Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

TEST RESULTS FOR FUME SUPPRESSANT CERTIFICATION
ATOCHEM, INC.
M&T's FUMETROL 101
IN CHROME ANODIZING TANKS

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EXECUTIVE SUMMARY

SCAQMD Rule 1169, adopted June 3, 1988 and amended September 8, 1989, requires all chromic anodizing operations in the District to demonstrate emission reductions of 95% or stack emission rates below 0.15 mg/amp-hour as of November 1, 1989. Further reductions are required in 1990 and 1992 for facilities with substantial emissions. The Metal Finishing Association of Southern California (MFASC) has offered to provide data on the efficiency of fume suppressants for preventing emissions of chromic acid mists.

SCAQMD has indicated that data from such tests would be accepted if the tests are conducted in accordance with SCAQMD requirements. The extent of the emission reduction in terms of a percentage of uncontrolled tank emissions must be clearly demonstrated for each anti-mist additive by multiple tests on chrome anodizing tanks. Once the additive is certified by the SCAQMD, the emission reductions will be acknowledged if the additive is used in accordance with the manufacturer's directions.

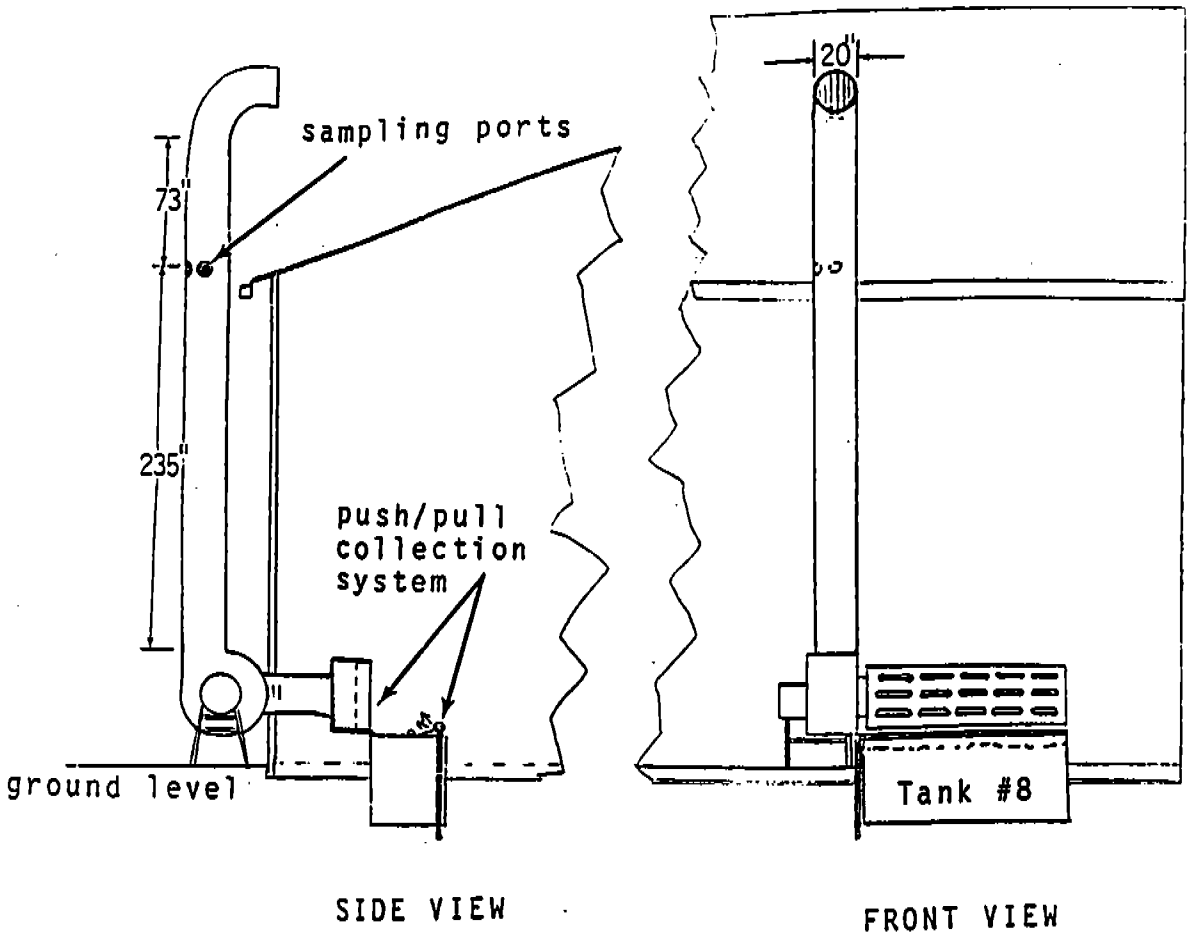
This report provides source test data and results on the efficiency of M&T Chemical's Fumetrol 101, manufactured by Atochem, Inc., in controlling chrome emissions from chromic acid anodizing tanks. After several days of testing an anodizing tank under uncontrolled and controlled conditions, it was found that the average efficiency of Fumetrol 101 in controlling chromic acid emissions was 96.0% for Fumetrol 101 used in conjunction with 2-inch polyballs.

INTRODUCTION

Pacific Environmental Services (PES), a participant in CARB's Independent Contractor Program, was contracted by M&T Chemical Company to perform source testing to determine the efficiency of M&T's Fumetrol 101 in reducing chromic acid emissions from chrome anodizing tanks. Two tests per day were conducted for a three day period on uncontrolled emissions from a chromic acid anodizing tank, two tests per day were conducted for a three day period on the emissions from the same tank with Fumetrol 101 added to the anodizing solution, and two tests per day were conducted for a three day period with Fumetrol 101 and 2-inch polyballs added to the anodizing solution. Test dates were January 24-31, 1990 for the uncontrolled tests, February 1-5, 1990 for the tests with Fumetrol 101, and February 6-8, 1990 for the tests with polyballs and Fumetrol 101.

In order to evaluate the effectiveness of the anti-mist additive Fumetrol 101, it was necessary to have a host chromic acid anodizing tank outfitted with an emission collection system. Facilities were made available by McDonnell Douglas Electronic Systems, located in Monrovia, CA. Mr. Jerry Mulkins,, provided assistance with tank operation during source testing. The sampling location for the tests was in the 20" I.D. tank exhaust duct for Tank #8. The sample location and tank diagram are shown in Figure 1.

Source tests were conducted by M.J. Simon and S.G. Parks of PES, under the direction of M.D. High, Vice President of PES. Sam Oguntulu of SCAQMD was present during most days of testing to observe test conditions. Tessie Guiala of M&T Chemical and Lerinda Smith of Milhorn Chemical and Supply Company were present during several days of uncontrolled testing and during the days of controlled tank testing to make the additions of Fumetrol 101 to the plating solution. They also assisted with the racking and stripping of parts between tests. Peter J. La Barbera, President of D.V. Industries, represented the Metal Finishing Association of Southern California and provided technical guidance and assistance to the team regarding the anodizing process and representative process conditions.



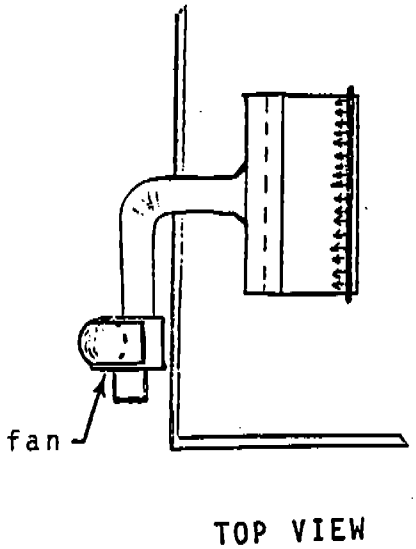


FIGURE 1

Sampling Location In Outlet Stack
Anodizing Tank #8
McDonnell Douglas Electronic Systems Company
Monrovia, CA.

EQUIPMENT AND PROCESS DESCRIPTION

McDonnell Douglas Electronic Systems Company, 700 Royal Oaks Drive, Monrovia, CA, is involved in the business of anodizing parts for the aerospace industry. The tested outlet stack at McDonnell Douglas served chromic acid anodizing Tank #8. The dimensions of anodizing Tank #8 were 71"l x 43"w x 52"d.

Before the tests were initiated a smoke tube was used to check the collection efficiency of the Tank #8 emission collection system. No fugitive emissions were observed at this time.

Two tests each were conducted using applied amperages of approximately 100, 200, and 400 for both uncontrolled and controlled conditions. Voltage was typically 22.0 - 24.0 volts D.C.. It was supplied by rectifier MF06 for the tests. During tests 4 and 5 voltage was increased to 50 volts in order to retain the correct amperage. These tests were voided because of the atypical voltage applied. In order to obtain repeatable current consumptions, identical dummy loads were plated. These dummy loads consisted of 12"l x 12"w x 1/16"d sheets, 2" deep x 12" diameter pans, and 3"w x 23"l x 2"d bars.

Air agitation was not used during any tests. The plating bath chromic acid concentration was approximately 7 oz./gallon. Tank temperature was maintained at 94 degrees Fahrenheit. Freeboard height was maintained at about 6" for all tests. The tank was used for production anodizing during certain of the test days.

For the controlled emission tests, M & T Chemical provided the fume suppressant. The manufacturer's representative, Tessie Guiala, installed suppressant in quantities sufficient to maintain 100% coverage of the anodizing solution surface. Fumetrol 101 is designed to produce a foam blanket from tank edge to tank edge. This foam cover inhibits spray and misting and scrubs the chromic acid mist from the gases that bubble to the surface. Fumetrol 101 is designed to not affect the chemical balance of the anodizing solution.

Two-inch polyballs were provided by D. V. Industries to be used with the Fumetrol 101.

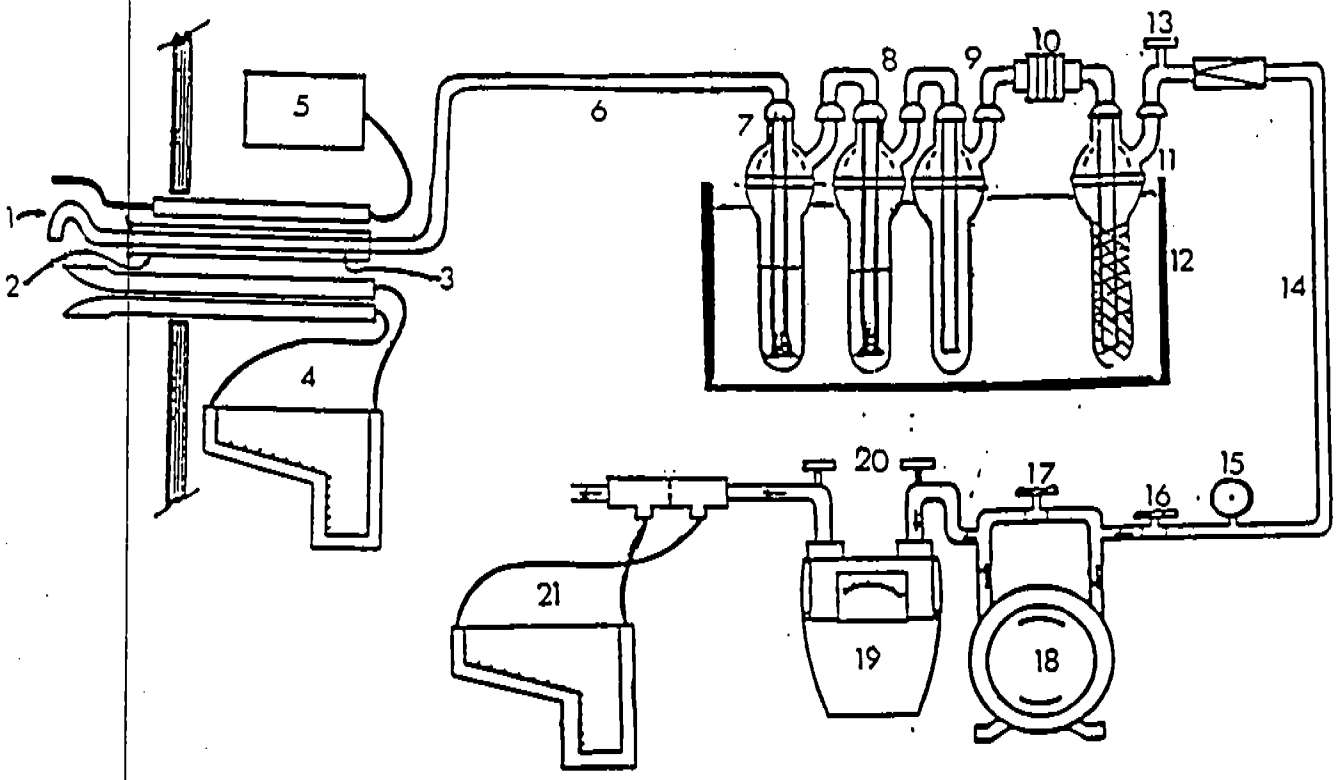
TESTING METHODOLOGY

PES used the proposed test method of CARB Method 425, dated July 7th, 1989, for sampling the chrome emissions. Sampling locations, velocities, volumetric flow rate, and moisture content determinations were done in accordance with CARB Methods 1, 2, and 4. As specified by CARB Method 1, 20 sampling points were used.

The sample was extracted through a glass nozzle, a nonheated 20" glass-lined stainless steel probe, a 10 foot teflon hose from the probe to the first impinger, two Greenburg-Smith impingers each with 100 ml of 0.1N sodium hydroxide solution, an empty impinger, a glass filter holder, an impinger filled with silica gel, a 25 foot umbilical line, a vacuum pump, a dry gas meter, and a calibrated orifice connected to an inclined manometer (Figure 2). Teflon coated glass fiber filters with 0.3, 0.1, and 0.035 micron pore layers were used in the filter holders.

The length of the first four tests was 60 minutes. The testing length was changed to 36 minutes for the remaining tests with the approval of the SCAQMD representative in order to better represent one cycle of the anodizing process. Field data were recorded on field data sheets (Appendix) during each test. Leak checks were performed before and after each test.

The volume of the impinger solution and the weight of the silica gel was recorded before and after the tests in order to obtain the moisture content of the stack gas stream. The contents of the impingers were placed in 500 ml. polyethylene containers and the sampling train from the impingers to the nozzle was rinsed 3 times with a 0.1 N sodium hydroxide solution and added to the same containers. Filters were placed in other polyethylene bottles and analyzed separately. The samples were kept at 60 degrees Fahrenheit or less during and after the tests prior to the analyses in order to prevent deterioration of hexavalent chrome to total chrome.



1. Glass or stainless steel sampling nozzle
2. Stainless steel probe sheath
3. Stainless steel, glass, or Teflon-lined probe
4. Type S pitot tube and manometer for ΔP readings
5. Stack temperature sensor
6. 15 ft. teflon probe line with ball and socket connectors
7. Greenburg-Smith impinger with 100 ml. of 0.02N $NaHCO_3$ solution
8. Greenburg-Smith impinger with 100 ml. of 0.02N $NaHCO_3$ solution
9. Modified Greenburg-Smith impinger - dry
10. Filter holder with teflon-lined glass fiber filter
11. Modified Greenburg-Smith impinger filled with 200 grams of silica gel
12. Impinger case filled with ice
13. Impinger exit gas temperature sensor
14. Umbilical line to meter box
15. Vacuum gauge
16. Coarse adjustment valve
17. By-pass valve to adjust ΔH
18. Leak free vacuum pump
19. Dry gas meter
20. Dry gas meter inlet and outlet temperature sensors
21. Orifice meter with manometer for ΔH readings

FIGURE 2
Diagram Of Sampling Train

Laboratory analyses were conducted by Thermo Analytical Laboratory in Monrovia, California. Analyses for total chrome used atomic absorption spectrophotometry and analyses for hexavalent chrome used diphenylcarbazide colorometric techniques. The detection level of the analytical procedure for hexavalent chrome, Cr 6, and total chrome, Cr T, were 0.003 and 0.001 mg/l respectively. Total chrome is easier to measure and detection levels can be reduced to lower levels than those possible for hexavalent chrome. Total chrome analyses serve as a back-up and quality control check for hexavalent chrome concentrations.

QUALITY ASSURANCE/QUALITY CONTROL

All sampling devices were constructed, calibrated and maintained as specified in EPA reference Methods 2 and 5 of 40 CFR 60, APTD-0576, and APTD-0581. The meter box was not moved from the site during the test series. It was calibrated before and after the tests to make sure that the gas meter correction factor remained within tolerance during the tests.

To ensure that the sampling trains were clean for each day of testing, all glassware and probe lines were cleaned with 0.1 normal nitric acid solution, 0.1 normal sodium hydroxide solution, distilled water, and acetone. The sampling trains were then capped until the next tests.

To demonstrate that the sampling trains remained free from contamination, a field train blank was run for each day of testing. An extra sampling train was taken to the site each day and placed near the actual sampling train. The sample from the field train blank was retrieved along with samples from the trains used for the tests. Results showed that the amount of hexavalent chrome in the trains was always below detectable amounts and that the amount of total chrome was always below 0.008 mg/liter for the liquid sample and below 9 micrograms for filter sample (Table 1).

Extra care was used during sample retrieval. Clean rubber stoppers were used to cap the trains. Each sampling train was rinsed three times with 0.1 normal sodium hydroxide solution after the each test and these rinses were added to the respective sample. Disposable rubber gloves were worn during sample retrieval to help eliminate contamination. All sample volumes and weights were recorded immediately on sample recovery sheets during charging and sample recovery.

TABLE 1

SUMMARY OF TRAIN BLANK RESULTS

Test No.	Liquid Blank $Cr^{\oplus}$ mg/l	Liquid Blank Cr^{T} mg/l	Filter Blank $Cr^{\oplus}$ ug	Filter Blank Cr^{T} ug
3	<0.003	0.001	<0.5	1.36
6	<0.003	<0.001	<0.5	<0.20
9	<0.003	0.008	<0.5	8.12
12	<0.003	0.007	<0.5	8.10
15	<0.003	0.006	<0.5	8.88
18	<0.003	0.004	<0.5	1.00
21	<0.003	0.003	<0.5	0.74
24	<0.003	0.003	<0.5	8.12
27	0.003	0.005	<0.5	2.14
30	<0.003	0.007	<0.5	5.42
Average	<0.003	0.0045	<0.5	4.41
Use as correction	0.0015	0.0045	<0.5	4.41

RESULTS OF SOURCE TESTS

Calculations were made from the field data sheets to determine sample volume, moisture content, molecular weight, velocities, flow rates of the exhaust gas stream. All tests were between 95% and 105% of isokinetic. Results are shown on the emission test calculation sheets (Appendix).

LOW LOAD

During baseline tests at low load (Tests AMT 1 & 2) and medium load (Tests AMT 4,5,7 & 8), Fumetrol 101 foam became very evident on the anodizing tank surface as anodizing took place. It apparently had not been adequately removed prior to the baseline tests. the presence of foam would be expected to lower the baseline uncontrolled emission rates and thereby lower the apparent reduction efficiency of the foam and polyballs.

Tests AMT 1 & 2 were run for 60 minutes. Subsequent tests were conducted for 36 minutes during uniform anodizing operating times at the request of the MFASC and SCAQMD representatives.

Tests AMT-1 & AMT-2, conducted on the uncontrolled tank with an average amperage of 108 showed an emissions rate of 5.18 mg/amp-hour for total chrome and 4.76 mg/amp-hour for hexavalent chrome (Table 2A and 2B).

Tests AMT-16 & AMT-17, conducted with a 100% coverage of the anodizing surface by Fumetrol 101, with an average amperage of 121, showed an emissions rate of 0.32 mg/amp-hour for total chrome and 0.38 mg/amp-hour for hexavalent chrome (Table 7A and 7B).

Tests AMT-28 & AMT-29, conducted with a 100% coverage of polyballs and Fumetrol 101 on the anodizing surface and at an average amperage of 105, showed an average emissions rate of 0.35 mg/amp-hour for total chrome and 0.25 mg/amp-hour for hexavalent chrome (Tables 11A & 11B).

From these results the reduction benefit of Fumetrol alone, and Fumetrol 101 along with polyballs, for anodizing conditions with nominal amperages of 100

was calculated. Results showed a reduction of 93.8% and 93.3% respectively for total chrome and 92.1% and 94.7% respectively for hexavalent chrome (Table 12).

MEDIUM LOAD

Difficulties were experienced with obtaining consistent process conditions during the first several days of testing for baseline emission rates. It took six days to get three days of test data. On 1/25/90, with a medium amperage load, voltage was increased during the test in an attempt to keep up the amperage. The problem was interpreted to be insufficient stripping of parts and improper racking of the parts with the result that anodizing was not occurring properly. Test results (AMT 4 & 5) were of dubious value. On all other tests, voltage was held constant after the initial 3 to 4 minutes of anodizing. On 1/26/90 with a medium amperage load, there reportedly were not enough parts to get a 200 A load so this test was discontinued. Much attention centered on the stripping and remounting of the aluminum parts, since the amperage would sometimes be less on a second duplicate anodizing test. The medium load test (AMT 7 & 8) were redone on 1/29/90; stripping and remounting of parts again was of major concern. Test AMT-8 showed low emission rates like tests AMT 4 & 5 due reportedly to improper stripping and racking of parts. Test AMT-7 was therefore used to establish the baseline uncontrolled emission rates.

Tests AMT-7, conducted on the uncontrolled tank with an amperage of 197 showed an emissions rate of 3.66 mg/amp-hour for total chrome and 3.18 mg/amp-hour for hexavalent chrome (Table 4A and 4B).

Tests AMT-19 & AMT-20, conducted with a 100% coverage of the anodizing surface by Fumetrol 101, with an average amperage of 145, showed an emissions rate of 0.76 mg/amp-hour for total chrome and 0.25 mg/amp-hour for hexavalent chrome (Table 8A and 8B).

Tests AMT-22 & AMT-23, conducted with a 100% coverage of polyballs and Fumetrol 101 on the anodizing surface and at an average amperage of 140, showed an average emissions rate of 0.28 mg/amp-hour for total chrome and 0.17 mg/amp-hour for hexavalent chrome (Tables 9A & 9B).

From these results the reduction benefit of Fumetrol alone, and Fumetrol 101 along with polyballs, for anodizing conditions with nominal amperages of 200 A was calculated. Results showed a reduction of 79.2% and 92.4% respectively for total chrome and 92.3% and 94.7% respectively for hexavalent chrome (Table 12).

HIGH LOAD

On 1/30/90, the bus bar started smoking during an attempted 400 A high load test so the test was discontinued and redone on 1/31/90 after stripping and remounting parts and completing tank repairs.

Tests AMT-10 & AMT-11, conducted on the uncontrolled tank with an average amperage of 434 showed an emissions rate of 6.37 mg/amp-hour for total chrome and 4.68 mg/amp-hour for hexavalent chrome (Table 5A and 5B).

Tests AMT-13 & AMT-14, conducted with a 100% coverage of the anodizing surface by Fumetrol 101, with an average amperage of 427, showed an emissions rate of 0.34 mg/amp-hour for total chrome and 0.16 mg/amp-hour for hexavalent chrome (Table 6A and 6B).

Tests AMT-25 & AMT-26, conducted with a 100% coverage of polyballs and Fumetrol 101 on the anodizing surface and at an average amperage of 450, showed an average emissions rate of 0.08 mg/amp-hour for total chrome and 0.07 mg/amp-hour for hexavalent chrome (Tables 10A & 10B).

From these results the reduction benefit of Fumetrol alone, and Fumetrol 101 along with polyballs, for anodizing conditions with nominal amperages of 400 A was calculated. Results showed a reduction of 94.6% and 98.8% respectively for total chrome and 96.6% and 98.5% respectively for hexavalent chrome (Table 12).

