F-050189	AQUEOUS	01 MAY 89		02 MAY 89

SUMMARY

DATA

PACKAGE

FOR

City of St. Louis Park

RMA QC# 4706

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

4706-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4706 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 4706-01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S4706X338

Level: (low/med) MED Date Received: 05/02/89

% Moisture: not dec. dec. Date Extracted: 05/04/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/16/89

GPC Cleanup: (Y/N) pH: 7.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	410.	U
496-11-7	2,3-Dihydroindene	1800.	
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	500.	
91-22-5	Quinoline	110.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	160.	
92-52-4	Biphenyl	470.	
208-96-8	Acenaphthylene	810.	
83-32-9	Acenaphthene	1700.	
132-64-9	Dibenzofuran	670.	
86-73-7	Fluorene	1500.	
132-65-0	Dibenzothiophene	140.	
85-01-8	Phenanthrene	300.	
120-12-7	Anthracene	98.	
260-94-6	Acridine	230.	U
86-74-8	Carbazole	150.	U
206-44-0	Fluoranthene	350.	
129-00-0	Pyrene	300.	B
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	220.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	180.	U
57-97-6	7,12-Dimethylbenzanthracene	220.	U
192-97-2	Benzo(E)Pyrene	150.	U
50-32-8	Benzo(A)Pyrene	180.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	170.	U
53-70-3	Dibenz(A,H)Anthracene	130.	U
191-24-2	Benzo(G,H,I)Perylene	220.	U
215-58-7	Dibenz(A,C)Anthracene	130.	U

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4706 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	4706-01	90	97	90
2	BLK01	64	72	95

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 4706 SAS No.: N/A SDG No.: N/A

Lab File ID: S4706X315 Lab Sample ID: BLK01

Date Extracted: 05/04/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 05/14/89 Time Analyzed: 19:50

Matrix: (soil/water) WATER Level: (low/med) MED

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	4706-01	4706-01	S4706X338	05/16/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 4706 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK01

Sample wt/vol: 500 (g/ml) ML Lab File ID: S4706X315

Level: (low/med) MED Date Received: 05/02/89

% Moisture: not dec. dec. Date Extracted: 05/04/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 05/14/89

GPC Cleanup: (Y/N) pH: 6.0 Dilution Factor: 10.0

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	410.	U
496-11-7	2,3-Dihydroindene	110.	U
95-13-6	1H-Indene	72.	U
91-20-3	Naphthalene	520.	U
4565-32-6	Benzo(B)Thiophene	72.	U
91-22-5	Quinoline	110.	U
120-72-9	1H-Indole	200.	U
91-57-6	2-Methylnaphthalene	72.	U
90-12-0	1-Methylnaphthalene	130.	U
92-52-4	Biphenyl	340.	U
208-96-8	Acenaphthylene	110.	U
83-32-9	Acenaphthene	100.	U
132-64-9	Dibenzofuran	80.	U
86-73-7	Fluorene	80.	U
132-65-0	Dibenzothiophene	88.	U
85-01-8	Phenanthrene	100.	U
120-12-7	Anthracene	88.	U
260-94-6	Acridine	230.	U
86-74-8	Carbazole	150.	U
206-44-0	Fluoranthene	110.	U
129-00-0	Pyrene	35.	J
56-55-3	Benzo(A)Anthracene	200.	U
218-01-9	Chrysene	220.	U
205-99-2	Benzo(B)Fluoranthene	200.	U
207-08-9	Benzo(K)Fluoranthene	180.	U
57-97-6	7,12-Dimethylbenzanthracene	220.	U
192-97-2	Benzo(E)Pyrene	150.	U
50-32-8	Benzo(A)Pyrene	180.	U
198-55-0	Perylene	200.	U
56-49-5	3-Methylcholanthrene	280.	U
193-39-5	Indeno(1,2,3-CD)Pyrene	170.	U
53-70-3	Dibenz(A,H)Anthracene	130.	U
191-24-2	Benzo(G,H,I)Perylene	220.	U
215-58-7	Dibenz(A,C)Anthracene	130.	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 4706 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX314	05/14/89	18:01
BLK-01	S4706X315	05/14/89	18:50

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 4706 SAS No: N/A SGD No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 ppt PAH STD	STDX334	05/15/89	23:41
4706-01	S4706X338	05/16/89	08:44

Rocky Mountain
Analytical Laboratory

Enseco

July 10, 1989

James Grube
City of St. Louis Park
5005 Minnetonka Blvd.
St. Louis Park, MN 55416

Dear Mr. Grube:

Enclosed is the report for the one aqueous sample received at Rocky Mountain Analytical Laboratory on May 23, 1989.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

If you have any questions, the Program Administrator assigned to this project is Jean Zimmerman.

Sincerely,

Ramona Power

Ramona Power
Data Control

Enclosures

cc: Jean Zimmerman, PA

RMAL #005041

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Discussion

This report contains results and supporting quality control and sample identification information associated with analyses performed on this project. The results and supporting information are contained in tables following this section, arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report
- Data Quality Assessment

Analyses were performed in accordance with EPA methods and with Enseco's current Quality Assurance Program Plan for Environmental Chemical Monitoring. The specific analytical methods used are presented with each result. The first four sections below describes the format, content, and organization for the four corresponding separate components of this report. The fifth section provides an overall data quality assessment of the results.

Sample Description Information

The Sample Description Information lists all the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Analytical Results

The analytical results for this project are presented in data tables. Each data table includes sample identification information, and where available and appropriate, dates sampled, received, authorized, prepared, and analyzed.

