Background Report Reference

AP-42 Section Number: 12.20

Background Chapter: 4

Reference Number: 82

Title: Chromium Emission Tests Results, Building 32 Plating Facility, BAAQMD Authority to Construct: 574 Naval Aviation Depot

May 1991

AP-42 Section 12.26
Reference
Report Sect. 4
Reference 82

Same as Ref 24.

NEESA 2-176 MAY 1991

CHROMIUM EMISSION TESTS RESULTS

BUILDING 32 PLATING FACILITY
BAAQMD AUTHORITY TO CONSTRUCT: 574
NAVAL AVIATION DEPOT, ALAMEDA

NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY

Port Hueneme, California 93043-5014

AP-42 Section 12.20
Reference
Report Sect. 4
Reference 82

Same as Ref 24.

NEESA 2-176 MAY 1991

CHROMIUM EMISSION TESTS RESULTS

BUILDING 32 PLATING FACILITY
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NAVAL AVIATION DEPOT, ALAMEDA

NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY

Port Hueneme, California 93043-5014

UIC: 65885

NEESA 2-176 MAY 1991

CHROMIUM EMISSION TESTS RESULTS

BUILDING 32 PLATING FACILITY
BAAQMD AUTHORITY TO CONSTRUCT: 574
NAVAL AVIATION DEPOT, ALAMEDA

By:

David J. Cook, EIT
Drek A. Newton, P.E.

Naval Energy And Environmental Support Activity
Port Hueneme, California 93043-5014

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EXECUTIVE SUMMARY

The Naval Energy and Environmental Support Activity performed chromium emission tests on chrome plating and chromic acid anodizing operations at Building 32, Naval Aviation Depot, Alameda, California. We performed the tests during April 15-18, 1991.

We measured outlet emissions on lines G, L, and M. We also measured emissions between the wet scrubber and fiber bed filter on line M.

The table below summarizes the test results.

SUMMARY OF RESULTS

LINE	SAMPLE LOCATION	AVERAGE CHROMIUM EMISSION RATE (mg/hr)	AVERAGE CHROMIUM EMISSION FACTOR (mg/Amp-hr)
G	OUTLET	< 4.689	< 0.0041
L	OUTLET	< 9.964	< 0.0010
M	OUTLET	< 5.999	< 0.0006
M	MIDDLE	4725.4	0.5037

Note: Results based on TMA/ARLI total chromium analysis.

Lines G, L, and M comply with Bay Area Air Quality Management District's 0.015 mg/Amp-hr chromium emission limit.

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APPENDIX A

SAMPLE ANALYSIS RESULTS
LABORATORY ANALYSIS REPORTS

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1.0 INTRODUCTION

The Naval Energy and Environmental Support Activity (NEESA) performed chromium emission tests at Building 32 Plating Facility, Naval Aviation Depot (NAD), Alameda, California. We tested sources S3201 to S3209 as required by BAAQMD Authority to Construct 574. Appendix E, pages E-1 to E-8, includes a copy of the Authority to Construct. We measured chromium emissions from three tank ventilation exhaust lines (G, L, and M).

2.0 BACKGROUND

Another source test company performed the initial startup chromium emission tests for NAD Alameda's new plating facility. Due to a lack of consistent results and following an examination of the emission control devices, Western Division, Naval Facilities Engineering Command scheduled NEESA to perform additional tests. The building contractor discovered a design deficiency in the control devices which caused high chromium concentrations in the recirculating scrubber water. Apparently wet scrubber recirculation water drained through the Chevron demister and into the demister sump. When the demister sump overflowed, this highly concentrated chromic acid solution ran back into the wet scrubber sump. Appendix E, pages E-9 to E-14, explains the design deficiencies in greater detail. Prior to our emission tests, the contractor made repairs to correct this problem.

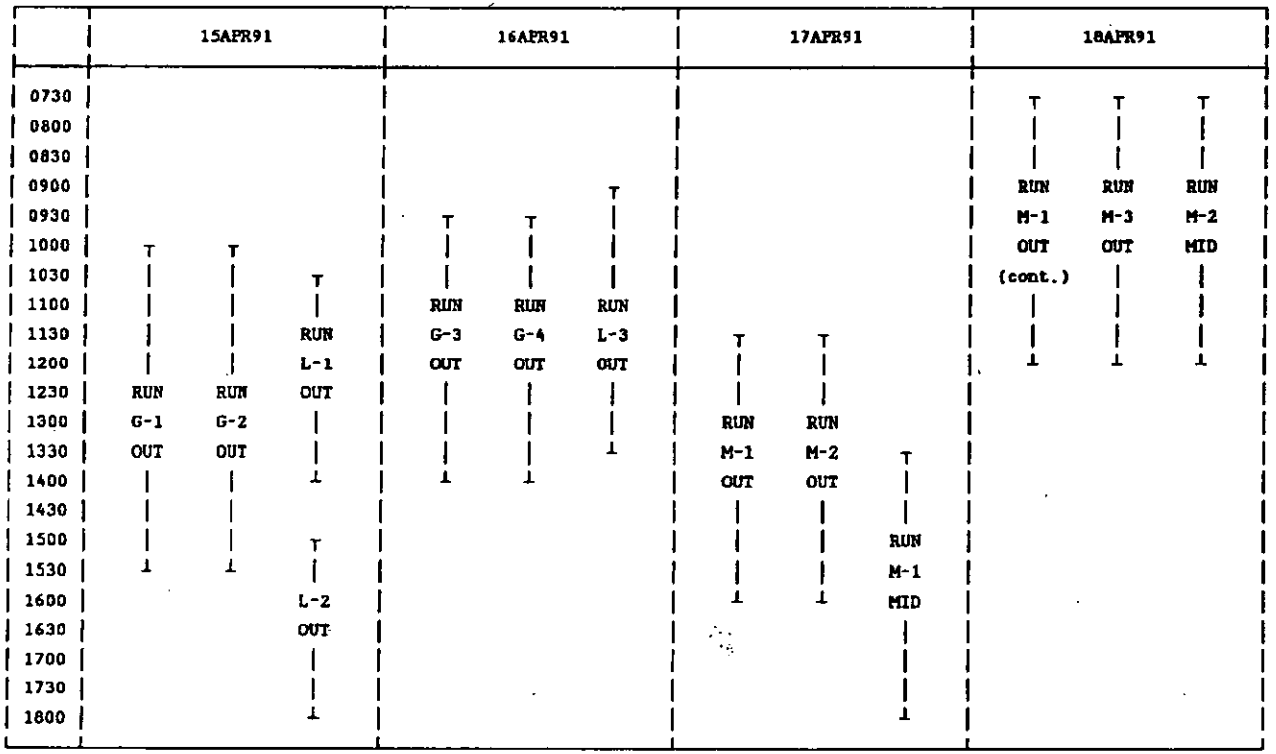

FIGURE 1: TEST SCHEDULE

3.0 SOURCE EMISSION TEST SCHEDULE

Figure 1 shows our emission test schedule. During tests where two probes were in the stack (in approximately the same plane), the minimum distance between one probe nozzle and the other probe was 4.8 inches.

Table 1 lists the hard chrome plating and chromic acid anodizing tanks ventilated by exhaust lines G, L, and M. All exhaust lines are controlled by a demister, a wet scrubber, and fiber filter bed. Appendix E, pages E-14 through E-20, contains plating shop design drawings and schematics of each control device.

CONFIRMED BY S.T. OBSERVER

TABLE 1: EXHAUST LINES AND PROCESS TANKS

Exhaust Line - Process	Control Devices[a]	Tank Rect.	Source No.[b]	Gals	≈ Area (ft)	Contents (oz/gal)	Temp (°F)
G - Chromic Acid Anodize	A3207	G-1	S3201	2400	16 x 4	10-12 CrO3	95
		G-2	S3202	1200	8 x 4	10-12 CrO3	95
L - Hard Chrome Plate	A3212	L-1	S3203	1400	8 x 4	30-33 CrO3	140
		L-2	S3204	1400	8 x 4	30-33 CrO3	140
		L-3[c]	S3205	1500	7 x 4	30-33 CrO3	140
		L-4[c]	S3205	1500	7 x 4	30-33 CrO3	140
M - Hard Chrome Plate	A3213	M-1	S3206	700	6 x 3	30-33 CrO3	140
		M-2	S3207	700	6 x 3	30-33 CrO3	140
		M-3	S3208	700	6 x 3	30-33 CrO3	140
		M-4	S3209	700	6 x 3	30-33 CrO3	140

[a] Control system identification numbers from Authority to Construct 574.
[b] Source identification numbers from Authority to Construct 574.
[c] Tank rectifiers L-3 and L-4 are on one tank S3205 (14 x 4).

We performed four outlet tests on line G. Line G ventilates two chromic acid anodizing tanks. During tests on line G, plating shop personnel placed four aluminum sheets (36.5 ft^2 surface area each) in anodizing tank G-1 and also placed parts in tank G-2. The tank load data sheets in Appendix B contain complete descriptions of parts loaded into the tanks.

We performed three outlet emission tests on line L. Exhaust line L ventilates three hard chrome plating tanks. During the tests, plating shop personnel placed four anodes (7.6 ft^2 surface area each) in each tank for a total of 30.4 ft^2 of plating surface in each tank.

We performed three outlet tests and two midline (between the wet scrubber and fiber bed filter) tests on line M. Line M pulls air from four hard chrome plating tanks. During the source tests, each tank contained four small anodes (1.5 ft^2 surface area each).

3.1 CHROMIUM EMISSION TEST PROCEDURE

Sampling procedures and equipment coincide with the Environmental Protection Agency (EPA) Methods 1, 2, 4, and 5 described in the Code of Federal Registrations, Volume 40, Part 60, Appendix A, of 1 July 1988 and California Air Resources Board (CARB) Method 425 (revised wet impingement method).

EPA Methods:
1: Sample and Velocity Traverses for Stationary Sources.
2: Determination of Stack Gas Velocity and Volumetric Flow Rate.
4: Determination of Moisture Content in Stack Gases.
5: Determination of Particulate Emissions From Stationary Sources.

CARB Method:
425: Determination of Total Chromium and Hexavalent Chromium Emissions From Stationary Sources.

The following comments briefly describe our test procedures and document any variations from the reference methods.

The CARB 425 sampling train is a modified EPA Method 5 train. The filter holder is unheated and is located between the third and fourth impingers. A teflon coated Pallflex T60A20 filter is used. The first and second impingers contain 0.1 N sodium hydroxide solution instead of water. The transition from the glass probe liner to the first impinger is either glass or flexible teflon tubing. We do not heat the probe.

For control device outlet emission tests, minimum sample volume (corrected to standard conditions) is 120 cubic feet.

We initially wash the sampling train at our laboratory using the following procedure. After a detergent wash, we soak all parts with 1:1 HNO_3 for a minimum of three hours, rinse with deionized water, and finally rinse with 0.1N NaOH solution. We do not analyze probe liner preparation rinses for chromium. The 0.1N NaOH sample recovery wash (post test) serves as the sample train wash (pre test) for the next test run.

A third party laboratory analyzed the samples. In general the lab used a flame atomic absorption spectrophotometer which can detect chromium concentrations in the lower ppm range. For samples below the ppm range, the lab used a graphite furnace which can detect chromium concentrations in the lower ppb range. For the control device outlet samples, the lab analyzed the first impinger solution, the second impinger solution, and the probe wash separately. For some control device inlet samples, the two impinger solutions were combined and analyzed as a single sample.

Normally, we do not split the samples for both hexavalent and total chromium analysis. We assume all chromium emissions to be hexavalent and analyze samples for total chromium. However, this time we had a laboratory analyze samples, from two outlet tests on each exhaust line for both hexavalent and total chromium.

4.0 CHAIN OF CUSTODY

LINES G, L, M

Sample Collection: Newton, Cook, Quil, Yee
Tank Load Data: Yee, Newton
Sample Recovery: Newton, Yee
Sample Transport: Newton, Yee

Bay Area Air Quality Management District
15,16 APR 91 Site Visit: Chuck McClure
Source Emission Testing
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Sample Analysis: Mark Hudnall
Thermo Analytical
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Analytical Technologies Incorporated
11 East Olive Road
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(904) 474-1001
Attn: John Hawkins

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5.0 RESULTS

Table 1 (section 3.0) lists chromium process data for each exhaust line. Table 2 shows chromium emission test results. Table 3 displays other emission test data.

The test results presented in Table 2 are based on total chromium analysis performed by Thermo Analytical/ARLI Laboratory in Monrovia, California. We had all samples analyzed by two laboratories. The first lab, Analytical Technologies (ATI) in Pensacola Florida, was unable to provide a detection limit low enough to demonstrate compliance of line G. ATI also had problems initially with the samples that contained filters. ATI reanalyzed and obtained more realistic results. Appendix D contains tables which show results based on both laboratory analyses. Final results are consistent with each other.

Appendix A contains laboratory analysis results for all emission test samples. Appendix B contains all field tank load data sheets and ampere-hour calculation sheets for hard chrome plating and chromic acid anodizing tests. Appendix C contains our field emission test data sheets. Appendix D summarizes the emission test results and contains sample calculations. Appendix E contains diagrams of the wet scrubber, fiber filter bed, and ventilation exhaust lines. Appendix E also includes Authority to Construct 574 and a letter to BAAQMD discussing repairs made to the control devices prior to these tests. Appendix F lists our HP-41C calculator program "Nomokin" used instead of a nomograph to determine isokinetic sampling parameters during testing. Appendix G contains equipment calibration sheets. Appendix H contains resumes of NEESA test personnel.

TABLE 2: CHROMIUM EMISSION TEST RESULTS

TEST	CHROMIUM SAMPLE WEIGHT (mg)	AIR SAMPLE VOLUME (m3)	CHROMIUM EMISSION RATE (mg/hr)	AVERAGE AMPERES (Amp)	CHROMIUM EMISSION FACTOR (mg/Amp-hr)
G-1-OUT	< 0.00038	4.583	< 4.066	996	< 0.0041
G-2-OUT	< 0.00038	4.428	< 4.347	996	< 0.0044
G-3-OUT	< 0.00042	4.047	< 4.969	1274	< 0.0039
G-4-OUT	< 0.00047	4.302	< 5.375	1274	< 0.0042
AVERAGE			< 4.689		< 0.0041
L-1-OUT	< 0.00040	3.160	< 6.528	9812	< 0.0007
L-2-OUT	0.00128	3.426	18.662	9812	0.0019
L-3-OUT	< 0.00045	4.644	< 4.701	10640	< 0.0004
AVERAGE			< 9.964		< 0.0010
M-1-OUT	0.00322	8.993	11.280	9387	0.0012
M-2-OUT	< 0.00048	4.301	< 3.524	9406	< 0.0004
M-3-OUT	< 0.00042	4.235	< 3.194	9362	< 0.0003
AVERAGE			< 5.999		< 0.0006
M-1-MID	0.78738	5.610	4139.2	9406	0.4401
M-2-MID	1.03569	5.302	5311.6	9362	0.5674
AVERAGE			4725.4		0.5037

Note: Results based on TMA/ARLI total chrome analysis.

CONSISTANT

TABLE 3: CHROMIUM EMISSION TEST DATA

TEST	DATE	NOZZLE DIA. (in.)	SAMPLE TIME (min.)	AIR SAMPLE VOLUME (dscf)	% H2O (%)	STACK FLOW (dscfm)	STACK VELOCITY (fpm)	ISO (%)
G-1-OUT	15APR91	0.198	240	161.82	1.8	28727	3106	103.1
G-2-OUT	15APR91	0.192	240	156.37	1.7	30090	3247	101.2
G-3-OUT	16APR91	0.186	240	142.90	1.9	28263	3061	104.9
G-4-OUT	16APR91	0.191	240	151.91	1.9	28705	3115	104.1
L-1-OUT	15APR91	0.184	180	111.57	1.7	30432	3284	103.6
L-2-OUT	15APR91	0.195	180	120.96	1.6	29475	3171	103.3
L-3-OUT	16APR91	0.198	240	163.97	1.8	28745	3112	104.4
M-1-OUT	17APR91	0.195	480	317.55	1.8	18549	3092	104.4
M-2-OUT	17APR91	0.191	240	151.88	1.9	18421	3081	104.9
M-3-OUT	18APR91	0.186	240	149.55	1.6	19081	3167	105.1
M-1-MID	17APR91	0.234	240	198.09	1.9	17355	2817	99.6
M-2-MID	18APR91	0.233	240	187.23	1.8	16004	2587	103.0

SATISFACTORY

SAMPLE ANALYSIS RESULTS

SAMPLE ID.		NET SAMPLE WEIGHT (gm, ml)	ATI HEX CHROMIUM ANALYSIS (mg/l)	ATI HEX CHROMIUM WEIGHT (mg)	ATI TOTAL CHROMIUM ANALYSIS (mg/l)	ATI TOTAL CHROMIUM WEIGHT (mg)	TMA/ARLI TOTAL CHROMIUM ANALYSIS (mg/l)	TMA/ARLI TOTAL CHROMIUM WEIGHT (mg)
G-1-OUT-PROBE	13	88.09	< 0.010	< 0.00088	< 0.005	< 0.00044	< 0.001	< 0.00009
G-1-OUT-IMP1	14	148.81	< 0.010	< 0.00149	< 0.005	< 0.00074	< 0.001	< 0.00015
G-1-OUT-IMP2	15	144.81	< 0.010	< 0.00145	< 0.005	< 0.00072	< 0.001	< 0.00014
TOTAL CHROMIUM WEIGHT				< 0.00382		< 0.00191		< 0.00038
G-2-OUT-PROBE	10	100.69			< 0.005	< 0.00050	< 0.001	< 0.00010
G-2-OUT-IMP1	11	140.86			< 0.005	< 0.00070	< 0.001	< 0.00014
G-2-OUT-IMP2	12	134.94			0.007	0.00094	< 0.001	< 0.00013
TOTAL CHROMIUM WEIGHT						< 0.00215		< 0.00038
G-3-OUT-PROBE	22	138.77			< 0.005	< 0.00069	< 0.001	< 0.00014
G-3-OUT-IMP1	23	147.43			< 0.005	< 0.00074	< 0.001	< 0.00015
G-3-OUT-IMP2	24	132.51			< 0.005	< 0.00066	< 0.001	< 0.00013
TOTAL CHROMIUM WEIGHT						< 0.00209		< 0.00042
G-4-OUT-PROBE	25	189.22	< 0.010	< 0.00189	< 0.005	< 0.00095	< 0.001	< 0.00019
G-4-OUT-IMP1	26	162.28	< 0.010	< 0.00162	< 0.005	< 0.00081	< 0.001	< 0.00016
G-4-OUT-IMP2	27	122.58	< 0.010	< 0.00123	< 0.005	< 0.00061	< 0.001	< 0.00012
TOTAL CHROMIUM WEIGHT				< 0.00474		< 0.00237		< 0.00047
L-1-OUT-PROBE	7	113.06			< 0.005	< 0.00057	< 0.001	< 0.00011
L-1-OUT-IMP1	8	146.03			< 0.005	< 0.00073	< 0.001	< 0.00015
L-1-OUT-IMP2	9	139.76			< 0.005	< 0.00070	< 0.001	< 0.00014
TOTAL CHROMIUM WEIGHT						< 0.00199		< 0.00040
L-2-OUT-PROBE	16	119.73	< 0.010	< 0.00120	< 0.005	< 0.00060	0.005	0.00060
L-2-OUT-IMP1	17	155.56	< 0.010	< 0.00156	< 0.005	< 0.00078	0.002	0.00031
L-2-OUT-IMP2	18	122.22	< 0.010	< 0.00122	< 0.005	< 0.00061	0.003	0.00037
TOTAL CHROMIUM WEIGHT				< 0.00398		< 0.00199		0.00128
L-3-OUT-PROBE	19	110.64	< 0.010	< 0.00111	< 0.005	< 0.00055	< 0.001	< 0.00011
L-3-OUT-IMP1	20	178.71	< 0.010	< 0.00179	0.005	0.00089	< 0.001	< 0.00018
L-3-OUT-IMP2	21	157.59	< 0.010	< 0.00158	< 0.005	< 0.00079	< 0.001	< 0.00016
TOTAL CHROMIUM WEIGHT				< 0.00447		< 0.00223		< 0.00045