SUMMARY

Residual Fumetrol 101 had not been completely removed from the anodizing solution before baseline testing started. However at the end of each of the low and medium load baseline tests, Fumetrol 101 foam was scraped or dipped from the tank surface. It is believed that the residual foam depressed or reduced

the baseline emissions for the low and medium loads by some amount.

Secondly, stripping and racking of the anodized parts seemed to be inconsistent during the low and medium load baseline emission tests.

More emphasis should be given to the results of the high load tests which showed 98.5% Cr6 reduction with Fumetrol 101 and polyballs. The residual foam was gone by the time the high load baseline tests were conducted. Also, Tessie Guila and Lerinda Smith were assisting with the stripping and racking of parts so that a consistent load was being provided. Finally, most anodizers will be operating at the higher amperages and would be most represented by the high load tests' results.

Even with the residual foam and process control problems, the use of fumetrol 101 and polyballs reduced Cr6 emission rates from a chromic acid anodizing tank by an average of 96.0 percent (94.7, 94.7, 98.5) for loads in the 100 to 400 ampere range.

If the amperage is omitted from the evaluation of reduction efficiency (Table 13) results can be expressed in mg/hour and results how 94.8, 96.2 and 98.5% reduction for an average of 96.5 percent.

TABLE 2A: TOTAL CHROME EMISSIONS FROM AN UNCONTROLLED CHROMIC ACID ANODIZING TANK AT LOW LOAD

TEST DATE: 1/24/90
POLLYBALLS: None
ADDITIVE: None
AMPERAGE: Nominally 100 A

ANT-1-L Sample liquid from the impingers in the sample train for test ANT-1.
ANT-1-F Sample caught on the filter in the sample train for test ANT-1.
ANT-2-L Sample liquid from the impingers in the sample train for test ANT-2.
ANT-2-F Sample caught on the filter in the sample train for test ANT-2.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr T (mg/l)	Impinger Catch Cr T (mg)	Filter Catch Cr T (mg)	Total Catch Cr T (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr T (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr T (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr T (mg/amp-hour)
ANT-1-L	550	0.1305	0.0718								
ANT-1-F				0.002							
TEST TOTAL					0.0733	60.429	0.0012	7034	512	117	4.374
ANT-2-L	545	0.1465	0.0798								
ANT-2-F				0.002							
TEST TOTAL					0.0816	60.243	0.0014	7303	593	99	5.992
AVERAGE							0.0013	7169	552	108	5.183

TABLE 2B: HEXAVALENT CHROME EMISSIONS FROM AN UNCONTROLLED CHROMIC ACID ANODIZING TANK AT LOW LOAD

TEST DATE: 1/24/90
POLLYBALLS: None
ADDITIVE: None
AMPERAGE: Nominally 100 A

ANT-1-L Sample liquid from the impingers in the sample train for test ANT-1.
ANT-1-F Sample caught on the filter in the sample train for test ANT-1.
ANT-2-L Sample liquid from the impingers in the sample train for test ANT-2.
ANT-2-F Sample caught on the filter in the sample train for test ANT-2.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (ng/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
ANT-1-L	550	0.1085	0.0597								
ANT-1-F				0.000							
TEST TOTAL					0.0597	60.429	0.0010	7034	417	117	3.562
ANT-2-L	545	0.1485	0.0809								
ANT-2-F				0.000							
TEST TOTAL					0.0809	60.243	0.0013	7303	589	99	5.946
AVERAGE							0.0012	7169	503	108	4.754

TABLE 3A: TOTAL CHROME EMISSIONS FROM AN UNCONTROLLED CHROMIC ACID ANODIZING TANK AT MEDIUM LOAD

TEST DATE: 1/25/90
POLLYBALLS: None
ADDITIVE: None
AMPERAGE: Nominally 200 A

ANT-4-L Sample liquid from the impingers in the sample train for test ANT-4.
ANT-4-F Sample caught on the filter in the sample train for test ANT-4.
ANT-5-L Sample liquid from the impingers in the sample train for test ANT-5.
ANT-5-F Sample caught on the filter in the sample train for test ANT-5.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr T (mg/l)	Impinger Catch Cr T (mg)	Filter Catch Cr T (mg)	Total Catch Cr T (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr T (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr T (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr T (mg/amp-hour)
ANT-4-L	550	0.0135	0.0074								
ANT-4-F				0.000							
TEST TOTAL					0.0074	60.637	0.0001	7460	55	122	0.449
ANT-5-L	655	0.0175	0.0115								
ANT-5-F				0.000							
TEST TOTAL					0.0115	62.434	0.0002	7510	83	213	0.388
AVERAGE							0.0002	7485	69	168	0.419

TABLE 3B: HEXAVALENT CHROME EMISSIONS FROM AN UNCONTROLLED CHROMIC ACID ANODIZING TANK AT MEDIUM LOAD

TEST DATE: 1/25/90
POLLYBALLS: None
ADDITIVE: None
AMPERAGE: Nominally 200 A

ANT-4-L Sample liquid from the impingers in the sample train for test ANT-4.
ANT-4-F Sample caught on the filter in the sample train for test ANT-4.
ANT-5-L Sample liquid from the impingers in the sample train for test ANT-5.
ANT-5-F Sample caught on the filter in the sample train for test ANT-5.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (mg/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
ANT-4-L	550	0.0185	0.0102								
ANT-4-F				0.000							
TEST TOTAL					0.0102	60.637	0.0002	7460	75	122	0.616
ANT-5-L	655	0.0185	0.0121								
ANT-5-F				0.000							
TEST TOTAL					0.0121	62.434	0.0002	7510	87	213	0.411
AVERAGE							0.0002	7485	81	168	0.513

TABLE 4A: TOTAL CHROME EMISSIONS FROM AN UNCONTROLLED CHROMIC ACID ANODIZING TANK AT MEDIUM LOAD

TEST DATE: 1/29/90
POLLYBALLS: None
ADDITIVE: None
AMPERAGE: Nominally 200 A

AMT-7-L Sample liquid from the impingers in the sample train for test AMT-7.
AMT-7-F Sample caught on the filter in the sample train for test AMT-7.
AMT-8-L Sample liquid from the impingers in the sample train for test AMT-8.
AMT-8-F Sample caught on the filter in the sample train for test AMT-8.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr T (mg/l)	Impinger Catch Cr T (mg)	Filter Catch Cr T (mg)	Total Catch Cr T (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr T (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr T (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr T (mg/amp-hour)
AMT-7-L	575	0.0945	0.0543								
AMT-7-F				0.004							
TEST TOTAL					0.0586	36.957	0.0016	7577	721	197	3.660
AMT-8-L	700	0.0215	0.0150								
AMT-8-F				0.003							
TEST TOTAL					0.0185	36.428	0.0005	7402	226	177	1.274
AVERAGE							0.0010	7490	473	187	2.467

TABLE 4B: HEXAVALENT CHROME EMISSIONS FROM AN UNCONTROLLED CHIC ACIDOME ANODIZING TANK AT MEDIUM LOAD

TEST DATE: 1/29/90
POLLYBALLS: None
ADDITIVE: None
AMPERAGE: Nominally 200 A

AMT-7-L	AMT-7-L	Sample liquid from the impingers in the sample train for test AMT-7.
AMT-7-F	AMT-7-F	Sample caught on the filter in the sample train for test AMT-7.
AMT-8-L	AMT-8-L	Sample liquid from the impingers in the sample train for test AMT-8.
AMT-8-F	AMT-8-F	Sample caught on the filter in the sample train for test AMT-8.

SAMPLE RUN NUMBER	SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (mg/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
AMT-7-L	AMT-7-L	575	0.0885	0.0509								
AMT-7-F	AMT-7-F				0.000							
TEST TOTAL	TEST TOTAL					0.0509	36.957	0.0014	7577	626	197	3.178
AMT-8-L	AMT-8-L	700	0.0185	0.0129								
AMT-8-F	AMT-8-F				0.000							
TEST TOTAL	TEST TOTAL					0.0129	36.428	0.0004	7402	158	177	0.892
	AVERAGE							0.0009	7490	392	187	2.035

TABLE 5A: TOTAL CHROME EMISSIONS FROM AN UNCONTROLLED CHROMIC ACID ANODIZING TANK AT HIGH LOAD

TEST DATE: 1/31/90
POLLYBALLS: None
ADDITIVE: None
AMPERAGE: Nominally 400 A

ANT-10-L Sample liquid from the impingers in the sample train for test ANT-10.
ANT-10-F Sample caught on the filter in the sample train for test ANT-10.
ANT-11-L Sample liquid from the impingers in the sample train for test ANT-11.
ANT-11-F Sample caught on the filter in the sample train for test ANT-11.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr T (mg/l)	Impinger Catch Cr T (mg)	Filter Catch Cr T (mg)	Total Catch Cr T (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr T (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr T (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr T (mg/amp-hour)
ANT-10-L	545	0.4415	0.2406								
ANT-10-F				0.004							
TEST TOTAL					0.2446	36.146	0.0068	7429	3016	442	6.830
ANT-11-L	490	0.4095	0.2007								
ANT-11-F				0.004							
TEST TOTAL					0.2049	35.982	0.0057	7372	2519	427	5.900
AVERAGE							0.0062	7401	2768	434	6.365

TABLE 5B: HEXAVALENT CHROME EMISSIONS FROM AN UNCONTROLLED CHROMIC ACID ANODIZING TANK AT HIGH LOAD

TEST DATE: 1/31/90
POLLYBALLS: None
ADDITIVE: None
AMPERAGE: Nominally 400 A

AMT-10-L Sample liquid from the impingers in the sample train for test AMT-10.
AMT-10-F Sample caught on the filter in the sample train for test AMT-10.
AMT-11-L Sample liquid from the impingers in the sample train for test AMT-11.
AMT-11-F Sample caught on the filter in the sample train for test AMT-11.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (mg/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
AMT-10-L	545	0.3285	0.1790								
AMT-10-F				0.000							
TEST TOTAL					0.1790	36.146	0.0050	7429	2208	442	4.999
AMT-11-L	490	0.3085	0.1512								
AMT-11-F				0.000							
TEST TOTAL					0.1512	35.982	0.0042	7372	1858	427	4.352
AVERAGE							0.0046	7401	2033	434	4.676

TABLE 6A: TOTAL CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT HIGH LOAD

TEST DATE: 2/1/90
POLLYBALLS: None
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 400 A

ANT-13-L Sample liquid from the impingers in the sample train for test ANT-13.
ANT-13-F Sample caught on the filter in the sample train for test ANT-13.
ANT-14-L Sample liquid from the impingers in the sample train for test ANT-14.
ANT-14-F Sample caught on the filter in the sample train for test ANT-14.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr T (mg/l)	Impinger Catch Cr T (mg)	Filter Catch Cr T (mg)	Total Catch Cr T (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr T (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr T (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr T (mg/amp-hour)
ANT-13-L	455	0.0165	0.0075								
ANT-13-F				0.004							
TEST TOTAL					0.0116	36.941	0.0003	7604	143	412	0.348
ANT-14-L	480	0.0185	0.0089								
ANT-14-F				0.003							
TEST TOTAL					0.0124	37.286	0.0003	7542	150	441	0.340
AVERAGE							0.0003	7573	147	427	0.344

TABLE 6B: HEXAVALENT CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT HIGH LOAD

TEST DATE: 2/1/90
POLLYBALLS: None
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 400 A

ANT-13-L Sample liquid from the impingers in the sample train for test ANT-13.
ANT-13-F Sample caught on the filter in the sample train for test ANT-13.
ANT-14-L Sample liquid from the impingers in the sample train for test ANT-14.
ANT-14-F Sample caught on the filter in the sample train for test ANT-14.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (mg/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
ANT-13-L	455	0.0115	0.0052								
ANT-13-F				0.000							
TEST TOTAL					0.0052	36.941	0.0001	7604	65	412	0.157
ANT-14-L	480	0.0125	0.0060								
ANT-14-F				0.000							
TEST TOTAL					0.0060	37.286	0.0002	7542	73	441	0.165
AVERAGE							0.0002	7573	69	427	0.161

TABLE 7B: HEXAVALENT CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT LOW LOAD

TEST DATE: 2/2/90
POLLYBALLS: None
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 100 A

AMT-16-L Sample liquid from the impingers in the sample train for test AMT-16.
AMT-16-F Sample caught on the filter in the sample train for test AMT-16.
AMT-17-L Sample liquid from the impingers in the sample train for test AMT-17.
AMT-17-F Sample caught on the filter in the sample train for test AMT-17.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (mg/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
AMT-16-L	460	0.0075	0.0034								
AMT-16-F				0.000							
TEST TOTAL					0.0034	35.419	0.0001	7608	44	119	0.374
AMT-17-L	420	0.0085	0.0036								
AMT-17-F				0.000							
TEST TOTAL					0.0036	35.602	0.0001	7696	46	123	0.376
AVERAGE							0.0001	7652	45	121	0.375

TABLE 8A: TOTAL CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT MEDIUM LOAD

TEST DATE: 2/5/90
POLLYBALLS: None
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 200 A

ANT-19-L Sample liquid from the impingers in the sample train for test ANT-19.
ANT-19-F Sample caught on the filter in the sample train for test ANT-19.
ANT-20-L Sample liquid from the impingers in the sample train for test ANT-20.
ANT-20-F Sample caught on the filter in the sample train for test ANT-20.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr T (mg/l)	Impinger Catch Cr T (mg)	Filter Catch Cr T (mg)	Total Catch Cr T (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr T (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr T (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr T (mg/amp-hour)
ANT-19-L	535	0.0165	0.0088								
ANT-19-F				0.000							
TEST TOTAL					0.0088	34.837	0.0003	7630	116	144	0.806
ANT-20-L	480	0.0165	0.0079								
ANT-20-F				0.000							
TEST TOTAL					0.0079	33.864	0.0002	7409	104	145	0.717
AVERAGE							0.0002	7520	110	145	0.761

TABLE 8B: HEXAVALENT CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT MEDIUM LOAD

TEST DATE: 2/5/90
POLLYBALLS: None
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 200 A

ANT-19-L Sample liquid from the impingers in the sample train for test ANT-19.
ANT-19-F Sample caught on the filter in the sample train for test ANT-19.
ANT-20-L Sample liquid from the impingers in the sample train for test ANT-20.
ANT-20-F Sample caught on the filter in the sample train for test ANT-20.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (mg/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
ANT-19-L	535	0.0025	0.0013								
ANT-19-F				0.000							
TEST TOTAL					0.0013	34.837	0.0000	7630	18	144	0.122
ANT-20-L	480	0.0085	0.0041								
ANT-20-F				0.000							
TEST TOTAL					0.0041	33.864	0.0001	7409	54	145	0.369
AVERAGE							0.0001	7520	36	145	0.246

TABLE 9A: TOTAL CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT MEDIUM LOAD

TEST DATE: 2/6/90
POLLYBALLS: Yes - 100% Coverage
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 200 A

ANT-22-L Sample liquid from the impingers in the sample train for test ANT-22.
ANT-22-F Sample caught on the filter in the sample train for test ANT-22.
ANT-23-L Sample liquid from the impingers in the sample train for test ANT-23.
ANT-23-F Sample caught on the filter in the sample train for test ANT-23.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr T (mg/l)	Impinger Catch Cr T (mg)	Filter Catch Cr T (mg)	Total Catch Cr T (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr T (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr T (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr T (mg/amp-hour)
ANT-22-L	440	0.0075	0.0033								
ANT-22-F				0.000							
TEST TOTAL					0.0033	35.148	0.0001	7577	43	141	0.303
ANT-23-L	490	0.0055	0.0027								
ANT-23-F				0.000							
TEST TOTAL					0.0027	34.624	0.0001	7511	35	138	0.254
AVERAGE							0.0001	7544	39	140	0.278

TABLE 9B: HEXAVALENT CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT MEDIUM LOAD

TEST DATE: 2/6/90
POLLYBALLS: Yes - 100% Coverage
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 200 A

ANT-22-L Sample liquid from the impingers in the sample train for test ANT-22.
ANT-22-F Sample caught on the filter in the sample train for test ANT-22.
ANT-23-L Sample liquid from the impingers in the sample train for test ANT-23.
ANT-23-F Sample caught on the filter in the sample train for test ANT-23.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (mg/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
ANT-22-L	440	0.0055	0.0024								
ANT-22-F				0.000							
TEST TOTAL					0.0024	35.148	0.0001	7577	31	141	0.222
ANT-23-L	490	0.0025	0.0012								
ANT-23-F				0.000							
TEST TOTAL					0.0012	34.624	0.0000	7511	16	138	0.116
AVERAGE							0.0001	7544	24	140	0.169

TABLE 10A: TOTAL CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT HIGH LOAD

TEST DATE: 2/7/90
POLLYBALLS: Yes - 100% Coverage
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 400 A

ANT-25-L Sample liquid from the impingers in the sample train for test ANT-25.
ANT-25-F Sample caught on the filter in the sample train for test ANT-25.
ANT-26-L Sample liquid from the impingers in the sample train for test ANT-26.
ANT-26-F Sample caught on the filter in the sample train for test ANT-26.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr T (mg/l)	Impinger Catch Cr T (mg)	Filter Catch Cr T (mg)	Total Catch Cr T (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr T (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr T (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr T (mg/amp-hour)
ANT-25-L	435	0.0065	0.0028								
ANT-25-F				0.001							
TEST TOTAL					0.0035	35.860	0.0001	7646	44	405	0.109
ANT-26-L	510	0.0035	0.0018								
ANT-26-F				0.000							
TEST TOTAL					0.0018	34.922	0.0001	7572	23	495	0.047
AVERAGE							0.0001	7609	34	450	0.078

TABLE 11B: HEXAVALENT CHROME EMISSIONS FROM A CONTROLLED CHROMIC ACID ANODIZING TANK AT LOW LOAD

TEST DATE: 2/8/90
POLLYBALLS: Yes - 100% Coverage
ADDITIVE: M&T's Fumetrol 101 - 100% Surface Coverage
AMPERAGE: Nominally 100 A

AMT-28-L Sample liquid from the impingers in the sample train for test AMT-28.
AMT-28-F Sample caught on the filter in the sample train for test AMT-28.
AMT-29-L Sample liquid from the impingers in the sample train for test AMT-29.
AMT-29-F Sample caught on the filter in the sample train for test AMT-29.

SAMPLE RUN NUMBER	SAMPLE VOLUME (ml)	Conc. Cr 6 (mg/l)	Impinger Catch Cr 6 (mg)	Filter Catch Cr 6 (mg)	Total Catch Cr 6 (mg)	SAMPLE METER VOL (dscf)	EMISSIONS Cr 6 (mg/dscf)	STACK FLOW RATE (dscfm)	ACTUAL EMISSIONS Cr 6 (mg/hour)	AVERAGE AMPERAGE (amps)	EMISSIONS Cr 6 (mg/amp-hour)
AMT-28-L	520	0.0045	0.0023								
AMT-28-F				0.000							
TEST TOTAL					0.0023	69.941	0.0000	7531	15	106	0.143
AMT-29-L	455	0.0125	0.0057								
AMT-29-F				0.000							
TEST TOTAL					0.0057	68.519	0.0001	7436	37	103	0.360
AVERAGE							0.0001	7484	26	105	0.251

TABLE 12: SUMMARY OF RESULTS AND PERCENT REDUCTION EFFICIENCY WITH M&T'S FUMETROL 101.

TEST NUMBERS		AVERAGE AMPERAGE	AVERAGE EMISSIONS Cr T (mg/amp-hour)	AVERAGE EMISSIONS Cr 6 (mg/amp-hour)	REDUCTION EFFICIENCY Cr T	REDUCTION EFFICIENCY Cr 6
Low Load						
AMT- 1 & AMT- 2	Uncontrolled	108	5.183	4.755		
AMT-16 & AMT-17	Fumetrol 101	121	0.322	0.375	93.8	92.1
AMT-28 & AMT-29	Fumetrol 101 w/ polyballs	105	0.345	0.251	93.3	94.7
Medium Load						
AMT-7	Uncontrolled	197	3.660	3.178		
AMT-19 & AMT-20	Fumetrol 101	145	1.761	0.246	79.2	92.3
AMT-22 & AMT-23	Fumetrol 101 w/ polyballs	140	0.278	0.169	92.4	94.7
High Load						
AMT-10 & AMT-11	Uncontrolled	434	6.365	4.676		
AMT-13 & AMT-14	Fumetrol 101	427	0.344	0.161	94.6	96.6
AMT-25 & AMT-26	Fumetrol 101 w/ polyballs	450	0.078	0.068	98.8	98.5

TABLE 13
REDUCTION EFFICIENCY FOR CHROME EMISSIONS USING
M & T'S FUMETROL 101 BASED ON MG/HOUR

Test Numbers		Average Emissions CrT mg/hr	Average Emissions Cr6 mg/hr	Reduction Efficiency CrT %	Reducti Efficienc Cr6 %
Low Load					
AMT- 1 & AMT- 2	Uncontrolled	552	503	-	-
AMT-16 & AMT-17	Fumetrol 101	39	45	92.9	91.2
AMT-28 & AMT-29	Fumetrol 101 w/ Polyballs	36	26	93.4	94.8
Medium Load					
AMT- 7	Uncontrolled	721	626		
AMT-19 & AMT-20	Fumetrol 101	110	36	84.7	94.2
AMT-22 & AMT-23	Fumetrol 101 w/ Polyballs	39	24	94.5	96.2
High Load					
AMT-10 & AMT-11	Uncontrolled	2768	2033		
AMT-13 & AMT-14	Fumetrol 101	147	69	94.7	96.6
AMT-25 & AMT-26	Fumetrol 101 w/ Polyballs	34	30	98.8	98.5

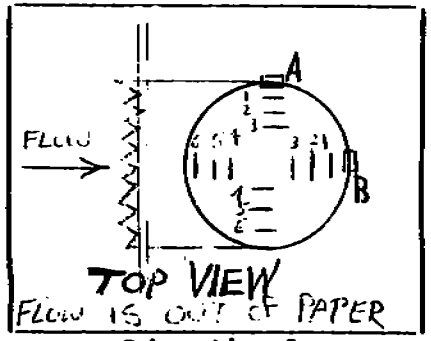
The field tests were conducted by M.J. Simon and S.G. Parks. Study direction and report preparation were under the supervision of M. Dean High, Vice President of Pacific Environmental Services, Inc.

Approved: M Dean High
M. Dean High

APPENDIX

FIELD DATA

Plant MCDONNELL DOUGLAS - MONROVIA
Date [illegible]
Sampling Location OUTLET STACK
Sample Type CARB METHOD - LTS CHROME
Run Number [illegible]-1
Operator [illegible]
Ambient Temperature [illegible]
Barometric Pressure 30.07
Static Pressure (P_s) +1.3
Filter Number(s) [illegible] 1E
Pretest Leak Rate = [illegible] cfm @ [illegible] in. Hg
Pretest Pitot Leak Check OK
Pretest Orsat Leak Check N.A.
Read and Record all Data Every 5 Minutes



Schematic of Traverse Point Layout

Probe Length and Type 4' glass lined Stainless Steel
Pitot Tube I.D. No. [illegible]
Nozzle I.D. No. & Diameter [illegible]
Assumed Moisture, % 1.0
Temp. Readout S/N N.A.
Meter Box Number 1A
Meter $\Delta H_@$ [illegible]
C Factor [illegible]
Meter Gamma 1.013
Heater Box Setting N.A.
Reference Δp 0.3
Post Test Leak Rate = [illegible] cfm @ [illegible] in. Hg
Post Test Pitot Leak Check OK
Post Test Orsat Leak Check N.A.