Data sheets contain a listing of the parameters measured in each test, the analytical results, the analytical method, and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Enseco-RMAL is no longer routinely blank-correcting analytical data. Uncorrected analytical results are reported, along with associated blank results, for all organic and metals analyses. Analytical results and blank results are reported for conventional inorganic parameters as specified in the method. This policy is described in detail in the Enseco Incorporated Quality Assurance Program Plan for Environmental Chemical Monitoring, Revision 3.3, April, 1989.

Quality Control Reports

As documented in more detail in Enseco's QAPP, various internal quality control checks are performed to assure that the laboratory was in control during the time that samples on this project were analyzed. The QC checks include analysis of method blanks, duplicate control samples (DCS), and single control samples (SCS). Results from these analyses are presented along with the control limits.

Method Blank Results: A method blank is a laboratory generated sample used to assess the degree to which laboratory operations and procedures cause false positive analytical results.

Duplicate Control Samples (DCS): Each DCS consists of a standard control matrix that is spiked with a group of target analytes representative of the method analytes. One Duplicate Control Sample is prepared for every twenty (20) samples.

Single Control Samples (SCS): An SCS is a spiked sample analyzed with each batch of samples.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

Data Quality Assessment

The results contained in this report were reviewed relative to data acceptance criteria as specified in Enseco's Quality Assurance Project Plan for completeness, precision, accuracy, representativeness and defensibility of the data. Unless otherwise stated below, no quality control problems or technical difficulties were encountered.

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
005041-0001-SA	GAC-SLP15C1-052289	AQUEOUS	22 MAY 89	13:00	23 MAY 89

Enseco

ANALYTICAL TEST REQUESTS
for
City of St. Louis Park

Lab ID: 005041	Group Code	Analysis Description	Custom Test?
0001	A	Total Organic Carbon (TOC)	N
		Polynuclear Aromatic Hydrocarbons, SIM Low Level	N
		Prep - PAH/SIM by GC/MS Low Level	N

Enseco

General Inorganics

Client Name: City of St. Louis Park
Client ID: GAC-SLP15C1-052289
Lab ID: 005041-0001-SA Enseco ID: 1039260
Matrix: AQUEOUS Sampled: 22 MAY 89 Received: 23 MAY 89
Authorized: 23 MAY 89 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Total Organic Carbon	2.4	mg/L	0.1	415.1	NA	13 JUN 89

N.D. = Not Detected
N.A. = Not Applicable

Reported By: Kurt Ill Approved By: Tammy Bailey

Enseco

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)
005041-0001-SA	AQUEOUS	TOC-A	13 JUN 89-B

Enseco

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 13 JUN 89-B								
Concentration Units: mg/L								
Total Organic Carbon	25	26.6	26.7	26.6	107	91-109	0.4	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

July 10, 1989

Enseco - RMAL Project Number 005041

Introduction

One aqueous sample was received at Enseco Rocky Mountain Analytical Laboratory on May 23, 1989. The sample was logged in under RMAL project number 005041. A cross reference associating the RMAL sample number to the actual field sample number is included. The sample was analyzed for low level part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Internal Quality Control Processes, Corrective Actions, and Resolution

All quality control and/or analytical problems encountered in processing the samples and corrective actions taken have been summarized below as per the 1989 QAPP.

PPT PAH

Sample 5041-01 shows target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in the sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with asterisk (*) on the data sheets (Form I) as per the 1989 QAPP.

The compounds 1H-indene and pyrene were detected above quality control limits in the method blank analysis. Both compounds were also found in the associated sample at concentrations less than the blank. These compounds are flagged with a "B" on the analysis data sheet. There was no available sample for re-extraction, however the concentrations of these compounds will be closely monitored in the future to show that this is an isolated case and not a laboratory trend.

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax. 303/431-7171

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Giberson **Date:** 7/10/89
Tracy Giberson
Data Control Supervisor

Approved by: Jean Zimmerman **Date:** July 10, 1989
Jean Zimmerman
Program Administrator

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
005041-0001-SA	GAC-SLP15C1-052289	AQUEOUS	22 MAY 89	13:00	23 MAY 89

SUMMARY

DATA

PACKAGE

FOR

City of St. Louis Park

RMA QC# 5041

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

5041-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 5041 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 5041-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S5041X746

Level: (low/med) LOW Date Received: 05/23/89

% Moisture: not dec. dec. Date Extracted: 05/27/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 06/16/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	13.	
95-13-6	1H-Indene	3.0	B
91-20-3	Naphthalene	2.1	J B
4565-32-6	Benzo(B)Thiophene	24.	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.1	B
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	3.3	*
83-32-9	Acenaphthene	11.	
132-64-9	Dibenzofuran	1.2	
86-73-7	Fluorene	2.0	
132-65-0	Dibenzothiophene	1.4	*
85-01-8	Phenanthrene	1.3	U
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.1	J B
129-00-0	Pyrene	2.5	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 5041 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	5041-01	67	69	73
2	BLK01	43	56	36

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

FORM II SV-1 1/87 Rev.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 5041 SAS No.: N/A SDG No.: N/A

Lab File ID: S5041X943 Lab Sample ID: BLK01

Date Extracted: 05/27/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 07/05/89 Time Analyzed: 10:10

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: 4500-X

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	5041-01	5041-01	S5041X746	06/16/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 5041 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S5041X943