SAMPLE ANALYSIS RESULTS

SAMPLE ID.		NET SAMPLE WEIGHT (gm, ml)	ATI HEX CHROMIUM ANALYSIS (mg/l)	ATI HEX CHROMIUM WEIGHT (mg)	ATI TOTAL CHROMIUM ANALYSIS (mg/l)	ATI TOTAL CHROMIUM WEIGHT (mg)	TMA/ARLI TOTAL CHROMIUM ANALYSIS (mg/l)	TMA/ARLI TOTAL CHROMIUM WEIGHT (mg)
M-1-OUT-PROBE	43	194.46	< 0.010	< 0.00194	< 0.005	< 0.00097	0.010	0.00194
M-1-OUT-IMP1	44	173.66	< 0.010	< 0.00174	< 0.005	< 0.00087	0.003	0.00052
M-1-OUT-IMP2	45	188.23	< 0.010	< 0.00188	0.006	0.00113	0.004	0.00075
TOTAL CHROMIUM WEIGHT				< 0.00556		< 0.00297		0.00322
M-2-OUT-PROBE	28	137.86			< 0.005	< 0.00069	< 0.001	< 0.00014
M-2-OUT-IMP1	29	195.04			< 0.005	< 0.00098	< 0.001	< 0.00020
M-2-OUT-IMP2	30	151.29			0.006	0.00091	< 0.001	< 0.00015
TOTAL CHROMIUM WEIGHT						< 0.00257		< 0.00048
M-3-OUT-PROBE	46	100.77	< 0.010	< 0.00101	< 0.005	< 0.00050	< 0.001	< 0.00010
M-3-OUT-IMP1	47	171.07	< 0.010	< 0.00171	< 0.005	< 0.00086	< 0.001	< 0.00017
M-3-OUT-IMP2	48	145.44	< 0.010	< 0.00145	< 0.005	< 0.00073	< 0.001	< 0.00015
TOTAL CHROMIUM WEIGHT				< 0.00417		< 0.00209		< 0.00042
M-1-MID-PROBE	31	190.37	2.850	0.54255	3.200	0.60918	3.700	0.70437
M-1-MID-IMP1	32	183.79	0.060	0.01103	0.110	0.02022	0.130	0.02389
M-1-MID-IMP2	33	168.92	0.760	0.12838	1.000	0.16892	0.350	0.05912
TOTAL CHROMIUM WEIGHT				0.68196		0.79832		0.78738
M-2-MID-PROBE	40	248.68	3.060	0.76090	3.800	0.94491	3.740	0.92999
M-2-MID-IMP1	41	176.67	0.410	0.07243	0.590	0.10424	0.560	0.09894
M-2-MID-IMP2	42	169.08	< 0.010	< 0.00169	0.066	0.01116	0.040	0.00676
TOTAL CHROMIUM WEIGHT				0.83503		1.06030		1.03569

QUALITY ASSURANCE SAMPLE AND BLANK ANALYSIS

SAMPLE ID.		ANALYSIS TARGET (mg/l)	ATI CHROMIUM ANALYSIS (mg/l)	TMA CHROMIUM ANALYSIS (mg/l)
30.3 ppb CHROMIUM QA	36	0.030[a]	0.014	0.015
96.8 ppb CHROMIUM QA	37	0.097[a]	0.058	-----
15.4 ppb CHROMIUM QA	39	0.015[a]	0.008	0.008
0.1N NaOH BLANK	38	BDL	< 0.005	-----
0.1N NaOH/FILTER BLANK	49	BDL	0.011[b]	< 0.001
POST RECOVERY RINSE (M-2-OUT)[c]	34	BDL	< 0.005	< 0.001
POST RECOVERY RINSE (M-1-MID)[c]	35	BDL	< 0.005	0.003

[a] The QA sample concentration targets must be inaccurate. We suspect a dilution error was made during QA sample preparation. Both labs report similar numbers for the QA samples so we believe the labs are accurate. TMA reanalyzed sample 36 and obtained 0.014 mg/l.

[b] ATI analysis of samples with filters, e.g. 49, are questionable. ATI digested the filters which is contrary to CARB 425. ATI initially reported phenomenally high numbers (1 mg/l) for all samples with filters (samples labeled IMP2). We believe TMAs results on IMP2 samples are more accurate.

[c] The post recovery rinse samples represent an extra rinse (≈50ml) of the probe, nozzle, and impingers. This rinse followed our normal sample recovery procedures. We analyzed these extra rinses to verify that our recovery methods are adequate.

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NEESA
CODE 111C1
ATTN: DREK NEWTON
PORT HUENEME CA 93043-0000

Lab I.D.#: 91-2768
Order Number: P42253
Order Date: 04/19/91
Client: 14012
Sampled By: NEESA
Sample Date: N/S
Sample Time: N/S

Project Number: N6258391P3506
Project Name: NAD ALAMEDA
Sample Site: NAD BLDG 32
Sample Type: AIR

N/S = Not Submitte

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
2768-1	13	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-2	14	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-3	15	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-4	16	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-5	17	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-6	18	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-7	19	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-8	20	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-9	21	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-10	25	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-11	26	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-12	27	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-13	31	CHROMIUM, HEXAVALENT	MG/L	2.85	0.01
2768-14	32	CHROMIUM, HEXAVALENT	MG/L	0.06	0.01
2768-15	33	CHROMIUM, HEXAVALENT	MG/L	0.76	0.01
2768-16	40	CHROMIUM, HEXAVALENT	MG/L	3.06	0.01
2768-17	41	CHROMIUM, HEXAVALENT	MG/L	0.41	0.01
2768-18	42	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-19	43	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-20	44	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-21	45	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-22	46	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-23	47	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01
2768-24	48	CHROMIUM, HEXAVALENT	MG/L	BDL	0.01

Comments: Method Reference: California Air Resource Board, Method 424.
BDL = Below Detection Limits.

Approved By : John V Hawkins

end of report

AnalyticalTechnologies, Inc.
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PENSACOLA, FLORIDA 32514

CLIENT NAME: NEESA

PROJECT: N62583919P3506

LAB ID: 91-2768

QC LEVEL: I

PAGE 1 OF 1

LAB ID	CLIENT ID	LAB ID	CLIENT ID
91-2768-1	13	91-2768-13	31
91-2768-2	14	91-2768-14	32
91-2768-3	15	91-2768-15	33
91-2768-4	16	91-2768-16	40
91-2768-5	17	91-2768-17	41
91-2768-6	18	91-2768-18	42
91-2768-7	19	91-2768-19	43
91-2768-8	20	91-2768-20	44
91-2768-9	21	91-2768-21	45
91-2768-10	25	91-2768-22	46
91-2768-11	26	91-2768-23	47
91-2768-12	27	91-2768-24	48

QUALITY CONTROL DATA

PARAMETER	PREPARATION DATE	ANALYSIS DATE	BATCH #	METHOD	DETECTION LIMIT	BLANK RESULT	SAMPLE RESULT	DUPLIC RESULT	RPD SAMPLE	MAX RPD	MATRIX SPIKE RESULT	TRUE MS RESULT	%REC MS	%REC CONTROL LIMITS
CHROMIUM, HEXAVALENT	04-19-91	04-19-91	1-AIR	CARB-425	0.01	BDL	BDL	BDL	N/C	20	0.52	0.50	104	75-125
CHROMIUM, HEXAVALENT	04-19-91	04-19-91	2-AIR	CARB-425	0.01	BDL	3.06	2.84	7	20	0.54	0.50	108	75-125

Notes: PPM = Parts Per Million, mg/l.
BDL = Below Detection Limit.
Results recorded are blank corrected.
Control limits are from ATI's internal quality assurance program and the referenced method.
N/C = Not Calculable due to at least one result = BDL.

Reference: California Air Resource Board, Method 425.

Analytical Technologies, Inc.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

NEESA
CODE 111C1
ATTN: DREK NEWTON
PORT HUENEME CA 93043-0000

Lab I.D.#: 91-2768A
Order Number: P42628
Order Date: 05/01/91
Client: 14012
Sampled By: NEESA
Sample Date: N/S
Sample Time: N/S

Project Number: N6258391P3506
Project Name: NAD ALAMEDA
Sample Site: NAD BLDG 32
Sample Type: AIR

N/S = Not Submitte

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
2768A-1	13	CHROMIUM	MG/L	BDL	0.005
2768A-2	14	CHROMIUM	MG/L	BDL	0.005
2768A-3	15	CHROMIUM	MG/L	BDL	0.005
2768A-4	16	CHROMIUM	MG/L	BDL	0.005
2768A-5	17	CHROMIUM	MG/L	BDL	0.005
2768A-6	18	CHROMIUM	MG/L	BDL	0.005
2768A-7	19	CHROMIUM	MG/L	BDL	0.005
2768A-8	20	CHROMIUM	MG/L	0.005	0.005
2768A-9	21	CHROMIUM	MG/L	BDL	0.005
2768A-10	25	CHROMIUM	MG/L	BDL	0.005
2768A-11	26	CHROMIUM	MG/L	BDL	0.005
2768A-12	27	CHROMIUM	MG/L	BDL	0.005
2768A-13	31	CHROMIUM	MG/L	3.2	0.005
2768A-14	32	CHROMIUM	MG/L	0.11	0.005
2768A-15	33	CHROMIUM	MG/L	1.0	0.005
2768A-16	40	CHROMIUM	MG/L	3.8	0.005
2768A-17	41	CHROMIUM	MG/L	0.59	0.005
2768A-18	42	CHROMIUM	MG/L	0.066	0.005
2768A-19	43	CHROMIUM	MG/L	BDL	0.005
2768A-20	44	CHROMIUM	MG/L	BDL	0.005
2768A-21	45	CHROMIUM	MG/L	0.006	0.005
2768A-22	46	CHROMIUM	MG/L	BDL	0.005
2768A-23	47	CHROMIUM	MG/L	BDL	0.005
2768A-24	48	CHROMIUM	MG/L	BDL	0.005

Comments: Method Reference: California Air Resources Board, 425.
BDL = Below Detection Limits.

Approved By : John V Hawkins

end of repor

QUALITY CONTROL DATA

AnalyticalTechnologies, Inc.
11 EAST OLIVE ROAD
PENSACOLA, FLORIDA 32514
PHONE (904) 474-1001

CLIENT NAME: NEESA

PROJECT: PO N62583391P3506

LAB ID: 91-2768A

QC LEVEL: I

PAGE 1 OF 1

LAB ID	CLIENT ID	LAB ID	CLIENT ID	LAB ID	CLIENT ID
91-2768A-1	13	91-2768A-9	21	91-2768A-17	41
91-2768A-2	14	91-2768A-10	25	91-2768A-18	42
91-2768A-3	15	91-2768A-11	26	91-2768A-19	43
91-2768A-4	16	91-2768A-12	27	91-2768A-20	44
91-2768A-5	17	91-2768A-13	31	91-2768A-21	45
91-2768A-6	18	91-2768A-14	32	91-2768A-22	46
91-2768A-7	19	91-2768A-15	33	91-2768A-23	47
91-2768A-8	20	91-2768A-16	40	91-2768A-24	48

PARAMETER	PREPARATION DATE	ANALYSIS DATE	BATCH #	METHOD	DETECTION LIMIT	BLANK RESULT	SAMPLE RESULT	DUPLIC RESULT	RPD SAMPLE	MAX RPD	MATRIX SPIKE RESULT	TRUE MS RESULT	%REC MS	%REC CONTROL LIMITS
CHROMIUM	04-30-91	05-01-91	CrG-004	425	0.005	BDL	0.008	BDL	N/C	20	0.017	0.020	85	75-125

Notes: PPM = Parts Per Million, mg/l.
BDL = Below Detection Limit.
Results recorded are blank corrected.
Control limits are from ATI's internal quality assurance program and the referenced method.
N/C = Not Calculable due to at least one result = BDL.

Reference: California Air Resources Board.

CHAIN OF CUSTODY

AnalyticalTechnologies, Inc.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514 PHONE (904) 474-1001

LAB I.D. # 91-2768

CLIENT DREK NEWTON
ADDRESS NFESA-111C
CITY PORT HUENEME
STATE CA ZIP 93043
PHONE NO. (805) 982-3903

PROJECT NUMBER
PROJECT NAME NAD ALAMEDA
SAMPLED BY NFESA
SAMPLE SITE NAD BLDG 32

PURCHASE ORDER NUMBER
N62583 91P3506

PROJECT MANAGER (person to receive data)
DREK NEWTON

REQUEST FAX DATA TO (FAX #)
805 982 5388
REQUEST VERBAL RESULTS BY (DATE)
NEED DATA PACKAGE BY (DATE)
QUALITY CONTROL REPORTING LEVEL
0 1 2 3 4 (circle one)
NEED EXTRA COPIES OF REPORT

SAMPLE MATRIX
DW DRINKING WATER
WW WASTEWATER
GW GROUNDWATER
SW SURFACE WATER
SO SOIL
OL OIL
AR AIR
SL SLUDGE
HZ HAZARDOUS

PARAMETERS/SAMPLE BOTTLE/CONTAINER DESCRIPTION/ PRESERVATIVES

FYE	SAMPLE I.D.	DATE	TIME	MATRIX	TOTAL	LAB USE ONLY
P	13			AIR		1
I	14					2
I2	15					3
P	16					4
I	17					5
I2	18					6
P	19					7
I	20					8
I2	21					9
P	25					10
I	26					11
I2	27					12
P	28 31					13
I	2 324					14
I2	33					15

TOTAL NUMBER OF BOTTLES/CONTAINERS

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
			[signature] 2:11 PM	11/19/91	1000

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

TURN AROUND TIME
(NORMAL) ☐ 2 WEEKS
RUSH: ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 1 WEEK

SAMPLE DISPOSAL INSTRUCTIONS
☐ ATI Disposal @ $5.00 each ☐ Return

SPECIAL INSTRUCTIONS
TOTAL & HEX CHROME
[illegible] 11/19/91
[illegible] 1PM
AND IS REPORT

WHITE — LAB CANARY — CLIENT PINK — REPORT

CHAIN OF CUSTODY

AnalyticalTechnologies, Inc.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514 PHONE (904) 474-1001

LAB I.D. # 91-2768

CLIENT DREK NEWTON
ADDRESS NFESA-111C
CITY PORT HUENEME
STATE CA ZIP 93043
PHONE NO. (805) 982-3903

PROJECT NUMBER
PROJECT NAME NAD ALAMEDA
SAMPLED BY NFESA
SAMPLE SITE BLDG 32

PURCHASE ORDER NUMBER
N62583 91P3506

PROJECT MANAGER (person to receive data)
DREK NEWTON

REQUEST FAX DATA TO (FAX #)
(805) 982 5388
REQUEST VERBAL RESULTS BY (DATE)
NEED DATA PACKAGE BY (DATE)
QUALITY CONTROL REPORTING LEVEL
0 1 2 3 4 (circle one)
NEED EXTRA COPIES OF REPORT

SAMPLE MATRIX
DW DRINKING WATER
WW WASTEWATER
GW GROUNDWATER
SW SURFACE WATER
SO SOIL
OL OIL
AR AIR
SL SLUDGE
HZ HAZARDOUS

PARAMETERS/SAMPLE BOTTLE/CONTAINER DESCRIPTION/ PRESERVATIVES

FYE	SAMPLE I.D.	DATE	TIME	MATRIX	TOTAL	LAB USE ONLY
P	40			AIR		16
I	41					17
I2	42					18
P	43					19
I	44					20
I2	45					21
P	46					22
I	47					23
I2	48					24

TOTAL NUMBER OF BOTTLES/CONTAINERS

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
			[signature]	11/19/91	1000

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

TURN AROUND TIME
(NORMAL) ☐ 2 WEEKS
RUSH: ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 1 WEEK

SAMPLE DISPOSAL INSTRUCTIONS
☐ ATI Disposal @ $5.00 each ☐ Return

SPECIAL INSTRUCTIONS
TOTAL & HEX CHROME
[illegible] 11/19/91
[illegible] 1PM
AND IS REPORT

AnalyticalTechnologies, Inc.

11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

Page ___ of ___

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: Derek Newton
Method of Shipment: Fed Ex
Date Received: 4/19/91
Sample Type: Air

ATI Lab I.D.#: 91-2768

Is there a chain of custody?	Y	N
Is the chain of custody signed?	Y	N
Were samples received cold?	Y	N
Were any containers broken?	Y	N
Were samples preserved correctly?	Y	N
Were samples received within holding time?	Y	N

PROJECT NUMBER:
PURCHASE ORDER NUMBER: MC5539/P3506
Q.C. LEVEL: 1 2 3 4
COMMENTS:

Sample 1	45
2	46
3	47
4	48
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

LIMIT OF LIABILITY

ATI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF ATI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES ATI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED DATE/TIME: YES ( ) NO (X)
NOTES:

INSPECTED BY: Jay L. Davison
DATE INSPECTED: 4/19/91

AnalyticalTechnologies, Inc.

11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

Page ___ of ___

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: Derek Newton
Method of Shipment: Fed Ex
Date Received: 4/19/91
Sample Type: Air

ATI Lab I.D.#: 91-2768

Is there a chain of custody?	Y	N
Is the chain of custody signed?	Y	N
Were samples received cold?	Y	N
Were any containers broken?	Y	N
Were samples preserved correctly?	Y	N
Were samples received within holding time?	Y	N

PROJECT NUMBER:
PURCHASE ORDER NUMBER: MC5539/P3506
Q.C. LEVEL: 1 2 3 4
COMMENTS:

Sample 1	13
2	14
3	15
4	16
5	17
6	18
7	19
8	20
9	21
10	25
11	26
12	27
13	31
14	32
15	33
16	40
17	41
18	42
19	43
20	44

LIMIT OF LIABILITY

ATI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF ATI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS, TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES ATI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED DATE/TIME: YES ( ) NO (X)
NOTES:

INSPECTED BY: Jay L. Davison
DATE INSPECTED: 4/19/91

Analytical Technologies, Inc.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

NEESA
CODE 111C1
ATTN: DREK NEWTON
PORT HUENEME CA 93043-0000

Lab I.D.#: 91-2776
Order Number: P42264
Order Date: 04/19/91
Client: 14012
Sampled By: NEESA
Sample Date: N/S
Sample Time: N/S

Project Number: N6258391P350
Project Name: NAD ALAMEDA
Sample Site: BLDG 32
Sample Type: AIR

N/S = Not Submitted

Lab ID	Sample ID	Parameter	Units	Results	Detection Limit
2776-1	1	CHROMIUM	MG/L	BDL	0.005
2776-2	2	CHROMIUM	MG/L	BDL	0.005
2776-3	3	CHROMIUM	MG/L	BDL	0.005
2776-4	4	CHROMIUM	MG/L	0.009	0.005
2776-5	5	CHROMIUM	MG/L	BDL	0.005
2776-6	6	CHROMIUM	MG/L	BDL	0.005
2776-7	7	CHROMIUM	MG/L	BDL	0.005
2776-8	8	CHROMIUM	MG/L	BDL	0.005
2776-9	9	CHROMIUM	MG/L	BDL	0.005
2776-10	10	CHROMIUM	MG/L	BDL	0.005
2776-11	11	CHROMIUM	MG/L	BDL	0.005
2776-12	12	CHROMIUM	MG/L	0.007	0.005
2776-13	22	CHROMIUM	MG/L	BDL	0.005
2776-14	23	CHROMIUM	MG/L	BDL	0.005
2776-15	24	CHROMIUM	MG/L	BDL	0.005
2776-16	28	CHROMIUM	MG/L	BDL	0.005
2776-17	29	CHROMIUM	MG/L	BDL	0.005
2776-18	30	CHROMIUM	MG/L	0.006	0.005
2776-19	34	CHROMIUM	MG/L	BDL	0.005
2776-20	35	CHROMIUM	MG/L	BDL	0.005
2776-21	38	CHROMIUM	MG/L	BDL	0.005
2776-22	36	CHROMIUM	MG/L	0.014	0.005
2776-23	37	CHROMIUM	MG/L	0.058	0.005
2776-24	39	CHROMIUM	MG/L	0.008	0.005
2776-25	49	CHROMIUM	MG/L	0.011	0.005

Comments: Method Reference: California Air Resources Board, 425.
BDL = Below Detection Limits.