Impinger Box No. 1B ;

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1240	368.887	0.95	3.5	3.5	83	97	101	6"	N.A.	60
A1	5 / 1248	371.4	1.10	4.0	4.0	83	100	100	7"		59
A2	10 / 1253	376.3	1.10	4.0	4.0	82	102	100	7"		60
A3	15 / 1258	381.4	1.10	4.0	4.0	83	104	100	7"		65
A4	20 / 1303	387.0	1.20	4.4	4.4	83	106	102	8"		65
A5	25 / 1308	392.8	1.10	4.0	4.0	83	106	106	6"		65
A6	30 / 1313	397.806	0.92	3.4	3.4	84	106	102	6"		65
1317 B1	35 / 1322	402.7	1.0	3.6	3.6	84	108	102	6"		65
B2	40 / 1327	407.2	1.10	4.0	4.0	84	108	100	7"		65
B3	45 / 1332	412.6	0.87	3.2	3.2	85	111	103	7"		67
B4	50 / 1337	418.3	1.1	4.0	4.0	85	113	105	7"		67
B5	55 / 1342	424.9	1.20	4.4	4.4	85	113	107	8"		67
B6	60 / 1347	428.741	1								
	/										
	/										
	/	V_m = 62.854	$\sqrt{\Delta P}$ = 1.0392	$\bar{\Delta H}$ 3.88		543.7	$\bar{T}_m$	104.2			
	/						$\bar{T}_m$	564.2			
	/										
	/										
	/										
	/										
	/										
	/										

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas - [illegible]
Date: 1-29-90
Source/Sample Number: 4UT-1

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(62.854)(1.013)\left[\frac{(30.07) + (7.68/13.6)}{(50.2)}\right]$

$V_{m(std)}$ = 60.429 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 21.6 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 1.016 scf

$V_{W(std)}$ = 1.016 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(1.016)}{(1.016)+(60.429)} =$ [illegible]

B_{Ws} = [illegible]

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\ \ ) + 0.320(\ \ ) + 0.280(\ \ )$

M_d = 29.6 lb/lb-mole

$M_s = M_d + B_{Ws}(18 - M_d) = (\ \ ) + (\ \ )(18 - \ \ )$

M_s = [illegible] lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 1-21-91
Source/Sample Number: AMT-1

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.0292)\sqrt{\frac{(543.7)}{(28.82)(30.17)}}$$

$V_{s(avg)}$ = 58.4 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.4)\left(\pi\left(\tfrac{12}{12}\right)^2\right)$$

Q_s = 7645 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7645)(1-0.016)\frac{(28.82)}{(543.7)}$$

Q_{std} = 7034 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(543.7)(60.429)}{(28.82)(58.4)(0.00309)(60)(1-0.016)}$$

%I = 101.1 %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas

Date: 1-24-90

Sampling Location: Uncontrolled Test - [illegible]

Sample Type: Method 425 Chromic

Run Number: A UT - 1

Sample Box Number: 1B

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: A UT - 1F

Description of Filter:

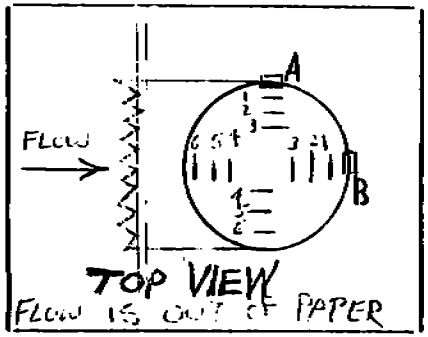
MOISTURE

Impingers			
Final Volume:	[illegible] ml	[illegible] ml	[illegible] ml
Initial Volume:	[illegible] ml	[illegible] ml	[illegible] ml
Net Volume:	-4 ml	-8 ml	[illegible] ml
Total H_2O:			[illegible]
Silica Gel			
Final Volume:	652.0 g	g	g
Initial Volume	619.4 g	g	g
Net Volume	32.6 g	g	g
Total Moisture:			[illegible]

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-24-86
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD - 125 CHROME
Run Number: AMT-2
Operator: [illegible]
Ambient Temperature: 85-90 F
Barometric Pressure: 30.00
Static Pressure (P_s): +7.3
Filter Number(s): [illegible]
Pretest Leak Rate = 0.005 cfm @ 15 in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 5 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: [illegible]
Nozzle I.D. No. & Diameter: 079Q
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.90
Post Test Leak Rate = 0.000 cfm @ 15 in. Hg
Post Test Pitot Leak Check: OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 2B

Traverse Point Number	Sampling Time, (min)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0	1417	429.183	0.95	3.5	3.5	86	106	104	6.5"	N.A.	65
A1	5	1422	431.2	1.0	3.6	3.6	84	109	107	6.5"		65
A2	10	1427	439.8	1.0	3.6	3.6	84	110	108	6.5"		64
A3	15	1432	444.4	1.1	4.0	4.0	83	108	104	7"		63
A4	20	1437	448.3	1.1	4.0	4.0	83	106	104	7"		61
A5	25	1442	454.8	1.0	3.6	3.6	83	106	102	7"		61
A6	30	1447	460.409	1.1	4.0	4.0	83	102	102	7"		62
B1	35	1452	465.8	1.2	4.4	4.4	84	106	100	8"		61
B2	40	1502	471.2	1.1	4.0	4.0	84	106	102	8"		60
B3	45	1507	476.9	0.8	2.9	2.9	83	107	101	5"		61
B4	50	1512	482.7	1.0	3.6	3.6	84	107	101	6"		62
B5	55	1517	486.5	1.1	4.0	4.0	84	108	102	6"		61
B6	60	1522	491.939									
			62.756	$\bar{H}$: 1.0174	$\bar{\Delta H}$: 3.77		$\bar{T}_s$: 543.5	$\bar{T}_m$:	564.9			

PACIFIC ENVIRONMENTAL SERVICES, INC.

PES

Plant: McDonnell Douglas - Monrovia
Date: 1-24-96
Source/Sample Number: AMT-2

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(62.36)(1.013)\left[\frac{(30.67) + (3.77/13.6)}{(564.9)}\right]$

$V_{m(std)}$ = 60.243 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 15.9 condensate from impingers and Silica Gel

$V_{W(std)}$ = .04707 V_{lc} = 0.748 scf

$V_{W(std)}$ = 0.748 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.748)}{(0.748)+(60.243)} =$ 0.012

B_{ws} = 1.2%

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.2 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (\quad) + (\quad)(18 - \quad)$

M_s = [illegible] lb/lb-mole

Plant: McDonnell Douglas Monrovia
Date: 1-24-90
Source/Sample Number: AMT-2

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.0174)\sqrt{\frac{(543.8)}{(30.17)(28.87)}}$$

$V_{s(avg)}$ = 57.7 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (57.7)\left(\pi\left(\tfrac{4}{12}\right)^2\right)$$

Q_s = 7553 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7553)(1-0.012)\frac{(30.17)}{(543.8)}$$

Q_{std} = 7303 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(543.5)(60.243)}{(30.17)(57.7)(0.00364)(60)(1-0.012)}$$

%I = 97.9 %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas

Date: 1-24-90

Sampling Location: Outlet - Low Load - Uncontrolled

Sample Type: Method 425 Chrome

Run Number: AMT-2

Sample Box Number: ~~AM~~ 2B

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-2F

Description of Filter:

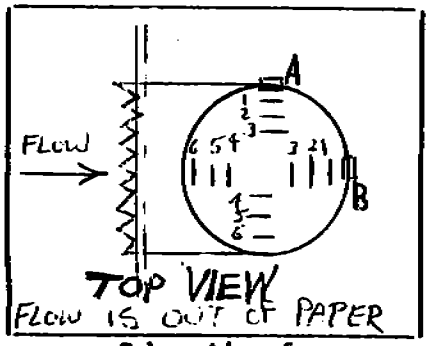
MOISTURE

Impingers			
Final Volume:	101 ml	101 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	1 ml	1 ml	ml
Total H_2O:			0
Silica Gel			
Final Volume:	664.9 g	g	g
Initial Volume	651.0 g	g	g
Net Volume	13.9 g	g	15.9 g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-23-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD HEX CHROME
Run Number: AUT-4
Operator: PARKS
Ambient Temperature: 95°
Barometric Pressure: 30.07
Static Pressure (P_s): +1.3
Filter Number(s): AUT-4F
Pretest Leak Rate = 0.000 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 5 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 9" 5A
Nozzle I.D. No. & Diameter: 070 (0.070)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 7A
Meter $\Delta H_@$: 1.946
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.5
Post Test Leak Rate = 0.006 cfm @ 15" in. Hg
Post Test Pitot Leak Check: OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 18

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1058	492.460	0.50	3.9	3.9	79	103	101	7"	N.A.	61
A1	5 / 1103	497.3	1.1	4.0	4.0	77	101	105	9"		60
A2	10 / 1108	501.7	1.0	3.6	3.6	80	104	108	8"		61
A3	15 / 1113	507.6	1.1	4.0	4.0	80	105	107	9"		63
A4	20 / 1118	513.8	1.1	4.0	4.0	77	101	103	9"		54
A5	25 / 1123	518.8	1.1	4.0	4.0	75	101	107	9"		56
A6	30 / 1128	523.4	1.1	4.0	4.0	81	105	107	9"		60
B1	35 / 1137	528.7	1.1	4.0	4.0	74	100	102	9"		56
B2	40 / 1142	534.0	1.1	4.0	4.0	76	102	100	9"		58
B3	45 / 1147	540.0	0.8	2.9	2.9	75	99	103	6"		56
B4	50 / 1152	544.6	1.0	3.6	3.6	76	99	101	8"		58
B5	55 / 1157	550.2	1.25	4.6	4.6	77	100	102	10"		58
B6	60 / 1202	555.317									
	/										
	/		$\overline{\Delta P}$ =								
	/	$\overline{V_m}$	62.857	1.0244	$\overline{\Delta H}$ = 4.18	$\overline{T_s}$ = 77.2	$\overline{T_m}$ =	102.7			
	/										
	/										
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	/										
	/										
	/										

Stop 1130

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas - Monrovia
Date: 1-25-90
Source/Sample Number: AMT-4

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(62.857)(1.013)\left[\frac{(30.07) + (4.18/13.6)}{(562.7)}\right]$

$V_{m(std)}$ = 60.637 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 3.8 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.179 scf

$V_{W(std)}$ = 0.179 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.179)}{(0.179)+(60.637)} = 0.003$

B_{Ws} = 0.3%

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{Ws}(18 - M_d) = (29.0) + (0.003)(18 - 29.0)$

M_s = [illegible] lb/lb-mole

PES

Plant: McDonnell Douglas - Monrovia
Date: 1-25-90
Source/Sample Number: AMT-4

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49 (0.84)(1.0244) \sqrt{\frac{(537.3)}{(30.17)(28.97)}}$$

$V_{s(avg)}$ = 57.7 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60 \left(57.7\right)\left(\pi \left(\tfrac{10}{12}\right)^2\right)$$

Q_s = 7553 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64 (7553)(1-0.003) \frac{(30.17)}{(537.3)}$$

Q_{std} = 7460 dscfm

8. Isokinetic Variation

$$\%I = K \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945 \frac{(537.3)(60.637)}{(30.17)(57.7)(0.0003064)(60)(1-0.003)}$$

%I = 96.5 %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas

Date: 1-26-00

Sampling Location: Uncontrolled - [illegible]

Sample Type: [illegible]

Run Number: ART-4

Sample Box Number: 1B

Clean-up Man: PARKS

Job Number: 3999

Comments:

FRONT HALF

Filter Number: [illegible]

Description of Filter:

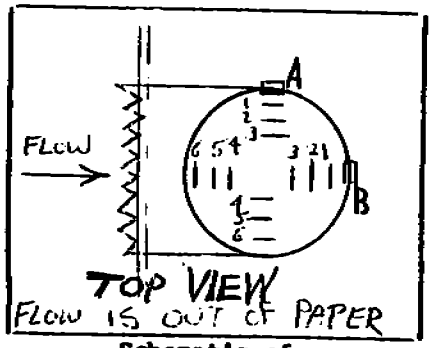
MOISTURE

Impingers			
Final Volume:	ml	ml	3 ml
Initial Volume:	100 ml	100 ml	ml
Net Volume:	-3 ml	-3 ml	3 ml
Total H_2O:			-6
Silica Gel			
Final Volume:	g	g	g
Initial Volume	663.5 g	g	g
Net Volume	+9.5 g	g	(+3.8) g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant MCDONNELL DOUGLAS - MONROVIA
Date 1-29-90
Sampling Location OUTLET STACK
Sample Type CARB METHOD 425 CHROME
Run Number ~~AMT6~~ AMT5
Operator DARKS
Ambient Temperature 85°
Barometric Pressure 30.07
Static Pressure (P_s) +1.3
Filter Number(s) AMT5F
Pretest Leak Rate = 0.002 cfm @ 15" in. Hg
Pretest Pitot Leak Check OK ✓
Pretest Orsat Leak Check N.A.
Read and Record all Data Every 5 Minutes



Schematic of Traverse Point Layout

Probe Length and Type 4' glass lined Stainless Steel
Pitot Tube I.D. No. S-21
Nozzle I.D. No. & Diameter [illegible]
Assumed Moisture, % 1.0
Temp. Readout S/N N.A.
Meter Box Number 1A
Meter $\Delta H_@$ 1.964
C Factor 1.1
Meter Gamma 1.013
Heater Box Setting N.A.
Reference Δp 0.5
Post Test Leak Rate = 0.000 cfm @ 15" in. Hg
Post Test Pitot Leak Check OK ✓
Post Test Orsat Leak Check N.A.

Impinger Box No. 23

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1225	555.687	0.86	3.6	3.6	80	95	99	9"	N.A.	60
A1	5 / 1230	560.8	1.0	3.6	3.6	83	99	103	8"		65
A2	10 / 1235	566.2	1.1	4.0	4.0	83	101	103	8"		63
A3	15 / 1240	570.9	1.15	4.2	4.2	82	102	102	9"		65
A4	20 / 145	577.0	1.15	4.2	4.2	82	101	103	9"		63
A5	25 / 1250	582.6	1.2	4.4	4.4	83	100	100	9"		63
A6	30 / 1255	588.039	1.1	4.0	4.0	84	104	102	9"		63
B1	35 / 1303	593.5	1.1	4.0	4.0	82	102	104	9"		65
B2	40 / 1308	599.0	1.1	4.0	4.0	82	102	106	9"		63
B3	45 / 1313	604.8	0.86	3.2	3.2	80	98	102	9"		63
B4	50 / 1318	609.7	1.0	3.6	3.6	84	101	105	8"		63
B5	55 / 1323	614.8	1.2	4.4	4.4	82	105	103	9.6"		60
B6	60 / 1328	620.337									
	/			$\overline{\Delta H}$ =							
	/	64.656	$\sqrt{\Delta P}$ = 1.037	3.93		$\bar{T}_s$ = 82°F	$\bar{T}_m$	561.8			
	/										
	/					$\bar{T}_s$ = 542K					
	/										
	/										
	/										
	/										
	/										
	/										
	/										

SWITCH 1258

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas Aerospace
Date: 1-25-90
Source/Sample Number: AWT-5

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(64.656)(1.013)\left[\frac{(30.07) + (3.93/13.6)}{(561.8)}\right]$

$V_{m(std)}$ = 62.434 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 4.38 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.179 scf

$V_{W(std)}$ = 0.179 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.179)}{(0.179)+(62.434)} = 0.003$

B_{ws} = 0.3%

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (\quad) + (\quad)(18 - \quad)$

M_s = _____ lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 1-25-88
Source/Sample Number: AUT-5

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49 (0.84)(1.037) \sqrt{\frac{(542)}{(30.17)(28.97)}}$$

$V_{s(avg)}$ = 58.6 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.6)\left(\pi (18/12)^2\right)$$

Q_s = 7671 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{s(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{s(std)} = 17.64 (7671)(1-0.003) \frac{(30.17)}{(542)}$$

$Q_{s(std)}$ = 7510 dscfm

8. Isokinetic Variation

$$\%I = K \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945 \frac{(542)(62.474)}{(30.17)(58.6)(0.00306)(60)(1-0.003)}$$

%I = 97.9 %

PES

SAMPLE RECOVERY DATA

Plant: Al-Pennsylvania Power

Date: 1-25-90

Sampling Location: Uncontrolled medium heat

Sample Type: 405 Chrome

Run Number: ~~AMT-5~~ AMT-5

Sample Box Number: 3B

Clean-up Man: PARKS

Job Number: 3449

Comments:

FRONT HALF

Filter Number: ~~C6~~ AMT-5F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	ml	ml	+1 ml
Initial Volume:	100 ml	100 ml	1 ml
Net Volume:	-7 ml	-6 ml	-1 ml
Total H_2O:			(-12)
Silica Gel			
Final Volume:	g	g	g
Initial Volume	644.0 g	g	g
Net Volume	+15.8 g	g	(+3) g
Total Moisture:			

Description of Impinger Catch:

SAMPLE RECOVERY DATA

Plant: _____

Date: _____

Sampling Location: _____

Sample Type: _____

Run Number: _____

Sample Box Number: _____

Clean-up Man: _____

Job Number: _____

Comments: _____

_____

FRONT HALF

Filter Number: _____ _____ _____

Description of Filter: _____

MOISTURE

Impingers

Final Volume:	_____ ml	_____ ml	_____ ml
Initial Volume:	_____ ml	_____ ml	_____ ml
Net Volume:	_____ ml	_____ ml	_____ ml
Total H_2O:	_____	_____	_____

Silica Gel

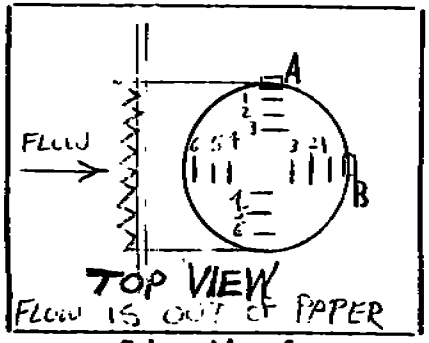
Final Volume:	_____ g	_____ g	_____ g
Initial Volume	_____ g	_____ g	_____ g
Net Volume	_____ g	_____ g	_____ g
Total Moisture:	_____	_____	_____

Description of Impinger Catch: _____

_____

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-29-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD - HEX CHROME
Run Number: AMT-7
Operator: [illegible]
Ambient Temperature: 80°
Barometric Pressure: 29.58
Static Pressure (P_s): +1.3
Filter Number(s): AMT-7F
Pretest Leak Rate = 0.008 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 15" 2A
Nozzle I.D. No. & Diameter: 0.26 (0.337)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.5
Post Test Leak Rate = 0.009 cfm @ 15" in. Hg
Post Test Pitot Leak Check: OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 1A

Traverse Point Number	Sampling Time, (min)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0	1357	624.419	0.99	3.6	3.6	80°	99	103	7"	N.A.	65°
A1	3 5	1400	624.8	1.1	4.6	4.6	80	96	102	8"		54°
A2	6 10	1403	625.7	1.1	4.0	4.0	80	97	103	8"		54°
A3	9 15	1406	626.6	1.2	4.4	4.4	77	93	96	9"		60°
A4	12 20	1409	627.6	1.2	4.4	4.4	73°	92	95	9"		58°
A5	15 25	1412	628.2	1.15	4.2	4.2	72°	91	93	9"		60°
A6	18 30	1415	629.29	1.1	4.0	4.0	70°	88	92	8"		58°
B1	21 35	1420	629.3	1.2	4.4	4.4	70	89	92	8"		58°
B2	24 40	1423	630.6	1.1	4.0	4.0	70	91	92	8"		57°
B3	27 45	1426	630.2	0.87	3.2	3.2	72°	92	94	7"		57°
B4	30 50	1429	631.0	1.0	3.7	3.7	71°	90	91	7"		56°
B5	33 55	1432	631.9	1.2	4.4	4.4	72°	91	93	7"		56°
B6	36 60	1435	632.463									
					4.09		534.1	T_m = 556.8				
				TAP = 1.0481								
		V_m = 28.544										

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: Mc Donnell Douglas - Monrovia
Date: 1-30-90
Source/Sample Number: AMT-7

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(.38544)(1.013)\left[\frac{(29.58) + (4.03/13.6)}{(556.8)}\right]$

$V_{m(std)}$ = 36.957 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 4.3 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.202 scf

$V_{W(std)}$ = 0.202 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.202)}{(0.202) + (36.957)} = 0.005$

B_{ws} = 0.5 %

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (29.0) + (0.005)(18 - 29.0)$

lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 1-30-90
Source/Sample Number: AUT-7

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.0481)\sqrt{\frac{(534.1)}{(29.68)(28.95)}}$$

$V_{s(avg)}$ = 59.3 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (59.3)\left(\pi\left(\tfrac{10}{12}\right)^2\right)$$

Q_s = 7768 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 28 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7768)(1-0.065)\frac{(29.68)}{(534.1)}$$

Q_{std} = 7577 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(534.1)(36.957)}{(29.68)(59.3)(0.0314)(36)(1-0.065)}$$

%I = 91.6 %

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas

Date: ~~1-26-90~~ 1-29-90

Sampling Location: Uncontrolled High Load

Sample Type: 4.05 Chrome

Run Number: AMT-7

Sample Box Number: ~~2B~~ 1B

Clean-up Man: Parks

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-7F

Description of Filter:

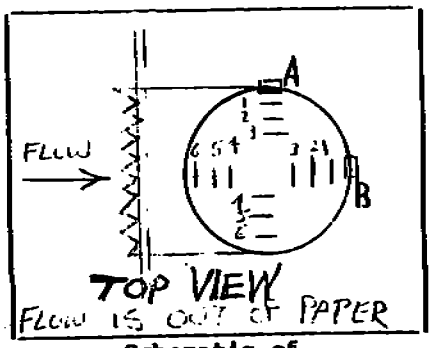
MOISTURE

Impingers Final Volume:	102 ml	52 ml	2 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	2 ml	-48 ml	+2 ml
Total H_2O:	42.1		-4
Silica Gel Final Volume:	~~[illegible]~~ g	g	g
Initial Volume	633.8 g	g	g
Net Volume	~~27.0~~ g	g	g
Total Moisture:	8.3		

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-9-96
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD - 1/2 CHROME
Run Number: ANT 8
Operator: MARKS
Ambient Temperature: 60°
Barometric Pressure: ~~29.67~~ 29.58
Static Pressure (P_s): +1.2
Filter Number(s): ANT 8
Pretest Leak Rate = 0.012 cfm @ 15 in. Hg
Pretest Pitot Leak Check: OK ✓
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: S-54
Nozzle I.D. No. & Diameter: 1A (0.138)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.967
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.5
Post Test Leak Rate = 0.003 cfm @ 10" in. Hg
Post Test Pitot Leak Check: ✓ OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 2B ;

Traverse Point Number	Sampling Time, (min)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0	1505	660.312	1.0	3.7	3.7	79°	75	85	8"	N.A.	61°
A1	3	1508	660.4	1.1	4.0	4.0	74°	75	83	8"		60°
A2	6	1511	660.8	1.0	3.7	3.7	74°	84	87	8"		65°
A3	9	1514	661.9	1.1	4.0	4.0	74°	85	88	8"		65
A4	12	1517	673.2	1.1	4.0	4.0	74°	86	88	8"		63
A5	15	1520	676.2	1.2	4.4	4.4	76°	88	87	8"		60°
A6	18	1523	679.528	1.05	3.8	3.8	76°	86	87	7.5"		58°
1525												
B1	21	1528	681.7	1.1	4.0	4.0	76°	87	88	9"		57°
B2	24	1531	683.9	1.1	4.0	4.0	76°	89	88	8"		57°
B3	27	1534	688.9	0.87	3.2	3.2	76°	89	88	7"		62°
B4	30	1537	692.2	0.87	3.2	3.2	76°	88	88	7"		63°
B5	33	1540	694.6	1.2	4.4	4.4	76°	89	87	7		63°
B6	36	1543	697.928									
		$\bar{V}_m$	37.516	$\sqrt{\Delta P}$ 1.0271	$\bar{\Delta H}$ 3.82		$\bar{T}_s$ 535.1		$\bar{T}_m$ 537.6			