Level: (low/med) LOW Date Received: 05/23/89

% Moisture: not dec. dec. Date Extracted: 05/27/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 07/05/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	1.0	J
496-11-7	2,3-Dihydroindene	1.4	U
95-13-6	1H-Indene	5.6	
91-20-3	Naphthalene	1.5	J
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.1	
90-12-0	1-Methylnaphthalene	1.6	U
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.8	
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	2.7	
129-00-0	Pyrene	12.	
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
57-97-6	7,12-Dimethylbenzanthracene	2.8	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
56-49-5	3-Methylcholanthrene	3.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U
215-58-7	Dibenz(A,C)Anthracene	1.6	U

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 5041 SAS No: N/A SDG No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 PPT PAH STD	STDX744	06/16/89	08:39
5041-01	S5041X746	06/16/89	11:19

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 5041 SAS No: N/A SDG No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 PPT PAH STD	STDX942	07/05/89	08:12
BLK01	S5041X943	07/05/89	10:10

n∞2E

INITIAL CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 5041

Instrument ID: 4500-X Calibration Date(s): 04/13/89

Minimum RRF is 0.050 Maximum % RSD is 35%

Lab File ID: RRF = STDX986 RRF = STDX984
RRF = STDX987 RRF = STDX985 RRF = STDX983

COMPOUND	20 PPT RRF	40 PPT RRF	240PPT RRF	1200PPT RRF	4800PPT RRF	AVE RRF	%RSD
D8-Naphthalene	2.648	2.513	2.437	2.666	2.301	2.513	6.0
D10-Flourene	1.360	1.278	1.306	1.368	1.525	1.367	7.0
D12-Chrysene	1.806	1.706	1.525	1.683	1.696	1.683	6.0
2,3-Benzofuran	1.487	1.438	1.347	1.488	1.513	1.455	4.5
2,3-Dihydroindene	1.481	1.456	1.392	1.541	1.586	1.491	5.0
1H-Indene	1.789	1.797	1.695	1.928	1.885	1.819	5.0
Naphthalene	3.034	2.882	2.745	3.077	2.515	2.851	8.0
Benzo(B)Thiophene	2.359	2.243	2.161	2.410	2.161	2.267	5.0
Quinoline	1.161	1.079	1.173	1.371	1.571	1.271	15.7
1H-Indole	1.641	1.623	1.591	1.803	1.912	1.714	8.0
2-Methylnaphthalene	1.533	1.457	1.414	1.568	1.663	1.527	6.4
1-Methylnaphthalene	1.584	1.508	1.462	1.621	1.693	1.574	5.8
Biphenyl	2.453	2.028	1.954	2.084	2.033	2.110	9.3
Acenaphthylene	1.701	1.683	1.695	2.001	2.111	1.838	11.0
Acenaphthene	1.472	1.310	1.301	1.418	1.539	1.408	7.3
Dibenzofuran	2.268	2.143	2.086	2.222	2.198	2.183	3.2
Flourene	1.608	1.460	1.504	1.619	1.823	1.603	8.8
Dibenzothiophene	1.305	1.218	1.163	1.085	1.329	1.220	8.3
Phenanthrene	1.362	1.263	1.219	1.127	1.355	1.265	7.8
Anthracene	1.089	1.042	1.063	1.035	1.346	1.115	11.7
Acridine	0.805	0.727	0.881	0.883	1.236	0.906	21.5
Carbazole	1.177	1.121	1.091	0.994	1.285	1.134	9.5
Fluoranthene	1.435	1.264	1.276	1.139	1.422	1.307	9.4
Pyrene	1.777	1.361	1.262	1.105	1.394	1.380	18.0
Benzo(A)Anthracene	1.832	1.786	1.580	1.851	1.933	1.796	7.4
Chrysene	1.851	1.896	1.611	1.802	1.843	1.801	6.2
Benzo(B)Fluoranthene	1.938	1.924	1.614	1.911	1.878	1.853	7.3
Benzo(K)Fluoranthene	2.230	1.991	1.602	1.897	2.114	1.967	12.2
Benzo(E)Pyrene	1.780	1.827	1.678	1.867	1.872	1.805	4.4
Benzo(A)Pyrene	1.412	1.437	1.356	1.562	1.750	1.503	10.5
Perylene	1.514	1.429	1.361	1.589	1.813	1.541	11.3
Indeno(1,2,3-CD)Pyrene	1.477	1.466	1.417	1.628	1.646	1.527	6.8
Dibenz(A,H)Anthracene	1.167	1.273	1.199	1.355	1.362	1.271	7.0
Benzo(G,H,I)Perylene	1.480	1.316	1.253	1.434	1.357	1.368	6.6