Approved By : G Michelotti

end of report

AnalyticalTechnologies,Inc.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

CLIENT NAME: NEESA

PROJECT: PO 6258391P3506

LAB ID: 91-2776

QC LEVEL: I

PAGE 1 OF 1

QUALITY CONTROL DATA

LAB ID	CLIENT ID
91-2776-1	1
91-2776-2	2
91-2776-3	3
91-2776-4	4
91-2776-5	5
91-2776-6	6
91-2776-7	7
91-2776-8	8
91-2776-9	9

LAB ID	CLIENT ID
91-2776-10	10
91-2776-11	11
91-2776-12	12
91-2776-13	22
91-2776-14	23
91-2776-15	24
91-2776-16	28
91-2776-17	29
91-2776-18	30

LAB ID	CLIENT ID
91-2776-19	34
91-2776-20	35
91-2776-21	38
91-2776-22	36
91-2776-23	37
91-2776-24	39
91-2776-25	49

PARAMETER	PREPARATION DATE	ANALYSIS DATE	BATCH #	METHOD	DETECTION LIMIT	BLANK RESULT	SAMPLE RESULT	DUPLIC RESULT	RPD SAMPLE	MAX RPD	MATRIX SPIKE RESULT	TRUE MS RESULT	%REC MS	%REC CONTROL LIMITS
CHROMIUM	04-22-91	04-26-91	CrW-85	425	0.007	BDL	BDL	BDL	N/C	20	0.22	0.20	110	75-125

Notes: PPM = Parts Per Million, mg/l.
BDL = Below Detection Limit.
Results recorded are blank corrected.
Control limits are from ATI's internal quality assurance program and the referenced method.
N/C = Not Calculable due to at least one result = BDL.

Reference: California Air Resources Board.

CHAIN OF CUSTODY

AnalyticalTechnologies, Inc.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514 PHONE (904) 474-1001

LAB I.D.# 91-2776

CLIENT Drek Newton
ADDRESS NEESA-111C
CITY Port Hueneme
STATE CA ZIP 93043
PHONE NO. 805 982-3903

PROJECT NUMBER
PROJECT NAME NAD ALAMEDA
SAMPLED BY NEESA
SAMPLE SITE BLDG 32

PURCHASE ORDER NUMBER
N6258391P3506

PROJECT MANAGER (person to receive data)
Drek Newton

REQUEST FAX DATA TO 805 982-5388 (FAX #)
REQUEST VERBAL RESULTS BY _____ (DATE)
NEED DATA PACKAGE BY _____ (DATE)
QUALITY CONTROL REPORTING LEVEL
1 2 3 4 (circle one)
NEED _____ EXTRA COPIES OF REPORT

FORM 9-93-200 — METRO PRINTING, INC., HUNTSVILLE, ALABAMA 35801

SAMPLE MATRIX

DW DRINKING WATER	OL OIL
WW WASTEWATER	AR AIR
GW GROUNDWATER	SL SLUDGE
SW SURFACE WATER	HZ HAZARDOUS
SO SOIL	

PARAMETERS/SAMPLE BOTTLE/CONTAINER DESCRIPTION/PRESERVATIVES

EVT	SAMPLE I.D.	DATE	TIME	MATRIX	TOTAL	LAB USE ONLY
IMP	1			AIR?		1
IMP	2					2
PROBE	3					3
I	4					4
I2	5					5
P	6					6
P	7					7
I	8					8
I2	9					9
P	10					10
I	11					11
I2	12					12
P	22					13
I	23					14
I2	24					15

TOTAL NUMBER OF BOTTLES/CONTAINERS

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
Drek Nauty via FEDEX	4/18		Mike Moran	4/19	1000

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

TURN AROUND TIME
(NORMAL) ☐ 2 WEEKS
RUSH: ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 1 WEEK

SAMPLE DISPOSAL INSTRUCTIONS
☐ Return

SPECIAL INSTRUCTIONS:
TOTAL CHROMIUM CONC
ug/l or mg/l
(PPB) (PPM)

WHITE — LAB CANARY — CLIENT PINK — REPORT

CHAIN OF CUSTODY

AnalyticalTechnologies, Inc.
11 EAST OLIVE ROAD PENSACOLA, FLORIDA 32514 PHONE (904) 474-1001

LAB I.D.# 91-2776

CLIENT Drek Newton
ADDRESS NEESA-111C
CITY Port Hueneme
STATE CA ZIP 93043
PHONE NO. 805 982-3903

PROJECT NUMBER
PROJECT NAME NAD ALAMEDA
SAMPLED BY NEESA
SAMPLE SITE BLDG 32

PURCHASE ORDER NUMBER
N6258391P3506

PROJECT MANAGER (person to receive data)
Drek Newton

REQUEST FAX DATA TO 805982-5388 (FAX #)
REQUEST VERBAL RESULTS BY _____ (DATE)
NEED DATA PACKAGE BY _____ (DATE)
QUALITY CONTROL REPORTING LEVEL

SAMPLE MATRIX

DW DRINKING WATER	OL OIL
WW WASTEWATER	AR AIR
GW GROUNDWATER	SL SLUDGE
SW SURFACE WATER	HZ HAZARDOUS
SO SOIL	

PARAMETERS/SAMPLE BOTTLE/CONTAINER DESCRIPTION/PRESERVATIVES

EVT	SAMPLE I.D.	DATE	TIME	MATRIX	TOTAL	LAB USE ONLY
P	28			AIR		16
I1	29					17
I2	30					18
EQUIP BLANK TRIP BLANKS	34 35					19
EQUIPMENT BLANK	38					20
I1	36					21
P	37					22
I2	39					23
FILTER BLANK	49					24
						25

TOTAL NUMBER OF BOTTLES/CONTAINERS

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
Drek Nauty via FEDEX	4/18		Mike Moran	4/19	1000

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

TURN AROUND TIME
(NORMAL) ☐ 2 WEEKS
RUSH: ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 1 WEEK

SAMPLE DISPOSAL INSTRUCTIONS

SPECIAL INSTRUCTIONS:
TOTAL CHROMIUM
ug/l or mg/l
PPB or PPM

Analytical Technologies, Inc.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

Page ___ of ___

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: NEESA
Method of Shipment Fed Ex.
Date Received: 4/19/91
Sample Type: Water

Is there a chain of custody?	(Y)	N
Is the chain of custody signed?	(Y)	N
Were samples received cold?	(Y)	N
Were any containers broken?	Y	(N)
Were samples preserved correctly?	(Y)	N
Were samples received within holding time?	(Y)	N

PROJECT NUMBER
PURCHASE ORDER NUMBER N6258391P3506
Q.C. LEVEL 1 2 3 4
COMMENTS:

ATI Lab I.D.#

Sample	
1	Imp 1 1
2	Imp 2 2
3	Probe 3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	22
14	23
15	24
16	28
17	29
18	30
19	34
20	35

A-13

- - - - - LIMIT OF LIABILITY - - - -

ATI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF ATI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES ATI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED
DATE/TIME: YES ( ) NO (Y)

NOTES:

INSPECTED BY: Mike Moore
DATE INSPECTED: 4/19/91

Analytical Technologies, Inc.
11 EAST OLIVE ROAD PHONE (904) 474-1001
PENSACOLA, FLORIDA 32514

Page ___ of ___

SAMPLE INSPECTION AND IDENTIFICATION SHEET

Client: Neesa
Method of Shipment Fed Ex.
Date Received: 4/19/91
Sample Type: Water

Is there a chain of custody?	(Y)	N
Is the chain of custody signed?	(Y)	N
Were samples received cold?	(Y)	N
Were any containers broken?	Y	(N)
Were samples preserved correctly?	(Y)	N
Were samples received within holding time?	(Y)	N

PROJECT NUMBER
PURCHASE ORDER NUMBER N6258391P3506
Q.C. LEVEL 1 2 3 4
COMMENTS:

ATI Lab I.D.#

Sample	
21	38
22	36
23	37
24	39
25	49
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

- - - - - LIMIT OF LIABILITY - - - -

ATI WILL PERFORM THE SERVICES IN ACCORDANCE WITH NORMAL PROFESSIONAL STANDARDS FOR THE INDUSTRY. THE TOTAL LIABILITY OF ATI, ITS OFFICERS, AGENTS, EMPLOYEES OR SUCCESSORS TO CLIENTS, ARISING OUT OF OR IN CONNECTION WITH THE SERVICES TO BE PROVIDED HEREIN, SHALL NOT EXCEED THE INVOICE AMOUNT FOR SAID SERVICES. CLIENT ACCEPTANCE OF A PROPOSAL RELEASES ATI FROM ANY LIABILITY IN EXCESS THEREOF, NOT WITHSTANDING ANY PROVISION TO THE CONTRARY IN ANY CLIENT PURCHASE ORDER OR CONTRACT.

CLIENT NOTIFIED
DATE/TIME: YES ( ) NO (Y)

NOTES:

INSPECTED BY: Mike Moore
DATE INSPECTED: 4/19/91

Page 1
Received: 04/22/91

TMA Inc. REPORT
05/02/91 12:37:59

Work Order # A1-04-098

REPORT TO: Receiving Officer, Bldg. 881
USN CBC NEESA
Port Hueneme, CA 93043-5000

ATTEN: Drek Newton

CLIENT: NEESA SAMPLES: 10
COMPANY: Naval Energy & Environental
FACILITY: Support Activity

WORK ID: Chromium Analysis
TAKEN: By NEESA Staff
TRANS: By NEESA Staff
TYPE: Liquids
P.O. #: N6258390MM919
INVOICE: under separate cover

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

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

CERTIFIED BY

CONTACT: MGH

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	16
02	17
03	18
04	25
05	26
06	27
07	35
08	43
09	44
10	45

TEST CODES and NAMES used on this workorder

CR_L	Chromium - Liquids
MPREPW	Metals Prep. - Liquid

TMA
Thermo Analytical Inc.

TMA/ARI
160 Taylor Street
Post Office Box 2360
Monrovia, CA 91016
(818) 357-3247

CHAIN OF CUSTODY

CLIENT / ADDRESS: NEESA Drek Newton 805-982-4905 Fax 805-982-1909
PROJECT: PO# N6258390MM919
SAMPLERS (SIGNATURE):

DATE: 4/22/91 PAGE 1 OF 1

SAMPLE NO	DATE	TIME	LOCATION	CR_L	SAMPLE TYPE OR MATRIX (e.g. water, soil, filters, charcoal tube, asbestos, oil)	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TESTS
16				X		1	
17				X		1	
18				X		1	
25				X		1	
26				X		1	
27				X		1	
35				X		1	
43				X		1	
44				X		1	
45				X		1	

1) RELINQUISHED BY: Signature	DATE 4/22/91	2) RECEIVED BY: Signature	DATE	3) RELINQUISHED BY: Signature	DATE	4) RECEIVED BY: Signature	DATE	10	TOTAL NUMBER OF CONTAINERS
Printed Name	TIME 4:35	Printed Name	TIME	Printed Name	TIME	Printed Name	TIME	METHOD OF SHIPMENT: Client Del.	
Company		Company		Company		Company			
5) RELINQUISHED BY: Signature	DATE 4/22/91	6) RECEIVED BY: Signature	DATE	7) RELINQUISHED BY: Signature	DATE	RECEIVED BY (Laboratory) Signature	DATE 4/22/91	SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS: NORMAL TAT Please FAX RESULTS	
Printed Name: Charles Yee	TIME 4:35	Printed Name	TIME	Printed Name	TIME	Printed Name: TMA/ARI	TIME 4:35		
Company: NEESA		Company		Company					

TMA Inc. REPORT Work Order # A1-04-098
Results by Sample

SAMPLE ID 16 SAMPLE # 01 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.005 mg/L

SAMPLE ID 17 SAMPLE # 02 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.002 mg/L

SAMPLE ID 18 SAMPLE # 03 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.003 mg/L

SAMPLE ID 25 SAMPLE # 04 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

TMA Inc. REPORT
Results by Sample

SAMPLE ID 26 SAMPLE # 05 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

SAMPLE ID 27 SAMPLE # 06 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

SAMPLE ID 35 SAMPLE # 07 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	0.003	mg/L

SAMPLE ID 43 SAMPLE # 08 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	0.010	mg/L

TMA Inc. REPORT
Results by Sample

SAMPLE ID 44 SAMPLE # 09 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.003 mg/L

SAMPLE ID 45 SAMPLE # 10 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.004 mg/L

Page 1 TMA Inc. REPORT Work Order # A1-05-008
Received: 05/01/91 05/03/91 14:07:47

REPORT TO: Receiving Officer, Bldg. 881
VSN CBC NEESA
Port Hueneme, CA 93043-5000

ATTEN: Drek Newton

CLIENT: NEESA SAMPLES: 23
COMPANY: Naval Energy & Environmental
FACILITY: Support Activity

WORK ID: Port Hueneme/Chrome
TAKEN: By Navy Staff
TRANS: By Navy Staff
TYPE: Liquid
P.O. #: N6258391M2386
INVOICE: under separate cover

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

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

CERTIFIED BY

CONTACT: MCH

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SAMPLE IDENTIFICATION

01	#7
02	#8
03	#9
04	#10
05	#11
06	#12
07	#13
08	#14
09	#15
10	#19
11	#20
12	#21
13	#22
14	#23
15	#24
16	#28
17	#29
18	#30
19	#36
20	#46
21	#47

TEST CODES and NAMES used on this workorder

CR_L	Chromium - Liquids
MPREPW	Metals Prep. - Liquid

SAMPLE IDENTIFICATION

22	#48
23	#49R

TMA
Thermo Analytical Inc.

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

CHAIN OF CUSTODY

CLIENT: US NAVY
ADDRESS:
CONTACT DARK NEWTON
PROJECT: PORT HUENEME / Chrome
SAMPLERS (SIGNATURE)

DATE: MAY 1, '91 PAGE 1 OF 2

ANALYSES: TOTAL CHROME (EPA 7191)

SAMPLE NO	DATE	TIME	LOCATION	TOTAL CHROME	SAMPLE TYPE OR MATRIX (e.g. water, soil, filters, charcoal tube, asbestos, oil)	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TESTS
7	—	—	7	✓			
8			8	✓			NOTE: These
9			9	✓			SAMPLES REQUIRE
10			10	✓			A TWO DAY TURN-
11			11	✓			AROUND TIME
12			12	✓			
13			13	✓			Required detection
14			14	✓			Limit 2 ppb (ug/L)
15			15	✓			
19			19	✓			
20			20	✓			
21			21	✓			

1) RELINQUISHED BY: Signature: Charles Yee; Printed Name: CHARLES YEE; Company: NEESA; DATE: 5/1/91; TIME: 1605
2) RECEIVED BY: Signature; Printed Name; Company; DATE; TIME
3) RELINQUISHED BY: Signature; Printed Name; Company; DATE; TIME
4) RECEIVED BY: Signature; Printed Name; Company; DATE; TIME
5) RELINQUISHED BY: Signature; Printed Name; Company; DATE; TIME
6) RECEIVED BY: Signature; Printed Name; Company; DATE; TIME
7) RELINQUISHED BY: Signature; Printed Name; Company; DATE; TIME
RECEIVED BY (Laboratory): Signature: K Masurd; Printed Name; TMA/ARLI; DATE: 5-1-91; TIME: 4:11

TOTAL NUMBER OF CONTAINERS
METHOD OF SHIPMENT
SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS

TMA
Thermo Analytical Inc.

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

CHAIN OF CUSTODY

CLIENT: US NAVY
ADDRESS:
CONTACT DEAK NEWTON
PROJECT: PORT HUENEME / CHROME
SAMPLERS (SIGNATURE)

DATE: MAY 1 '91 PAGE 2 OF 2

ANALYSES: TOTAL CHROM (EPA 7191)

SAMPLE NO	DATE	TIME	LOCATION	TOTAL CHROM	SAMPLE TYPE OR MATRIX (e.g. water, soil, filters, charcoal tube, asbestos, oil)	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TESTS
22			22	✓			NOTE: These samples
23			23	✓			REQUIRE A 2 day
24			24	✓			Turnaround time
28			28	✓			
29			29	✓			Required detection
30			30	✓			Limit 2 ppb (ug/L)
36			36	✓			
46			46	✓			
47			47	✓			
48			48	✓			
49B			49B *	✓			
							*SEE NOTE ON BOTTLE

1) RELINQUISHED BY: Signature: Charles Yee; Printed Name: CHARLES YEE; Company: NEESA; DATE: 5/1/91; TIME: 1605
2) RECEIVED BY: Signature; Printed Name; Company; DATE; TIME
3) RELINQUISHED BY: Signature; Printed Name; Company; DATE; TIME
4) RECEIVED BY: Signature; Printed Name; Company; DATE; TIME
5) RELINQUISHED BY: Signature; Printed Name; Company; DATE; TIME
6) RECEIVED BY: Signature; Printed Name; Company; DATE; TIME
7) RELINQUISHED BY: Signature; Printed Name; Company; DATE; TIME
RECEIVED BY (Laboratory): Signature: K Masurd; Printed Name; TMA/ARLI; DATE: 5-1-91; TIME: 4:11

TOTAL NUMBER OF CONTAINERS
METHOD OF SHIPMENT
SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS

TMA Inc. REPORT Work Order # A1-05-008
Results by Sample

SAMPLE ID #7 SAMPLE # 01 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #8 SAMPLE # 02 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #9 SAMPLE # 03 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #10 SAMPLE # 04 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

TMA Inc. REPORT

Results by Sample

SAMPLE ID #11 SAMPLE # 05 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #12 SAMPLE # 06 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #13 SAMPLE # 07 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #14 SAMPLE # 08 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

TMA Inc. REPORT
Results by Sample

SAMPLE ID #15 SAMPLE # 09 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

SAMPLE ID #19 SAMPLE # 10 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

SAMPLE ID #20 SAMPLE # 11 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

SAMPLE ID #21 SAMPLE # 12 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

TMA Inc. REPORT Work Order # A1-05-008

Results by Sample

SAMPLE ID #22 SAMPLE # 13 FRACTIONS: A
Date & Time Collected not specified W Category

CR_L	<0.001	mg/L

SAMPLE ID #23 SAMPLE # 14 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

SAMPLE ID #24 SAMPLE # 15 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

SAMPLE ID #28 SAMPLE # 16 FRACTIONS: A
Date & Time Collected not specified Category

CR_L	<0.001	mg/L

TMA/ARLI 160 Taylor Street / Monrovia, CA 91016 / (818) 357-3247 / FAX (818) 359-5036

TMA Inc. REPORT
Results by Sample

SAMPLE ID #29 SAMPLE # 17 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #30 SAMPLE # 18 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #36 SAMPLE # 19 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.015 mg/L

SAMPLE ID #46 SAMPLE # 20 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

TMA Inc. REPORT Work Order # A1-05-008
Results by Sample

SAMPLE ID #47 SAMPLE # 21 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #48 SAMPLE # 22 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #49B SAMPLE # 23 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

ceived: 05/01/91

TMA Inc. REPORT

Work Order # A1-05-009

05/10/91 13:06:07

REPORT TO: Commanding Officer, Code LO4B
Naval Civil Engineering Lab
Port Hueneme, CA 93043

ATTEN: Drek Newton

CLIENT: NAV CIVIL EN
OMPANY: Naval Facilities Engineering
CILITY: Command

SAMPLES: 15

ORK ID: Port Hueneme/Chrome
TAKEN: By Navy Staff
TRANS: By Navy Staff
TYPE: Liquid
P.O. #: N6258391M2306
NVOICE: under separate cover

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

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

CERTIFIED BY

CONTACT: MCH

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SAMPLE IDENTIFICATION

#1 [illegible]
#2 [illegible]
#3
#4
#5
#6
#31
#32
#33
#34
#38
#39
#40
#41
#42

TEST CODES and NAMES used on this workorder

CR L	Chromium - Liquids
MPREPW	Metals Prep. - Liquid

TEL No.

May 10,91 13:44 P.02/07

TMA
Thermo Analytical Inc.