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas - Monrovia
Date: 1-30-90
Source/Sample Number: AMT-8

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(37.516)(1.013)\left[\frac{(29.58) + (3.87/13.6)}{(549.6)}\right]$

$V_{m(std)}$ = 36.428 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 5.6 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.264 scf

$V_{W(std)}$ = 0.264 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.264)}{(0.264)+(36.428)} = 0.007$

B_{ws} = 0.7 %

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (29.0) + (0.007)(18 - 29.0)$

M_s = 28.9 lb/lb-mole

Plant: McDonnell Douglas - Newport
Date: 1-30-90
Source/Sample Number: AUT-8

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.0271)\sqrt{\frac{(535.1)}{(29.68)(28.92)}}$$

$V_{s(avg)}$ = 58.2 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.2)\left(\pi\left(\frac{48}{12}\right)^2\right)$$

Q_s = 7618 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7618)(1-0.007)\frac{(29.68)}{(535.1)}$$

Q_{std} = 7402 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(535.1)(36.476)}{(29.68)(58.2)(0.0031)(36)(1-0.007)}$$

%I = 96.6 %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas

Date: ~~1-26-90~~ 1-29-90

Sampling Location: Uncontrolled - High Lead

Sample Type: 425 Chrome

Run Number: AMT-8

Sample Box Number: 2B

Clean-up Man: Parks

Job Number: 3999

Comments:

FRONT HALF

Filter Number: AMT-8F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	~~-1~~ 76 ml	121 ml	-1 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	-24 ml	21 ml	-1 ml
Total H_2O:			(-2)
Silica Gel			
Final Volume:	660.8 g	g	g
Initial Volume	653.3 g	g	g
Net Volume	7.6 g	g	(5.6) g
Total Moisture:			

Description of Impinger Catch:

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas

Date: ~~1-26-90~~ 1-29-90

Sampling Location: Blank

Sample Type: 425 Chrome

Run Number: AMT-9

Sample Box Number: 3B

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-9F

Description of Filter:

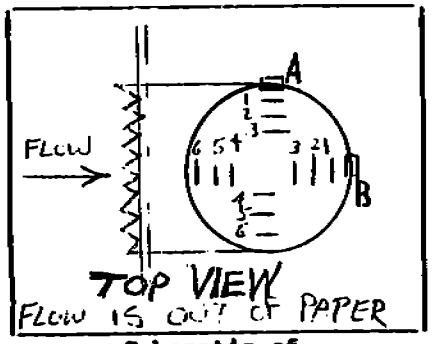
MOISTURE

Impingers			
Final Volume:	100 ml	100 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	0 ml	0 ml	0 ml
Total H_2O:			
Silica Gel			
Final Volume:	635.5 g	g	g
Initial Volume	g	g	g
Net Volume	0 g	g	g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-31-96
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD 425 CHROME
Run Number: AMT-10
Operator: MARKS
Ambient Temperature: 75°
Barometric Pressure: 29.34
Static Pressure (P_s): -1.3
Filter Number(s): AMT-10F
Pretest Leak Rate = 0.005 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK ✓
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 5" 59
Nozzle I.D. No. & Diameter: 077 (0.237)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.5
Post Test Leak Rate = 0.003 cfm @ 15" in. Hg
Post Test Pitot Leak Check: OK ✓
Post Test Orsat Leak Check: N.A.

Impinger Box No. 1A ;

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1103	702.112	0.97	3.6	3.6	65	84	86	8"	N.A.	54
A1	3 / 1106	705.6	1.05	4.0	4.0	73	92	90	8.5"		56
A2	6 / 1109	708.9	1.05	4.0	4.0	72	92	92	9"		56
A3	9 / 1112	711.5	1.0	3.7	3.7	69	91	89	8"		61
A4	12 / 1115	714.6	1.1	4.0	4.0	71	92	92	8"		61
A5	15 / 1118	717.7	1.1	4.0	4.0	67	89	85	8"		58
A6	18 / 1121	720.607	1.1	4.0	4.0	67	85	83	8"		52
B1	21 / 1126	724.4	1.1	4.0	4.0	69	92	90	9"		58
B2	24 / 1129	727.6	1.2	4.4	4.4	69	95	92	9"		61
B3	27 / 1132	730.8	0.82	3.0	3.0	71	93	89	6.5"		60
B4	30 / 1135	733.9	0.97	3.6	3.6	68	92	88	8"		58
B5	33 / 1138	736.4	1.25	4.6	4.6	69	93	89	10"		60
B6	36 / 1141	739.649									

Swap 1123

PACIFIC ENVIRONMENTAL SERVICES, INC.

PES

Plant: McDonnell Douglas - Monrovia
Date: 1-31-90
Source/Sample Number: AMT-10

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(37.537)(1.013)\left[\frac{(29.34) + (3.91/13.6)}{(549.8)}\right]$

$V_{m(std)}$ = 36.146 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 5.3 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.249 scf

$V_{W(std)}$ = 0.249 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.249)}{(0.249)+(36.146)} = 0.007$

B_{ws} = 0.7 %

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (29.0) + (0.007)(18 - 29.0)$

M_s = 28.92 lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 1-31-90
Source/Sample Number: AMT-10

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.028)\sqrt{\frac{(528.8)}{(28.92)(29.44)}}$$

$V_{s(avg)}$ = 58.2 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.2)\left(\pi\left(\frac{10}{12}\right)^2\right)$$

Q_s = 7618 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7618)(1-0.007)\frac{(29.44)}{(528.8)}$$

Q_{std} = 7429 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(528.8)(36.146)}{(29.44)(58.2)(0.003064)(36)(1-0.007)}$$

%I = 96.3 %

PES

SAMPLE RECOVERY DATA

Plant: M-Douglas

Date: ~~2~~ - 1-31-90

Sampling Location: Outlet - High Load - Additive

Sample Type: 425 Chrome

Run Number: ANT-10

Sample Box Number:

Clean-up Man: PARKS

Job Number: 7449

Comments:

FRONT HALF

Filter Number: | | |

Description of Filter:

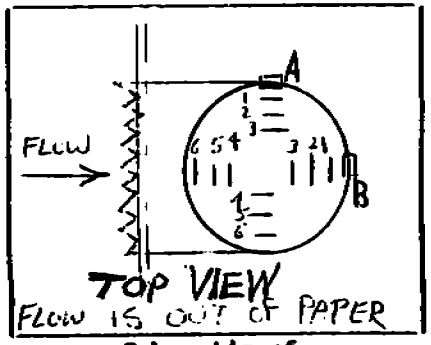
MOISTURE

Impingers			
Final Volume:	ml	ml	ml
Initial Volume:	ml	ml	ml
Net Volume:	+4 ml	-8 ml	+1 ml
Total H_2O:			(-3)
Silica Gel			
Final Volume:	g	g	g
Initial Volume	g	g	g
Net Volume	+8.3 g	g	(+5.3) g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant MCDONNELL DOUGLAS - MONROVIA
Date 1-31-90
Sampling Location OUTLET STACK
Sample Type CARB METHOD 1/2 CHROME
Run Number ~~AMT-11~~ AMT-11
Operator PARKS
Ambient Temperature 75°
Barometric Pressure 29.34
Static Pressure (P_s) + 1.3
Filter Number(s) AMT-11F
Pretest Leak Rate = 0.011 cfm @ 15" in. Hg
Pretest Pitot Leak Check OKV
Pretest Orsat Leak Check N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type 4' glass lined Stainless Steel
Pitot Tube I.D. No. "S" 24
Nozzle I.D. No. & Diameter 19Q (0.233)
Assumed Moisture, % 1.0
Temp. Readout S/N N.A.
Meter Box Number 1A
Meter $\Delta H_@$ 1.969
C Factor 1.1
Meter Gamma 1.013
Heater Box Setting N.A.
Reference Δp 0.5
Post Test Leak Rate = 0.007 cfm @ 16" in. Hg
Post Test Pitot Leak Check ✓ OK
Post Test Orsat Leak Check N.A.

Impinger Box No. 3B ;

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1216 DN	739.928	1.0	3.7	3.7	69	86	88	7"	N.A.	54
A1	3 / 1216 DN	743.2	1.0	3.7	3.7	72	88	89	7"		51
A2	6 / 1222	747.0	1.1	4.0	4.0	73	89	89	7"		59
A3	9 / 1225	750.9	1.1	4.0	4.0	73	93	89	7"		60
A4	12 / 1228	762.6	1.2	4.4	4.4	75	94	90	8"		62
A5	15 / 1231	756.0	1.1	4.0	4.0	75	95	92	3"		64
A6	18 / 1234	758.995	0.95	3.5	3.5	76	94	93	6"		63
B1	21 / 1239	761.8	1.1	4.0	4.0	77	95	93	7"		62
B2	24 / 1242	765.1	1.1	4.0	4.0	77	97	93	7"		63
B3	27 / 1245	768.4	0.85	3.1	3.1	78	98	94	6"		64
B4	30 / 1248	771.2	1.0	3.7	3.7	78	98	93	7"		62
B5	33 / 1251	774.6	1.1	4.0	4.0	77	99	92	7"		64
B6	36 / 1254	777.492									
	/										
	/										
	/	37.564	[illegible]								
	/	✓	✓	✓		✓		✓			
	/										
	/										
	/										
	/										
	/										
	/										

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas-Monrovia
Date: 1-31-90
Source/Sample Number: AMT-11

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(37.564)(1.013)\left[\frac{(29.34) + (3.84/13.6)}{(552.6)}\right]$

$V_{m(std)}$ = 35.982 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = +4.1 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.193 scf

$V_{W(std)}$ = 0.193 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.193)}{(0.193) + (35.982)} = 0.005$

B_{Ws} = 0.5%

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{Ws}(18 - M_d) = (29.0) + (0.005)(18 - 29.0)$

lb/lb-mole

Plant: McDonnell Douglas Monrovia
Date: 1-31-90
Source/Sample Number: AMT-11

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.024)\sqrt{\frac{(534.9)}{(29.44)(28.95)}}$$

$V_{s(avg)}$ = 58.3 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\left(58.3\right)\left(\pi\left(\frac{10}{12}\right)^2\right)$$

Q_s = 7631 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{std} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{std} = 17.64(7631)(1-0.005)\frac{(29.44)}{(534.9)}$$

Q_{std} = 7372 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(534.9)(35.482)}{(29.44)(58.3)(36)(0.0314)(1-0.005)}$$

%I = 95.8 %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date:

Sampling Location: Outlet - High Load - Additive

Sample Type: 425 Chrome

Run Number:

Sample Box Number:

Clean-up Man: 2949

Job Number:

Comments:

FRONT HALF

Filter Number: AMT-11F

Description of Filter: Clear

MOISTURE

Impingers			
Final Volume:	ml	121 ml	ml
Initial Volume:	ml	ml	ml
Net Volume:	-22 ml	+21 ml	ml
Total H_2O:			(-1)
Silica Gel			
Final Volume:	g	g	g
Initial Volume	g	g	g
Net Volume	(+5.1) g	g	g
Total Moisture:			(+4.1)

Description of Impinger Catch:

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas

Date: 1-31-90

Sampling Location: Blank

Sample Type: Chrome

Run Number:

Sample Box Number:

Clean-up Man: Simon

Job Number: 2949

Comments:

FRONT HALF

Filter Number: _____ _____ _____

Description of Filter: _____

MOISTURE

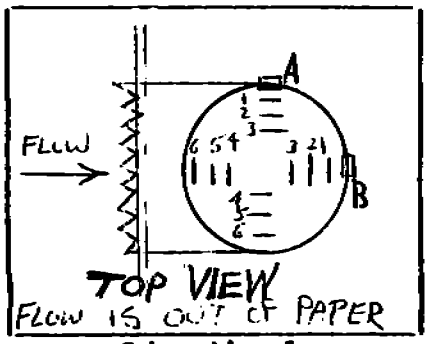
Impingers			
Final Volume:	ml	ml	ml
Initial Volume:	ml	ml	ml
Net Volume:	ml	ml	ml
Total H_2O:			

Silica Gel			
Final Volume:	g	g	g
Initial Volume	g	g	g
Net Volume	g	g	g
Total Moisture:			

Description of Impinger Catch: _____

FIELD DATA

Plant MCDONNELL DOUGLAS - MONROVIA
Date 2-14
Sampling Location OUTLET STACK
Sample Type CARB METHOD 425 CHROME
Run Number AMT-13
Operator APKS
Ambient Temperature 70°
Barometric Pressure + 29.57" Hg
Static Pressure (P_s) + 1.2 1.26
Filter Number(s) AMT-13F
Pretest Leak Rate = .014 cfm @ 15" in. Hg
Pretest Pitot Leak Check OK ✓
Pretest Orsat Leak Check N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type 4' glass lined Stainless Steel
Pitot Tube I.D. No. 15" 2A
Nozzle I.D. No. & Diameter 102 (0.339)
Assumed Moisture, % 1.0
Temp. Readout S/N N.A.
Meter Box Number 1A
Meter $\Delta H_@$ 1.964
C Factor 1.1
Meter Gamma 1.013
Heater Box Setting N.A.
Reference Δp 0.05
Post Test Leak Rate = .008 cfm @ 15" in. Hg
Post Test Pitot Leak Check ✓ OK
Post Test Orsat Leak Check N.A.

Impinger Box No. 3B ;

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1057	778.243	0.98	3.6	3.6	67	79	81	8"	N.A.	50
A1	3 / 1100	780.8	1.1	4.0	4.0	66	80	80	8"		49
A2	6 / 1103	784.1	1.1	4.0	4.0	68	82	80	9"		55
A3	9 / 1106	788.1	1.2	4.4	4.4	68	84	80	10"		57
A4	12 / 1109	791.8	1.2	4.4	4.4	68	85	81	10"		58
A5	15 / 1112	794.7	1.25	4.6	4.6	68	86	81	10"		58
A6	18 / 1115	797.508	1.1	4.0	4.0	68	85	82	9"		60
B1	21 / 1120	800.7	1.15	4.2	4.2	68	87	82	9"		57
B2	24 / 1123	803.6	1.15	4.2	4.2	69	89	83	9"		59
B3	27 / 1126	806.9	0.86	2.8	2.8	69	90	84	7"		59
B4	30 / 1129	810.8	0.95	3.5	3.5	69	91	85	6"		60
B5	33 / 1132	813.7	1.25	4.6	4.6	70	90	84	10"		60
B6	36 / 1135	815.898									
	/										
	/										
	/										
	/										
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	/										
	/										

Switch 1117

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas - Monrovia
Date: 2-1-90
Source/Sample Number: AMT-13

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(37.655)(1.013)\left[\frac{(29.57) + (4.03/13.6)}{(544.0)}\right]$

$V_{m(std)}$ = 36.941 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 18.9 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.419 scf

$V_{W(std)}$ = 0.419 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.419)}{(0.419)+(36.941)} = 0.011$ %

B_{ws} = 1.1 %

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (29.0) + (0.011)(18 - 29.0)$

M_s = 28.88 lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 2-1-90
Source/Sample Number: ANT-13

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.051)\sqrt{\frac{(528.2)}{(29.66)(28.88)}}$$

$V_{s(avg)}$ = 59.3 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (59.3)\left(\pi\left(\frac{10}{12}\right)^2\right)$$

Q_s = 7762 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7762)(1-0.011)\frac{(29.66)}{(528.2)}$$

Q_{std} = 7604 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(528.2)(36.941)}{(29.66)(59.3)(0.[illegible])(36)(1-0.011)}$$

%I = 95.3 %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date: 2-1-90

Sampling Location: Controlled Low Load

Sample Type: 405 Chrome

Run Number: AMT-13

Sample Box Number: 3B

Clean-up Man: Parks

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-13F

Description of Filter:

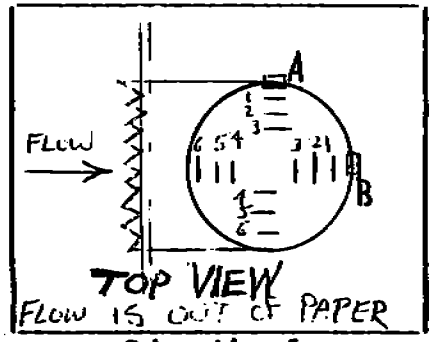
MOISTURE

Impingers			
Final Volume:	90 ml	111 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	-10 ml	+11 ml	0 ml
Total H_2O:			(+1)
Silica Gel			
Final Volume:	672.4 g	g	g
Initial Volume	664.5 g	g	g
Net Volume	(+7.9) g	g	(+8.9) g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 2-1-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD - 125 CHROME
Run Number: AMT-14
Operator: PARKS
Ambient Temperature: 65° 70°
Barometric Pressure: 29.57
Static Pressure (P_s): -11.3
Filter Number(s): AMT-14F
Pretest Leak Rate = 0.007 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 15A 7A
Nozzle I.D. No. & Diameter: 070 (0.375)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.007
Heater Box Setting: N.A.
Reference Δp: 0.3
Post Test Leak Rate = 0.007 cfm @ 18" in. Hg
Post Test Pitot Leak Check: OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 46

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1205	816.387	1.0	3.7	3.7	69	86	86	8"	N.A.	59
A1	3 / 1208	820.3	1.1	4.0	4.0	69	87	86	9"		55
A2	6 / 1211	822.7	1.1	4.0	4.0	69	88	87	9"		56
A3	9 / 1214	825.8	1.15	4.2	4.2	69	89	90	9"		60
A4	12 / 1217	829.2	1.15	4.2	4.2	69	91	87	9"		61
A5	15 / 1220	832.8	1.15	4.8	4.2	69	90	88	9"		61
A6	18 / 1223	835.805	1.15	4.2	4.2	69	88	86	9"		59
B1	21 / 1226	838.7	1.1	4.0	4.0	69	89	86	9"		60
B2	24 / 1232	842.8	1.0	3.7	3.7	70	90	86	9"		60
B3	27 / 1235	846.2	0.86	2.8	2.8	70	90	86	6"		62
B4	30 / 1238	849.3	1.0	3.7	3.7	70	90	86	7"		62
B5	33 / 1241	851.1	1.3	4.8	4.8	70	91	86	11"		62
B6	36 / 1244	854.672									
	/										
	/										
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	/										

SWITCH 1226

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas Uniroyal
Date: 2-1-90
Source/Sample Number: AMT-14

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(35.285)(1.013)\left[\frac{(29.57) + (.46/13.6)}{(547.9)}\right]$

$V_{m(std)}$ = 37.286 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 6.9 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.325 scf

$V_{W(std)}$ = 0.325 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.325)}{(0.325)+(37.286)} = 0.009$

B_{Ws} = 0.9%

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = [illegible] lb/lb-mole

$M_s = M_d + B_{Ws}(18 - M_d) = (\quad) + (\quad)(18 - \quad)$

[illegible] lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 2-1-86
Source/Sample Number: AMT-14

5. Stack Gas Velocity Average

$$V_s(avg) = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_s(avg) = 85.49(0.84)(1.042)\sqrt{\frac{(529.3)}{(29.67)(28.9)}}$$

$V_s(avg)$ = 58.8 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.8)\left(\pi\left(\frac{10}{12}\right)^2\right)$$

Q_s = 7697 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{std} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{std} = 17.64(7697)(1-0.009)\frac{(29.67)}{(529.3)}$$

Q_{std} = 7542 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(529.3)(37.286)}{(29.67)(0.009)(58.8)(36)(1-0.009)}$$

%I = 97.8 %

PES

SAMPLE RECOVERY DATA

Plant: Mcdonnell Douglas - Monrovia

Date: 2-1-90

Sampling Location: Controlled Low Load

Sample Type: 425 Chrome

Run Number: AMT-14

Sample Box Number: 4B

Clean-up Man: Parks

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-14F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	106 ml	82 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	+6 ml	-18 ml	-12 ml
Total H_2O:			
Silica Gel			
Final Volume:	662.0 g	g	g
Initial Volume	643.1 g	g	g
Net Volume	18.9 g	g	+6.9 g
Total Moisture:			

Description of Impinger Catch:

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date: 2-1-90

Sampling Location: Controlled Low Load

Sample Type: 425 Chrome

Run Number: AMT-15 Blank

Sample Box Number: 2B

Clean-up Man: Parks

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-15F

Description of Filter:

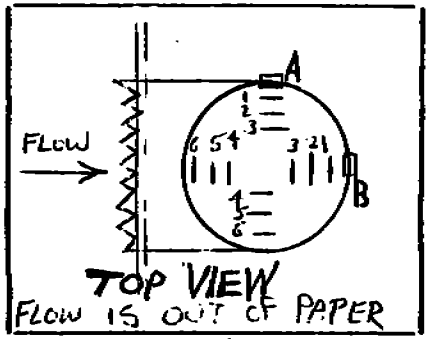
MOISTURE

Impingers			
Final Volume:	100 ml	100 ml	ml
Initial Volume:	100 ml	100 ml	ml
Net Volume:	0 ml	0 ml	ml
Total H_2O:			
Silica Gel			
Final Volume:	622.0 g	g	g
Initial Volume	622.0 g	g	g
Net Volume	g	g	0 g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 2-2-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD 425 CHROME
Run Number: AMT-16
Operator: PARKS
Ambient Temperature: 70°
Barometric Pressure: 27.91
Static Pressure (P_s): +1.2
Filter Number(s): AMT-16F
Pretest Leak Rate = 0.02 cfm @ 15" in. Hg
Pretest Pitot Leak Check: ✓ OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 15" 54
Nozzle I.D. No. & Diameter: 0.223 4.0 in
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 14
Meter $\Delta H@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.55
Post Test Leak Rate = 0.00 cfm @ 15" in. Hg
Post Test Pitot Leak Check: OK ✓
Post Test Orsat Leak Check: N.A.