CONTINUING CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 5041

Instrument ID: 4500-X Calibration Date(s): 06/16/89 Time: 08:39

Lab ID: STDX744 Initial Calibration Date : 04/13/89

Minimum RRF is 0.050 Maximum %D is 35%

COMPOUND	INITIAL AVE RRF	40 PPT RRF	%D
D8-Naphthalene	2.513	2.019	19.7
D10-Fluorene	1.367	1.191	12.9
D12-Chrysene	1.683	1.253	25.5
2,3-Benzofuran	1.455	1.020	29.9
2,3-Dihydroindene	1.491	1.090	26.9
1H-Indene	1.819	1.379	24.2
Naphthalene	2.851	2.380	16.5
Benzo(B)Thiophene	2.267	1.822	19.6
Quinoline	1.271	1.135	10.7
1H-Indole	1.714	1.416	17.4
2-Methylnaphthalene	1.527	1.298	15.0
1-Methylnaphthalene	1.574	1.273	19.1
Biphenyl	2.110	1.671	20.8
Acenaphthylene	1.838	1.870	-1.7
Acenaphthene	1.408	1.196	15.1
Dibenzofuran	2.183	1.800	17.5
Flourene	1.603	1.408	12.2
Dibenzothiophene	1.220	1.043	14.5
Phenanthrene	1.265	1.169	7.6
Anthracene	1.115	1.097	1.6
Acridine	0.906	0.820	9.5
Carbazole	1.134	1.090	3.9
Fluoranthene	1.307	1.177	9.9
Pyrene	1.380	1.203	12.8
Benzo(A)Anthracene	1.796	1.453	19.1
Chrysene	1.801	1.327	26.3
Benzo(B)Fluoranthene	1.853	1.208	34.8
Benzo(K)Fluoranthene	1.967	1.394	29.1
Benzo(E)Pyrene	1.805	1.227	32.0
Benzo(A)Pyrene	1.503	1.106	26.4
Perylene	1.541	1.102	28.5
Indeno(1,2,3-CD)Pyrene	1.527	1.087	28.8
Dibenz(A,H)Anthracene	1.271	0.832	34.5
Benzo(G,H,I)Perylene	1.368	0.895	34.6

FORM VII

CONTINUING CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 5041

Instrument ID: 4500-X Calibration Date(s): 07/05/89 Time: 08:12

Lab ID: STDX942 Initial Calibration Date : 04/13/89

Minimum RRF is 0.050 Maximum %D is 35%

COMPOUND	INITIAL AVE RRF	40 PPT RRF	%D
D8-Naphthalene	2.513	2.050	18.4
D10-Fluorene	1.367	1.219	10.8
D12-Chrysene	1.683	1.604	4.7
2,3-Benzofuran	1.455	1.050	27.8
2,3-Dihydroindene	1.491	1.377	7.6
1H-Indene	1.819	1.438	20.9
Naphthalene	2.851	2.887	-1.3
Benzo(B)Thiophene	2.267	1.875	17.3
Quinoline	1.271	0.865	31.9
1H-Indole	1.714	1.181	31.1
2-Methylnaphthalene	1.527	1.364	10.7
1-Methylnaphthalene	1.574	1.452	7.8
Biphenyl	2.110	1.813	14.1
Acenaphthylene	1.838	1.749	4.8
Acenaphthene	1.408	1.307	7.2
Dibenzofuran	2.183	1.818	16.7
Flourene	1.603	1.406	12.3
Dibenzothiophene	1.220	1.196	2.0
Phenanthrene	1.265	1.262	0.2
Anthracene	1.115	1.020	8.5
Acridine	0.906	0.689	24.0
Carbazole	1.134	0.931	17.9
Fluoranthene	1.307	1.224	6.4
Pyrene	1.380	1.212	12.2
Benzo(A)Anthracene	1.796	1.865	-3.8
Chrysene	1.801	1.865	-3.6
Benzo(B)Fluoranthene	1.853	1.475	20.4
Benzo(K)Fluoranthene	1.967	1.802	8.4
Benzo(E)Pyrene	1.805	1.806	-0.1
Benzo(A)Pyrene	1.503	1.371	8.8
Perylene	1.541	1.332	13.6
Indeno(1,2,3-CD)Pyrene	1.527	1.296	15.1
Dibenz(A,H)Anthracene	1.271	1.029	19.0
Benzo(G,H,I)Perylene	1.368	1.247	8.8

FORM VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 5041 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX744 Date Analyzed: 06/16/89

Instrument ID: 4500-X Time Analyzed: 08:39

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	124000	211000	124000
UPPER LIMIT	248000	422000	248000
LOWER LIMIT	62000	107000	62000
SAMPLE NO.			
5041-01	150000	256000	153000

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

1/87 Rev.

FORM VIII SV-2

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 5041 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDX942 Date Analyzed: 07/05/89

Instrument ID: 4500-X Time Analyzed: 08:12

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	151000	229000	102000
UPPER LIMIT	302000	458000	204000
LOWER LIMIT	75500	114000	51000
SAMPLE NO.			
BLK01	198000	322000	197000

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

1/87 Rev.

FORM VIII SV-2

Enseco

CASE NARRATIVE

FOR

City of St. Louis Park

August 22, 1989

Enseco - RMAL Project Number 005568

Introduction

Five aqueous samples (includes MS) were received at Enseco Rocky Mountain Analytical Laboratory on June 30, 1989. The samples were logged in under RMAL project number 005568. Sample GAC-SLP15FBD-0629899 (RMA # 005568-03) was extracted and held as per the QAPP. A cross reference associating the RMAL sample numbers to the actual field sample numbers is included. The samples were analyzed for low level part-per-trillion (ppt) polynuclear aromatic hydrocarbons (PAH).

Data Quality Assessment

The results contained in this report were reviewed relative to data acceptance criteria as specified in the 1989 QAPP for completeness, precision, accuracy, representativeness and defensibility of the data. Unless otherwise stated below, no quality control problems or technical difficulties were encountered which would impact the interpretation or use of data in this report.