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

CHAIN OF CUSTODY

CLIENT: US NAVY
ADDRESS:
PROJECT: CONTACT DERK NEWTON HOT HUFNEME/CHROME
SAMPLERS (SIGNATURE):

ANALYSES: TCLP CHROME, CAM 17 CHROME

SAMPLE NO	DATE	TIME	LOCATION	SAMPLE TYPE OR MATRIX (e.g. water soil, filters, charcoal tube, asbestos, oil)	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TESTS
1			1			DATE MAY 1 PAGE 1 OF 2
2			2			Detection limit 2ppb (ug/L)
3			3			
4			4			NORMAL TURNAROUND TIME
5			5			
6			6			
31			31			
32			32			
33			33			
34			34			
38			38			
39			39			

1) RELINQUISHED BY: Signature / Printed Name / Company	DATE / TIME	2) RECEIVED BY: Signature / Printed Name / Company	DATE / TIME	3) RELINQUISHED BY: Signature / Printed Name / Company	DATE / TIME	4) RECEIVED BY: Signature / Printed Name / Company	DATE / TIME	TOTAL NUMBER OF CONTAINERS / METHOD OF SHIPMENT / SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS
Charles Yee / CHARLES YEE / NEESA								
5) RELINQUISHED BY: Signature / Printed Name / Company	DATE / TIME	6) RECEIVED BY: Signature / Printed Name / Company	DATE / TIME	7) RELINQUISHED BY: Signature / Printed Name / Company	DATE / TIME	RECEIVED BY (Laboratory) Signature / Printed Name: TMA/ARLI	DATE / TIME	5-1-91 4:20pm

TMA
Thermo Analytical Inc.

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

CHAIN OF CUSTODY

CLIENT: US NAVY
ADDRESS:
PROJECT: CONTACT DERK NEWTON HOT HUFNEME/CHROME
SAMPLERS (SIGNATURE):

ANALYSES: TCLP CHROME, CAM 17 CHROME

SAMPLE NO	DATE	TIME	LOCATION	SAMPLE TYPE OR MATRIX (e.g. water soil, filters, charcoal tube, asbestos, oil)	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TESTS
40			40			DATE MAY 1 1991 PAGE 2 OF 2
41			41			DETECTION LIMIT 2ppb (ug/L)
42			42			
						NORMAL TAT
DAM			* BOX			

1) RELINQUISHED BY: Signature / Printed Name / Company	DATE / TIME	2) RECEIVED BY: Signature / Printed Name / Company	DATE / TIME	3) RELINQUISHED BY: Signature / Printed Name / Company	DATE / TIME	4) RECEIVED BY: Signature / Printed Name / Company	DATE / TIME	TOTAL NUMBER OF CONTAINERS / METHOD OF SHIPMENT / SPECIAL SHIPMENT-HANDLING OR STORAGE REQUIREMENTS
Charles Yee / CHARLES YEE / NEESA								
5) RELINQUISHED BY: Signature / Printed Name / Company	DATE / TIME	6) RECEIVED BY: Signature / Printed Name / Company	DATE / TIME	7) RELINQUISHED BY: Signature / Printed Name / Company	DATE / TIME	RECEIVED BY (Laboratory) Signature: K Mazerolle / Printed Name: TMA/ARLI	DATE / TIME	5-1-91 4:20pm

Received: 05/01/91 IMA Inc. REPORT Work Order # A1-05-009
Results by Sample

SAMPLE ID #1 SAMPLE # 01 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #2 SAMPLE # 02 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #3 SAMPLE # 03 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #4 SAMPLE # 04 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

Results by Sample

SAMPLE ID #5

SAMPLE # 05 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #6

SAMPLE # 06 FRACTIONS: A
Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #31

SAMPLE # 07 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 3.70 mg/L

SAMPLE ID #32

SAMPLE # 08 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.13 mg/L

TMA Inc. REPORT

Work Order # A1-05-007

Results by Sample

SAMPLE ID #33

SAMPLE # 09 FRACTIONS: A

Date & Time Collected not specified Category

CR_L 0.35 mg/L

SAMPLE ID #34

SAMPLE # 10 FRACTIONS: A

Date & Time Collected not specified Category

CR_L <0.001 mg/L

SAMPLE ID #38

W

SAMPLE # 11 FRACTIONS: A

Date & Time Collected not specified Category

A-30

CR_L <0.001 mg/L

SAMPLE ID #39

SAMPLE # 12 FRACTIONS: A

Date & Time Collected not specified Category

CR_L 0.008 mg/L

SAMPLE ID #40 SAMPLE # 13 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 3.74 mg/L

SAMPLE ID #41 SAMPLE # 14 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.56 mg/L

SAMPLE ID #42 SAMPLE # 15 FRACTIONS: A
Date & Time Collected not specified Category

CR_L 0.040 mg/L

A-31

IACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

A	I	MPREPW
'A	I	MPREPW
‹A	I	MPREPW
!A	I	MPREPW
›A	I	MPREPW
‹A	I	MPREPW
'A	I	MPREPW
:A	I	MPREPW
'A	I	MPREPW
‹A	I	MPREPW
A	I	MPREPW
'A	I	MPREPW
:A	I	MPREPW
!A	I	MPREPW
›A	I	MPREPW

CHROMIUM EMISSION TEST
RECOVERY SHEET
G-1-OUT

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 13

Tare Weight	Final Weight	Sample Weight
31.96	120.05	88.09

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 14

Tare Weight	Final Weight	Sample Weight
31.64	180.45	148.81

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 15

Tare Weight	Final Weight	Sample Weight
32.33	177.14	144.81

[ ] 14. Mark the fluid levels on the containers.

CHROMIUM EMISSION TEST RECOVERY SHEET

G-2-OUT

[✓] 1. Preweigh container #1.
[✓] 2. Rinse the front half using 0.1N NaOH into container #1.
[✓] 3. Weigh container #1.
[✓] 4. Record sample identification here 10

Tare Weight	Final Weight	Sample Weight
32.31	133.00	100.69

[✓] 5. Preweigh container #2.
[✓] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[✓] 7. Weigh container #2.
[✓] 8. Record sample identification here 11

Tare Weight	Final Weight	Sample Weight
32.38	173.24	140.86

[✓] 9. Preweigh container #3.
[✓] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[✓] 11. Weigh container #3.
[✓] 12. Carefully place the filter into container #3.
[✓] 13. Record sample identification here 12

Tare Weight	Final Weight	Sample Weight
32.46	167.40	134.94

[✓] 14. Mark the fluid levels on the containers.

CHROMIUM EMISSION TEST
RECOVERY SHEET

G-3-OUT

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 22

Tare Weight	Final Weight	Sample Weight
32.24	171.01	138.77

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 23

Tare Weight	Final Weight	Sample Weight
32.50	179.93	147.43

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 24

Tare Weight	Final Weight	Sample Weight
32.29	164.80	132.51

[ ] 14. Mark the fluid levels on the containers.

G-4-out

CHROMIUM EMISSION TEST RECOVERY SHEET

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 25

Tare Weight	Final Weight	Sample Weight
32.04	221.26	189.22

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 26

Tare Weight	Final Weight	Sample Weight
32.55	194.83	162.28

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 27

Tare Weight	Final Weight	Sample Weight
32.16	154.74	122.58

[ ] 14. Mark the fluid levels on the containers.

CHROMIUM EMISSION TEST
RECOVERY SHEET
L-1-OUT

[✓] 1. Preweigh container #1.
[✓] 2. Rinse the front half using 0.1N NaOH into container #1.
[✓] 3. Weigh container #1.
[✓] 4. Record sample identification here _____

1ml SPILL

Tare Weight	Final Weight	Sample Weight
~~32.63~~ 32.21	~~144.06~~ 144.27	112.06 + 1 = 113.06

[✓] 5. Preweigh container #2.
[✓] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[✓] 7. Weigh container #2.
[✓] 8. Record sample identification here 8

Tare Weight	Final Weight	Sample Weight
~~32.70~~ 32.03	~~177.46~~ 178.06	146.03

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 9

Tare Weight	Final Weight	Sample Weight
32.70	172.46	139.76

[ ] 14. Mark the fluid levels on the containers.

CHROMIUM EMISSION TEST
RECOVERY SHEET
L-2-OUT

[✓] 1. Preweigh container #1.
[✓] 2. Rinse the front half using 0.1N NaOH into container #1.
[✓] 3. Weigh container #1.
[✓] 4. Record sample identification here 16

Tare Weight	Final Weight	Sample Weight
31.93	151.66	119.73

[✓] 5. Preweigh container #2.
[✓] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[✓] 7. Weigh container #2.
[✓] 8. Record sample identification here 17

Tare Weight	Final Weight	Sample Weight
31.95	187.51	155.56

[✓] 9. Preweigh container #3.
[✓] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[✓] 11. Weigh container #3.
[✓] 12. Carefully place the filter into container #3.
[✓] 13. Record sample identification here 18

Tare Weight	Final Weight	Sample Weight
31.75	153.97	122.22

[✓] 14. Mark the fluid levels on the containers.

CHROMIUM EMISSION TEST
RECOVERY SHEET
L-3-OUT

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 19

Tare Weight	Final Weight	Sample Weight
32.30	142.94	110.64

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 20

Tare Weight	Final Weight	Sample Weight
32.12	210.83	178.71

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 21

Tare Weight	Final Weight	Sample Weight
31.65	189.24	157.59

[ ] 14. Mark the fluid levels on the containers.

M-1-OUT

CHROMIUM EMISSION TEST RECOVERY SHEET

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 43

Tare Weight	Final Weight	Sample Weight
32.17	226.63	194.46

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 44

Tare Weight	Final Weight	Sample Weight
32.80	206.46	173.66

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 45

Tare Weight	Final Weight	Sample Weight
31.70	219.93	188.23

[ ] 14. Mark the fluid levels on the containers.

CHROMIUM EMISSION TEST
RECOVERY SHEET

M-2-OUT

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 28

Tare Weight	Final Weight	Sample Weight
31.59	169.45	137.86

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 29

Tare Weight	Final Weight	Sample Weight
32.38	227.42	195.04

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 30

Tare Weight	Final Weight	Sample Weight
32.13	183.42	151.29

[ ] 14. Mark the fluid levels on the containers.

CHROMIUM EMISSION TEST
RECOVERY SHEET

~~M-2-OUT~~ M-3-OUT

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 46

Tare Weight	Final Weight	Sample Weight
32.67	133.44	100.77

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 47

Tare Weight	Final Weight	Sample Weight
32.26	203.33	171.07

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 48.

Tare Weight	Final Weight	Sample Weight
32.11	177.55	145.44

[ ] 14. Mark the fluid levels on the containers.

CHROMIUM EMISSION TEST
RECOVERY SHEET

M-1-MID

M-1-MID

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 31

Tare Weight	Final Weight	Sample Weight
31.43	221.80	190.37

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 32

Tare Weight	Final Weight	Sample Weight
31.96	215.75	183.79

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 33

Tare Weight	Final Weight	Sample Weight
31.90	200.82	168.92

[ ] 14. Mark the fluid levels on the containers.

M-2-MID

CHROMIUM EMISSION TEST RECOVERY SHEET

M-2-MID

[ ] 1. Preweigh container #1.
[ ] 2. Rinse the front half using 0.1N NaOH into container #1.
[ ] 3. Weigh container #1.
[ ] 4. Record sample identification here 40

Tare Weight	Final Weight	Sample Weight
32.48	281.14	248.66

[ ] 5. Preweigh container #2.
[ ] 6. Shake the first impinger well and drain through arm into container #2. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #2.
[ ] 7. Weigh container #2.
[ ] 8. Record sample identification here 41

Tare Weight	Final Weight	Sample Weight
32.37	209.04	176.67

[ ] 9. Preweigh container #3.
[ ] 10. Shake the second impinger well and drain through the arm into container #3. DO NOT SEPARATE THE IMPINGERS. Add NaOH rinse, shake well and drain through the arm into container #3.
[ ] 11. Weigh container #3.
[ ] 12. Carefully place the filter into container #3.
[ ] 13. Record sample identification here 42

Tare Weight	Final Weight	Sample Weight
31.42	200.50	169.08

[ ] 14. Mark the fluid levels on the containers.

APPENDIX B

AMPERE-HOUR CALCULATION SHEETS
FIELD TANK LOAD DATA

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AMPERE-HOUR CALCULATION SHEET
NAVAL AVIATION DEPOT, ALAMEDA
BUILDING 32, RECTIFIERS G-1, G-2
CHROMIC ACID ANODIZE
4/15/91, LINE G

TESTS G-1-OUT, G-2-OUT

RECTIFIER	G-1	G-2	TOTAL
INITIAL AMP-HR READING	11302.3	20738.3	
FINAL AMP-HR READING	14790.2	21235.6	
TOTAL AMP-HRS	3487.9	497.3	3985.2
TIME, HRS (See Note)	4.0	4.0	
AVERAGE AMPS DURING TEST	872.0	124.3	996.3

Note: Time btwn amp-hour readings or test time, whichever is longer.

AMPERE-HOUR CALCULATION SHEET
NAVAL AVIATION DEPOT, ALAMEDA
BUILDING 32, RECTIFIERS G-1, G-2
CHROMIC ACID ANODIZE
4/16/91, LINE G

TESTS G-3-OUT, G-4-OUT

RECTIFIER	G-1	G-2	TOTAL
INITIAL AMP-HR READING	14790.2	21235.6	
FINAL AMP-HR READING	19507.3	21616.1	
TOTAL AMP-HRS	4717.1	380.5	5097.6
TIME, HRS (See Note)	4.0	4.0	
AVERAGE AMPS DURING TEST	1179.3	95.1	1274.4

Note: Time btwn amp-hour readings or test time, whichever is longer.

AMPERE-HOUR CALCULATION SHEET
NAVAL AVIATION DEPOT, ALAMEDA
BUILDING 32, RECTIFIERS L-1, L-2, L-3, L-4
HARD CHROME PLATE
4/15/91, LINE L

TESTS L-1-OUT, L-2-OUT

RECTIFIER	L-1	L-2	L-3	L-4	TOTAL
INITIAL AMP-HR READING	92660.0	247799.0	22862.0	32894.0	
FINAL AMP-HR READING	115790.0	270572.0	38331.2	48383.0	
TOTAL AMP-HRS	23130.0	22773.0	15469.2	15489.0	
TIME, HRS (See Note)	7.8	7.8	7.8	7.8	
AVERAGE AMPS DURING TEST	2952.8	2907.2	1974.8	1977.3	9812

Note: Time btwn amp-hour readings or test time, whichever is longer.

AMPERE-HOUR CALCULATION SHEET
NAVAL AVIATION DEPOT, ALAMEDA
BUILDING 32, RECTIFIERS L-1, L-2, L-3, L-4
HARD CHROME PLATE
4/16/91, LINE L

TESTS L-3-OUT

RECTIFIER	L-1	L-2	L-3	L-4	TOTAL
INITIAL AMP-HR READING	1623.0	1612.0	40855.0	50875.0	
FINAL AMP-HR READING	18001.0	17644.0	48499.2	58499.2	
TOTAL AMP-HRS	16378.0	16032.0	7644.2	7624.2	
TIME, HRS (See Note)	4.8	4.8	4.0	4.0	
AVERAGE AMPS DURING TEST	3448.0	3375.2	1911.0	1906.0	10640

Note: Time btwn amp-hour readings or test time, whichever is longer.

AMPERE-HOUR CALCULATION SHEET
NAVAL AVIATION DEPOT, ALAMEDA
BUILDING 32, RECTIFIERS M-1, M-2, M-3, M-4
HARD CHROME PLATE
4/17/91, LINE M

TESTS M-2-OUT, M-1-MID

RECTIFIER	M-1	M-2	M-3	M-4	TOTAL
INITIAL AMP-HR READING	97932.5	70565.0	25930.0	70618.5	
FINAL AMP-HR READING	114626.0	87132.9	43222.8	87471.5	
TOTAL AMP-HRS	16693.5	16567.9	17292.8	16853.0	
TIME, HRS (See Note)	7.2	7.2	7.2	7.2	
AVERAGE AMPS DURING TEST	2329.3	2311.8	2412.9	2351.6	9406

Note: Time btwn amp-hour readings or test time, whichever is longer.

AMPERE-HOUR CALCULATION SHEET
NAVAL AVIATION DEPOT, ALAMEDA
BUILDING 32, RECTIFIERS M-1, M-2, M-3, M-4
HARD CHROME PLATE
4/18/91, LINE M

TESTS M-3-OUT, M-2-MID

RECTIFIER	M-1	M-2	M-3	M-4	TOTAL
INITIAL AMP-HR READING	14980.0	87471.0	43600.0	88157.0	
FINAL AMP-HR READING	24390.0	98810.0	55370.0	99561.0	
TOTAL AMP-HRS	9410.0	11339.0	11770.0	11404.0	
TIME, HRS (See Note)	4.0	4.9	4.9	4.9	
AVERAGE AMPS DURING TEST	2342.7	2306.2	2393.9	2319.5	9362

Note: Time btwn amp-hour readings or test time, whichever is longer.

AMPERE-HOUR CALCULATION SHEET
NAVAL AVIATION DEPOT, ALAMEDA
BUILDING 32, RECTIFIERS M-1, M-2, M-3, M-4
HARD CHROME PLATE
4/17/91 & 4/18/91, LINE M

TESTS M-1-OUT

RECTIFIER	M-1	M-2	M-3	M-4	TOTAL
INITIAL AMP-HR READING, 4/17	97932.5	70565.0	25930.0	70618.5	
FINAL AMP-HR READING, 4/17	114626.0	87132.9	43222.8	87471.5	
TOTAL AMP-HRS, 4/17	16693.5	16567.9	17292.8	16853.0	
TIME, HRS, 4/17 (See Note)	7.2	7.2	7.2	7.2	
INITIAL AMP-HR READING, 4/18	14980.0	87471.0	43600.0	88157.0	
FINAL AMP-HR READING, 4/18	24390.0	98810.0	55370.0	99561.0	
TIME, HRS, 4/18	4.0	4.9	4.9	4.9	
TOTAL AMP-HRS, 4/18	9410.0	11339.0	11770.0	11404.0	
TOTAL AMP-HRS, 4/17-18	26103.5	27906.9	29062.8	28257.0	
TOTAL TIME, HRS, 4/17-18	11.2	12.1	12.1	12.1	
AVERAGE AMPS DURING TEST	2334.1	2309.5	2405.2	2338.5	9387

Note: Time btwn amp-hour readings or test time, whichever is longer.