Impinger Box No. 3B

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	~~45~~ 0 / 1045	854.988	0.97	3.3	3.3	68	82	82	7"	N.A.	55
A1	3 / 1048	857.9	1.1	3.6	3.6	68	82	82	8"		55
A2	6 / 1051	860.8	1.15	3.9	3.9	69	84	82	9"		58
A3	9 / 1054	863.9	1.15	3.9	3.9	68	86	82	8"		59
A4	12 / 1057	867.0	1.17	3.9	3.9	69	88	83	9"		61
A5	15 / 1100	870.2	1.2	4.0	4.0	69	84	84	7"		61
A6	18 / 1103	873.431	1.0	3.3	3.3	68	88	85	7"		60
B1	21 / 1108	876.9	1.2	4.0	4.0	68	91	85	8"		59
B2	24 / 1111	879.2	1.2	4.0	4.0	69	92	86	9"		60
B3	27 / 1114	882.4	1.15	3.9	3.9	69	93	84	9"		60
B4	30 / 1117	886.0	0.83	2.8	2.8	68	92	88	6"		60
B5	33 / 1120	887.9	0.90	3.0	3.0	69	93	87	6"		60
B6	~~36~~ / 1123	890.864									
	/										
	/										
	/	35.876	1.039	3.63	$\overline{H}$ =	68.85	$\overline{T_m}$ =	546.2			
	/										
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	/										
	/										
	/										

Switch 1105

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas - Monrovia
Date: 2-3-91
Source/Sample Number: AMT-16

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(35.876)(1.013)\left[\frac{(29.91) + (3.63/13.6)}{(546.2)}\right]$

$V_{m(std)}$ = 35.419 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 2.3 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.11 scf

$V_{W(std)}$ = 0.11 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.11)}{(0.11)+(35.419)} = 0.003$

B_{ws} = 0.003

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (29.0) + (0.003)(18 - 29.0)$

= 28.9 lb/lb-mole

Plant: McDonnell Douglas - Stanton
Date: 2-2-90
Source/Sample Number: 4077-16

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49 (0.84)(1.034) \sqrt{\frac{(528.5)}{(30.01)(28.97)}}$$

$V_{s(avg)}$ = 58.2 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.2)(2.18)$$

Q_s = 7618 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64 (7618)(1-0.003) \frac{(30.01)}{(528.5)}$$

Q_{std} = 7608 dscfm

8. Isokinetic Variation

$$\%I = K \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945 \frac{(528.5)(35.489)}{(30.01)(58.2)([illegible])(36)(1-0.003)}$$

%I = [illegible] %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date:

Sampling Location: Controlled - Low Load

Sample Type: 425 Chrome

Run Number: AMT-16

Sample Box Number:

Clean-up Man: Parks

Job Number: 3949

Comments:

FRONT HALF

Filter Number:

Description of Filter:

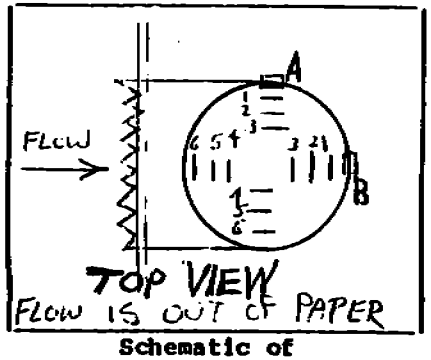
MOISTURE

Impingers			
Final Volume:	94 ml	100 ml	1 ml
Initial Volume:	ml	ml	0 ml
Net Volume:	-6 ml	0 ml	1 ml
Total H_2O:			-5
Silica Gel			
Final Volume:	660.0 g	g	g
Initial Volume	g	g	g
Net Volume	7.3 g	g	2.5 g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 2-2-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD 425 CHROME
Run Number: AMT-17
Operator: PARKS
Ambient Temperature: 70°
Barometric Pressure: 24.9
Static Pressure (P_s): +1.2
Filter Number(s): AMT-17F
Pretest Leak Rate = 0.007 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OKV
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 15" 27
Nozzle I.D. No. & Diameter: 23P ~~0.2~~ d=0.222
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 7A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.55
Post Test Leak Rate = 0.007 cfm @ 15" in. Hg
Post Test Pitot Leak Check: VOK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 1B ;

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1147	891.007	0.97	3.3	3.3	74	89	88	7"	N.A.	53
A1	3 / 1150	894.0	1.1	3.6	3.6	78	97	96	7"		59
A2	6 / 1153	897.1	1.1	3.6	3.6	76	97	96	7"		61
A3	9 / 1156	899.9	1.1	3.6	3.6	77	99	96	7"		60
A4	12 / 1159	903.1	1.15	3.9	3.9	75	98	95	8"		62
A5	15 / 1202	906.3	1.2	4.6	4.6	75	100	95	8"		62
A6	18 / 1205	909.619	1.1	3.6	3.6	75	99	96	7"		61
B1	21 / 1210	912.8	1.2	4.0	4.0	76	101	97	8"		60
B2	24 / 1213	916.8	1.1	3.6	3.6	75	101	96	7"		60
B3	27 / 1216	919.6	0.83	2.5	2.5	75	103	98	6"		60
B4	30 / 1219	921.8	0.97	3.3	3.3	77	103	99	6"		60
B5	33 / 1222	924.6	1.25	4.0	4.3	79	95	103	8"		59
B6	36 / 1225	927.836									
	/										
	/		Ave $\sqrt{\Delta P_s}$ = 1.042 ✓		Ave ΔH = 3.625 ✓			Ave T_m = 97.5 or 557.5R ✓			
	θ = 36' /	V_m = 36.75							✓		<68 ✓
	/					Ave T_s = 76.25 or 536 ✓					
	/										
	/										
	/										
	/										
	/										
	/										
	/										

Wash 103

Added ICE

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDONNELL DOUGLAS - MONROVIA
Date: 2-2-90
Source/Sample Number: AMT- 17

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(36.759)(1.03)\left[\frac{(29.95) + (3.625/13.6)}{(557.5)}\right]$

$V_{m(std)}$ = 35.602 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 6.4 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.3012 scf

$V_{W(std)}$ = 0.301 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.301)}{(0.301) + (35.602)} = 0.00838$

B_{ws} = 0.8%

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\ _\ ) + 0.320(\ _\ ) + 0.280(\ _\ )$

M_d = Use 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (29.0) + (0.008)(18 - 29.0)$

M_s = 28.901 lb/lb-mole

Plant: McDONNELL DOUGLAS - MONROVIA
Date: 2-2-90
Source/Sample Number: AMT-17

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.042)\sqrt{\frac{(557.5)}{(30.038)(28.91)}}$$

$V_{s(avg)}$ = 59.95 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (59.95)\left(\left(\frac{\frac{20}{12}}{2}\right)^2 \pi\right)$$

Q_s = 7,847 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7847)(1-\cancel{0.4}\ .008)\frac{(30.038)}{(536.)}$$

Q_{std} = 7,696 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(536)(35.602)}{(30.038)(59.95)\left(\left(\frac{.222}{\frac{12}{2}}\right)^2 \pi\right)(36)(1-0.008)}$$

$\cancel{.0002638}$ .0000856

%I = 104.3 %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monroe

Date:

Sampling Location: ~~[illegible]~~ Low Load - Controlled

Sample Type: 425 Chrome

Run Number: AN-18

Sample Box Number:

Clean-up Man: PARKS

Job Number: 3940

Comments:

FRONT HALF

Filter Number: AN-18F

Description of Filter:

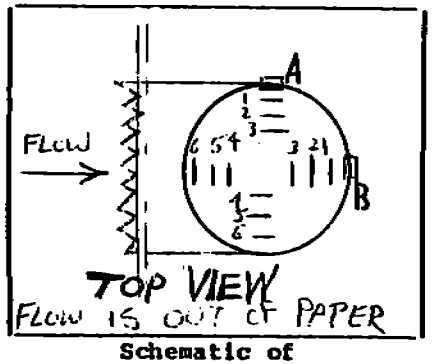
MOISTURE

Impingers			
Final Volume:	100 ml	100 ml	0 ml
Initial Volume:	ml	ml	0 ml
Net Volume:	0 ml	0 ml	0 ml
Total H_2O:			
Silica Gel			
Final Volume:	621 g	g	g
Initial Volume	g	g	g
Net Volume	0 g	g	g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 7-5-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD - HEXCHROME
Run Number: AMT-19
Operator: PARKS
Ambient Temperature: 70°
Barometric Pressure: 29.92
Static Pressure (P_s): +1.3
Filter Number(s): AMT-19F
Pretest Leak Rate = 0.007 cfm @ 15" in. Hg
Pretest Pitot Leak Check: ✓OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: "S" # 2A
Nozzle I.D. No. & Diameter: 42P (0.222")
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.6
Post Test Leak Rate = 0.007 cfm @ 16" in. Hg
Post Test Pitot Leak Check: OK ✓
Post Test Orsat Leak Check: N.A.

Impinger Box No. 3B

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1057	928.232	0.98	3.1	3.1	64	86	84	6"	N.A.	50
A1	3 / 1100	930.6	1.0	3.2	3.2	64	85	85	6"		46
A2	6 / 1103	933.8	1.0	3.2	3.2	64	85	85	6"		48
A3	9 / 1106	936.8	1.15	3.6	3.6	65	89	86	7"		53
A4	12 / 1109	939.8	1.15	3.6	3.6	66	89	86	7"		50
A5	15 / 1112	942.8	1.15	3.6	3.6	65	90	88	7"		52
A6	18 / 1115	945.617	1.15	3.6	3.6	66	91	88	7"		58
B1	21 / 1120	949.0	1.15	3.6	3.6	66	92	89	7"		55
B2	24 / 1123	952.3	1.1	3.5	3.5	66	93	89	7"		56
B3	27 / 1126	954.8	0.86	2.7	2.7	67	96	89	6"		58
B4	30 / 1129	957.6	1.1	3.5	3.5	67	96	90	7"		56
B5	33 / 1132	960.5	1.25	3.9	3.9	68	98	91	8"		56
B6	36 / 1135	963.78									
	/										
	/										
	/				✓ $\bar{T}_s$	525.7	✓ $\bar{T}_m$ =	544.2			
	/ $\sqrt{T_m}$	35.486	$\bar{\Delta P}$ 1.041	13.43							
	/										
	/										
	/										
	/										
	/										
	/										
	/										

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas - Monrovia
Date: 3-5-91
Source/Sample Number: AUT-19

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(35.48)(1.03)\left[\frac{(29.92) + (3.43/13.6)}{(549.2)}\right]$

$V_{m(std)} =$ 34.837 dscf

2. Volume Water Vapor Collected, Standard Conditions

$V_{lc} =$ 23.3 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc} =$ 0.155 scf

$V_{W(std)} =$ 0.155 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.155)}{(0.155) + (34.837)} =$ 0.004

$B_{ws} =$ 0.004

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

$M_d =$ 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (\quad) + (\quad)(18 - \quad)$

$M_s =$ lb/lb-mole

Plant: McDonnell Douglas-Monrovia
Date: [illegible]
Source/Sample Number: AMT-19

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.041)\sqrt{\frac{(535.7)}{(30.02)(28.46)}}$$

$V_{s(avg)}$ = 58.1 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.1)\left(\pi\left(\frac{12}{12}\right)^2\right)$$

Q_s = 7605 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7605)(1-0.024)\frac{(30.02)}{(535.7)}$$

Q_{std} = 7636 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(535.7)(7.537)}{(30.02)(58.1)(0.0314)(180)(1-0.024)}$$

%I = 11.26 %

FIELD DATA

Plant: McDonnell Douglas Monrovia
Date: 1-5-90
Sampling Location: Outlet Stack
Sample Type: U3S Chrome
Run Number: AMT-20
Operator: MARKS
Ambient Temperature: 70°F
Barometric Pressure: 24.92
Static Pressure (P_s): +1.3
Filter Number(s): AMT-20F
Pretest Leak Rate = 0.007 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: NA
Read and Record all Data Every 3 Minutes

Schematic of Traverse Point Layout

Probe Length and Type: 4' Glass
Pitot Tube I.D. No.: "J" - 6A
Nozzle I.D. No. & Diameter: 43F (0.222")
Assumed Moisture, %: 1%
Temp. Readout S/N: NA
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: NA
Reference Δp: 0.6
Post Test Leak Rate = 0.007 cfm @ 17" in. Hg
Post Test Pitot Leak Check: OK ✓
Post Test Orsat Leak Check: NA

PROBE No. ____ ; PROBE UMBILICAL No. ____ ; IMPINGER BOX No. 4A ; METER BOX γ 1.013

Traverse Point Number	Sampling Time (min) / Clock (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1200	963.984	0.95	3.0	3.0	66	90	86	7"	NA	68
A1	3 / 1203	966.8	1.1	3.5	3.5	68	91	91	7"		50
A2	6 / 1206	969.6	1.05	3.4	3.4	67	95	90	7"		55
A3	9 / 1209	971.9	1.1	3.5	3.5	68	97	90	7"		58
A4	12 / 1212	975.6	1.15	3.6	3.6	68	98	93	8"		60
A5	15 / 1215	975.5	1.1	3.5	3.5	68	99	93	7"		60
A6	18 / 1218	981.522	1.05	3.4	3.4	65	98	94	7"		60
B1	21 / 1223	984.0	1.1	3.5	3.5	69	100	95	7"		61
B2	24 / 1226	987.8	1.1	3.5	3.5	69	101	96	7"		61
B3	27 / 1229	991.0	0.8	2.5	2.5	69	102	97	6"		61
B4	30 / 1232	993.2	0.86	2.7	2.7	69	100	98	6"		61
B5	33 / 1235	996.8	1.0	3.3	3.3	68	101	98	7"		
B6	36 / 1238	998.827									
	/										
	/										
	/										
	/	$\overline{V_m}$ = 34.403	1.014	$\overline{\Delta H}$ = 3.33		$\overline{T_s}$ 67.78		$\overline{T_m}$ 555.5			
	/										
	/										
	/										
	/										
	/										
	/										
	/										

SWITCH 1226

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas - Monrovia
Date: 2-5-91
Source/Sample Number: AMT - 21

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(30.403)(1.013)\left[\frac{(29.92) + (2.28/13.6)}{(555.5)}\right]$

$V_{m(std)} =$ 30.864 dscf

2. Volume Water Vapor Collected, Standard Conditions

$V_{lc} =$ 3.5 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc} =$ 0.165 scf

$V_{W(std)} =$ 0.165 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.165)}{(0.165) + (30.864)} =$ 0.005

$B_{ws} =$ 0.005

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

$M_d =$ 29.6 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (\quad) + (\quad)(18 - \quad)$

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date: 1-5-90

Sampling Location: Outlet - Controlled - ~~Double~~ Medium Load

Sample Type: 425 Chrome

Run Number: AMT-20

Sample Box Number: 4B

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-20F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	95 ml	99 ml	+2 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	-5 ml	-1 ml	+2 ml
Total H_2O:			-4
Silica Gel			
Final Volume:	655.5 g	g	g
Initial Volume	648.0 g	g	g
Net Volume	7.5 g	g	+3.5 g
Total Moisture:			

Description of Impinger Catch:

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date: 1-5-90

Sampling Location: Outlet - Controlled - ~~Boots~~ Medium Load

Sample Type: 425 Chrome

Run Number: AMT - 21

Sample Box Number: 2B

Clean-up Man:

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT

Description of Filter:

MOISTURE

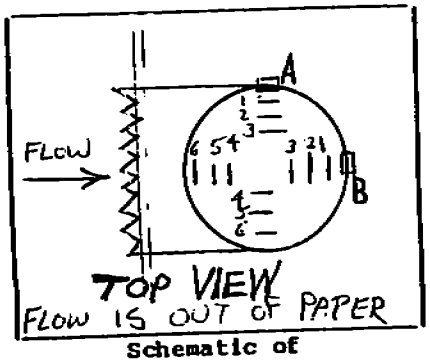
Impingers			
Final Volume:	100 ml	100 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	0 ml	0 ml	0 ml
Total H_2O:			+0

Silica Gel			
Final Volume:	6415.0 g	g	g
Initial Volume	6415.0 g	g	g
Net Volume	0 g	g	g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-6-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD 425 CHROME
Run Number: AMT-22
Operator: DARKS
Ambient Temperature: 75°
Barometric Pressure: 29.88
Static Pressure (P_s): +1.3
Filter Number(s): AMT-225
Pretest Leak Rate = 0.007 cfm @ 15" in. Hg
Pretest Pitot Leak Check: ✓ OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 5A
Nozzle I.D. No. & Diameter: 42P (0.333)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.6
Post Test Leak Rate = 0.008 cfm @ 15" in. Hg
Post Test Pitot Leak Check: OK ✓
Post Test Orsat Leak Check: N.A.

Impinger Box No. 4B ;

Traverse Point Number	Sampling Time, (min)	/ Clock Time / (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0	1106	000.117	1.0	3.1	3.1	64	83	82	5"	N.A.	50
A1	3	1109	2.85	1.0	3.1	3.1	64	81	82	5"		50
A2	6	1112	05.6	1.1	3.5	3.5	60	78	78	5"		49
A3	9	1115	08.8	1.1	3.5	3.5	64	83	81	5"		52
A4	12	1118	011.7	1.2	3.8	3.8	65	87	85	5"		53
A5	15	1121	014.7	1.2	3.8	3.8	64	86	83	6"		54
A6	18	1124	017.952	0.95	3.0	3.0	63	84	82	5"		56
B1	21	1129	020.8	1.1	3.5	3.5	64	86	82	5"		52
B2	24	1132	023.7	1.2	3.8	3.8	64	87	83	6"		54
B3	27	1135	026.9	0.83	2.6	2.6	64	88	83	5"		55
B4	30	1138	029.6	1.1	3.5	3.5	66	90	86	5"		56
B5	33	1141	032.2	1.2	3.8	3.8	65	90	86	6"		56
B6	36	1144	035.537									
			V_m = 35.42	Ave $\sqrt{\Delta P_s}$ = 1.039	Ave ΔH = 3.73		T_s = 523.9°R	T_m = 543°R				60 ✓

Start 1126

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas-Monrovia
Date: 2-6-90
Source/Sample Number: AMT-22

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(35.420)(1.013)\left[\frac{(29.88) + (3.73/13.6)}{(543)}\right]$

$V_{m(std)}$ = 35.148 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 9.7 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.457 scf

$V_{W(std)}$ = 0.457 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.457)}{(0.457)+(35.148)} = .0128$

B_{Ws} = 1.3%

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\ \ ) + 0.320(\ \ ) + 0.280(\ \ )$

M_d = use 29.0 lb/lb-mole

$M_s = M_d + B_{Ws}(18 - M_d) = (29.0) + (0.013)(18 - 29.0)$

M_s = 28.86 lb/lb-mole

Plant: McDONNELL DOUGLAS - MONROVIA
Date: 2-6-90
Source/Sample Number: AMT-22

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.039)\sqrt{\frac{(523.9)}{(29.98)(28.86)}}$$

$V_{s(avg)}$ = 58.1 - ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.1)\left(\left(\frac{20}{12}\right)^2 \frac{\pi}{2}\right)$$

Q_s = 7,605 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7{,}605)(1-.013)\frac{(29.98)}{(523.9)}$$

Q_{std} = 7,577 dsofm

8. Isokinetic Variation

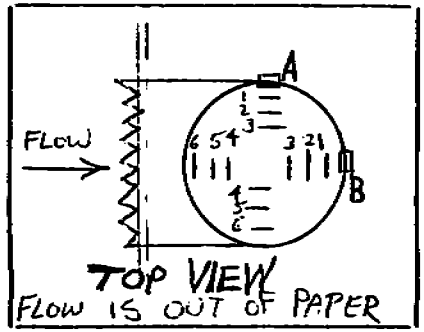
$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(523.9)(35.148)}{(29.98)(58.1)\left(\left(\frac{.23}{12}\right)^2 \frac{\pi}{2}\right)(360)(1-0.013)}$$

%I = 97.4 %

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 9-6-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD +25 CHROME
Run Number: AMT-33
Operator: MIKS
Ambient Temperature: 75°
Barometric Pressure: 29.85
Static Pressure (P_s): -1.3
Filter Number(s): AMT-23F
Pretest Leak Rate = 0.004 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 15" JA
Nozzle I.D. No. & Diameter: 23P (0.222")
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.6
Post Test Leak Rate = 0.007 cfm @ 15" in. Hg
Post Test Pitot Leak Check: OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 1B

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1206	035.385	0.95	3.0	3.0	65	86	88	7"	N.A.	59
A1	3 / 1209	038.6	0.95	3.0	3.0	68	87	89	7"		60
A2	6 / 1212	041.3	1.0	3.1	3.1	68	90	88	7"		61
A3	9 / 1215	044.3	1.1	3.5	3.5	68	91	88	7"		60
A4	12 / 1218	047.4	1.2	3.8	3.8	67	90	86	8"		60
A5	15 / 1221	050.4	1.2	3.9	3.9	66	91	86	8"		61
A6	18 / 1224	053.584	0.95	3.0	3.0	67	89	86	7"		60
B1	21 / 1227	057.3	1.2	3.8	3.8	67	90	86	8"		59
B2	24 / 1230	059.8	1.1	3.5	3.5	69	93	86	7"		60
B3	27 / 1233	062.5	0.80	2.5	2.5	69	93	87	5"		63
B4	30 / 1236	065.1	1.1	3.5	3.5	69	92	88	8"		62
B5	33 / 1241	067.9	1.2	3.8	3.5	69	92	88	8"		60
B6	36 / 1244	071.181									
	/										
	/										
	/										
	/	35.296	1.029	3.36	$\overline{T_s}$ = 528.8		$\overline{T_m}$ = 548.8				
	/										
	/										
	/										
	/										
	/										
	/										
	/										

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas
Date: 2-6-90
Source/Sample Number: AMT-23

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(35.296)(1.013)\left[\frac{(29.88) + (3.36/13.6)}{(548.8)}\right]$

$V_{m(std)}$ = 34.624 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 3.5 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.165 scf

$V_{W(std)}$ = 0.165 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.165)}{(0.165)+(34.625)} = 0.005$

B_{Ws} = 0.005

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\ \ ) + 0.320(\ \ ) + 0.280(\ \ )$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{Ws}(18 - M_d) = (29.0) + (0.005)(18 - 29.0)$

M_s = 28.95 lb/lb-mole

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Menrovia

Date: 1-6-90

Sampling Location: Controlled

Sample Type: 425 Chrome

Run Number: AMT-23

Sample Box Number: 1B

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-23F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	95 ml	99 ml	+1 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	-5 ml	-1 ml	ml
Total H_2O:			(-5)
Silica Gel			
Final Volume:	663.0 g	g	g
Initial Volume	654.5 g	g	g
Net Volume	8.5 g	g	(+3.5) g
Total Moisture:			

Description of Impinger Catch:

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date: 1-6-90

Sampling Location: Blank

Sample Type: 425 Chrome

Run Number: AMT-24L

Sample Box Number: ~~AMT~~ - 2B

Clean-up Man:

Job Number:

Comments:

FRONT HALF

Filter Number: AMT-24F

Description of Filter:

MOISTURE

Impingers

Final Volume:	100 ml	100 ml	ml
Initial Volume:	100 ml	100 ml	ml
Net Volume:	0 ml	0 ml	ml
Total H_2O:			

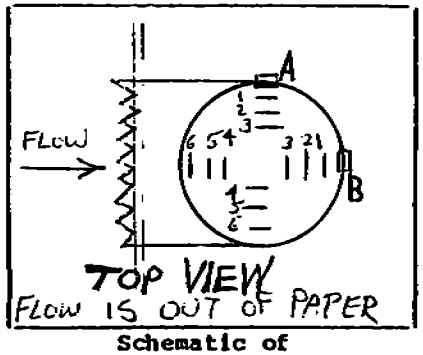
Silica Gel

Final Volume:	645.0 g	g	g
Initial Volume	645.0 g	g	g
Net Volume	g	g	g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-7-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD 425 CHROME
Run Number: AMT-25
Operator: MARKS
Ambient Temperature: 66°
Barometric Pressure: 29.64
Static Pressure (P_s): +1.2
Filter Number(s): AMT-25F
Pretest Leak Rate = 0.007 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 5"-51
Nozzle I.D. No. & Diameter: 042P (0.223)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.6
Post Test Leak Rate = 0.007 cfm @ 16 in. Hg
Post Test Pitot Leak Check: OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 1B

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1040	071.439	1.1	3.5	3.5	61	60	64	5"	N.A.	45
A1	3 / 1043	074.6	1.0	3.1	3.1	62	62	60	5"		45
A2	6 / 1046	077.8	1.1	3.5	3.5	62	65	61	6"		55
A3	9 / 1049	080.9	1.25	4.0	4.0	63	69	62	6"		58
A4	12 / 1052	083.0	1.2	3.5	3.5	63	71	63	6"		58
A5	15 / 1055	086.6	1.1	3.5	3.5	62	73	64	6"		58
A6	18 / 1058	089.592	1.1	3.5	3.5	62	69	65	6"		60
B1	21 / 1104	092.6	1.2	3.8	3.8	62	74	65	6"		60
B2	24 / 1107	095.4	1.1	3.5	3.5	62	74	65	6"		57
B3	27 / 1110	098.6	0.99	3.2	3.2	61	76	66	5"		56
B4	30 / 1113	101.9	1.0	3.1	3.1	62	76	67	5"		57
B5	33 / 1116	104.6	1.1	3.5	3.5	65	78	65	6"		57
B6	36 / 1119	106.842									
	/										
	/										
	/										
	/	V_m = 35.403	$\sqrt{\Delta P}$ = 1.045	$\bar{H}$ = 3.47		$\bar{T}_s$ = 522.3		$\bar{T}_m$ = 527.4			
	/										
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Sw TTP 1101

PACIFIC ENVIRONMENTAL SERVICES, INC.