PPT PAH

Samples 5568-01, 01MS, 02 and the associated blank show target compounds that do not meet secondary ion confirmation. In some instances a compound that does not meet secondary ion confirmation criteria may still be determined to be present in the sample after close inspection of the data by the analyst. Supportive data includes mass chromatograms maxima at the same scan for primary and secondary ions, as well as discernible quantitation interference with the secondary ion. These compounds are flagged with asterisk (*) on the data sheets (Form I) as per the 1989 QAPP.

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

The 1989 QAPP sets forth specific requirements for the measurement of benzo(j)fluoranthene. Results have not been provided previously for this compound. The special procedure in the QAPP will be implemented on all future projects.

This data package is in compliance with the terms and conditions of the 1989 QAPP, both technically and for completeness, for other than the conditions detailed above.

Reported by: Tracy Giberson — **Date:** 8/22/89
Tracy Giberson
Data Control Supervisor

Approved by: Debbie Fazio — **Date:** 8/22/89
Debbie Fazio
Program Administrator

Enseco

TABLE OF CONTENTS

for

City of St. Louis Park

RMAL QC# 5568

PAH

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6. Matrix Spike Duplicate Data.....N/A

Enseco

SAMPLE DESCRIPTION INFORMATION
for
City of St. Louis Park

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
005568-0001-SA	GAC-SLP15T-062989	AQUEOUS	29 JUN 89		30 JUN 89
005568-0001-MS	GAC-SLP15TMS-062989	AQUEOUS	29 JUN 89		30 JUN 89
005568-0002-SA	GAC-SLP15TD-062989	AQUEOUS	29 JUN 89		30 JUN 89
005568-0003-SA	GAC-SLP15FBD-062989	AQUEOUS	29 JUN 89		30 JUN 89
005568-0004-SA	GAC-SLP15FB-062989	AQUEOUS	29 JUN 89		30 JUN 89

Enseco Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 9843

Attn: _____

Enseco Client: St. Louis Park

Project: _____

Sampling Co.: _____

Sampling Site: _____

Team Leader: S. Anderson

SAMPLE SAFE™ CONDITIONS

1. Packed by: SA Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by _____
5. Initial Contents Temp. _____ °C Seal # _____
6. Sampling Status. Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory Yes No
8. Contents Temperature Upon Receipt by Lab 14.3 °C
9. Condition of Contents 1 bottle broken 15 FB

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
6/29/89		GAC-SLP15TMS - 062989	Amber	6	PPT-PAH	
		GAC-SLP15FB - 062989	Amber	6	PPT-PAH	

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by (signed)	Date	Time
1	[signature]		6/29/89	1400
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: SA

Method of Shipment: Fed X Airbill # 2865075561

Received for Lab: RMA Signed: CF Date/Time: 6-30-89 08:30

Enseco Project No: _____

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - ocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 9839

Attn: _____

Enseco Client: St. Louis Park

Project: _____

Sampling Co.: _____

Sampling Site: _____

Team Leader: S. Anderson

SAMPLE SAFE™ CONDITIONS

1. Packed by: SA Seal # _____
2. Seal Intact Upon Receipt by Sampling Co Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory. (Yes) No
8. Contents Temperature Upon Receipt by Lab: 14.3 °C
9. Condition of Contents: OK

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
6/29/89		GAC-SLP15T - 062989	Amber	6	PPT-PAH	
		GAC-SLP15TD - 062989	Amber	6	PPT-PAH	

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by (signed)	Received by (signed)	Date	Time
1	[signature]		6/29/89	1400
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: SA

Method of Shipment: Fed X Airbill # 2865075861

Received for Lab: RMA Signed: [signature] Date/Time: 6/30/89 0830

Enseco Project No: _____

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421 6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No. 9842

Attn: _____

Enseco Client: St. Louis Park

Project: _____

Sampling Co.: _____

Sampling Site: _____

Team Leader: S. Anderson

SAMPLE SAFE™ CONDITIONS

1. Packed by: SA Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes No
3. Condition of Contents: _____
4. Sealed for Shipping by: _____
5. Initial Contents Temp.: _____ °C Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: (Yes) No
8. Contents Temperature Upon Receipt by Lab: 14.3 °C
9. Condition of Contents: ok

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
1	103	- P1 F D - 0 8	-	6	PPT- PAH	
562-3015		- SLP 2 - 0	- bar		PT- PAH	

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished by: (signed)	Received by: (signed)	Date	Time
[signature]		6/29/89	1400

SHIPPING DETAILS

Delivered to Shipper by: SA

Method of Shipment: Fed X Airbill # 2865075841

Received for Lab: RMA Signed: [signature] Date/Time 6-29-89 08:30

Enseco Project No. 5562

White and Pink Copies to Lab Yellow to Sampler

SS-001

SUMMARY

DATA

PACKAGE

FOR

City of St. Louis Park

RMA QC# 5568

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

5568-01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 5568 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 5568-01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S5568Z569

Level: (low/med) LOW Date Received: 06/30/89

% Moisture: not dec. dec. Date Extracted: 07/03/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 07/28/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	66.	B
95-13-6	1H-Indene	2.2	
91-20-3	Naphthalene	2.0	J B
4565-32-6	Benzo(B)Th..ophene	10.	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.4	B
90-12-0	1-Methylnaphthalene	2.8	B *
92-52-4	Biphenyl	7.6	
208-96-8	Acenaphthylene	17.	
83-32-9	Acenaphthene	35.	
132-64-9	Dibenzofuran	8.7	
86-73-7	Fluorene	21.	
132-65-0	Dibenzothiophene	2.0	
85-01-8	Phenanthrene	2.6	B
120-12-7	Anthracene	1.7	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	4.7	
129-00-0	Pyrene	5.0	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