G

TANK LOAD DATA SHEET

CRO3 ANODIZE

DATE: 4/15/91
BASE: NAD ALAMEDA
BUILDING NO: 32

TANK NO: G-1, G-2
RUN NO: G-1-OUT
G-2-OUT

RECTIFIER	WORKPIECE DESCRIPTION
G-1	4 — 61"x43"x1/16" ALUMINUM SHEETS 2 sheets each row T = 93°F
G-2	1 61"x43"x1/16" Al. sheet 1 row of parts T = 91°F

TIME (INIT)	RECTIFIER AMP			
	G-1 A	G-1 AMP-HR	G-2 A	G-2 AMP-HRS
1010	550	113023	210	207383
1020	1030	114230	190	207654
1035	750	116660	200	208090
1040	1550	117820	200	208260
1055	1540	120020	200	208756
1110	1530	126120	200	209223
1125	1530	129720	200	209640
1140	1530	133928	200	210116
1330	460	133928	230	210116
1345	540	135114	200	210672
1400	730	136440	160	211011
1445	1250	144530	140	212018
1500	950	147902	140	212356

G

TANK LOAD DATA SHEET

CrO_3 ANODIZE

DATE: 4/16/91
BASE: NAD ALAMEDA
BUILDING NO: 32

TANK NO: G-1, G-2
RUN NO: G-3-OUT
G-4-OUT

RECTIFIER	WORKPIECE DESCRIPTION
G-1	4 Aluminum sheets
	4 Aluminum sheets 1335 —
G-2	Small parts 0935 — 1100
	Small parts 1205 —

	RECTIFIER			
TIME (INIT)	G-1 AMPS	G-1 AMP-HR	G-2 AMP	G-2 AMP-HR
0935		147902		212356
0940			40V 290	212630
0950			180	212958
1005				
1020	20V 1600	150930	40V 140	213651
1050	1550 92°F	159290	130 93°F	214256
1100	1550	—	TURNED OFF 130	214455
1115	14V 1550	165640	—	
1135	1550	171491		
CHG LOADS →				
1205		171491	0 START AMP	214455
1210			39V 235 90°F	214675
1235	15V ~~1500~~ Start	171491	190	
1250	17.5 1450 92	174900	37 110	215541
1315	19.4V 1500 92	181570	39 95	215923
1330	19V 1500	185740	40 90	216128
1335	1500			
1400	18.8V 1500 92°	B-6 193600	OFF 90A	216161
1409	OFF	195073		

L

TANK LOAD DATA SHEET
HARD CHROME

DATE: 4/15/91
BASE: NAD ALAMEDA
BUILDING NO: 32

TANK NO: L-1, L-2, L-3, L-4
RUN NO: L-1-OUT
L-2-OUT

RECTIFIER	WORKPIECE DESCRIPTION
L-1	(4) ANODES (1100 IN² SURF AREA EACH)
L-2	(4) "
L-3	(4) "
L-4	(4) "

Amp/Tot

TIME (INIT)	RECTIFIER L-1	L-2	L-3	L-4
1030	3000A/42660	3010A/247799	2000/228620	2010A/328940
1100	3000/94110 (1854)	3010/249296 (1858)	2000/279190	2000/339670
1130	3000/95457 (3205)	3010/250620 (3211)	2010/248170	2000/348670
1145	2980/96227 (3971)	3000/251365 (3956)	2000/253050	2000/353599
1230	3000/98540 (6285)	2990 253670 (6261)	2000/268660	2000/369180
1300	3000/100040 (7284)	2990 255070 (7622)	2000/277340	2000/377720
1340	2990/101933 (9681)	2990 256970 (9562)	2010/291010	2000/391590
1400	2990/103068 (10812)	2990/258070 (10661)	2000/298540	2000/399110
1445	2980/105270 (13014)	2990/260240 (12831)	2000/313220	2000/413800
1500	2980 106070 (13814)	2990/261020 (17611)	2000/318500	2000/419050
1600	2980 108863 (16610)	2990/263770 (16361)	2000/337200	2010/437780
1630	2990/110570 (18314)	2980/265450 (18092)	2000/348680	2000/449260
1656	2980/111755 (9505)	2980/266605 (19199)	2000/356631	2000/457250
1745	2970/114090 (21835)	2990/268840 (21432)	2000/371100	2000/471500
LAST 1820	2980 115790 (23534)	2980 270572 (23163)	2000 383312	2000 483830

B-7

TANK LOAD DATA SHEET

HARD CHROME PLATE

DATE: 4/16/91
BASE: NAD ALAMEDA
BUILDING NO: 32

TANK NO: L-1,L-2,L-3,L-4
RUN NO: L-3-OUT

RECTIFIER	WORKPIECE DESCRIPTION
L-1	4 ANODES (100 IN² SURFACE AREA)
L-2	4 "
L-3	4 "
L-4	4 "

AMP/TOT AMP HR

TIME (INIT)	RECTIFIER L-1	L-2	L-3	L-4
0830	3510A / 1623	3500 / 1612	2010 (4222)	2000 (8888)
0915	3570 / 4430	3570 / 4364	2020 / 48550 (25224)	2000 / 508750 (24921)
0945	3570 / 6030	3500 / 5950	2010 / 417800 (34495)	2000 / 518600 (34247)
1015	3510 / 7870	3500 / 7705	2000 / 428000	2000 / 528050
1045	3520 (12555) / 9750	3510 (250190) / 9618	2000 / 438820	2000 / 538850
1117	3510 / 11400	3510 / 11192	2000 / 447900	2000 / 547930
1147	3500 / 13158	3500 / 12918	2000 / 457840	2000 / 557880
1215	3510 / 14752	3500 / 14480	2000 / 466870	2000 / 566930
1245	3510 / 16587	3500 / 16281	2000 / 477200	2000 / 577260
1315	1800 (13386)	17644 (288216)	484992	584992

TANK LOAD DATA SHEET

DATE: 4/17/91
BASE: NADA/ALAMEDA
BUILDING NO: 32

HARD CHROME LINE M

TANK NO: M-1, M-2, M-3, M-4
RUN NO: M-1-OUT
M-2-OUT
M-1-MID

RECTIFIER	WORKPIECE DESCRIPTION
M-1	4 SUM ANODES (210 IN² SURF AREA EACH)
M-2	4 "
M-3	4 "
M-4	4 "

	RECTIFIER			
TIME (INIT)	M-1	M-2	M-3	M-4
1043am	979325	705650	259800	706185
1043am	2400	2400	2410	2410
1124am	2390 99-050	2410 721380	2400 225600	2400 722270
1158am	2390 1009221	2390 735586	2400 290345	2390 736646
1259pm	2390 1032175	2380 758235	2400 313840	2390 759435
1415pm	2400 1062645	2390 785420	2360 345200	2390 780825
1513pm	2380 1084440	2360 810140	2400 368200	2400 812400
1616pm	2380 1109335	2360 834735	2390 393700	2390 837150
1700	2370 1126480	2370 851600	2400 411200	2410 854200
1735	2370 1139480	2350 864520	2390 425000	2400 867700
1753	2370 1146260	2360 871329	2390 432228	2390 874715

TANK LOAD DATA SHEET

DATE: 4/18/01
BASE: KIRTLAND AFB
BUILDING NO: 32

HARD CHROME LINE M

TANK NO: M-1, M-2, M-3, M-4
RUN NO: M-1-OUT CONTINUE
M-3-OUT
M-2-MID

RECTIFIER	WORKPIECE DESCRIPTION
M-1	4 ANODES
M-2	4 "
M-3	4 "
M-4	4 "

TIME (INIT)	RECTIFIER			
	M-1	M-2	M-3	M-4
0700	2400 149800	2400 874710	2390 836060	2400 881570
0804	2400 174700	2390 899420	2390 461200	2380 906000
0908	2390 200000	2390 924500	2400 487000	2360 930800
0946	2390 214390	2390 938900	2400 502300	2420 945800
1101	2400 243900	2400 968100	2400 532680	2350 975200
1155	2390	2380 988100	2400 553700	2400 995610

APPENDIX C

FIELD SAMPLING DATA

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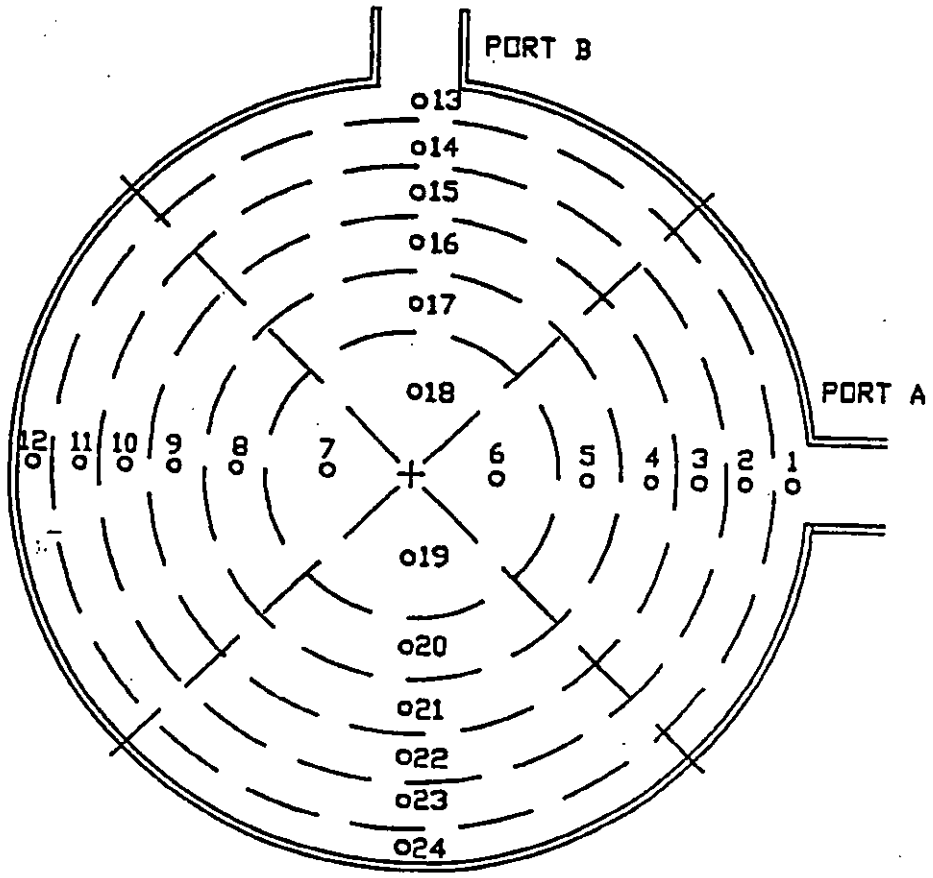
24 POINT SAMPLE TRAVERSE



LINE G OUTLET - CHROMIC ACID ANODIZE

STACK DIAMETER (IN.) 41.5

TRAVERSE POINT	EPA METHOD 1 (% OF DIA)	TRAVERSE POINT LOCATION (DISTANCES FROM I.D.)
1 & 13	2.1	1.0 *
2 & 14	6.7	2.8
3 & 15	11.8	4.9
4 & 16	17.7	7.3
5 & 17	25.0	10.4
6 & 18	35.6	14.8
7 & 19	64.4	26.7
8 & 20	75.0	31.1
9 & 21	82.3	34.2
10 & 22	88.2	36.6
11 & 23	93.3	38.7
12 & 24	97.9	40.5 *

* Location adjusted.

PRELIMINARY VELOCITY TRAVERSE DATA SHEET

PROBE 520 USED FOR THIS TRAIN

DATE: 13 APRIL 1991	DISTURB	DISTANCE A: 0.5	ft/(dia)
BASE: NAD ALAMEDA	A	DISTANCE B: 0.5	ft/(dia)
BUILDING NO: 32	TEST SITE	~~TRAVERSE PTS REQ'D:~~	
LINE NO: G (CrO3 Anodize)	B	TRAVERSE PTS USED, n: 24	
SCRUBBER: INLET (OUTLET)		CIRCULAR DIAMETER: 41.5	in
READINGS BY: D. Cook	DISTURB	RECTANGULAR L x W: N/A	in

	STACK PRESSURES (inches H_2O) ΔP_{vel}	P_{stat}	$\sqrt{\Delta P}$	CYCLONIC FLOW $\lvert\alpha\rvert$°
1	0.16	-0.32	0.40	
2	0.25	-0.36	0.50	3°
3	0.81	-0.56	0.90	
4	1.1	-0.59	1.05	2°
5	1.3	-0.61	1.14	
6	1.4	-0.62	1.18	4°
7	1.3	-0.67	1.14	
8	1.3	-0.70	1.14	1°
9	1.4	-0.73	1.18	
10	1.3	-0.71	1.14	2°
11	0.88	-0.65	0.94	
12	0.57	-0.51	0.75	2°

	STACK PRESSURES (inches H_2O) ΔP_{vel}	P_{stat}	$\sqrt{\Delta P}$	CYCLONIC FLOW $\lvert\alpha\rvert$°
13	0.2	-0.38	0.45	
14	0.42	-0.45	0.65	5°
15	0.77	-0.60	0.88	
16	1.1	-0.62	1.05	3°
17	1.1	-0.62	1.05	
18	1.25	-0.62	1.12	0°
19	1.3	-0.70	1.14	
20	1.4	-0.83	1.18	5°
21	1.5	-0.73	1.22	
22	1.3	-0.71	1.14	6°
23	0.67	-0.52	0.82	
24	0.45	-0.48	0.67	4°

AVERAGE VELOCITY HEAD $\Delta P = [(\Sigma\sqrt{\Delta P})/n]^2$ = 0.90

AVERAGE STATIC PRESSURE = $(\Sigma P_{stat})/n$ = -0.60

AVERAGE CYCLONIC FLOW ANGLE = $(\Sigma\alpha)/n$ = 3°

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/15/91 LINE NO: G ANODIZE

BASE: NAD ALAMEDA RUN NO: G-1 OUT

BUILDING NO: 32 CONTROL DEVICE: INLET OUTLET

PREP BY: D COOK IMPINGER BOX NO: 4

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
4-1	1. 100ml 0.1N NaOH	497.38	598.44	621.28	22.84
4-2	2. 100ml 0.1N NaOH	509.98	608.78	616.16	7.38
4-3	3. Empty	501.73	———	502.42	0.69
4-4	4. 500ml silica gel	506.88	913.45	943.99	30.54
				Net Weight Gain	61.45

Filter No: 0

Silica gel condition: Before test NEW After test 35% SEXIT

Nozzle No: 3/4"-3 Calibrated by: DAC

					Average
ID Before Test:	0.199	0.197	0.198	0.198	0.198
ID After Test:	0.198	0.197	0.199	0.198	0.198

STACK TEST 65

SOURCE EMISSION TESTING DATA SHEET

LEAK CHECKED WITH IMPINGER BOX No. 4

(SJS rev11/88, #02510)

STACK AREA = 1353 in² (41.5 in dia)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg: 29.875		METER BOX #: 13	PROBE # (PITOT #): S-12	NOZZLE #: 3/16 11-3
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 50°		METER ΔH@: 2.119	PITOT COEF: 0.82	IDEAL NOZZLE DIA, in.: 0.218
DATE: 15APR91	AVE STATIC PRESSURE, in H_2O: -0.60		METER γ: 1.011	PROBE LENGTH, in.: 60	ACTUAL NOZZLE DIA, in.: 0.198
OPERATOR: Quin	AVE VEL HEAD, in H_2O: 0.861		SAMPLE BOX #: 4	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S: ⊖ Steady @ 5.6 in H_2O, ⊕ Steady @ 5.6 in H_2O
RUN #: G-1-OUT	ASSUMED MOISTURE, %: 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM@ in Hg: 0.006 @ 10 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
						Inlet (B)	Outlet (E)							
START 10:07	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(Tm in) °F	(Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
24	0	592.029	0.65	0.37	66	57	56	55	AMB	1.2	20.9	0	0	0
23	10	596.336	1.12	0.63	65	62	61	50		2.0				
22	20	602.283	1.99	1.10	65	68	63	44		2.1				
21	30	610.844	2.56	1.40	65	74	65	47		3.3				
20	40	619.944	2.57	1.40	65	78	68	52		3.7				
19	50	629.252	2.20	1.20	66	77	69	52		3.0				
18	60	637.400	2.40	1.30	65	80	71	52		2.6				
17	70	645.006	2.21	1.20	66	80	71	54		2.6				
16	80	652.050	2.21	1.20	66	81	72	54		2.6				
15	90	660.300	2.03	1.10	65	81	73	51		2.5				
14	100	667.818	1.68	0.91	65	81	74	51		2.1				
13	110	673.549	0.64	0.35	66	79	74	52		1.1				
12	120	677.832												
STOP TOTAL 12:07														
A	Σ													

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX #	PROBE # (PITOT #)	NOZZLE #
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in. POST TEST	ACTUAL NOZZLE DIA, in.
OPERATOR	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S #2 OK 3 in H_2O #1 OK 4 in H_2O
RUN: G-1-OUT	ASSUMED MOISTURE, % 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg OK 0.005 cfm @ 10 in Hg

TRAVERSE POINT # START 1319	SAMPLING TIME min	GAS METER READING (Vm) ft^3	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	VELOCITY HEAD (MEAS) (ΔP) in H_2O	STACK TEMPERATURE @ (Ts) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER Inlet (Tm in) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
12	120	677.832	0.13	0.07	61	61	61	63	Ambs	1.0				
11	130	679.848	0.44	0.26	65	60	61	57		1.1				
10	140	683.38	1.13	0.63	64	62	61	51		1.4				
9	150	688.805	1.87	1.05	69	65	61	44		2.0				
8	160	695.459	2.18	1.20	65	71	62	46		2.3				
7	170	702.923	2.55	1.40	65	72	63	49		3.1				
6	180	711.333	2.27	1.25	67	74	65	46		2.9				
5	190	719.3	2.21	1.21	65	75	66	47		2.8				
4	200	727.100	2.21	1.25	67	74	66	46		2.6				
3	210	734.949	1.92	1.05	64	73	66	47		2.5				
2	220	742.278	1.20	0.66	64	72	65	47		1.8				
1	230	748.082	1.01	0.56	64	69	64	47		1.8				
ISM	240	753.77												
TOTAL														
AVERAGE														

G-1-OUT

```
 RONSKIN 3/91

 ENTER DATA THEN PUSH R/S
 G-1-OUT RUN
 TEST NO=?  G43
          1.      RUN
 RUN NO=?
          1.      RUN
 FILTER NO=?
          0.      RUN
 DELTA-H=?
          2.119   RUN
 GAMMA=?
          1.011   RUN
 STACK AREA, IN. SQ.=?
      1,353.000   RUN
 STACK STATIC P, IN H2O=?
          -.600   RUN
 PBAR IN HG=?
         29.875   RUN
 % H2O=?
          1.000   RUN
 STACK GAS WET
 MW, LB/LBMOL=?
         28.800   RUN
 AVG STACK TEMP, F=?
         68.000   RUN
 AVG DELTA-P, IN H2O=?
           .861   RUN
 AMB TEMP, F=?
         58.000   RUN
 PITOT CSUBP=?
           .820   RUN
 AVG STACK
 VELOCITY FPM = 3,855.937

 FOR 0.75 CFM
 IDEAL NOZZLE
 DIA INCHES= 0.218

 ACTUAL NOZZLE
 DIA INCHES=?
           .198   RUN

 SAMPLE CFM = 0.619

 --BEGIN RUN--

 INITIAL METER
 VOLUME FT3 =?
        592.029   RUN
 ****************
 POINT NO. 1.
             .37 STO 01
           66.00 STO 02
           57.00 STO 03
                 RUN
 DELTA H = 0.65
 ****************
 POINT NO. 2.
             .63 STO 01
           65.00 STO 02
           62.00 STO 03
                 RUN
 DELTA H = 1.12
 ****************
 POINT NO. 3.
            1.10 STO 01
           65.00 STO 02
           60.00 STO 03
                 RUN
 DELTA H = 1.99
 ****************
 POINT NO. 4.
            1.40 STO 01
           65.00 STO 02
           74.00 STO 03
                 RUN
 DELTA H = 2.56
 ****************
 POINT NO. 5.
            1.40 STO 01
           65.00 STO 02
           70.00 STO 03
                 RUN
 DELTA H = 2.57
 ****************
 POINT NO. 6.
            1.20 STO 01
           66.00 STO 02
           77.00 STO 03
                 RUN
 DELTA H = 2.20
 ****************
 POINT NO. 7.
            1.30 STO 01
           65.00 STO 02
           80.00 STO 03
                 RUN
 DELTA H = 2.40
 ****************
 POINT NO. 8.
            1.20 STO 01
           64.00 STO 02
           80.00 STO 03
                 RUN
 DELTA H = 2.21
 ****************
 POINT NO. 9.
            1.20 STO 01
           66.00 STO 02
           81.00 STO 03
                 RUN
 DELTA H = 2.21
 ****************
 POINT NO. 10.
            1.10 STO 01
           65.00 STO 02
           81.00 STO 03
                 RUN
 DELTA H = 2.03
 ****************
 POINT NO. 11.
             .91 STO 01
           65.00 STO 02
           81.00 STO 03
                 RUN
 DELTA H = 1.68
 ****************
 POINT NO. 12.
             .35 STO 01
           66.00 STO 02
           79.00 STO 03
                 RUN
 DELTA H = 0.64
 ****************
 POINT NO. 13.
             .07 STO 01
           61.00 STO 02
           61.00 STO 03
                 RUN
 DELTA H = 0.13
 ****************
 POINT NO. 14.
             .26 STO 01
           65.00 STO 02
           68.00 STO 03
                 RUN
 DELTA H = 0.46
 ****************
 POINT NO. 15.
             .63 STO 01
           64.00 STO 02
           62.00 STO 03
                 RUN
 DELTA H = 1.13
 ****************
 POINT NO. 16.
            1.05 STO 01
           69.00 STO 02
           65.00 STO 03
                 RUN
 DELTA H = 1.87
 ****************
 POINT NO. 17.
            1.20 STO 01
           65.00 STO 02
           71.00 STO 03
                 RUN
 DELTA H = 2.18
 ****************
 POINT NO. 18.
            1.40 STO 01
           65.00 STO 02
           72.00 STO 03
                 RUN
 DELTA H = 2.55
 ****************
 POINT NO. 19.
            1.25 STO 01
           67.00 STO 02
           74.00 STO 03
                 RUN
 DELTA H = 2.27
 ****************
 POINT NO. 20.
            1.21 STO 01
           65.00 STO 02
           75.00 STO 03
                 RUN
 DELTA H = 2.21
 ****************
 POINT NO. 21.
            1.25 STO 01
           67.00 STO 02
           74.00 STO 03
                 RUN
 DELTA H = 2.27
 ****************
 POINT NO. 22.
            1.05 STO 01
           64.00 STO 02
           73.00 STO 03
                 RUN
 DELTA H = 1.92
 ****************
 POINT NO. 23.
             .66 STO 01
           64.00 STO 02
           72.00 STO 03
                 RUN
 DELTA H = 1.20
 ****************
 POINT NO. 24.
             .56 STO 01
           64.00 STO 02
           69.00 STO 03
                 RUN
 DELTA H = 1.01
 ****************
 POINT NO. 25.
            0.00   RUN
 ======
 ISOKIN
 AVG VALUES
 KV=21.614
 TMETER F=71.917
 DELTA-H=1.728
 DELTA P=0.889
 FINAL METER
 VOLUME FT3=?
          753.771   RUN
 INITIAL=592.029
 SAMPLE TIME
 MIN. =?
          240.000   RUN
 PSTACK ABS
 IN HG=29.831
 TSTACK F=65.209
 ======

 SOURCE TYPE?
 0=OTHER
 1=BOILER
            0.000   RUN
 % CO2 =?
            0.000   RUN
 % O2 =?
           20.900   RUN
 H2O GAIN KNOWN?
 1=YES 0=NO
            1.000   RUN
 WEIGH IMPINGERS
 HIT R/S
 TO CONTINUE...
                    PUN
                    RUN
 H2O GAIN = ?
           61.458   RUN
 NET METER
 VOL. FT3=
                  163.521
 CORRECTED
 SAMPLE VOL.
 VMSTD SCF=
                  161.824
 MOLE FRACT, DRY
 GAS, (1-BWS) =
                    0.982
 % H2O =
                    1.8
 STACK GAS WET
 MOL. WT, MS,
 LB/LB MOL=
                   28.646
 AVG VELOCITY
 FPM =
                3,186.173
 STACK DRY GAS
 FLOW RS  SCFM=
               28,727.323
 ACFM =
               29,185.887

 ISOKINETIC %I =103.1
 G-1-OUT
```