PES

Plant: McDonnell Douglas - Monrovia
Date: 1-14-00
Source/Sample Number: ANT-25

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(35.403)(1.013)\left[\frac{(29.64) + (3.47/13.6)}{(527.4)}\right]$

$V_{m(std)}$ = 35.860 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 4.9 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.231 scf

$V_{W(std)}$ = 0.231 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.231)}{(0.231) + (35.860)} = 0.006$

B_{Ws} = 0.6 %

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{Ws}(18 - M_d) = (29.0) + (0.006)(18 - 29.0)$

M_s = lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 1-14-90
Source/Sample Number: AMT-25

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.045)\sqrt{\frac{(522.3)}{(29.74)(28.93)}}$$

$V_{s(avg)}$ = 58.5 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\left(58.5\right)\left(\left(\frac{10}{12}\right)^2 \pi\right)$$

Q_s = 7658 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7658)(1-0.006)\frac{(29.74)}{(522.3)}$$

$Q_{(std)}$ = 7646 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(522.3)(35.860)}{(29.74)(58.5)(0.00371)(36)(1-0.006)}$$

%I = 104.8 %

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date: 1-7-90

Sampling Location: Controlled

Sample Type: 425 Chrome

Run Number: AMT- ~~26~~ 25

Sample Box Number: ~~4B~~ 1B

Clean-up Man: Parks

Job Number: 3449

Comments:

FRONT HALF

Filter Number: AMT-25F

Description of Filter:

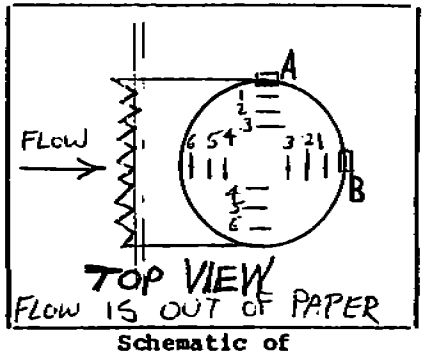
MOISTURE

Impingers			
Final Volume:	100 ml	99 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	ml	-1 ml	ml
Total H_2O:			(-1)
Silica Gel			
Final Volume:	658.9 g	g	g
Initial Volume	653.0 g	g	g
Net Volume	5.9 g	g	(+4.9) g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-7-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD 425 CHROME
Run Number: AMT-2
Operator: PARKS
Ambient Temperature: 66°
Barometric Pressure: 29.64
Static Pressure (P_s): 1.3
Filter Number(s): AMT-26F
Pretest Leak Rate = 0.007 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 5" - 29
Nozzle I.D. No. & Diameter: 0431 (0.222")
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: .11
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.6
Post Test Leak Rate = 0.007 cfm @ 15" in. Hg
Post Test Pitot Leak Check: OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 4B

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1225	107.042	1.0	3.1	3.1	63	70	70	6"	N.A.	57
A1	3 / 1228	109.4	1.1	3.5	3.5	62	70	70	6"		46
A2	6 / 1231	112.9	1.1	3.5	3.5	62	70	70	6"		50
A3	9 / 1234	115.8	1.1	3.5	3.5	62	70	70	6"		50
A4	12 / 1237	119.4	1.1	3.5	3.5	64	75	71	5"		57
A5	15 / 1240	122.0	1.1	3.5	3.5	65	78	72	5"		57
A6	18 / 1243	125.427	1.2	3.8	3.8	66	76	73	5"		58
A7	21 / 1246	128.4	1.15	3.6	3.6	67	79	73	5"		58
B2	24 / 1251	131.7	1.1	3.5	3.5	67	75	74	5"		56
B3	27 / 1254	134.5	0.96	3.7	3.7	66	81	74	5"		57
B4	30 / 1257	137.2	0.89	2.8	2.8	66	80	74	4"		58
B5	33 / 1300	139.9	1.0	3.8	3.8	67	57	75	4"		57
B6	36 / 1303	142.007									
	/										
	/										
	/										
	/	$\overline{V_m}$ = 34.915	$\overline{\Delta P}$ = 1.036	$\overline{\Delta H}$ = 3.4		$\overline{T_s}$ = 528.8		$\overline{T_m}$ = 534.0			
	/										
	/										
	/										
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	/										
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	/										

Start 1245

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas - Monrovia
Date: 1-07-90
Source/Sample Number: AMT-26

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(34.915)(1.013)\left[\frac{(29.64) + (3.4/13.6)}{(534.0)}\right]$

$V_{m(std)}$ = 34.922 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 3.3 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.155 scf

$V_{W(std)}$ = 0.155 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.155)}{(0.155)+(34.922)} = 0.004$

B_{Ws} = 0.004

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{Ws}(18 - M_d) = (29.0) + (0.004)(18 - 29.0)$

M_s = 28.96 lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 1-7-90
Source/Sample Number: AMT-26

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.036)\sqrt{\frac{(524.8)}{(29.74)(28.96)}}$$

$V_{s(avg)}$ = 58.1 - ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.1)\left(\pi\left(\frac{10}{12}\right)^2\right)$$

Q_s = 7605 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7605)(1-0.004)\frac{(29.74)}{(524.8)}$$

Q_{std} = 7572 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(524.8)(34.92)}{(29.74)(58.1)(0.00268)(36)(1-0.004)}$$

%I = 104.0 %

PES

SAMPLE RECOVERY DATA

Plant: Mc Donnell Douglas – Monrovia

Date: 1-7-90

Sampling Location: Controlled

Sample Type: 425 Chrome

Run Number: ~~AMT-25~~ AMT-25

Sample Box Number: 4B

Clean-up Man: Parks

Job Number: 3949

Comments:

FRONT HALF

Filter Number: ~~AMT-25F~~ AMT-25F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	95 ml	96 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	-5 ml	-4 ml	ml
Total H_2O:			(-9)
Silica Gel			
Final Volume:	667.8 g	g	g
Initial Volume	655.5 g	g	g
Net Volume	12.3 g	g	(+3.3) g
Total Moisture:			

Description of Impinger Catch:

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Monrovia

Date: 1-7-90

Sampling Location: Controlled - Blank Train

Sample Type: 425 Chrome

Run Number: AMT-27 Blank

Sample Box Number: 2B

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-27F

Description of Filter:

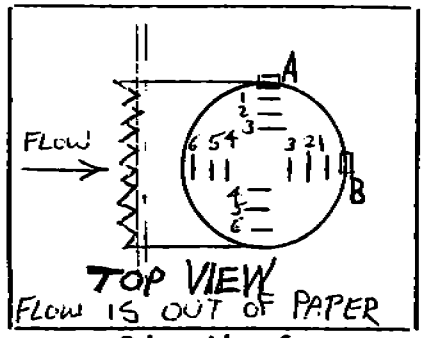
MOISTURE

Impingers			
Final Volume:	100 ml	100 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	ml	ml	ml
Total H_2O:			
Silica Gel			
Final Volume:	645.0 g	g	g
Initial Volume	645.0 g	g	g
Net Volume	0 g	g	g
Total Moisture:			

Description of Impinger Catch:

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-8-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD 425 CHROME
Run Number: AMT-25
Operator: PARKS
Ambient Temperature: 75°
Barometric Pressure: 29.65
Static Pressure (P_s): +1.2
Filter Number(s): AM-25F
Pretest Leak Rate = [illegible] cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 15" SA
Nozzle I.D. No. & Diameter: 0131P (0.222)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: 1A
Meter $\Delta H_@$: 1.964
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.6
Post Test Leak Rate = [illegible] cfm @ 15" in. Hg
Post Test Pitot Leak Check: OK
Post Test Orsat Leak Check: N.A.

Impinger Box No. 1B

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1027	143.158	1.0	3.1	3.1	67	85	83	5"	N.A.	60
A1	3 / 1030	146.8	1.1	3.5	3.5	67	82	83	6"		51
A2	6 / 1033	148.7	1.1	3.5	3.5	67	83	82	6"		50
A3	9 / 1036	151.8	1.1	3.5	3.5	66	83	83	6"		50
A4	12 / 1039	154.8	1.1	3.5	3.5	68	86	84	6"		58
A5	15 / 1042	157.8	1.1	3.5	3.5	68	88	84	6"		60
A6	18 / 1045	160.760	0.98	3.1	3.1	67	87	85	6"		62
SKETCH 1047 B1	21 / 1050	162.8	1.2	3.8	3.8	68	88	85	6"		63
B2	24 / 1053	167.4	1.2	3.8	3.8	68	88	85	6"		62
B3	27 / 1056	169.8	1.0	3.1	3.1	68	90	86	6"		60
B4	30 / 1059	173.0	1.0	3.1	3.1	67	91	86	6"		60
B5	33 / 1102	175.8	1.2	3.8	3.8	67	91	86	6"		60
B6	36 / 1105	178.699	1.0	3.1	3.1	68	89	87	6"		60
SKETCH 1116 A1	39 / 1119	181.3	1.1	3.5	3.5	69	89	87	6"		60
A2	42 / 1122	184.6	1.1	3.5	3.5	67	88	86	6"		60
A3	45 / 1125	187.2	1.1	3.5	3.5	68	89	88	6"		60
A4	48 / 1128	190.4	1.1	3.5	3.5	67	90	87	6"		60
A5	51 / 1131	193.4	1.1	3.5	3.5	68	91	87	6"		60
A6	54 / 1134	196.578	0.93	3.0	3.0	69	91	88	5"		60
SKETCH 1136 B1	57 / 1139	199.7	1.1	3.5	3.5	69	93	89	6"		60
B2	60 / 1142	202.9	1.1	3.5	3.5	68	92	89	6"		60
B3	63 / 1145	205.5	0.95	3.0	3.0	68	91	89	6"		60
B4	66 / 1148	208.6	0.98	3.1	3.1	69	90	88	6"		60
B5	69 / 1151	211.2	1.1	3.5	3.5	69	90	86	7"		60
B6	72 / 1154	214.483									

$\overline{\sqrt{\Delta H}}$ = 071.53 $\overline{\Delta H}$ = 3.4 $\overline{T_s}$ = 527.7 $\overline{T_m}$ = 544.9

$\sqrt{P_s}$ = 1.035

PACIFIC ENVIRONMENTAL SERVICES, INC.

PES

SAMPLE RECOVERY DATA

Plant: McDonnell Douglas - Huntington

Date: 6-8-90

Sampling Location: Controlled

Sample Type: 425 Chrome

Run Number: AMT-28

Sample Box Number: 1B

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-28F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	102 ml	90 ml	2 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	+2 ml	-10 ml	+2 ml
Total H_2O:			(-10)
Silica Gel			
Final Volume:	657.5 g	g	g
Initial Volume	638.3 g	g	g
Net Volume	19.2 g	g	(+9.2) g
Total Moisture:			

Description of Impinger Catch:

Plant: McDonnell Douglas - Monrovia
Date: 1-8-90
Source/Sample Number: AMT - 28

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(71.330)(1.013)\left[\frac{(29.65) + (3.4/13.6)}{(544.9)}\right]$

$V_{m(std)}$ = 69.941 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 9.2 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.433 scf

$V_{W(std)}$ = 0.433 scf

3. Percent Moisture, by volume

$B_{Ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.433)}{(0.433) + (69.941)} = 0.006$

B_{Ws} = 0.006

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (29.0) + (0.006)(18 - 29.0)$

Plant: McDonnell Douglas - Norwalk
Date: 1-5-9
Source/Sample Number: AMT-28

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.035)\sqrt{\frac{(527.7)}{(29.75)(28.93)}}$$

$V_{s(avg)}$ = 58.2 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\ (58.2)\left(\pi\left(\frac{10}{12}\right)^2\right)$$

Q_s = 7618 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7618)(1-0.006)\frac{(29.75)}{(527.7)}$$

Q_{std} = 7531 dscfm

8. Isokinetic Variation

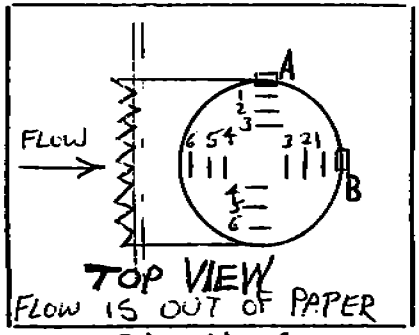
$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(527.7)(69.941)}{(29.75)(58.2)(0.0069)(72)(1-0.006)}$$

%I = 104.7 %

FIELD DATA

Plant: MCDONNELL DOUGLAS - MONROVIA
Date: 1-8-90
Sampling Location: OUTLET STACK
Sample Type: CARB METHOD 425 CHROME
Run Number: ANT-01
Operator: FARKS
Ambient Temperature: 75°
Barometric Pressure: 29.65
Static Pressure (P_s): 1.2
Filter Number(s): ANT-01F
Pretest Leak Rate = 0.007 cfm @ 15" in. Hg
Pretest Pitot Leak Check: OK
Pretest Orsat Leak Check: N.A.
Read and Record all Data Every 3 Minutes



Schematic of Traverse Point Layout

Probe Length and Type: 4' glass lined Stainless Steel
Pitot Tube I.D. No.: 5A 24
Nozzle I.D. No. & Diameter: C028 (0.228)
Assumed Moisture, %: 1.0
Temp. Readout S/N: N.A.
Meter Box Number: A
Meter $\Delta H_@$: 1.967
C Factor: 1.1
Meter Gamma: 1.013
Heater Box Setting: N.A.
Reference Δp: 0.6
Post Test Leak Rate = ___ cfm @ ___ in. Hg
Post Test Pitot Leak Check: OK ✓
Post Test Orsat Leak Check: N.A.

Impinger Box No. 4B ;

Traverse Point Number	Sampling Time, (min) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft^3	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. (T_s) °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg	Sample Box Temp. Filter Temp. °F	Impinger Temp. °F
A1	0 / 1214	215.809	0.98	3.1	3.1	69	89	89	5"	N.A.	60
A1	3 / 1217	218.8	1.0	3.1	3.1	69	89	88	5"		57
A2	6 / 1220	221.6	1.1	3.5	3.5	69	90	90	5"		60
A3	9 / 1223	223.9	1.1	3.5	3.5	69	89	88	6"		60
A4	12 / 1226	227.6	1.2	3.8	3.8	69	93	89	7"		60
A5	15 / 1229	230.4	1.2	3.8	3.8	69	92	88	7"		61
A6	18 / 1232	233.8	1.0	3.1	3.1	69	93	90	6"		60
B1	21 / 1237	236.7	1.1	3.5	3.5	69	94	89	6"		60
B2	24 / 1240	239.6	1.2	3.8	3.8	69	94	89	7"		58
B3	27 / 1243	242.8	0.95	3.0	3.0	69	92	87	6"		59
B4	30 / 1246	245.6	0.93	3.0	3.0	69	93	89	6"		58
B5	33 / 1249	248.5	1.0	3.1	3.1	69	94	89	7"		58
B6	36 / 1252	251.369	1.0	3.1	3.1	69	94	89	6"		58
A1	39 / 1305	254.2	1.1	3.5	3.5	69	94	90	6"		54
A2	42 / 1308	257.0	1.1	3.5	3.5	68	93	89	6"		57
A3	45 / 1311	259.8	1.1	3.5	3.5	69	93	88	6"		57
A4	48 / 1314	263.1	1.1	3.5	3.5	69	90	88	6"		59
A5	51 / 1317	266.1	1.1	3.5	3.5	69	94	90	6"		58
A6	54 / 1320	269.260	1.1	3.5	3.5	71	96	90	6"		59
B1	57 / 1325	272.2	1.2	3.8	3.8	70	95	89	6"		59
B2	60 / 1328	276.1	1.0	3.1	3.1	70	95	89	6"		59
B3	63 / 1331	279.1	1.0	3.1	3.1	70	94	89	6"		56
B4	66 / 1334	281.3	0.8	2.5	2.5	71	94	93	5"		61
B5	69 / 1337	283.8	0.8	2.5	2.5	71	94	93	5"		60
B6	72 / 1340	286.543									

$\bar{V}_m$ = 70.734 $\sqrt{\Delta P}$ = 1.023 $\bar{\Delta H}$ = 3.31 $\bar{T}_s$ = 529.3 $\bar{T}_m$ = 551.2

PACIFIC ENVIRONMENTAL SERVICES, INC.

Plant: McDonnell Douglas Morrow
Date: 1-8-90
Source/Sample Number: AMT-29

1. $V_{m(std)} = 17.64\ V_m\ Y \left[\frac{P_{bar} + (\Delta H/13.6)}{T_m}\right]$

$V_{m(std)} = 17.64(70.734)(1.013)\left[\frac{(29.65) + (3.31/13.6)}{(551.2)}\right]$

$V_{m(std)}$ = 68.519 dscf

2. Volume Water Vapor Collected, Standard Conditions

V_{lc} = 6.6 condensate from impingers and Silica Gel

$V_{W(std)} = .04707\ V_{lc}$ = 0.311 scf

$V_{W(std)}$ = 0.311 scf

3. Percent Moisture, by volume

$B_{ws} = \frac{V_{W(std)}}{V_{W\ std} + V_{m\ (std)}} = \frac{(0.311)}{(0.311)+(68.519)} = 0.005$

B_{ws} = 0.005

4. Molecular Weight, Stack gas

Dry Molecular Wight

$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%\ O_2) + 0.280\ (\%\ N_2 + \%\ CO)$

$M_d = 0.440(\quad) + 0.320(\quad) + 0.280(\quad)$

M_d = 29.0 lb/lb-mole

$M_s = M_d + B_{ws}(18 - M_d) = (29.0) + (0.005)(18 - 29.0)$

M_s = 29.05 lb/lb-mole

Plant: McDonnell Douglas - Monrovia
Date: 1-8-90
Source/Sample Number: AMT-29

5. Stack Gas Velocity Average

$$V_{s(avg)} = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s}{P_s M_s}}$$

$$V_{s(avg)} = 85.49(0.84)(1.623)\sqrt{\frac{(529.3)}{(29.74)(28.95)}}$$

$V_{s(avg)}$ = 57.6 ft/sec.

6. Stack Volumetric Flow Rate, Actual Conditions (Stack Temperature and Pressure)

$$Q_s = 60\ V_s\ A = 60\left(57.6\right)\left(\pi\left(\frac{10}{12}\right)^2\right)$$

Q_s = 7540 acfm

7. Stack volumetric flow rate, standard conditions (68° F, 29.92 Hg)

$$Q_{(std)} = 17.64\ Q_s\ (1-B_{ws})\ \frac{P_s}{T_s} =$$

$$Q_{(std)} = 17.64(7540)(1-0.005)\frac{(29.74)}{(529.3)}$$

Q_{std} = 74.36 dscfm

8. Isokinetic Variation

$$\%I = K\ \frac{T_s\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1-B_{ws})}$$

$$= 0.0945\ \frac{(529.3)(68.59)}{(29.74)(57.6)(0.000271)(72)(1-0.005)}$$

%I = 103.0 %

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SAMPLE RECOVERY DATA

Plant: McDonnell - Monrovia

Date: 1-8-90

Sampling Location: Controlled

Sample Type: 425 Chrome

Run Number: AMT-29

Sample Box Number: 48

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	82 ml	108 ml	2 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	-18 ml	-8 ml	2 ml
Total H_2O:			(-8)
Silica Gel			
Final Volume:	673.5 g	g	g
Initial Volume	658.9 g	g	g
Net Volume	14.6 g	g	(+6.6) g
Total Moisture:			

Description of Impinger Catch:

PES

SAMPLE RECOVERY DATA

Plant: M - Douglas

Date: 1-8-90

Sampling Location: BLANK

Sample Type: 425 Chrome

Run Number: AMT - 30 L

Sample Box Number: 2B

Clean-up Man: PARKS

Job Number: 3949

Comments:

FRONT HALF

Filter Number: AMT-30F

Description of Filter:

MOISTURE

Impingers			
Final Volume:	100 ml	100 ml	0 ml
Initial Volume:	100 ml	100 ml	0 ml
Net Volume:	0 ml	0 ml	0 ml
Total H_2O:			
Silica Gel			
Final Volume:	655.2 g	g	g
Initial Volume	655.2 g	g	g
Net Volume	0 g	g	g
Total Moisture:			

Description of Impinger Catch:

PES

CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP MCDONNELL DOUGLAS - MONROVIA
TEST DATE 1-29-90
TEST NUMBER AMT-1 and AMT-2
TANK NUMBER 8
LENGTH 71"
WIDTH 43"
DEPTH 52"
FREEBOARD 6½" w/ parts inserted
HOOD TYPE 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS NONE SIZE _____ PERCENT COVERAGE _____
ADDITIVE NONE MANUFACTURER _____ PRODUCT _____
AGITATION AIR NONE
ACID STRENGTH 7.0 oz/gal
BATH TEMP 94°F

RECTIFIER NO. MF06 calb. 2/17/89

TIME	VOLTS	AMPS	AMP-HOURS		
	START	AMT-1			
1245	18.5	120	06972.0		
1313	18.6	110	07041.5	Δ = 126.4	
1394	18.5	100	07098.4		
	END	AMT-1			
1415	19.0	100	07101.0		
	START	AMT-2			
1417	21.5	100	07104.0		
1447	21.5	100	07156.1	Δ = 108.1	
1523	21.5	90	07212.8		
		END AMT-2			

PES

CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP MCDONNELL DOUGLAS - MONROVIA
TEST DATE 1-25-90
TEST NUMBER AMT-4 and AMT-5
TANK NUMBER 8
LENGTH 71"
WIDTH 43"
DEPTH 52"
FREEBOARD 6½" w/ parts inserted
HOOD TYPE 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS NONE SIZE _____ PERCENT COVERAGE _____
ADDITIVE NONE MANUFACTURER _____ PRODUCT _____
AGITATION AIR NONE
ACID STRENGTH 7.0 oz/gal
BATH TEMP 94°F

RECTIFIER NO. MF06 calb. 2/17/89

TIME	VOLTS	AMPS	AMP-HOURS			
	START AMT-4					
1155	23.0	160	7256.7			
1125	~~2~~ 40.0	160	7327.4			
1130	50.0	120	7334.9	Δ = 130.0		
1202	50.0	120	7356.7			
	END AMT-4					
1210	ADDED MORE PARTS TO ACHIEVE HIGHER AMPERAGE					
	START AMT-5					
1225	15.0	220	7399.9			
1226	18.0	220	7402.4			
1236	36.0	190	7512.0	Δ = 227.0		
1329	40.0	185	7626.9			
	END AMT-5					

CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP MCDONNELL DOUGLAS - MONROVIA
TEST DATE 1-24-90
TEST NUMBER AMT- ~~6~~ 8 and AMT-7
TANK NUMBER 8
LENGTH 71"
WIDTH 43"
DEPTH 52"
FREEBOARD 6½" w/ parts
HOOD TYPE 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS NONE SIZE _____ PERCENT COVERAGE _____
ADDITIVE NONE MANUFACTURER _____ PRODUCT _____
AGITATION AIR NONE
ACID STRENGTH 7.0 oz/gal
BATH TEMP 94°F

RECTIFIER NO. MF06 calb. 2/17/89

TIME	VOLTS	AMPS	AMP-HOURS		
	START AMT-7				
1400	23.0	190	07734.8		
1415	23.0	190	07792.6	Δ = 118.4	
1436	24.0	170	07853.2		
	END AMT-7				
	START AMT-8				
1509	24.0	160	07862.5		
1529	24.0	150	07914.2	Δ = 109.3	
1544	24.0	160	07971.8		
	END AMT-8				