5568-02

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 5568 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 5568-02

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S5568Z571

Level: (low/med) LOW Date Received: 06/30/89

% Moisture: not dec. dec. Date Extracted: 07/03/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 07/28/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	68.	B
95-13-6	1H-Indene	2.3	
91-20-3	Naphthalene	2.1	J B
4565-32-6	Benzo(B)Thiophene	10.	
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	1.4	B
90-12-0	1-Methylnaphthalene	2.6	B
92-52-4	Biphenyl	7.5	
208-96-8	Acenaphthylene	18.	
83-32-9	Acenaphthene	35.	
132-64-9	Dibenzofuran	8.6	
86-73-7	Fluorene	21.	
132-65-0	Dibenzothiophene	2.1	*
85-01-8	Phenanthrene	2.9	B
120-12-7	Anthracene	1.9	
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	4.9	
129-00-0	Pyrene	5.1	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

5568-04

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 5568 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 5568-04

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S5568Z572

Level: (low/med) LOW Date Received: 06/30/89

% Moisture: not dec. dec. Date Extracted: 07/03/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 07/28/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	1.1	J
496-11-7	2,3-Dihydroindene	12.	B
95-13-6	1H-Indene	0.9	U
91-20-3	Naphthalene	5.7	J B
4565-32-6	Benzo(B)Thiophene	0.9	U
91-22-5	Quinoline	1.4	U
120-72-9	1H-Indole	2.5	U
91-57-6	2-Methylnaphthalene	2.1	B
90-12-0	1-Methylnaphthalene	1.2	J B
92-52-4	Biphenyl	4.3	U
208-96-8	Acenaphthylene	1.4	U
83-32-9	Acenaphthene	1.3	U
132-64-9	Dibenzofuran	1.0	U
86-73-7	Fluorene	1.0	U
132-65-0	Dibenzothiophene	1.1	U
85-01-8	Phenanthrene	1.0	J B
120-12-7	Anthracene	1.1	U
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.9	U
206-44-0	Fluoranthene	1.4	U
129-00-0	Pyrene	1.2	J B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	2.8	U
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
192-97-2	Benzo(E)Pyrene	1.9	U
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

5568-01MS

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 5568 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: 5568-01MS

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S5568Z570

Level: (low/med) LOW Date Received: 06/30/89

% Moisture: not dec. dec. Date Extracted: 07/03/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 07/28/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q
271-89-6	2,3-Benzofuran	5.1	U
496-11-7	2,3-Dihydroindene	110.	B
95-13-6	1H-Indene	12.	SP
91-20-3	Naphthalene	11.	B SP
456[illegible]-32-6	Benzo(B)Thiophene	19.	
9[illegible]-22-5	Quinoline	12.	SP
120-72-9	1H-Indole	1.0	J
91-57-6	2-Methylnaphthalene	11.	B SP
90-12-0	1-Methylnaphthalene	4.6	B*
92-52-4	Biphenyl	15.	
208-96-8	Acenaphthylene	34.	
83-32-9	Acenaphthene	64.	
132-64-9	Dibenzofuran	18.	
86-73-7	Fluorene	53.	SP
132-65-0	Dibenzothiophene	4.2	*
85-01-8	Phenanthrene	5.0	B
120-12-7	Anthracene	3.3	*
260-94-6	Acridine	2.9	U
86-74-8	Carbazole	1.2	J
206-44-0	Fluoranthene	9.2	
129-00-0	Pyrene	8.5	B
56-55-3	Benzo(A)Anthracene	2.5	U
218-01-9	Chrysene	9.1	SP
205-99-2	Benzo(B)Fluoranthene	2.5	U
207-08-9	Benzo(K)Fluoranthene	2.3	U
192-97-2	Benzo(E)Pyrene	2.8	SP
50-32-8	Benzo(A)Pyrene	2.3	U
198-55-0	Perylene	2.5	U
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U
53-70-3	Dibenz(A,H)Anthracene	1.6	U
191-24-2	Benzo(G,H,I)Perylene	2.8	U

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 5568 SAS No.: N/A SDG No.: N/A

	EPA SAMPLE NO.	S1 (NAP) #	S2 (FLU) #	S3 (CHR) #
1	5568-01	65	68	44
2	5568-02	60	66	58
3	5568-04	76	78	69
4	5568-01MS	77	69	66
5	BLK01	69	74	69

	QC LIMITS
S1 (NAP) = D8-NAPHTHALENE	(14-108)
S2 (FLU) = D10-FLUORENE	(41-162)
S3 (CHR) = D12-CHRYSENE	(10-118)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3C

WATER SEMIVOLATILE MATRIX SPIKE RECOVERY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 5568 SAS No.: N/A SDG No.: N/A

Matrix Spike - EPA Sample No.: 5568-01

COMPOUND	SPIKE ADDED (ng/L)	SAMPLE CONCENTRATION (ng/L)	MS CONCENTRATION (ng/L)	MS % REC
1H-Indene	10	2.2	12.	98
Naphthalene	10	2.0	11.	90
Quinoline	10	ND	12.	120
2-Methylnaphthalene	10	1.4	11.	96
Fluorene	10	21.	53.	320
Chrysene	10	ND	9.1	91
Benzo(E)Pyrene	10	ND	2.8	28

COMMENTS:

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: ENSECO Case No.: 5568 SAS No.: N/A SDG No.: N/A