C-6

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/15/91 LINE NO: G ANODIZE

BASE: NAD ALAMEDA RUN NO: G-2-OUT

BUILDING NO: 32 CONTROL DEVICE: INLET (OUTLET)

PREP BY: D. COOK IMPINGER BOX NO: 2

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
2-1	1. 100ml 0.1N NaOH	455.58	555.02	577.96	22.94
2-2	2. 100ml 0.1N NaOH	446.65	546.33	550.50	4.17
2-3	3. Empty	501.26	———	502.29	1.03
2-4	4. 500ml silica gel	———	911.30	939.63	28.33
				Net Weight Gain	56.47

Filter No: 0

Silica gel condition: Before test ~~USED~~ NEW After test 80% changed color

Nozzle No: 3/16"-2 Calibrated by: DMC

					Average
ID Before Test:	0.191	0.192	0.191	0.192	0.192
ID After Test:	0.191	0.191	0.189	0.191	0.191

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

STACK AREA = 1353 in² (dia = 41.5 in)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg: 29.875		METER BOX #: 17	PROBE # (PITOT #): 5-9	NOZZLE #: 3/16 - 2
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 50°		METER ΔH@: 2.007	PITOT COEF: 0.827	IDEAL NOZZLE DIA, in.
DATE: 15 APR 91	AVE STATIC PRESSURE, in H_2O: -0.60		METER γ: 1.012	PROBE LENGTH, in.: 60 in	ACTUAL NOZZLE DIA, in.: 0.192
OPERATOR: Quiz	AVE VEL HEAD, in H_2O: 0.861		SAMPLE BOX #: 2	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S #4 at 18 in Hg, #4 at 3.3 in Hg
RUN #: G-2-OUT	ASSUMED MOISTURE, %: 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM @ in Hg: 0.003 @ 10 in Hg

TRAVERSE POINT # 10:12	SAMPLING TIME min	GAS METER READING (Vm) ft^3	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	VELOCITY HEAD (MEAS)A (ΔP) in H_2O	STACK TEMPERATURE (Ts) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER Inlet (Tm in) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
1	0	352.245	0.11	0.07	63	60	61	58	AMB	2.0	20.9	0	0	0
2	10	354.671	0.35	0.23	62	63	64	56		2.9				
3	20	358.140	1.14	0.74	62	67	65	51		5.0				
4	30	364.700	~~2.63~~ 1.70	1.70	65	71	66	48		6.2				
5	40	374.420	2.03	1.30	65	76	68	55		6.0				
6	50	383.0	2.19	1.40	65	77	70	57		6.0				
7	60	391.588	2.04	1.30	65	78	71	57		5.0				
8	70	398.710	2.64	1.30	65	80	72	56		5.0				
9	80	405.689	2.08	1.30	65	77	72	58		5.0				
10	90	412.664	1.96	1.25	65	78	72	57		4.8				
11	100	419.378	1.53	0.98	66	78	73	57		3.7				
12	110	424.065	0.91	0.58	65	78	75	58		3.5				
~~13~~	120	429.894												
TOTAL														
AVG/E														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

A = 1353 in² (41.5 in dia)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX #	PROBE # (PITOT #)	NOZZLE #
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in. POST TEST	ACTUAL NOZZLE DIA, in.
OPERATOR	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S: Bef 3.5 in H_2O Aft 3.6 in H_2O
RUN # G-2-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg: 0.00 / @ 10 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
START 1324	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	Inlet (Tm in) °F	Outlet (Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
13	120	429.814	0.66	0.43	64	66	65	59	AMB	30	20.9	0	0	0
14	130	433.962	1.83	1.20	65	64	65	59		4.5				
15	140	440.908	~~1.83~~ 2.43	~~1.20~~ 1.60	70	67	64	48		4.8				
16	150	447.182	2.16	1.40	65	70	65	51		5.4				
17	160	454.652	2.16	1.40	65	71	65	51		5.9				
18	170	462.677	2.02	1.30	65	73	66	52		5.5				
19	180	~~467.510~~ 476.510	2.02	1.30	65	73	67	52		6.1				
20	190	478.387	1.87	1.20	65	74	~~68~~	53		5.4				
21	200	486.680	1.87	1.20	65	74	~~68~~	53		5.4				
22	210	493.127	1.44	~~0.95~~	64	73	68	53		4.6				
23	220	499.559	0.86	0.55	64	73	68	52		3.8				
24	230	504.700	0.45	0.29	62	72	67	53		3.0				
~~25~~	240	508.492												
1524 TOTAL														
AVERAGE														

G-2-OUT

```
MONOKIN 3.91

ENTER DATA
THEN PUSH R/S
G-2-OUT
TEST NO=?  G
           A    RUN

RUN NO.=?
          2.    RUN

FILTER NO=?
          0.    RUN

DELTA-H*AT = ?
       2.007    RUN

METER GAMMA = ?
       1.012    RUN

STACK AREA
IN. SQ. = ?
   1,353.000    RUN

STACK STATIC
P IN H2O=?
        -.600   RUN

PBAR IN HG=?
      29.875    RUN

% H2O=?
       1.000    RUN

STACK GAS WET
MOL WT, MS,
LB/LB MOL=?
      28.800    RUN

AVG STACK
TEMP DEG F=?
      68.000    RUN

AVG DELTA-P
IN. H2O=?
        .861    RUN

AMBIENT
TEMP F=?
      50.000    RUN

PITOT TUBE
CSUBP=?
        .827    RUN

AVG STACK
VELOCITY FPM = 3,082.024

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.217

ACTUAL NOZZLE
DIA INCHES=?
        .192    RUN

SAMPLE CFM = 0.587

INITIAL METER
VOLUME FT3 =?
      352.245   RUN
**********
POINT NO. 1.
          .07 STO 01
        63.00 STO 02
        60.00 STO 03
              RUN
DELTA H = 0.11
**********
POINT NO. 2.
          .23 STO 01
        62.00 STO 02
        65.00 STO 03
              RUN
DELTA H = 0.35
**********
POINT NO. 3.
          .74 STO 01
        62.00 STO 02
        67.00 STO 03
              RUN
DELTA H = 1.14
**********
POINT NO. 4.
         1.70 STO 01
        65.00 STO 02
        71.00 STO 03
              RUN
DELTA H = 2.63
**********
POINT NO. 5.
         1.30 STO 01
        65.00 STO 02
        76.00 STO 03
              RUN
DELTA H = 2.03
**********
POINT NO. 6.
         1.40 STO 01
        65.00 STO 02
        77.00 STO 03
              RUN
DELTA H = 2.19
**********
POINT NO. 7.
         1.30 STO 01
        65.00 STO 02
        70.00 STO 03
              RUN
DELTA H = 2.04
**********
POINT NO. 8.
         1.30 STO 01
        65.00 STO 02
        80.00 STO 03
              RUN
DELTA H = 2.04
**********
POINT NO. 9.
         1.33 STO 01
        65.00 STO 02
        77.00 STO 03
              RUN
DELTA H = 2.00
**********
POINT NO. 10.
         1.25 STO 01
        65.00 STO 02
        70.00 STO 03
              RUN
DELTA H = 1.96
**********
POINT NO. 11.
          .90 STO 01
        66.00 STO 02
        70.00 STO 03
              RUN
DELTA H = 1.53
**********
POINT NO. 12.
          .50 STO 01
        65.00 STO 02
        70.00 STO 03
              RUN
DELTA H = 0.91
**********
POINT NO. 13.
          .43 STO 01
        64.00 STO 02
        66.00 STO 03
              RUN
DELTA H = 0.66
**********
POINT NO. 14.
         1.20 STO 01
        65.00 STO 02
        64.00 STO 03
              RUN
DELTA H = 1.03
**********
POINT NO. 15.
         1.20 STO 01
        70.00 STO 02
        67.00 STO 03
              RUN
DELTA H = 1.02
**********
POINT NO. 16.
         1.40 STO 01
        65.00 STO 02
        70.00 STO 03
              RUN
DELTA H = 2.16
**********
POINT NO. 17.
         1.40 STO 01
        65.00 STO 02
        71.00 STO 03
              RUN
DELTA H = 2.16
**********
POINT NO. 18.
         1.30 STO 01
        65.00 STO 02
        73.00 STO 03
              RUN
DELTA H = 2.02
**********
POINT NO. 19.
         1.30 STO 01
        65.00 STO 02
        73.00 STO 03
              RUN
DELTA H = 2.02
**********
POINT NO. 20.
         1.20 STO 01
        65.00 STO 02
        74.00 STO 03
              RUN
DELTA H = 1.87
**********
POINT NO. 21.
         1.20 STO 01
        65.00 STO 02
        74.00 STO 03
              RUN
DELTA H = 1.87
**********
POINT NO. 22.
          .95 STO 01
        64.00 STO 02
        73.00 STO 03
              RUN
DELTA H = 1.48
**********
POINT NO. 23.
          .55 STO 01
        64.00 STO 02
        73.00 STO 03
              RUN
DELTA H = 0.86
**********
POINT NO. 24.
          .29 STO 01
        62.00 STO 02
        72.00 STO 03
              RUN
DELTA H = 0.45
**********
POINT NO. 25.

          0.00  RUN
======
ISOKIN
AVG VALUES
KV=22.409
TMETER F=72.292
DELTA-H=1.591
DELTA P=0.957
FINAL METER
VOLUME FT3=?
        508.492 RUN
INITIAL=352.245
SAMPLE TIME
MIN. =?
        240.000 RUN
PSTACK ABS
IN HG=29.831
TSTACK F=64.667
======

SOURCE TYPE?
0=OTHER
1=BOILER
          0.000 RUN
% CO2 =?


          0.000 RUN
% O2 =?
         20.900 RUN
H2O GAIN KNOWN?
1=YES 0=NO
          1.000 RUN
WEIGH IMPINGERS
HIT R/S
TO CONTINUE...
                RUN
H2O GAIN = ?
         56.470 RUN
WET METER
VOL. FT3=
              158.122

CORRECTED
SAMPLE VOL.
VMSTD  SCF=
              156.371
MOLE FRACT. DRY
GAS, (1-BWS) =
                0.983
% H2O =
                1.7
STACK GAS WET
MOL. WT, MS,
LB/LB MOL=
               28.655
AVG VELOCITY
FPM =
            3,247.374
STACK DRY GAS
FLOW RS  SCFM=
           30,890.124
ACFM =
           30,511.787

ISOKINETIC %I =101.2

--END RUN--
```

G-2-OUT
FB

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/16/91 LINE NO: G ANODIZE

BASE: NAD ALAMEDA RUN NO: G-3-OUT

BUILDING NO: 32 CONTROL DEVICE: INLET (OUTLET)

PREP BY: DRT IMPINGER BOX NO: 3

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
3-1	1. 100ml 0.1N NaOH	514.73	613.08	636.85	23.77
3-2	2. 100ml 0.1N NaOH	521.87	618.95	624.35	5.40
3-3	3. Empty	459.05	—	459.08	0.03
3-4	4. 500ml silica gel	—	846.13	875.06	28.93
				Net Weight Gain	58.13

Filter No: C

Silica gel condition: Before test 30% After test 70% spent

Nozzle No: 3/16-4 Calibrated by: DRT

					Average
ID Before Test:	0.184	0.186	0.186	0.186	0.186
ID After Test:	0.184	0.187	0.187	0.186	0.186

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510) Ave Stack 5°F

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg: 29.92		METER BOX #: 13	PROBE # (PITOT #): S-20	NOZZLE #: 3/16 - 4
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 62		METER ΔH@: 2.119	PITOT COEF: .847	IDEAL NOZZLE DIA, in.: 0.206
DATE: 16 APR 91	AVE STATIC PRESSURE, in H_2O: -0.66		METER γ: 1.011	PROBE LENGTH, in.: 60	ACTUAL NOZZLE DIA, in.: 0.186
OPERATOR: Quil	AVE VEL HEAD, in H_2O: .957		SAMPLE BOX #: 3	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S: #1 5.7 in #2 4.7 in
RUN #: G-3-OUT	ASSUMED MOISTURE, %: 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg: .002 @ 10 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC) (A)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE (B)	GAS SAMPLE TEMPERATURE AT DRY GAS METER (C)		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
START 0944	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	Inlet (Tm in) °F	Outlet (Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
1	0	753.959	0.07	0.05	60	59	56	55	AMBIENT	1				
2	10	755.674	0.31	0.21	61	58	56	46		1.2				
3	20	758.824	0.92	0.62	64	60	57	42		2.1				
4	30	764.144	1.78	1.20	65	62	57	42		5.0				
5	40	772.189	1.81	1.21	66	68	59	49		3.9				
6	50	779.5	1.96	1.30	66	71	61	53		4.0				
7	60	786.85	1.86	1.23	66	74	64	56		3.0				
8	70	793.792	1.85	1.22	68	76	66	54		3.5				
9	80	800.852	1.90	1.25	68	79	69	52		3.8				
10	90	808.158	1.69	1.11	68	78	69	54		3.7				
11	100	815.213	1.22	0.80	68	78	70	54		2.3				
12	110	820.586	0.62	0.41	68	78	71	55	V	1.6				
STOP 1144	120	824.553												
TOTAL														
AVG														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #0251Q)

PLANT	BAROMETRIC PRESSURE, in Hg		METER BOX #	PROBE # (PITOT #)	NOZZLE #
LOCATION	AMBIENT TEMPERATURE, °F		METER ΔI@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in.	ACTUAL NOZZLE DIA, in.
OPERATOR	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S
RUN # G-3-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg

Post Test
Pos #1 OK
#2 OK 5 in H_2O
#4 OK 5 in H_2O
0.001 @ 15 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOx
						Inlet	Outlet							
31 AM 1207	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(Tm in) °F	(Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
24	120	824.553	0.41	0.27	68	72	69	59	AMB	1.4				
23	130	828.131	0.79	0.53	68	71	69	58		2.0				
22	140	832.789	1.55	1.03	69	74	70	51		3.0				
21	150	839.342	2.02	1.33	69	79	71	53		4.0				
20	160	846.955	1.92	1.25	67	83	73	52		4.0				
19	170	854.551	1.99	1.30	68	83	74	49		4.0				
18	180	862.167	1.92	1.25	68	83	75	50		4.0				
17	190	869.800	1.84	1.20	67	83	75	51		3.8				
16	200	877.281	1.69	1.10	67	83	75	52		3.6				
15	210	884.477	1.33	0.87	67	82	75	49		3.0				
14	220	890.865	0.64	0.42	66	81	74	50		1.7				
13	230	895.156	0.17	0.11	58	79	74	50		1.0				
1447	240	897.333												
TOTAL														
AVERAGE														