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CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP MCDONNELL DOUGLAS - MONROVIA
TEST DATE 1-31-90
TEST NUMBER AMT-10 and AMT-11
TANK NUMBER 8
LENGTH 71"
WIDTH 43"
DEPTH 52"
FREEBOARD 6½" w/ parts
HOOD TYPE 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS NONE SIZE _____ PERCENT COVERAGE _____
ADDITIVE NONE MANUFACTURER _____ PRODUCT _____
AGITATION AIR NONE
ACID STRENGTH 7.0 oz/gal
BATH TEMP 94°F

RECTIFIER NO. MF06 calb. 2/17/89

TIME	VOLTS	AMPS	AMP-HOURS			
1027	12	400→380	28153.8			
1029.5	0	(ARCING)				
1100.5	10	320→300	081590			
1103	17.5	400→380	081687			
1104	22.0	450→400	081747			
	START	AMT-10				
1105	22.5	400	08185.7		Δ=272.3	
1122	22.5	400	083160			
1130	22.5	400	08443.0			
1142	22.5	400	08456.0			
	END AMT-10					
1213	10.0	400→325	08482.5			
1214	15.0	400→350	08490.4			
1215	22.0	430→400	08495.6			
1215.5	22.0	440→400	08500.9			
	START AMT-11					
1216	7.5	400	085065		Δ=277.5	
1236	22.5	400	08934.0			
1255	22.5	400	08784.0			
	END AMT-11					

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CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP: MCDONNELL DOUGLAS - MONROVIA
TEST DATE: 2/1/90
TEST NUMBER: AMT-13 and AMT-14
TANK NUMBER: 8
LENGTH: 71"
WIDTH: 43"
DEPTH: 52"
FREEBOARD: 6'-7" TANK SOLUTION SURFACE
HOOD TYPE: 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS: NONE SIZE — PERCENT COVERAGE —
ADDITIVE: FOMETROL 101 MANUFACTURER MAT PRODUCT —
AGITATION AIR: NONE
ACID STRENGTH: 7.0 oz/gal.
BATH TEMP: 99°F

RECTIFIER NO. MF 06

TIME	VOLTS	AMPS	AMP-HOURS			
1052	0	0	88488			
1053	5.0	390→300	88490			
1054	10	460→450	88519			
1054.5	12	450→370	88570			
1055	17	420→370	088612			
	START TEST AMT-13					
1057	22.5	395	88688			
1115	22.5	390	88970		Δ=268	
1136	22.0	400	091368			
1136	END TEST AMT-13					
1200	4.0	130→100	091450			
1201	8.0	250→170	091468			
1202	10.0	290→250	091486			
1205	17.5	420→380	091570			
	START AMT-14					
1209	22.5	420	091682			
1224	22.5	420	093070		Δ=213.8	
1244	22.0	440	094620			
1244	END AMT-14					

NOTE: Foam Thickness = 2.0" End of test AMT-14

PES

CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP MCDONNELL DOUGLAS - MONROVIA
TEST DATE 2-2-90
TEST NUMBER AMT-16 and AMT-17
TANK NUMBER 8
LENGTH 71"
WIDTH 43"
DEPTH 52"
FREEBOARD 6½" TO Surface, 6" TO Foam
HOOD TYPE 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS NO SIZE PERCENT COVERAGE
ADDITIVE ~~NO~~ YES MANUFACTURER M&T PRODUCT FUMETROL 101
AGITATION AIR NONE
ACID STRENGTH 7.0 oz/gal
BATH TEMP 93F

RECTIFIER NO. MF06 calb. 2/17/89

TIME	VOLTS	AMPS	AMP-HOURS			
1043	5.0	170→100	09582.0			
1044	10.0	140→120	09582.9			
1044.5	20.0	200→170	09584.4	← START AMT-16		
1045	23.5	120	09585.6			
1104	23.5	120	09625.0	Δ=81.1		
1124	23.5	120	09666.7			
		END AMT-16				
1144	5.0	150→100	096688			
1145.5	10.0	120→110	09670.1			
1146	21.0	120→120	09672.0			
		START AMT-17				
1147	23.5	120	09674.0	Δ=79.8		
1206	23.5	120	09712.0			
1226	23.5	120	09753.8			
		END AMT-17				

CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP: MCDONNELL DOUGLAS - MONROVIA
TEST DATE: 2-5-90
TEST NUMBER: AMT-19 and AMT-20
TANK NUMBER: 8
LENGTH: 71"
WIDTH: 43"
DEPTH: 52"
FREEBOARD: 5½" TO FOAM SURFACE, 6" TO SOLUTION
HOOD TYPE: 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS: NONE SIZE: — PERCENT COVERAGE: —
ADDITIVE: YES MANUFACTURER: M&T PRODUCT: FUMETROL 101
AGITATION AIR: NONE
ACID STRENGTH: 7.0 oz/gal
BATH TEMP: 94°F

RECTIFIER NO. MF06 calb. 2/17/89

TIME	VOLTS	AMPS	AMP-HOURS			
1057.5	5.0	150→100	9763.7			
1055	10.0	150→120	9764.6			
1056	21.5	220→180	9768.1			
1057	23.5	180→170	9768.9			
	START	TEST AMT-19				
1057	23.5	170	9770.8			
1116	23.5	160	9816.0	Δ=93.9		
1136	23.5	160	9864.7			
	END AMT-19					
1156.0	6.0	120→100	9866.8			
1157.0	9.0	120→100	9868.4			
1158.0	13.5	190→120	~~9869.6~~	9866.5		
1159.0	20.0	180→140	~~9869.6~~	9872.6		
~~1200~~	—	START AMT-20				
1200	23.5	170	9874.0			
1208	23.5	150	9919.3	Δ=96.8		
1240	24.0	150	9972.8			
	END AMT-20					

CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP MCDONNELL DOUGLAS - MONROVIA
TEST DATE 2-6-90
TEST NUMBER AMT-22 and AMT-23
TANK NUMBER 8
LENGTH 71"
WIDTH 43"
DEPTH 52"
FREEBOARD 6" TO SOLUTION W/O PARTS; 4½" W/ PARTS & BALLS TO TOP OF BALLS
HOOD TYPE 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS YES SIZE 2" DIA. PERCENT COVERAGE 100
ADDITIVE YES MANUFACTURER M&T PRODUCT Fluorosi lar
AGITATION AIR NONE
ACID STRENGTH 7.0 oz/gal
BATH TEMP 94°F

RECTIFIER NO. MF06 calb. 2/17/89

TIME	VOLTS	AMPS	AMP-HOURS			
1103	5.0	180→100	10126.0			
1104	11.0	180→110	10126.9			
1105	19.0	160→140	10128.7			
1106	23.5	140→180	10130.5			
		START AMT-22				
1106	23.5	150	10131.5			
1125	24.0	140	10174.0	Δ =	89.5	
1144	23.5	140	10221.0			
		END AMT-22				
1202	5.0	180→110	10225.1			
1203	11.0	180→110	10226.6			
1205.5	13.0	180→110	10228.6			
1205	23.5	140→140	10231.9			
		START AMT-23				
1206	23.5	140	10233.3			
1225	23.5	140	10277.0	Δ =	89.5	
1245	23.5	140	10322.5			
		END AMT-23				

PES

CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP: MCDONNELL DOUGLAS - MONROVIA
TEST DATE: 2-7-90
TEST NUMBER: AMT-25 and AMT-26
TANK NUMBER: 8
LENGTH: 71"
WIDTH: 43"
DEPTH: 52"
FREEBOARD: 6"
HOOD TYPE: 3 ROWS SLOTS ON BACK OF TANK
POLLYBALLS: YES — SIZE: 2" — PERCENT COVERAGE: 100
ADDITIVE: YES — MANUFACTURER: M&T — PRODUCT: Fumetrol 101
AGITATION AIR: NONE
ACID STRENGTH: 7.0 oz/gal
BATH TEMP: 94°F

RECTIFIER NO. MF06 calb. 2/17/89

TIME	VOLTS	AMPS	AMP-HOURS	
1035	3.0	240→210	10440.7	
1036	7.0	270→250	10446.5	
1037	15.0	300→270	10450.1	
1038	17.0	330→400	10457.1	
	START AMT-25			
1040	22.5	400	10470.2	
1100	22.5	380	10602.9	Δ=210.0
1120	22.5	390	10740.2	
	END AMT-25			
1220	3.0	200→150	11062	
1221	10.0	250→310	111121	
1222	15.0	450→400	111208	
1223	19.5	590→420	111249	
1224	22.0	590→420	111325	
	START AMT-26			
1225	22.0	460	111437	Δ=313.3
1245	22.0	460	112940	
1305	22.0	460	114520	

CHROME PLATING OR ANODIZING PROCESS DATA

PLATING SHOP MCDONNELL DOUGLAS - MONROVIA
TEST DATE 2-8-90
TEST NUMBER AMT-28 and AMT-29
TANK NUMBER 8
LENGTH 71
WIDTH 43
DEPTH 52
FREEBOARD 5" TO BALLS, 6" to top of foam
HOOD TYPE SLOT ON BACK OF TANK
POLLYBALLS 7.5 SIZE 2" PERCENT COVERAGE 100
ADDITIVE Yes MANUFACTURER M&T PRODUCT [illegible]
AGITATION AIR 150
ACID STRENGTH 7.0
BATH TEMP 114°F

RECTIFIER NO. MF06

TIME	VOLTS	AMPS	AMP-HOURS			
1023	0	0	115040			
1024.5	14.0	150→90	115053			
1025.5	20.0	150→105	115076	← START AMT-28		
1027	23.5	110	115096			
1031	23.5	100	115430			
1106	23.5	100	115790			
			END PART 1, START PART 2			$A_1 = 145.0$
1114	0	0 ~~115800~~	115800			
11165	10	150→100	115809			
1116	23.5	100	115842			
1136	24.0	100	116170			
1156	24.0	100	116546			
			AMT-28 END PART 2			
1212.0	10.0	150→100	116558			
1213.5	16.0	150→100	116572	← START AMT-29		
1214.0	23.0	160	116596			
1233.0	24.0	100	116930			
1253	24.0	100	117291	← END PART 1		
1258.5	5.0	150→100	117299			
1259.5	10.0	150→100	117313			
1301.0	21.0	160→100	117342	← START PART 2		
1302.0	24.0	105	117361			$A_2 = 140.9$
1321	24.0	100	117671			
1341		100	118004			
		END AMT-29				
						$A_T = 285.3$

Chain of Custody Record

TMA/ARLI
160[illegible] Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

Thermo Analytical Inc.

DATE 1-25-90 PAGE 1 OF 1

CLIENT PES
ADDRESS (818) 357-1993

PROJECT 3949
SAMPLERS (SIGNATURE) Mark J. Simon

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Total Chrome	Hexavalent Chrome	Volume	Sample Type	NUMBER OF CONTAINERS	Observations/ Comments
AMT-1L	1/24/90													+	+	+	Liquid	1	
AMT-2L	↓													+	+	+	Liquid	1	
AMT-3L	↓													+	+	+	Liquid	1	
AMT-1F	↓													+	+		Filter	1	
AMT-2F	↓													+	+		Filter	1	
AMT-3F	↓													+	+		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Dean High	1/25	Signature: Brian Davis	1/25/90	Signature:		Signature:	
Printed Name: Dean High	TIME 10:25A	Printed Name: BRIAN DAVIS	TIME 10:25 AM	Printed Name:	TIME	Printed Name:	TIME
Company: PES.		Company: TMA		Company:		Company:	
RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature:		Signature:		Signature:		Signature:	
Printed Name:	TIME	Printed Name:	TIME	Printed Name:	TIME	Printed Name: TMA, Inc./ARLI	TIME
Company:		Company:		Company:			

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

Chain of Custody Record

The Analytical Inc.
160[redacted]reet
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

DATE 1-25-90 PAGE 1 OF 1

CLIENT PES
ADDRESS 818 357-1993
PROJECT MANAGER - DEAN HIGH
PROJECT 3949
SAMPLERS (SIGNATURE) Mark J. Simon

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Total Chrome	Hexavalent Chrome	Volume	Sample Type	NUMBER OF CONTAINERS	Observations/ Comments
AMT-4L														X	X	X	Liquid	1	
AMT-5L														X	X	X	Liquid	1	
AMT-6L														X	X	X	Liquid	1	
AMT-4F														X	X		Filter	1	
AMT-5F														X	X		Filter	1	
AMT-6F														X	X		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Mark Simon	1/25	Signature: Brian Davis		Signature:		Signature:	
Printed Name: MARK SIMON	TIME 1550	Printed Name: BRIAN DAVIS	TIME	Printed Name:	TIME	Printed Name:	TIME
Company: P.E.S.		Company: TMA		Company:		Company:	
RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature:		Signature:		Signature:		Signature:	
Printed Name:	TIME	Printed Name:	TIME	Printed Name:	TIME	Printed Name: TMA, Inc./ARLI	TIME
Company:		Company:		Company:			

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: +

Chain of Custody Record

TMA
Thermo Analytical Inc.
160 [illegible] Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

DATE 1-30-90 PAGE 1 OF 1

CLIENT Pacific Environmental Services
ADDRESS (818) 357-1993
PROJECT 3949
SAMPLERS (SIGNATURE) Scott G Parks

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Total Chrome	Hexavalent Chrome	Volume	Sample Type	Number of Containers	Observations/ Comments
AMT-7L	1-30	1430												X	X	X	Liquid	1	
AMT-7F	1-30	1430												X	X		Filter	1	
AMT-8L	1-30	"												X	X	X	Liquid	1	
AMT-8F	1-30	↓												X	X		Filter	1	
AMT-9L	1-30	↓												X	X	X	Liquid	1	
AMT-9F	1-30	↓												X	X		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Scott A Parks	1-30-90	Signature: Brian Davis	1-30-90	Signature:		Signature:	
Printed Name: Scott G. Parks	TIME 2:30	Printed Name: BRIAN DAVIS	TIME 2:30 PM	Printed Name:	TIME	Printed Name:	TIME
Company: P.E.S.		Company: TMA		Company:		Company:	
RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature:		Signature:		Signature:		Signature:	
Printed Name:	TIME	Printed Name:	TIME	Printed Name:	TIME	Printed Name: TMA, Inc./ARLI	TIME
Company:		Company:		Company:			

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

Chain of Custody Record

TMA
The Analytical Inc.
10[redacted] Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

DATE 1-31-90 PAGE 1 OF 1

CLIENT Pacific Environmental Services
ADDRESS 818 357-1993

PROJECT 3948
SAMPLERS (SIGNATURE) Mark J. Simon

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Hexavalent Chrome	Total Chrome	Volume	Sample Type	NUMBER OF CONTAINERS	Observations/ Comments
AMT-10L	1230	1/30	McDD											+	+	+	Liquid	1	
AMT-11L														+	+	+	Liquid	1	
AMT-12L														+	+	+	Liquid	1	
AMT-10F														+	+		Filter	1	
AMT-11F														+	+		Filter	1	
AMT-12F														+	+		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Mark Simon	1/31	Brian Davis	1-31-90				
Signature		Signature		Signature		Signature	
Mark Simon	TIME 1630	BRIAN DAVIS	TIME 4:30 PM		TIME		TIME
Printed Name		Printed Name		Printed Name		Printed Name	
PES		TMA					
Company		Company		Company		Company	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature		Signature		Signature		Signature	
Printed Name	TIME	Printed Name	TIME	Printed Name	TIME	Printed Name	TIME
Company		Company		Company		TMA, Inc./ARLI	

6 TOTAL NUMBER OF CONTAINERS

METHOD OF SHIPMENT Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS

TMA Thermo Analytical Inc.

160 Taylor Street
Post Office Box 1360
Monrovia, CA 91016
(818) 357-3247

Chain of Custody Record

DATE 2/1/90 PAGE 1 OF 1

CLIENT PES
ADDRESS (818) 357-1993
Project Mgr - Dean High
PROJECT 3948
SAMPLERS (SIGNATURE) Mark J. Simon

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Hexavalent Chrome	Total Chrome	Volume	Sample Type	NUMBER OF CONTAINERS	Observations/ Comments
AMT-13F	2/1/90	1300												X	X			1	See Below
AMT-14F	↓	↓												X	X			1	↓
AMT-15F	↓	↓												X	X			1	↓
AMT-13L	↓	↓												X	X	X		1	↓
AMT-14L	↓	↓												X	X	X		1	↓
AMT-15L	↓	↓												X	X	X		1	↓
—	—	—																	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Mark Simon	2/1	Signature: Brian Davis	2-1-90	Signature:		Signature:	
Printed Name: Mark Simon	TIME 3:10 PM	Printed Name: BRIAN DAVIS	TIME 3:10 PM	Printed Name:	TIME	Printed Name:	TIME
Company: PES		Company: TMA		Company:		Company:	
RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature:		Signature:		Signature:		Signature:	
Printed Name:	TIME	Printed Name:	TIME	Printed Name:	TIME	Printed Name: TMA, Inc./ARLI	TIME
Company:		Company:		Company:			

6 TOTAL NUMBER OF CONTAINERS

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: Expect low Concentrations - Use long light path cell and graphite furnace methods.

Chain of Custody Record

Thermo. Analytical Inc.
160 Taylor Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

DATE 2-2-90 PAGE 1 OF 1

CLIENT Pacific Environmental Services
ADDRESS (818) 357-1993
PROJECT 3949
SAMPLERS (SIGNATURE) Scott A Parks

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Total Chrome	Hexavalent Chrom	Volume	Sample Type	Number of Containers	Observations/ Comments
AMT-16L	2-2-90													X	X	X	Liquid	1	
AMT-17L	2-2-90													X	X	X	Liquid	1	
AMT-18L	↓													X	X	X	Liquid	1	
AMT-16F	↓													X	X		Filter	1	
AMT-17F	↓													X	X		Filter	1	
AMT-18F	↓													X	X		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Scott A Parks	2-2-90	Signature: Brian Davis	2-2-90	Signature:		Signature:	
Printed Name: Scott A. Parks	TIME 2:13 PM	Printed Name: BRIAN DAVIS	TIME 2:14 PM	Printed Name:	TIME	Printed Name:	TIME
Company: P.E.S.		Company: THA		Company:		Company:	
RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature:		Signature:		Signature:		Signature:	
Printed Name:	TIME	Printed Name:	TIME	Printed Name:	TIME	Printed Name: THA, Inc./ARLI	TIME
Company:		Company:		Company:			

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: Expect low concentrations use long lightpath cell and graphite furnace methods

Merit Analytical Inc.
160 Taylor Street
Monrovia, CA 91016
(818) 357-3247

Chain of Custody Record

DATE 1-5-90 PAGE 1 OF 1

CLIENT: Pacific Environmental Services
ADDRESS: (818) 357-1993
PROJECT: 3949
SAMPLERS (SIGNATURE): Scott G Parks

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Total Chrome	Hexavalent Chrome	Volume	Sample Type	NUMBER OF CONTAINERS	Observations/ Comments
AMT-19L	1-5-90													X	X	X	Liquid	1	
AMT-20L	1-5-90													X	X	X	Liquid	1	
AMT-21L	1-5-90													X	X	X	Liquid	1	
AMT-19F	"													X	X		Filter	1	
AMT-20F	"													X	X		Filter	1	
AMT-21F	"													X	X		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Scott G Parks	1-5-90	Signature: Brian Davis	1-5-90	Signature:		Signature:	
Printed Name: Scott G. Parks	TIME 2:45	Printed Name: BRIAN DAVIS	TIME 3:40 PM	Printed Name:	TIME	Printed Name:	TIME
Company: P.E.S.		Company: TMA		Company:		Company:	
RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature:		Signature:		Signature:		Signature:	
Printed Name:	TIME	Printed Name:	TIME	Printed Name:	TIME	Printed Name: TMA, Inc./ARLI	TIME
Company:		Company:		Company:			

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: Expect Low Concentration Use Long Light-path cell and Graphite Furnace Methods.

Chain of Custody Record

Thermo Analytical Inc.
160 Taylor Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

DATE 2-6-90 PAGE 1 OF 1

CLIENT P.E.S.
ADDRESS (818) 357-1993
PROJECT 3949 Dean High
SAMPLERS (SIGNATURE) Mark J. Simon

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Total Chrome	Hexavalent Chrome	Volume	Sample Type	NUMBER OF CONTAINERS	Observations/ Comments
MT-22L	2-6-90	1300												X	X	X	Liquid	1	
MT-23L														X	X	X	Liquid	1	
MT-24L														X	X	X	Liquid	1	
MT-22F														X	X		Filter	1	
MT-23F														X	X		Filter	1	
MT-24F														X	X		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Mark J. Simon	2/6/90	Signature: [illegible]		Signature		Signature	
Printed Name: Mark J. Simon	TIME 3PM	Printed Name		Printed Name	TIME	Printed Name	TIME
Company: P.E.S.		Company		Company		Company	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature		Signature		Signature		Signature	
Printed Name	TIME	Printed Name	TIME	Printed Name	TIME	Printed Name: THA, Inc./ARLI	TIME
Company		Company		Company			

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: Expect Low Concentrations: Use long light path cell and graphite Furnace methods.

Chain of Custody Record

The Analytical Inc.
16[redacted] Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

DATE 1-7-90 PAGE 1 OF 1

CLIENT Pacific Environmental Services
ADDRESS (818) 357-1493
PROJECT 3949
SAMPLERS (SIGNATURE) Scott D Parks

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Total Chrome	Hexavalent Chrome	Volume	Sample Type	NUMBER OF CONTAINERS	Observations/ Comments
AMT-25 L	1-7-90	3:30												X	X	X	Liquid	1	
AMT-26 L	"													X	X	X	Liquid	1	
AMT-27 L	"													X	X	X	Liquid	1	
AMT-25 F	"													X	X		Filter	1	
AMT-26 F	"													X	X		Filter	1	
AMT-27 F	"													X	X		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Scott D Parks	1-7-90	Signature: Brian Davis	1-7-90	Signature:		Signature:	
Printed Name: SCOTT G. PARKS	TIME 3:30	Printed Name: BRIAN DAVIS	TIME 3:30	Printed Name:	TIME	Printed Name:	TIME
Company:		Company: TMA		Company:		Company:	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature:		Signature:		Signature:		Signature:	
Printed Name:	TIME	Printed Name:	TIME	Printed Name:	TIME	Printed Name: TMA, Inc./ARLI	TIME
Company:		Company:		Company:			

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: Expect low Concentrations, use long light-path cell, and graphite furnace.

CHAIN OF CUSTODY RECORD

Thermo Analytical Inc.
160 Taylor Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

DATE 2-8-90 PAGE 1 OF 1

CLIENT P.E.S.
ADDRESS (818) 357-1993
Dean High = Project Manager
PROJECT 3948
SAMPLERS (SIGNATURE) Mark J. Simon

SAMPLE NO	DATE	TIME	LOCATION	CAM Metals (17)	Pr. Pollutant Metals (13)	Hazardous Char. (Request List)	Gen. Minerals (Request List)	TPHC 418.1	Base/Neu/Acids (Organics)	Pesticides	Volatile Orgs. (601/602)	8015 Modified	Volatile Orgs. (624/8240)	Hexavalent Chrome	Total Chrome	Volume	Sample Type	NUMBER OF CONTAINERS	Observations/ Comments
AMT-28L	2/8/90	1300	3948											+	+	+	Liquid	1	
AMT-29L	↓	↓												+	+	+	Liquid	1	
AMT-30L														+	+	+	Liquid	1	
AMT-28F														+	+		Filter	1	
AMT-29F														+	+		Filter	1	
AMT-30F	↓	↓												+	+		Filter	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY	DATE
Signature: Mark J. Simon	2/8/90	Signature: Brian Davis	2-8-90	Signature:		Signature:	
Printed Name: Mark J. SIMON	TIME 4:00 PM	Printed Name: BRIAN DAVIS	TIME 4:00 PM	Printed Name:	TIME	Printed Name:	TIME
Company: P.E.S.		Company: TMA		Company:		Company:	

RELINQUISHED BY	DATE	RECEIVED BY	DATE	RELINQUISHED BY	DATE	RECEIVED BY (laboratory)	DATE
Signature:		Signature:		Signature:		Signature:	
Printed Name:	TIME	Printed Name:	TIME	Printed Name:	TIME	Printed Name: TMA, Inc./ARLI	TIME
Company:		Company:		Company:			

TOTAL NUMBER OF CONTAINERS: 6

METHOD OF SHIPMENT: Delivered Personally

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: Expect Low Concentrations. Use long light path cell and graphite furnace methods.