Lab File ID: S5568Z573 Lab Sample ID: BLK01

Date Extracted: 07/03/89 Extraction: (SepF/Cont/Sonc) SEPF

Date Analyzed: 07/28/89 Time Analyzed: 06:08

Matrix: (soil/water) WATER Level: (low/med) LOW

Instrument ID: 4500-Z

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
1	5568-01	5568-01	S5568Z569	07/28/89
2	5568-02	5568-02	S5568Z571	07/28/89
3	5568-04	5568-04	S5568Z572	07/28/89
4	5568-01MS	5568-01MS	S5568Z570	07/28/89

COMMENTS:

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BLK01

Lab Name: RMAL Contract No.: N/A

Lab Code: ENSECO Case No.: 5568 SAS No.: N/A SDG No.: N/A

Matrix: (soil/water) WATER Lab Sample ID: BLK01

Sample wt/vol: 4000 (g/ml) ML Lab File ID: S5568Z573

Level: (low/med) LOW Date Received: 06/30/89

% Moisture: not dec. dec. Date Extracted: 07/03/89

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 07/28/89

GPC Cleanup: (Y/N) N pH: 6.0 Dilution Factor: 0.125

CONCENTRATION UNITS: NG/L

CAS NO.	COMPOUND		Q	
271-89-6	2,3-Benzofuran	5.1	U	
496-11-7	2,3-Dihydroindene	1.2	J	
95-13-6	1H-Indene	0.9	U	
91-20-3	Naphthalene	2.8	J	*
4565-32-6	Benzo(B)Thiophene	0.9	U	
91-22-5	Quinoline	1.4	U	
120-72-9	1H-Indole	2.5	U	
91-57-6	2-Methylnaphthalene	2.0		*
90-12-0	1-Methylnaphthalene	1.2	J	*
92-52-4	Biphenyl	4.3	U	
208-96-8	Acenaphthylene	1.4	U	
83-32-9	Acenaphthene	1.3	U	
132-64-9	Dibenzofuran	1.0	U	
86-73-7	Fluorene	1.0	U	
132-65-0	Dibenzothiophene	1.1	U	
85-01-8	Phenanthrene	1.1	J	
120-12-7	Anthracene	1.1	U	
260-94-6	Acridine	2.9	U	
86-74-8	Carbazole	1.9	U	
206-44-0	Fluoranthene	1.4	U	
129-00-0	Pyrene	1.1	J	
56-55-3	Benzo(A)Anthracene	2.5	U	
218-01-9	Chrysene	2.8	U	
205-99-2	Benzo(B)Fluoranthene	2.5	U	
207-08-9	Benzo(K)Fluoranthene	2.3	U	
192-97-2	Benzo(E)Pyrene	1.9	U	
50-32-8	Benzo(A)Pyrene	2.3	U	
198-55-0	Perylene	2.5	U	
193-39-5	Indeno(1,2,3-CD)Pyrene	2.1	U	
53-70-3	Dibenz(A,H)Anthracene	1.6	U	
191-24-2	Benzo(G,H,I)Perylene	2.8	U	

5B
SEMIVOLATILE ORGANIC GC/MS PAH

Lab Name: RMAL Contract No: N/A

Lab Code: ENSECO Case No: 5568 SAS No: N/A SDG No: N/A

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS

SAMPLE ID	LAB FILE ID	DATE OF ANALYSIS	TIME OF ANALYSIS
40 PPT PAH STD	STDZ565	07/27/89	22:12
5568-01	S5568Z569	07/28/89	02:40
5568-01MS	S5568Z570	07/28/89	03:32
5568-02	S5568Z571	07/28/89	04:24
5568-04	S5568Z572	07/28/89	05:16
BLK01	S5568Z573	07/28/89	06:08