G-3-OUT

```
NOMOKIN 3/91

ENTER DATA
THEN PUSH R/S

TEST NO.:  G
          1.    RUN
RUN NO.=?
          3.    RUN
FILTER NO=?
          0.    RUN
DELTA-H^AT = ?
        2.119   RUN
METER GAMMA = ?
        1.011   RUN
STACK AREA
IN. SQ. = ?
    1,353.000   RUN
STACK STATIC
P IN H2O=?
         -.600  RUN
PBAR IN HG=?
       29.920   RUN
% H2O=?
        1.000   RUN
STACK GAS WET
MOL WT, MS,
LB/LB MOL=?
       28.888   RUN
AVG STACK
TEMP DEG F=?
       65.000   RUN
AVG DELTA-P
IN. H2O=?
         .957   RUN
AMBIENT
TEMP F=?
       62.000   RUN
PITOT TUBE
CSQRP=?
         .847   RUN
AVG STACK
VELOCITY FPM = 3,315.918

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.206

ACTUAL NOZZLE
DIA INCHES=?
         .186   RUN

SAMPLE CFM = 0.610

INITIAL METER
VOLUME FT3 =?
      753.959   RUN
**********
POINT NO. 1.
          .05 STO 01
        60.00 STO 02
        59.00 STO 03
              RUN
DELTA H = 0.07
**********
POINT NO. 2.
          .21 STO 01
        61.00 STO 02
        58.00 STO 03
              RUN
DELTA H = 0.31
**********
POINT NO. 3.
          .62 STO 01
        64.00 STO 02
        60.00 STO 03
              RUN
DELTA H = 0.92
**********
POINT NO. 4.
         1.20 STO 01
        65.00 STO 02
        62.00 STO 03
              RUN
DELTA H = 1.70
**********
POINT NO. 5.
         1.21 STO 01
        66.00 STO 02
        68.00 STO 03
              RUN
DELTA H = 1.81
**********
POINT NO. 6.
         1.30 STO 01
        66.00 STO 02
        71.00 STO 03
              RUN
DELTA H = 1.96
**********
POINT NO. 7.
         1.23 STO 01
        74.00 STO 03
              RUN
DELTA H = 1.86
**********
POINT NO. 8.
         1.22 STO 01
        68.00 STO 02
        76.00 STO 03
              RUN
DELTA H = 1.85
**********
POINT NO. 9.
         1.25 STO 01
        68.00 STO 02
        79.00 STO 03
              RUN
DELTA H = 1.90
**********
POINT NO. 10.
         1.11 STO 01
        68.00 STO 02
        78.00 STO 03
              RUN
DELTA H = 1.69
**********
POINT NO. 11.
          .89 STO 01
        68.00 STO 02
        78.00 STO 03
              RUN
DELTA H = 1.22
**********
POINT NO. 12.
          .41 STO 01
        68.00 STO 02
        78.00 STO 03
              RUN
DELTA H = 0.62
**********
POINT NO. 13.
          .27 STO 01
        68.00 STO 02
        72.00 STO 03
              RUN
DELTA H = 0.41
**********
POINT NO. 14.
          .53 STO 01
        68.00 STO 02
        71.00 STO 03
              RUN
DELTA H = 0.79
**********
POINT NO. 15.
         1.03 STO 01
        69.00 STO 02
        74.00 STO 03
              RUN
DELTA H = 1.55
**********
POINT NO. 16.
         1.33 STO 01
        69.00 STO 02
        79.00 STO 03
              RUN
DELTA H = 2.02
**********
POINT NO. 17.
         1.25 STO 01
        67.00 STO 02
        83.00 STO 03
              RUN
DELTA H = 1.92
**********
POINT NO. 18.
         1.30 STO 01
        68.00 STO 02
        83.00 STO 03
              RUN
DELTA H = 1.99
**********
POINT NO. 19.
         1.25 STO 01
        68.00 STO 02
        83.00 STO 03
              RUN
DELTA H = 1.92
**********
POINT NO. 20.
         1.20 STO 01
        67.00 STO 02
        83.00 STO 03
              RUN
DELTA H = 1.84
**********
POINT NO. 21.
         1.10 STO 01
        67.00 STO 02
        83.00 STO 03
              RUN
DELTA H = 1.69
**********
POINT NO. 22.
          .87 STO 01
        67.00 STO 02
        82.00 STO 03
              RUN
DELTA H = 1.33
**********
POINT NO. 23.
          .42 STO 01
        66.00 STO 02
        81.00 STO 03
              RUN
DELTA H = 0.64
**********
POINT NO. 24.
          .11 STO 01
        58.00 STO 02
        79.00 STO 03
              RUN
DELTA H = 0.17
**********
POINT NO. 25.
         0.00   RUN
******
ISOKIN
AVG VALUES
KV=20.633
TMETER F=74.750
DELTA-H=1.344
DELTA P=0.888
FINAL METER
VOLUME FT3=?
      897.333   RUN
INITIAL=753.959
SAMPLE TIME
MIN. =?
      240.000   RUN
PSTACK ABS
IN HG=29.876
TSTACK F=66.250
******

SOURCE TYPE?
0=OTHER
1=BOILER
        0.000   RUN

% CO2 =?
        0.000   RUN
% O2 =?
       20.900   RUN
H2O GAIN KNOWN?
1=YES 0=NO
        1.000   RUN
WEIGH IMPINGERS
HIT R/S
TO CONTINUE...

                RUN
H2O GAIN = ?
       58.130   RUN
MET METER
VOL. FT3=
              144.951
CORRECTED
SAMPLE VOL.
VMSTD  SCF=
              142.982
MOLE FRACT. DRY
GAS, (1-BWS) =
                0.981
% H2O =
                  1.9
STACK GAS WET
MOL. WT, MS,
LB/LB MOL=
               28.632
AVG VELOCITY
FPM =
            3,861.198
STACK DRY GAS
FLOW RS  SCFM=
           28,262.505
ACFM =
           28,762.431

ISOKINETIC %I =104.9

--END RUN--
```

G-3-OUT

C-14

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/16/91 LINE NO: G ANODIZE

BASE: NAD ALAMEDA RUN NO: G-4-OUT

BUILDING NO: 32 CONTROL DEVICE: INLET (OUTLET)

PREP BY: [signature] IMPINGER BOX NO: 2

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
2-1	1. 100ml 0.1N NaOH	455.1	553.1	581.53	28.43
2-2	2. 100ml 0.1N NaOH	445.3	540.6	546.86	6.26
2-3	3. Empty	502.1	—	502.70	0.60
2-4	4. 500ml silica gel	488.25	875.7	903.93	28.23
				Net Weight Gain	63.52

Filter No: 0

Silica gel condition: Before test NEW After test 30% Spent

Nozzle No: 3/16-2 Calibrated by: [signature]

					Average
ID Before Test:	0.191	0.191	0.191	0.189	0.191
ID After Test:	0.191	0.191	0.190	0.191	0.191

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #0251Q)

STACK Area = 1353 in² (41.5" DIA)

PLANT: RUN 32	BAROMETRIC PRESSURE, in Hg: 29.92		METER BOX #: 17	PROBE # (PITOT #): 5-9	NOZZLE #: 3/16-2
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 62		METER ΔI@: 2.007	PITOT COEF: .827	IDEAL NOZZLE DIA, in.: 0.209
DATE: 16 APR 91	AVE STATIC PRESSURE, in H_2O: -0.60		METER γ: 1.012	PROBE LENGTH, in.: 6C	ACTUAL NOZZLE DIA, in.: 0.191
OPERATOR: Quil	AVE VEL HEAD, in H_2O: 0.957		SAMPLE BOX #: 2	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S: 3.5 in H2C 3.5 in H2O
RUN #: 6-4-OUT	ASSUMED MOISTURE, %: 1.7	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM@ in Hg: 0.002 @ 10 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS) A	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
START 0939	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O B	(Ts) °F	Inlet C (Tm in) °F	Outlet (Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
24	0	508.414	0.58	0.39	65	61	59	53	AMB	3.2	20.9	0	0	0
23	10	512.567	1.19	0.80	65	62	60	45		4.3				
22	20	518.790	1.80	1.20	66	67	62	43		4.9				
21	30	525.661	1.96	1.30	66	69	63	46		5.4				
20	40	533.541	2.11	1.40	66	70	63	50		6.1				
19	50	541.760	1.97	1.30	66	72	65	58		5.5				
18	60	549.25	1.85	1.22	66	73	66	56		5.0				
17	70	556.45	1.82	1.20	68	74	67	57		5.1				
16	80	563.7	1.75	1.15	68	76	69	53		5.0				
15	90	571.067	1.45	0.95	68	79	70	50		4.8				
14	100	577.870	0.83	0.55	69	76	70	51		3.5				
13	110	582.719	0.31	0.20	63	76	71	53		2.5				
STOP 1139	120	585.725												
TOTAL														
AVG														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #0251Q)

PLANT	BAROMETRIC PRESSURE, in Hg		METER BOX #	PROBE # (PITOT #)	NOZZLE #
LOCATION	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in. POST TEST	ACTUAL NOZZLE DIA, in.
OPERATOR	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL Past	LEAK CHECK @ PITOT'S in H_2O #2 OK 5.4 #4 OK @ 5.4 in H_2O
RUN # G-4-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING Past	LEAK RATE CFM@ in Hg 0.004 @ 10 in Hg

TRAVERSE POINT # START 1 2 12	SAMPLING TIME min	GAS METER READING (Vm) ft^3	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	VELOCITY HEAD (MEAS) (ΔP) in H_2O	STACK TEMPERATURE (Ts) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER Inlet (Tm in) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
1	120	585.725	0.11	0.07	64	70	69	60	Amb	2.0				
2	130	587.546	0.41	0.27	65	70	69	57 60		2.8				
3 4 12	140	591.012	1.12	0.74	69	73	70	51		4.2				
4	150	596.818	1.74	1.15	69	76	71	50		5.0				
5	160	603.862	1.98	1.30	68	78	73	48		5.4				
6	170	611.452	1.99	1.30	69	81	74	48		5.6				
7	180	619.286	2.00	1.30	68	82	75	48		5.8				
8	190	627.189	1.92	1.25	69	82	76	48		5.8				
9	200	635.006	1.86	1.21	67	82	76	49		5.7				
10	210	642.739	1.74	1.13	68	82	76	49		5.4				
11	220	650.164	1.12	0.73	67	81	75	48		4.0				
12	230	655984	0.72	0.47	67	79	75	48		3.3				
STOP 12	240	660.638												
TOTAL														
AVERAGE														

G-4-OUT

```
NONOKIN 3/91

ENTER DATA
THEN PUSH R/S
G-4-OUT
TEST NO=?                    G
                1.      RUN
RUN NO.=?
                4.      RUN
FILTER NO=?
                0.      RUN
DELTA-H*AT = ?
            2.007       RUN
METER GAMMA = ?
            1.012       RUN
STACK AREA
IN. SQ. = ?
          1,353.000     RUN
STACK STATIC
P IN H20=?
             -.600      RUN
PBAR IN HG=?
           29.920       RUN
% H2O=?
            1.000       RUN
STACK GAS WET
MOL WT, MS,
LB/LB MOL=?
           28.800       RUN
AVG STACK
TEMP DEG F=?
           65.000       RUN
AVG DELTA-P
IN. H20=?
             .957       RUN
AMBIENT
TEMP F=?
           62.000       RUN
PITOT TUBE
CSUBP=?
             .827       RUN
AVG STACK
VELOCITY FPM = 3,237.620

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.209

ACTUAL NOZZLE
DIA INCHES=?
             .191       RUN
```

```
SAMPLE CFM = 0.628

--BEGIN RUN--

ENTER DATA RS:

STO A = DELTA-P
STO B = T-STACK
STO C = T-METER

TO CORRECT
ERROR, RE-ENTER
ALL VALUES AS
NEGATIVES

TO CHECK
ISOKIN, HIT
500, R/S

TO END RUN,
HIT 0, R/S

INITIAL METER
VOLUME FT3 =?
          500.414       RUN
**********
POINT NO. 1:
              .39 STO 01
            65.00 STO 02
            61.00 STO 03
                  RUN
DELTA H = 0.50
**********
POINT NO. 2.
              .00 STO 01
            65.00 STO 02
            62.00 STO 03
                  RUN
DELTA H = 1.19
**********
POINT NO. 3.
             1.20 STO 01
            66.00 STO 02
            67.00 STO 03
                  RUN
DELTA H = 1.00
**********
POINT NO. 4.
             1.30 STO 01
            66.00 STO 02
            69.00 STO 03
                  RUN
DELTA H = 1.96
```

```
**********
POINT NO. 5.
             1.40 STO 01
            66.00 STO 02
            70.00 STO 03
                  RUN
DELTA H = 2.11
**********
POINT NO. 6.
             1.30 STO 01
            66.00 STO 02
            72.00 STO 03
                  RUN
DELTA H = 1.97
**********
POINT NO. 7.
             1.22 STO 01
            73.00 STO 03
                  RUN
DELTA H = 1.65
**********
POINT NO. 8.
             1.20 STO 01
            68.00 STO 02
            74.00 STO 03
                  RUN
DELTA H = 1.62
**********
POINT NO. 9.
             1.15 STO 01
            76.00 STO 03
                  RUN
DELTA H = 1.75
**********
POINT NO. 10.
              .95 STO 01
            68.00 STO 02
            79.00 STO 03
                  RUN
DELTA H = 1.45
**********
POINT NO. 11.
              .55 STO 01
            69.00 STO 02
            76.00 STO 03
                  RUN
DELTA H = 0.83
**********
POINT NO. 12.
              .20 STO 01
            63.00 STO 02
            76.00 STO 03
                  RUN
DELTA H = 0.31
```

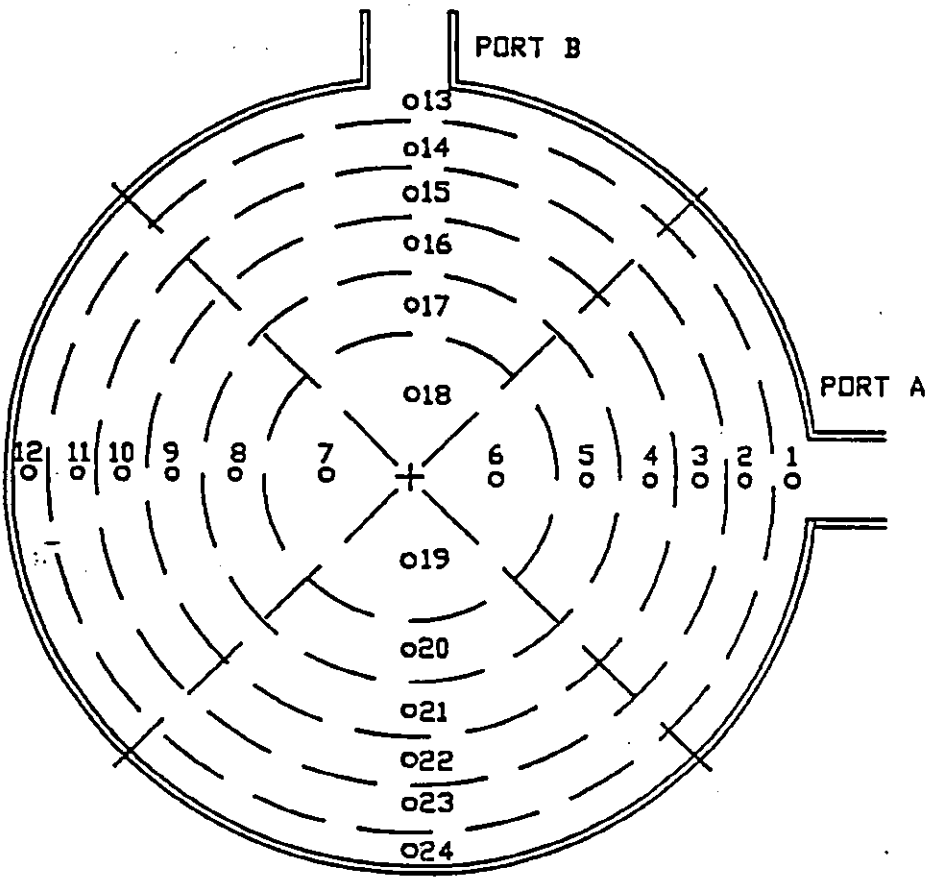
```
**********
POINT NO. 13.
              .07 STO 01
            64.00 STO 02
            70.00 STO 03
                  RUN
DELTA H = 9.11
**********
POINT NO. 14.
              .27 STO 01
            65.00 STO 02
            70.00 STO 03
                  RUN
DELTA H = 0.41
**********
POINT NO. 15.
              .74 STO 01
            69.00 STO 02
            73.00 STO 03
                  RUN
DELTA H = 1.12
**********
POINT NO. 16.
             1.15 STO 01
            69.00 STO 02
            76.00 STO 03
                  RUN
DELTA H = 1.74
**********
POINT NO. 17.
             1.30 STO 01
            68.00 STO 02
            78.00 STO 03
                  RUN
DELTA H = 1.98
**********
POINT NO. 18.
             1.30 STO 01
            69.00 STO 02
            81.00 STO 03
                  RUN
DELTA H = 1.99
**********
POINT NO. 19.
             1.30 STO 01
            68.00 STO 02
            82.00 STO 03
                  RUN
DELTA H = 2.00
**********
POINT NO. 20.
             1.25 STO 01
            69.00 STO 02
            82.00 STO 03
                  RUN
DELTA H = 1.92
```

```
**********
POINT NO. 21.
             1.21 STO 01
            67.00 STO 02
            82.00 STO 03
                  RUN
DELTA H = 1.86
**********
POINT NO. 22.
             1.13 STO 01
            69.00 STO 02
            82.00 STO 03
                  RUN
DELTA H = 1.74
**********
POINT NO. 23.
              .73 STO 01
            67.00 STO 02
            81.00 STO 03
                  RUN
DELTA H = 1.12
**********
POINT NO. 24.
              .47 STO 01
            67.00 STO 02
            79.00 STO 03
                  RUN
DELTA H = 0.72
**********
POINT NO. 25.
             0.00   RUN
======
ISOKIN
AVG VALUES
KV=21.499
TMETER F=74.625
DELTA-H=1.438
DELTA P=0.877
FINAL METER
VOLUME FT3=?
          660.638       RUN
INITIAL=500.414
SAMPLE TIME
MIN. =?
          240.000       RUN
PSTACK ABS
IN HG=29.876
TSTACK F=66.917
======
```

```
SOURCE TYPE?
0=OTHER
1=BOILER
             0.000      RUN
% CO2 =?
             0.000      RUN
% O2 =?
            20.900      RUN
H20 GAIN KNOWN?
1=YES 0=NO
             1.000      RUN
WEIGH IMPINGERS
HIT R/S
TO CONTINUE...

                        RUN
H20 GAIN = ?
            63.520      RUN
WET METER
VOL. FT3=
                      154.851
CORRECTED
SAMPLE VOL.
VMSTD  SCF=
                      151.900
MOLE FRACT. DRY
GAS, (1-BWS) =
                        0.981
% H20 =
                          1.9
STACK GAS WET
MOL. WT, MS,
LB/LB MOL=
                       28.627
AVG VELOCITY
FPM =
                    3,114.677
STACK DRY GAS
FLOW RS  SCFM=
                   20,784.864
ACFM =
                   29,264.984

ISOKINETIC %I =104.1

--END RUN--
G-4-OUT
```

C-18

24 POINT SAMPLE TRAVERSE



LINE L OUTLET - HARD CHROME PLATE

STACK DIAMETER (IN.) 41.5

TRAVERSE POINT	EPA METHOD 1 (% OF DIA)	TRAVERSE POINT LOCATION (DISTANCES FROM I.D.)
1 & 13	2.1	1.0 *
2 & 14	6.7	2.8
3 & 15	11.8	4.9
4 & 16	17.7	7.3
5 & 17	25.0	10.4
6 & 18	35.6	14.8
7 & 19	64.4	26.7
8 & 20	75.0	31.1
9 & 21	82.3	34.2
10 & 22	88.2	36.6
11 & 23	93.3	38.7
12 & 24	97.9	40.5 *

* Location adjusted.