[redacted]

REPORT TO: Pacific Environmental Service
150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN: Mr. Dean High

CLIENT: PACIFIC ENVI SAMPLES: 6
COMPANY: Pacific Environmental Service
FACILITY:

WORK ID: 3949 Chrome Analysis
TAKEN: By Pacific Environ. Staff
TRANS: By Pacific Environ. Staff
TYPE: Liquid and filters
P.O. #: 3949
INVOICE: under separate cover

PREPARED BY: Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN: Ms. Carole Harris
PHONE: 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT: RSF

This report is for the sole and exclusive use of the client to whom it is addressed and represents only those samples herein described. Samples not destroyed in testing are retained a maximum of 30 days unless otherwise requested.

SAMPLE IDENTIFICATION

01 AMT-1L
02 AMT-2L
03 AMT-3L
04 AMT-1F
05 AMT-2F
06 AMT-3F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium -- Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

SAMPLE ID AMT-1L SAMPLE # 01 FRACTIONS: A
Date & Time Collected 01/24/90 Category

CR_HEX 0.11 mg/L CR_LF 0.135 mg/L VOL_L 550 mls

SAMPLE ID AMT-2L SAMPLE # 02 FRACTIONS: A
Date & Time Collected 01/24/90 Category

CR_HEX 0.15 mg/L CR_LF 0.151 mg/L VOL_L 545 mls

SAMPLE ID AMT-3L SAMPLE # 03 FRACTIONS: A
Date & Time Collected 01/24/90 Category

CR_HEX <0.003 mg/L CR_LF 0.001 mg/L VOL_L 595 mls

SAMPLE ID AMT-1F SAMPLE # 04 FRACTIONS: A
Date & Time Collected 01/24/90 Category

CRHEXS <0.5 ug/filter CRHGAA 5.98 ug/filter

SAMPLE ID AMT-2F SAMPLE # 05 FRACTIONS: A
Date & Time Collected 01/24/90 Category

CRHEXS <0.5 ug/filter CRHGAA 6.12 ug/filter

SAMPLE ID AMT-3F SAMPLE # 06 FRACTIONS: A
Date & Time Collected 01/24/90 Category

CRHEXS <0.5 ug/filter CRHGAA 1.36 ug/filter

Three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

QC DATA

SA#	Hex Cr	Total Cr
AMT-2L	0.15 mg/L	0.151 mg/L
AMT-2L duplicate	0.15 mg/L	0.166 mg/L
AMT-2L Spike	112.% R	110% R

REPORT TO: Pacific Environmental Service
150 E. Foothill Blvd
Arcadia, CA 91006

ATTEN: Mr. Dean High

CLIENT: PACIFIC ENVI SAMPLES: 6
COMPANY: Pacific Environmental Service
ENTITY:

WORK ID: 3949 Chrome Analysis
TAKEN: By Pacific Environ. Staff
TRANS: By Pacific Environ. Staff
TYPE: Liquid and filters
P.O. #: 3949
INVOICE: under separate cover

PREPARED BY: Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN: Ms. Carole Harris
PHONE: 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT: RSF

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SAMPLE IDENTIFICATION

AMT-4L
AMT-5L
AMT-6L
AMT-4F
AMT-5F
AMT-6F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

SAMPLE ID AMT-4L SAMPLE # 01 FRACTIONS: A
Date & Time Collected 01/25/90 Category

CR HEX 0.02 mg/L CR LF 0.018 mg/L VOL L 550 mls

SAMPLE ID AMT-5L SAMPLE # 02 FRACTIONS: A
Date & Time Collected 01/25/90 Category

CR HEX 0.02 mg/L CR LF 0.022 mg/L VOL L 655 mls

SAMPLE ID AMT-6L SAMPLE # 03 FRACTIONS: A
Date & Time Collected 01/25/90 Category

CR HEX <0.003 mg/L CR LF <0.001 mg/L VOL L 680 mls

SAMPLE ID AMT-4F SAMPLE # 04 FRACTIONS: A
Date & Time Collected 01/25/90 Category

CRHEXS <0.5 ug/filter CRHGAA <0.20 ug/filter

SAMPLE ID AMT-5F

SAMPLE # 05 FRACTIONS: A

Date & Time Collected 01/25/90 Category

CRHEXS <0.5 ug/filter CRHGAA <0.20 ug/filter

SAMPLE ID AMT-6F

SAMPLE # 06 FRACTIONS: A

Date & Time Collected 01/25/90 Category

CRHEXS <0.5 ug/filter CRHGAA 0.20 ug/filter

three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

FROM: Pacific Environmental Service
TO: 150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN: Mr. Dean High

PROJECT: PSEIFE EDVI SAMPLES &
Pacific Environmental Service

PREPARED BY: Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN: Ms. Carole Harris
PHONE: 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT: RSF

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JOB ID: 3997 Chrome Analysis
SAMPLED: By Pacific Environ. Staff
RECEIVED: by Pacific Environ. Staff
TYPE: Liquid and filters
JOB #: 3997
REMARKS: under separate cover

SAMPLE IDENTIFICATION

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR IF	Chromium by HGF - Liquids
VOL L	Sample Volume

Results by Sample

SAMPLE ID AMT-7L

SAMPLE # 01 FRACTIONS: A
Date & Time Collected 01/30/90 Category

CR HEX 0.007 mg/l CR LF 0.007 mg/l VOL L 570 mls

SAMPLE ID AMT-4H

SAMPLE # 02 FRACTIONS: A
Date & Time Collected 01/30/90 Category

CR HEX 0.02 mg/l CR LF 0.026 mg/l VOL L 700 mls

SAMPLE ID AMT-9

SAMPLE # 03 FRACTIONS: A
Date & Time Collected 01/30/90 Category

CR HEX <0.003 mg/l CR LF 0.008 mg/l. VOL L 640 mls

SAMPLE ID AMT-7F

SAMPLE # 04 FRACTIONS: A
Date & Time Collected 01/30/90 Category

NI PB <0.5 ug/filters CRNGAA 8.68 ug/filters

[illegible] ID AMI-10 SAMPLE # 05 FRACTIONS: A
Date & Time Collected 01/30/90 Category

[illegible] 10.5 CRIBAA 7.86
filters ug/filters

[illegible] ID AMI-4 SAMPLE # 06 FRACTIONS: A
Date & Time Collected 01/30/90 Category

[illegible] 10.5 CRIBAA 8.12
filters ug/filters

Environmental Service

[illegible] samples and their [illegible] were analyzed for hexavalent and total chromium contents according to [illegible] Method 6200. The results of the [illegible] were measured

QC Data

Sample	Hex Cr	Total Cr
AMI-09	0.01 mg/L	0.026 mg/L
AMI-09 dup	0.02 mg/L	0.028 mg/L
AMI-09 spike	100% R	97. % R

Received: 01/31/90 02/07/90 10:49:35

REPORT TO
Pacific Environmental Service
150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN Mr. Dean High

CLIENT PACIFIC ENVI SAMPLES 6
COMPANY Pacific Environmental Service
FACILITY

WORK ID 3948 Chrome Analysis
TAKEN By Pacific Environ. Staff
TRANS By Pacific Environ. Staff
TYPE Liquid And Filters
P.O. # 3948
INVOICE under separate cover

PREPARED BY
Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN Ms. Carole Harris
PHONE 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT RSF

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SAMPLE IDENTIFICATION

01 AMT-10L
02 AMT-11L
03 AMT-12L
04 AMT-10F
05 AMT-11F
06 AMT-12F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

Received: 01/31/90

Results by Sample

SAMPLE ID AMT-10L — SAMPLE # 01 FRACTIONS: A
Date & Time Collected 01/30/90 Category

CR_HEX	CR_LF	VOL_L
0.33 mg/L	0.446 mg/L	545 mls

SAMPLE ID AMT-11L — SAMPLE # 02 FRACTIONS: A
Date & Time Collected 01/30/90 Category

CR_HEX	CR_LF	VOL_L
0.31 mg/L	0.414 mg/L	490 mls

SAMPLE ID AMT-12L — SAMPLE # 03 FRACTIONS: A
Date & Time Collected 01/30/90 Category

CR_HEX	CR_LF	VOL_L
<0.003 mg/L	0.007 mg/L	510 mls

SAMPLE ID AMT-10F — SAMPLE # 04 FRACTIONS: A
Date & Time Collected 01/30/90 Category

CRHEXS	CRHGAA
<0.5 ug/filter	8.34 Total ug

Received: 01/31/90

Results by Sample

SAMPLE ID AMT-11F

SAMPLE # 05 FRACTIONS: A

Date & Time Collected 01/30/90 Category

CRHEXS <0.5 ug/filter CRHGAA 8.70 Total ug

SAMPLE ID AMT-12F

SAMPLE # 06 FRACTIONS: A

Date & Time Collected 01/30/90 Category

CRHEXS <0.5 ug/filter CRHGAA 8.10 Total ug

Pacific Environmental Service

Three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

Received: 02/01/90 02/07/90 10:50:58

REPORT TO
Pacific Environmental Service
150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN Mr. Dean High

CLIENT PACIFIC ENVI SAMPLES 6
COMPANY Pacific Environmental Service
FACILITY

WORK ID 3948
TAKEN By Pacific Environ. Staff
TRANS By Pacific Environ. Staff
TYPE Liquid and Filters
P.O. # 3948
INVOICE under separate cover

PREPARED BY
Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN Ms. Carole Harris
PHONE 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT RSF

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SAMPLE IDENTIFICATION

01 AMT-13L
02 AMT-14L
03 AMT-15L
04 AMT-13F
05 AMT-14F
06 AMT-15F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

Received: 02/01/90

Results by Sample

SAMPLE ID AMT-13L — SAMPLE # 01 FRACTIONS: A
Date & Time Collected 02/01/90 — Category

CR_HEX	CR_LF	VOL_L
0.013 mg/L	0.021 mg/L	455 mls

SAMPLE ID AMT-14L — SAMPLE # 02 FRACTIONS: A
Date & Time Collected 02/01/90 — Category

CR_HEX	CR_LF	VOL_L
0.014 mg/L	0.023 mg/L	480 mls

SAMPLE ID AMT-15L — SAMPLE # 03 FRACTIONS: A
Date & Time Collected 02/01/90 — Category

CR_HEX	CR_LF	VOL_L
<0.003 mg/L	0.006 mg/L	420 mls

SAMPLE ID AMT-13F — SAMPLE # 04 FRACTIONS: A
Date & Time Collected 02/01/90 — Category

CRHEXS	CRHGAA
<0.5 ug/filter	8.50 ug/filter

Received: 02/01/90

Results by Sample

SAMPLE ID AMT-14F

SAMPLE # 05 FRACTIONS: A

Date & Time Collected 02/01/90 Category

CRHEXS <0.5 ug/filter CRHGAA 7.90 ug/filter

SAMPLE ID AMT-15F

SAMPLE # 06 FRACTIONS: A

Date & Time Collected 02/01/90 Category

CRHEXS <0.5 ug/filter CRHGAA 8.88 ug/filter

Received: 02/01/90 02/07/90 10:50:58

Pacific Environmental Service

Three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

QC Data

Sa#	Hex Cr	Total Cr
AMT-14L	0.014 mg/L	0.023 mg/L
AMT-14L dup	0.015 mg/L	0.024 mg/L
AMT-14L spike	98% R	97. % R

REPORT TO
Pacific Environmental Service
150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN Mr. Dean High

CLIENT PACIFIC ENVI SAMPLES 6
COMPANY Pacific Environmental Service
FACILITY

WORK ID 3949 Chrome Analysis
TAKEN By Pacific Environ. Staff
TRANS By Pacific Environ. Staff
TYPE Liquid and Filters
P.O. # 3949
INVOICE under separate cover

PREPARED BY
Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN Ms. Carole Harris
PHONE 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT RSF

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SAMPLE IDENTIFICATION

01 AMT-16L
02 AMT-17L
03 AMT-18L
04 AMT-16F
05 AMT-17F
06 AMT-18F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

SAMPLE ID AMT-16L SAMPLE # 01 FRACTIONS: A
Date & Time Collected 02/02/90 Category

CR_HEX 0.009 mg/L CR_LF 0.009 mg/L VOL_L 460 mls

SAMPLE ID AMT-17L SAMPLE # 02 FRACTIONS: A
Date & Time Collected 02/02/90 Category

CR_HEX 0.010 mg/L CR_LF 0.014 mg/L VOL_L 420 mls

SAMPLE ID AMT-18L SAMPLE # 03 FRACTIONS: A
Date & Time Collected 02/02/90 Category

CR_HEX <0.003 mg/L CR_LF 0.004 mg/L VOL_L 480 mls

SAMPLE ID AMT-16F SAMPLE # 04 FRACTIONS: A
Date & Time Collected 02/02/90 Category

CRHEXS <0.5 ug/filter CRHGAA 1.16 ug/filter

SAMPLE ID AMT-17F

SAMPLE # 05 FRACTIONS: A

Date & Time Collected 02/02/90 Category

CRHEXS <0.5 ug/filter CRHGAA 1.30 ug/filter

SAMPLE ID AMT-18F

SAMPLE # 06 FRACTIONS: A

Date & Time Collected 02/02/90 Category

CRHEXS <0.5 ug/filter CRHGAA 1.00 ug/filter

Pacific Environmental Service

Three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

REPORT TO
Pacific Environmental Service
150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN Mr. Dean High

CLIENT PACIFIC ENVI SAMPLES 6
COMPANY Pacific Environmental Service
FACILITY

WORK ID 3949 Chrome Analysis
TAKEN By Pacific Environ. Staff
TRANS By Pacific Environ. Staff
TYPE Liquid and Filters
P.O. # 3949
INVOICE under separate cover

PREPARED BY
Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN Ms. Carole Harris
PHONE 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT RSF

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SAMPLE IDENTIFICATION

01 AMT-19L
02 AMT-20L
03 AMT-21L
04 AMT-19F
05 AMT-20F
06 AMT-21F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

Received: 02/05/90 Results by Sample

SAMPLE ID AMT-19L SAMPLE # 01 FRACTIONS: A
Date & Time Collected 02/05/90 Category

CR_HEX 0.004 mg/L CR_LF 0.021 mg/L VOL_L 535 mls

SAMPLE ID AMT-20L SAMPLE # 02 FRACTIONS: A
Date & Time Collected 02/05/90 Category

CR_HEX 0.010 mg/L CR_LF 0.021 mg/L VOL_L 480 mls

SAMPLE ID AMT-21L SAMPLE # 03 FRACTIONS: A
Date & Time Collected 02/05/90 Category

CR_HEX <0.003 mg/L CR_LF 0.003 mg/L VOL_L 435 mls

SAMPLE ID AMT-19F SAMPLE # 04 FRACTIONS: A
Date & Time Collected 02/05/90 Category

CRHEXS <0.5 ug/Filter CRHGAA 1.38 ug/Filter

Received: 02/[illegible]/90 Results by Sample

SAMPLE ID AMT-20F SAMPLE # 05 FRACTIONS: A

Date & Time Collected 02/05/90 Category

CRHEXS <0.5 ug/Filter CRHGAA 0.92 ug/Filter

SAMPLE ID AMT-21F SAMPLE # 06 FRACTIONS: A

Date & Time Collected 02/05/90 Category

CRHEXS <0.5 ug/Filter CRHGAA 0.74 ug/Filter

Pacific Environmental Service

Three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

QC Data

Sa#	Hex Cr	Total Cr
AMT-19L	0.010 mg/L	0.021 mg/L
AMT-19L dup	0.010 mg/L	0.022 mg/L
AMT-19L spike	106% R	109. % R

Received: 02/07/90 02/15/90 10:06:55

REPORT TO
Pacific Environmental Service
150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN Mr. Dean High

CLIENT PACIFIC ENVI SAMPLES 6
COMPANY Pacific Environmental Service
FACILITY

WORK ID 3949
TAKEN By Pacific Environ. Staff
TRANS By Pacific Environ. Staff
TYPE Liquid and Filters
P.O. # 3949
INVOICE under separate cover

PREPARED BY
Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN Ms. Carole Harris
PHONE 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT RSF

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SAMPLE IDENTIFICATION

01 AMT-22L
02 AMT-23L
03 AMT-24L
04 AMT-22F
05 AMT-23F
06 AMT-24F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

Received: 02/07/90 Results by Sample

SAMPLE ID AMT-22L SAMPLE # 01 FRACTIONS: A
Date & Time Collected 02/06/90 Category

CR_HEX 0.007 mg/L CR_LF 0.012 mg/L VOL_L 440 mls

SAMPLE ID AMT-23L SAMPLE # 02 FRACTIONS: A
Date & Time Collected 02/06/90 Category

CR_HEX 0.004 mg/L CR_LF 0.010 mg/L VOL_L 490 mls

SAMPLE ID AMT-24L SAMPLE # 03 FRACTIONS: A
Date & Time Collected 02/06/90 Category

CR_HEX <0.003 mg/L CR_LF 0.003 mg/L VOL_L 490 mls

SAMPLE ID AMT-22F SAMPLE # 04 FRACTIONS: A
Date & Time Collected 02/06/90 Category

CRHEXS <0.5 ug/filter CRHGAA 0.88 ug/filter

Received: 02/07/90 [redacted] Results by Sample

SAMPLE ID AMT-23F
SAMPLE # 05 FRACTIONS: A
Date & Time Collected 02/06/90 Category

CRHEXS <0.5 ug/filter CRHGAA 1.00 ug/filter

SAMPLE ID AMT-24F
SAMPLE # 06 FRACTIONS: A
Date & Time Collected 02/06/90 Category

CRHEXS <0.5 ug/filter CRHGAA 8.12 ug/filter

Pacific Environmental Service

Three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

Received: 02/07/90 02/13/90 16:06:33

REPORT TO: Pacific Environmental Service
150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN: Mr. Dean High

CLIENT: PACIFIC ENVI SAMPLES: 6
COMPANY: Pacific Environmental Service
FACILITY:

WORK ID: 3949
TAKEN: By Pacific Environ. Staff
TRANS: By Pacific Environ. Staff
TYPE: Liquid and Filters
P.O. #: 3949
INVOICE: under separate cover

PREPARED BY: Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN: Ms. Carole Harris
PHONE: 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT: RSF

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SAMPLE IDENTIFICATION

01 AMT-25L
02 AMT-26L
03 AMT-27L
04 AMT-25F
05 AMT-26F
06 AMT-27F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

Received: 02/07/90 Results by Sample

SAMPLE ID AMT-25L SAMPLE # 01 FRACTIONS: A
Date & Time Collected 02/07/90 Category

CR_HEX 0.007 mg/L CR_LF 0.011 mg/L VOL_L 435 mls

SAMPLE ID AMT-26L SAMPLE # 02 FRACTIONS: A
Date & Time Collected 02/07/90 Category

CR_HEX 0.006 mg/L CR_LF 0.008 mg/L VOL_L 510 mls

SAMPLE ID AMT-27L SAMPLE # 03 FRACTIONS: A
Date & Time Collected 02/07/90 Category

CR_HEX <0.003 mg/L CR_LF 0.005 mg/L VOL_L 525 mls

SAMPLE ID AMT-25F SAMPLE # 04 FRACTIONS: A
Date & Time Collected 02/07/90 Category

CRHEXS <0.5 ug/filter CRHGAA 5.04 ug/filter

SAMPLE ID AMT-26F SAMPLE # 05 FRACTIONS: A
Date & Time Collected 02/07/90 Category

CRHEXS <0.5 ug/filter CRHGAA 1.52 ug/filter

SAMPLE ID AMT-27F SAMPLE # 06 FRACTIONS: A
Date & Time Collected 02/07/90 Category

CRHEXS <0.5 ug/filter CRHGAA 2.14 ug/filter

Pacific Environmental Service

Three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

QC Data

Sa#	Hex Cr	Total Cr
AMT-25L	0.007 mg/L	0.011 mg/L
AMT-25L dup	0.006 mg/L	0.012 mg/L
AMT-25L spike	102% R	101. % R

Received: 02/09/90 02/13/90 16:06:44

REPORT TO
Pacific Environmental Service
150 E. Foothill Blvd.
Arcadia, CA 91006

ATTEN Mr. Dean High

CLIENT PACIFIC ENVI SAMPLES 6
COMPANY Pacific Environmental Service
FACILITY

WORK ID 3948
TAKEN By Pacific Environ. Staff
TRANS By Pacific Environ. Staff
TYPE Liquid and Filter
P.O. # 3948
INVOICE under separate cover

PREPARED BY
Thermo Analytical, Inc.
160 Taylor Street
Monrovia, CA 91016

ATTEN Ms. Carole Harris
PHONE 818-357-3247

Robert S. Ferguson
CERTIFIED BY

CONTACT RSF

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SAMPLE IDENTIFICATION

01 AMT-28L
02 AMT-29L
03 AMT-30L
04 AMT-28F
05 AMT-29F
06 AMT-30F

TEST CODES and NAMES used on this report

CRHEXS	Hexavalent Chromium
CRHGAA	Chromium - Air
CR HEX	Hexavalent Chromium
CR LF	Chromium by HGF - Liquids
VOL L	Sample Volume

Received: 02/09/90 Results by Sample

SAMPLE ID AMT-28L SAMPLE # 01 FRACTIONS: A
Date & Time Collected 02/08/90 Category

CR_HEX 0.006 mg/L CR_LF 0.011 mg/L VOL_L 520 mls

SAMPLE ID AMT-29L SAMPLE # 02 FRACTIONS: A
Date & Time Collected 02/08/90 Category

CR_HEX 0.014 mg/L CR_LF 0.020 mg/L VOL_L 455 mls

SAMPLE ID AMT-30L SAMPLE # 03 FRACTIONS: A
Date & Time Collected 02/08/90 Category

CR_HEX <0.003 mg/L CR_LF 0.007 mg/L VOL_L 530 mls

SAMPLE ID AMT-28F SAMPLE # 04 FRACTIONS: A
Date & Time Collected 02/08/90 Category

CRHEXS <0.5 ug/filter CRHGAA 5.04 ug/filter

SAMPLE ID AMT-29F SAMPLE # 05 FRACTIONS: A
Date & Time Collected 02/08/90 Category

CRHEXS <0.5 ug/filter CRHGAA 3.00 ug/filter

SAMPLE ID AMT-30F SAMPLE # 06 FRACTIONS: A
Date & Time Collected 02/08/90 Category

CRHEXS <0.5 ug/filter CRHGAA 5.42 ug/filter

Pacific Environmental Service

Three liquids and three filters were analyzed for hexavalent and total chromium content, according to EPA Method 425. The volumes of the liquids were measured.

QC Data

Sa#	Hex Cr	Total Cr
AMT-28L	0.006 mg/L	0.011 mg/L
AMT-28L dup	0.007 mg/L	0.012 mg/L
AMT-28L spike	104% R	107. % R