INITIAL CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 5568

Instrument ID: 4500-Z Calibration Date(s): 07/11/89

Minimum RRF is 0.050 Maximum % RSD is 35%

Lab File ID: RRF 40.= STDZ338 RRF 1200.= STDZ337
RRF 20.= STDZ335 RRF 240.= STDZ334 RRF 4800.= STDZ332

COMPOUND	20 PPT RRF	40 PPT RRF	240 PPT RRF	1200PPT RRF	4800PPT RRF	AVE RRF	%RSD
D8-Naphthalene	1.931	2.037	2.441	2.318	1.722	2.090	13.9
D10-Flourene	2.201	1.340	1.625	1.444	1.286	1.579	23.5
D12-Chrysene	1.356	1.460	1.519	1.461	1.152	1.390	10.4
2,3-Benzofuran	1.061	1.104	1.285	1.165	0.992	1.121	9.9
2,3-Dihydroindene	1.047	1.126	1.301	1.176	1.011	1.132	10.1
1H-Indene	1.367	1.474	1.714	1.537	1.287	1.476	11.1
Naphthalene	2.165	2.305	2.680	2.508	1.855	2.303	13.8
Benzo(B)Thiophene	1.873	1.936	2.223	2.057	1.665	1.951	10.7
Quinoline	0.783	0.938	1.280	1.289	1.213	1.101	20.7
1H-Indole	1.249	1.357	1.673	1.634	1.427	1.468	12.4
2-Methylnaphthalene	1.127	1.150	1.349	1.289	1.125	1.208	8.6
1-Methylnaphthalene	1.158	1.304	1.470	1.381	1.188	1.300	10.0
Biphenyl	1.834	1.802	2.315	2.029	1.664	1.929	13.1
Acenaphthylene	1.963	2.112	2.485	2.352	1.870	2.156	12.0
Acenaphthene	1.385	1.403	1.711	1.458	1.263	1.444	11.5
Dibenzofuran	1.974	1.970	2.465	2.219	1.740	2.074	13.3
Flourene	1.599	1.674	1.869	1.707	1.436	1.657	9.5
Dibenzothiophene	1.206	1.338	1.488	1.476	1.061	1.314	13.9
Phenanthrene	1.537	1.477	1.554	1.475	1.099	1.428	13.1
Anthracene	1.296	1.318	1.503	1.433	1.066	1.323	12.6
Acridine	0.967	0.953	1.223	1.229	1.017	1.078	12.7
Carbazole	1.096	1.121	1.353	1.355	1.077	1.200	11.8
Fluoranthene	1.621	1.563	1.762	1.717	1.237	1.580	13.1
Pyrene	1.430	1.441	1.782	1.639	1.148	1.488	16.1
Benzo(A)Anthracene	1.410	1.647	1.726	1.873	1.434	1.618	12.2
Chrysene	1.504	1.736	1.696	1.721	1.366	1.605	10.2
Benzo(B)Fluoranthene	1.315	1.653	1.941	1.777	1.476	1.632	15.1
Benzo(K)Fluoranthene	1.677	1.912	1.743	2.015	1.404	1.750	13.4
Benzo(E)Pyrene	1.450	1.667	1.802	1.882	1.304	1.621	14.9
Benzo(A)Pyrene	1.382	1.403	1.574	1.659	1.349	1.473	9.2
Perylene	1.363	1.425	1.630	1.734	1.372	1.505	11.1
Indeno(1,2,3-CD)Pyrene	1.350	1.543	1.745	1.934	1.622	1.639	13.3
Dibenz(A,H)Anthracene	1.087	1.202	1.418	1.549	1.279	1.307	13.9
Benzo(G,H,I)Perylene	1.216	1.452	0.561	1.493	1.385	1.221	31.4

CONTINUING CALIBRATION DATA
PAH COMPOUNDS

Lab Name: RMAL Lab Code: Enseco Case No: 5568

Instrument ID: 4500-Z Calibration Date(s): 07/27/89 Time: 22:12

Lab ID: STDZ565 Initial Calibration Date : 07/11/89

Minimum RRF is 0.050 Maximum %D is 35%

COMPOUND	RRF	40 PPT RRF	%D
D8-Naphthalene	2.090	2.021	3.3
D10-Fluorene	1.579	1.305	17.4
D12-Chrysene	1.390	1.415	-1.8
2,3-Benzofuran	1.121	1.001	10.7
2,3-Dihydroindene	1.132	1.040	8.1
1H-Indene	1.476	1.351	8.5
Naphthalene	2.303	2.455	-6.6
Benzo(B)Thiophene	1.951	1.811	7.2
Quinoline	1.101	1.086	1.4
1H-Indole	1.468	1.392	5.2
2-Methylnaphthalene	1.208	1.220	-1.0
1-Methylnaphthalene	1.300	1.238	4.8
Biphenyl	1.929	1.845	4.4
Acenaphthylene	2.156	2.041	5.3
Acenaphthene	1.444	1.404	2.8
Dibenzofuran	2.074	1.944	6.3
Flourene	1.657	1.513	8.7
Dibenzothiophene	1.314	1.285	2.2
Phenanthrene	1.428	1.395	2.3
Anthracene	1.323	1.302	1.6
Acridine	1.078	1.190	-10.4
Carbazole	1.200	1.311	-9.3
Fluoranthene	1.580	1.508	4.6
Pyrene	1.488	1.756	-18.0
Benzo(A)Anthracene	1.618	1.796	-11.0
Chrysene	1.605	1.642	-2.3
Benzo(B)Fluoranthene	1.632	1.705	-4.5
Benzo(K)Fluoranthene	1.750	1.528	12.7
Benzo(E)Pyrene	1.621	1.624	-0.2
Benzo(A)Pyrene	1.473	1.434	2.6
Perylene	1.505	1.596	-6.0
Indeno(1,2,3-CD)Pyrene	1.639	1.502	8.4
Dibenz(A,H)Anthracene	1.307	1.263	3.4
Benzo(G,H,I)Perylene	1.221	1.338	-9.6

FORM VII

8C

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: RMAL Contract: N/A

Lab Code: Enseco Case No: 5568 SAS No.: N/A SDG No: N/A

Lab File ID (Standard): STDZ565 Date Analyzed: 07/27/89

Instrument ID: 4500-Z Time Analyzed: 22:12

	IS#1 (ACN) AREA #	IS#2 (PHN) AREA #	IS#3 (BAP) AREA #
12 HOUR STD	167500	261500	172900
UPPER LIMIT	335000	523000	345800
LOWER LIMIT	83800	130800	86400
SAMPLE NO.			
5568-01	182700	296300	273200
5568-02	169100	269500	190600
5568-04	192900	321700	255000
5568-01MS	163600	271500	216100
BLK01	202300	339500	258300

IS#1 (ACN) = D10-ACENAPHTHENE
IS#2 (PHN) = D10-PHENANTHRENE
IS#3 (BAP) = D12-BENZO(A)PYRENE

UPPER LIMIT = + 100% of internal standard area
LOWER LIMIT = - 50% of internal standard area

Column used to flag internal standard area values with an asterisk

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FORM VIII SV-2