PRELIMINARY VELOCITY TRAVERSE DATA SHEET

DATE: 4/13/91		DISTURB	DISTANCE A: 0.5 ft/(dia)
BASE: NAD ALAMEDA			DISTANCE B: 0.5 ft/(dia)
BUILDING NO: 32		TEST SITE	TRAVERSE PTS REQ'D: 20TS
LINE NO: L (Chrome Plate)			TRAVERSE PTS USED, n: 24
SCRUBBER: INLET/(OUTLET)			CIRCULAR DIAMETER: 41.5 in
READINGS BY: DRR		DISTURB	RECTANGULAR L x W: —— in

	STACK PRESSURES (inches H_2O) ΔP_{vel}	P_{stat}	$\sqrt{\Delta P}$	CYCLONIC FLOW $\lvert\alpha\rvert^\circ$
1	0.10	-0.37	0.316	
2	0.20	-0.49	0.447	2
3	0.74	-0.62	0.860	8
4	1.10	-0.67	1.049	1
5	1.20	-0.68	1.095	
6	1.20	-0.72	1.095	0
7	1.35	-0.72	1.162	
8	1.37	-0.84	1.171	4
9	1.30	-0.80	1.140	
10	1.25	-0.78	1.118	3
11	0.85	-0.65	0.922	
12	0.50	-0.54	0.707	4
AVE		-0.657		

TOT 41.083

	STACK PRESSURES (inches H_2O) ΔP_{vel}	P_{stat}	$\sqrt{\Delta P}$	CYCLONIC FLOW $\lvert\alpha\rvert^\circ$
13	0.17	-0.31	0.412	
14	0.45	-0.45	0.671	0
15	0.92	-0.63	0.959	
16	1.20	-0.70	1.095	1
17	1.25	-0.69	1.118	
18	1.32	-0.71	1.149	2
19	1.35	-0.73	1.162	
20	1.40	-0.75	1.183	2
21	1.32	-0.80	1.149	
22	1.30	-0.77	1.140	2
23	0.90	-0.66	0.949	
24	0.47	-0.57	0.686	5

TOT 22.756

AVERAGE VELOCITY HEAD $\Delta P = [(\Sigma\sqrt{\Delta P})/n]^2 =$ 0.899

AVERAGE STATIC PRESSURE $= (\Sigma P_{stat})/n =$ -0.652

AVERAGE CYCLONIC FLOW ANGLE $= (\Sigma\alpha)/n =$ 2.2°

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/15/91

LINE NO: L HARD CHROME

BASE: NAD ALAMEDA

RUN NO: ~~G-1-OUT~~ L-1-OUT

BUILDING NO: 32

CONTROL DEVICE: INLET OUTLET

PREP BY: D. COOK

IMPINGER BOX NO: 3

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
3-1	1. 100ml 0.1N NaOH	512.43	611.97	627.15	15.28
3-2	2. 100ml 0.1N NaOH	520.64	620.23	622.72	2.49
3-3	3. Empty	458.41	458.41	458.85	0.44
3-4	4. 500ml silica gel	451.53	823.18	846.28	23.10
				Net Weight Gain	41.21

Filter No: #0

Silica gel condition: Before test NEW After test 30% SPENT

Nozzle No: ~~3~~ 3/16-4 Calibrated by: D. NEWTON

					Average
ID Before Test:	~~0.184~~	0.185	~~0.185~~	0.186	~~0.185~~ VERIFY
ID After Test:	0.184	0.186	0.186	0.186	0.186

ZAP

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

$A = 1353 IN^2 (41.5'' DIA)$

PLANT: NAD ALAMEDA	BAROMETRIC PRESSURE, in Hg: 29.875		METER BOX #: 14	PROBE # (PITOT #): 5-20	NOZZLE #: 3/16-4
LOCATION: ESD632	AMBIENT TEMPERATURE, °F: 53		METER ΔH@: 2.126	PITOT COEF: 0.847	IDEAL NOZZLE DIA, in.: 0.210
DATE: 4/15/91	AVE STATIC PRESSURE, in H2O: -0.65		METER γ: 0.986	PROBE LENGTH, in.: 60 in	ACTUAL NOZZLE DIA, in.: 0.184
OPERATOR: D. COOK	AVE VEL HEAD, in H2O: 0.905		SAMPLE BOX #: 3	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S: — OK @ 4.5 "H2O; + OK @ 5.7 "H2O
RUN: L-1-OUT	ASSUMED MOISTURE, %: 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM @ in Hg: 0.003 @ 10

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
START TIME 10:35	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	Inlet (Tm in) °F	Outlet (Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
1	0	~~716.707~~ ~~716.7097~~	0.20	0.14	61	63	62	60	AMB	0.90	20.9	0	0	0
2	7.5	718.598	0.60	0.42	64	~~65~~ 61	63	58		1.8				
3	15.0	721.834	1.03	0.72	65	66	63	53		3.0				
4	22.5	726.374	1.66	1.15	65	70	64	52		3.3				
5	30.0	731.404	1.81	1.25	65	72	65	53		4.0				
6	37.5	736.988	1.85	1.27	65	74	66	54		4.2				
7	45.0	742.8	1.96	1.34	64	74	67	54		4.5				
8	52.5	748.817	1.97	1.35	65	75	68	53		4.5				
9	60.0	754.893	1.93	1.32	66	76	69	51		4.2				
10	67.5	760.776	1.88	1.28	64	76	69	51		4.0				
11	75.0	766.	1.20	0.82	66	77	71	52		2.4				
12	82.5	771.147	0.76	0.52	66	78	72	52		1.2				
STOP 12:05	90.0	773.859												
TOTAL														
AVERAGE														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02310)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX #	PROBE # (PITOT #)	NOZZLE #
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE: 4/15/91	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in. POST	ACTUAL NOZZLE DIA, in.
OPERATOR: D. COOK	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S @ Steady @ 4.9 in H_2O @ Steady @ 5.2 in H_2O
RUN #: 2-1-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg 0.002 @ 6 in Hg

TRAVERSE POINT # (START TIME 12:30)	SAMPLING TIME min	GAS METER READING (Vm) ft^3	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	VELOCITY HEAD (MEAS) (ΔP) in H_2O	STACK TEMPERATURE (Ts) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER: Inlet (Tm in) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER: Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
13	90	773.859	0.51	0.35	63	74	72	56	AMB	1.0	20.9	0	0	0
14	97.5	776.7	0.66	0.45	64	73	72	54		1.1				
15	105	779.532	1.60	~~0.~~ 1.1	~~66~~ 64	72	71	51		3.0				
16	112.5	784.152	1.90	1.30	~~67~~ 63	74	71	49.		3.9				
17	120	789.694	1.90	1.30	63	75	71	51		4.0				
18	127.5	795.372	1.92	1.31	64	76	70	52		4.0				
19	135	801.376	1.99	1.36	64	75	69	53		4.0				
20	142.5	807.166	1.93	1.32	64	75	69	52		4.0				
21	150	813.032	1.97	1.35	64	73	68	52		4.0				
22	157.5	818.	1.68	1.15	64	73	67	52		3.8				
23	165	824.327	0.94	0.65	65	72	67	53		2.0				
24	172.5	828.317	0.67	0.46	65	70	66	53		1.0				
14:00	180	831.248												
TOTAL														
AVERAGE			1.44	0.933	64	72.8								

L-1-OUT

```
XEQ "WORKDIN"
WORKDIN 3.91

ENTER DATA
THEN PUSH R/S

TEST NO=?
                L
                X     RUN

RUN NO.=?
                1.    RUN

FILTER NO=?
                0.    RUN

DELTA-H@AT = ?
            2.126     RUN
METER GAMMA = ?
             .986     RUN
STACK AREA
IN. SQ. = ?
        1,353.000     RUN
STACK STATIC
P IN H2O=?
             -.650    RUN
PBAR IN HG=?
            29.875    RUN
% H2O=?
             1.000    RUN
STACK GAS MET
MOL WT. WS.
LB/LB MOL=?
            28.600    RUN
AVG STACK
TEMP DEG F=?
            53.000    RUN
AVG DELTA-P
IN. H2O=?
             .985     RUN
AMBIENT
TEMP F=?
            53.000    RUN
PITOT TUBE
CSUBP=?
             .847     RUN
AVG STACK
VELOCITY FPM = 3,201.24

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.209

ACTUAL NOZZLE
DIA INCHES=?
             .184     RUN

SAMPLE CFM = 0.560
```

```
--BEGIN RUN--

ENTER DATA AS:

STO A = DELTA-P
STO B = T-STACK
STO C = T-METER

TO CORRECT
ERROR, RE-ENTER
ALL VALUES AS
NEGATIVES

TO CHECK
ISOKIN, HIT
500, R/S

TO END RUN,
HIT 0, R/S

INITIAL METER
VOLUME FT3 =?
          716.707     RUN
****************
POINT NO. 1.
                .14 STO 01
              61.00 STO 02
              63.00 STO 03
                    RUN
DELTA H = 0.20
****************
POINT NO. 2.
                .42 STO 01
              64.00 STO 02
              64.00 STO 03
                    RUN
DELTA H = 0.60
****************
POINT NO. 3.
                .72 STO 01
              65.00 STO 02
              66.00 STO 03
                    RUN
DELTA H = 1.03
****************
POINT NO. 4.
               1.15 STO 01
              65.00 STO 02
              70.00 STO 03
                    RUN
DELTA H = 1.66
```

```
****************
POINT NO. 5.
               1.25 STO 01
              65.00 STO 02
              72.00 STO 03
                    RUN
DELTA H = 1.81
****************
POINT NO. 6.
               1.27 STO 01
              65.00 STO 02
              74.00 STO 03
                    RUN
DELTA H = 1.85
****************
POINT NO. 7.
               1.34 STO 01
              64.00 STO 02
              74.00 STO 03
                    RUN
DELTA H = 1.96
****************
POINT NO. 8.
               1.35 STO 01
              65.00 STO 02
              75.00 STO 03
                    RUN
DELTA H = 1.97
****************
POINT NO. 9.
               1.32 STO 01
              66.00 STO 02
              76.00 STO 03
                    RUN
DELTA H = 1.93
****************
POINT NO. 10.
               1.20 STO 01
              64.00 STO 02
              76.00 STO 03
                    RUN
DELTA H = 1.00
****************
POINT NO. 11.
                .82 STO 01
              66.00 STO 02
              77.00 STO 03
                    RUN
DELTA H = 1.20
****************
POINT NO. 12.
                .52 STO 01
              66.00 STO 02
              78.00 STO 03
                    RUN
DELTA H = 0.76
```

```
****************
POINT NO. 13.
                .35 STO 01
              63.00 STO 02
              74.00 STO 03
                    RUN
DELTA H = 0.51
****************
POINT NO. 14.
                .45 STO 01
              64.00 STO 02
              73.00 STO 03
                    RUN
DELTA H = 0.66
****************
POINT NO. 15.
             500.00   RUN
LAST HTR VOL ?
             776.70   RUN
TIME ?
              97.50   RUN
PRESENT ISOKIN=106.99
****************
POINT NO. 15.
               1.10 STO 01
              64.00 STO 02
              72.00 STO 03
                    RUN
DELTA H = 1.60
****************
POINT NO. 16.
               1.30 STO 01
              63.00 STO 02
              74.00 STO 03
                    RUN
DELTA H = 1.90
****************
POINT NO. 17.
               1.30 STO 01
              63.00 STO 02
              75.00 STO 03
                    RUN
DELTA H = 1.99
****************
POINT NO. 18.
               1.31 STO 01
              64.00 STO 02
              76.00 STO 03
                    RUN
DELTA H = 1.92
****************
```

```
POINT NO. 19.
               1.36 STO 01
              64.00 STO 02
              75.00 STO 03
                    RUN
DELTA H = 1.99
****************
POINT NO. 20.
               1.32 STO 01
              64.00 STO 02
              75.00 STO 03
                    RUN
DELTA H = 1.93
****************
POINT NO. 21.
               1.35 STO 01
              64.00 STO 02
              73.00 STO 03
                    RUN
DELTA H = 1.97
****************
POINT NO. 22.
               1.15 STO 01
              64.00 STO 02
              73.00 STO 03
                    RUN
DELTA H = 1.60
****************
POINT NO. 23.
                .65 STO 01
              65.00 STO 02
              72.00 STO 03
                    RUN
DELTA H = 0.94
****************
POINT NO. 24.
                .46 STO 01
              65.00 STO 02
              70.00 STO 03
                    RUN
DELTA H = 0.67
****************
POINT NO. 25.
                0.00  RUN

******
ISOKIN
AVG VALUES
KV=22.121
TMETER F=72.792
DELTA-H=1.439
DELTA P=0.933
```

```
FINAL METER
VOLUME FT3=?
          831.248     RUN
INITIAL=716.707
SAMPLE TIME
MIN. =?
          180.000     RUN
PSTACK ABS
IN HG=29.827
TSTACK F=64.292
******

SOURCE TYPE?
0=OTHER
1=BOILER
                0.000 RUN
% CO2 =?
                0.000 RUN
% O2 =?
               20.900 RUN
H2O GAIN KNOWN?
1=YES 0=NO
                1.000 RUN
WETCH IMPINGERS
HIT R/S
TO CONTINUE...

                      RUN
H2O GAIN = ?
               41.210 RUN
NET METER
VOL. FT3=
                    112.937

CORRECTED
SAMPLE VOL.
VMSTD  SCF=
                    111.560

MOLE FRACT. DRY
GAS, (1-BWS) =
                      0.983

% H2O =
                      1.7

STACK GAS WET
MOL. WT. MS,
LB/LB MOL=
                     28.651

AVG VELOCITY
FPM =
                  3,203.617

STACK DRY GAS
FLOW RS  SCFM=
                 30,432.344

ACFM =
                 30,852.328

ISOKINETIC %I =103.6

--END RUN--
L-1-OUT
```

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 15 APRIL 1991 LINE NO: L HARD CHROME

BASE: NAD ALAMEDA RUN NO: L-2-OUT

BUILDING NO: 32 CONTROL DEVICE: INLET (OUTLET)

PREP BY: D. COOK IMPINGER BOX NO: 1

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
1-1	1. 100ml 0.1N NaOH	467.1	568.7	584.11	15.4
1-2	2. 100ml 0.1N NaOH	454.3	559.8	561.85	2.1
1-3	3. Empty	454.6	——	455.6	1.0
1-4	4. 500ml silica gel	~~904.0~~	904.0	927.2	23.2
				Net Weight Gain	~~33.9~~ 41.7

Filter No: 6

Silica gel condition: Before test 50% SPENT After test 85% SPENT

Nozzle No: 3/16"-1 Calibrated by: D. NEWTON

					Average
ID Before Test:	0.194	0.196	0.195	0.194	0.195
ID After Test:	0.194	0.195	0.195	0.194	0.195

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #0251Q) A = 1353 in² (41.5" DIA)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg: 29.875		METER BOX #: 14	PROBE # (PITOT #): 5-7	NOZZLE #: 3/16 - 1
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 63		METER ΔH@: 2.126	PITOT COEF: 0.83	IDEAL NOZZLE DIA, in.: 0.211
DATE: 4/15/91	AVE STATIC PRESSURE, in H_2O: -0.65		METER γ: 0.986	PROBE LENGTH, in.: 60	ACTUAL NOZZLE DIA, in.: 0.195
OPERATOR: D. COOK	AVE VEL HEAD, in H_2O: 0.905		SAMPLE BOX #: 1	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S: @ Steady @ 4.8 in H_2O; @ " 4.6 in H_2O
RUN #: L-2-OUT	ASSUMED MOISTURE, %: 1.8%	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM@ in Hg: 0.003 cfm @ 10 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
						Inlet	Outlet							
SUMCT 2.195	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(Tm in) °F	(Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
1	0	831.643	0.14	0.08	61	61	60	51	N/A	1.0	20.9	0	0	0
2	7.5	833.894	0.40	0.23	64	61	60	48		1.1				
3	15.0	836.479	1.27	0.74	66	61	60	47		2.9				
4	22.5	840.771	2.04	1.18	65	64	60	45		4.5				
5	30.0	846.522	2.11	1.21	65	67	61	48		4.2				
6	37.5	852.547	2.24	1.28	64	69	61	50		4.6				
7	45.0	858.708	2.35	1.34	64	70	62	50		4.8				
8	52.5	865.1	2.47	1.41	65	71	63	50		5.0				
9	60.0	871.491	2.46	1.40	65	71	63	50		4.9				
10	67.5	877.891	2.23	1.27	65	71	64	50		4.7				
11	75.0	884.1	1.47	0.84	65	70	64	50		3.2				
12	82.5	889.299	0.84	0.48	65	69	64	49		1.1				
SUMCT 2.195	90.0	891.929												
TOTAL														
Σ														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

%H_2O = ~~13%~~ 1.6%

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX #	PROBE # (PITOT #)	NOZZLE #
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF (POST TEST)	IDEAL NOZZLE DIA, in.
DATE: 4/15/91	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in. 1'	ACTUAL NOZZLE DIA, in.
OPERATOR: D. COOK	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S 1/2 @ 5.6 in H_2O; 1/4 @ 3.5 in H_2O
RUN #: L-2-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg: 0.002 @ 8 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
						Inlet	Outlet							
~START ~1630	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(Tm in) °F	(Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
13	90	891.929	0.38	0.22	59	59	59	53	AMB	1.1	20.9	0	0	0
14	97.5	894.512	0.79	0.46	62	59	59	49		2.0				
15	105.0	897.908	1.92	1.11	63	61	59	48		3.9				
16	112.5	902.9	2.23	1.28	~~65~~ 62	~~65~~ 64	59	47		4.5				
17	120.0	908.9	2.28	1.30	62	67	60	50		4.5				
18	127.5	915.0	2.28	1.30	62	67	60	50		4.6				
19	135.0	921.003	2.27	1.3	63	67	60	51		4.6				
20	142.5	927.243	2.37	1.35	62	68	61	51		4.7				
21	150.0	933.544	2.28	1.30	63	68	61	51		4.7				
22	157.5	939.816	2.01	1.15	63	68	61	50		4.4				
23	165.0	945.872	1.14	0.65	64	68	61	51		2.5				
24	172.5	950.324	0.94	0.54	63	66	60	51		2.1				
~1800 STOP	180.0	954.272												
TOTAL				0										
AVERAGE			1.705	0.908	63	66								

L-2-OUT

```
XEQ "NOMOKIN"
NOMOKIN 3/91

ENTER DATA
THEN PUSH R/S

TEST NO=?
                0.      RUN
RUN NO.=?
                2.      RUN
FILTER NO=?
                0.      RUN
DELTA-H@AT = ?
            2.126       RUN
METER GAMMA = ?
             .986       RUN
STACK AREA
IN. SQ. = ?
          1,353.000     RUN
STACK STATIC
P IN H2O=?
             -.650      RUN
PBAR IN HG=?
           29.875       RUN
% H2O=?
            1.000       RUN
STACK GAS WET
MOL WT, MS,
LB/LB MOL=?
           28.600       RUN
AVG STACK
TEMP DEG F=?
           64.000       RUN
AVG DELTA-P
IN. H2O=?
             .985       RUN
AMBIENT
TEMP F=?
           63.000       RUN
PITOT TUBE
CSUBP=?
             .838       RUN
AVG STACK
VELOCITY FPM = 3,178.444

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.211

ACTUAL NOZZLE
DIA INCHES=?
             .195       RUN

SAMPLE CFM = 0.643
```

```
--BEGIN RUN--

ENTER DATA AS:

STO A = DELTA-P
STO B = T-STACK
STO C = T-METER

TO CORRECT
ERROR, RE-ENTER
ALL VALUES AS
NEGATIVES

TO CHECK
ISOKIN, HIT
500, R/S

TO END RUN,
HIT 0, R/S

INITIAL METER
VOLUME FT3 =?
          831.643       RUN
@@@@@@@@@@@@@@@
POINT NO. 1.
                .00 STO 01
              61.00 STO 02
              61.00 STO 03
                    RUN
DELTA H = 0.14
@@@@@@@@@@@@@@@
POINT NO. 2.
                .23 STO 01
              64.00 STO 02
              61.00 STO 03
                    RUN
DELTA H = 0.40
@@@@@@@@@@@@@@@
POINT NO. 3.
                .74 STO 01
              66.00 STO 02
              61.00 STO 03
                    RUN
DELTA H = 1.27
@@@@@@@@@@@@@@@
POINT NO. 4.
               1.18 STO 01
              65.00 STO 02
              64.00 STO 03
                    RUN
DELTA H = 2.04
```

```
@@@@@@@@@@@@@@@
POINT NO. 5.
               1.21 STO 01
              65.00 STO 02
              67.00 STO 03
                    RUN
DELTA H = 2.11
@@@@@@@@@@@@@@@
POINT NO. 6.
               1.20 STO 01
              64.00 STO 02
              69.00 STO 03
                    RUN
DELTA H = 2.24
@@@@@@@@@@@@@@@
POINT NO. 7.
               1.34 STO 01
              64.00 STO 02
              70.00 STO 03
                    RUN
DELTA H = 2.35
@@@@@@@@@@@@@@@
POINT NO. 8.
               1.41 STO 01
              65.00 STO 02
              71.00 STO 03
                    RUN
DELTA H = 2.47
@@@@@@@@@@@@@@@
POINT NO. 9.
               1.48 STO 01
              65.00 STO 02
              71.00 STO 03
                    RUN
DELTA H = 2.46
@@@@@@@@@@@@@@@
POINT NO. 10.
               1.27 STO 01
              65.00 STO 02
              71.00 STO 03
                    RUN
DELTA H = 2.23
@@@@@@@@@@@@@@@
POINT NO. 11.
                .84 STO 01
              65.00 STO 02
              70.00 STO 03
                    RUN
DELTA H = 1.47
@@@@@@@@@@@@@@@
POINT NO. 12.
                .48 STO 01
              65.00 STO 02
              69.00 STO 03
                    RUN
DELTA H = 0.84
```

```
@@@@@@@@@@@@@@@
POINT NO. 13.
                .22 STO 01
              59.00 STO 02
              59.00 STO 03
                    RUN
DELTA H = 0.38
@@@@@@@@@@@@@@@
POINT NO. 14.
                .46 STO 01
              62.00 STO 02
              59.00 STO 03
                    RUN
DELTA H = 0.79
@@@@@@@@@@@@@@@
POINT NO. 15.
               1.11 STO 01
              63.00 STO 02
              61.00 STO 03
                    RUN
DELTA H = 1.92
@@@@@@@@@@@@@@@
POINT NO. 16.
               1.28 STO 01
              62.00 STO 02
              64.00 STO 03
                    RUN
DELTA H = 2.23
@@@@@@@@@@@@@@@
POINT NO. 17.
               1.30 STO 01
              62.00 STO 02
              67.00 STO 03
                    RUN
DELTA H = 2.20
@@@@@@@@@@@@@@@
POINT NO. 18.
               1.30 STO 01
              62.00 STO 02
              67.00 STO 03
                    RUN
DELTA H = 2.28
@@@@@@@@@@@@@@@
POINT NO. 19.
               1.30 STO 01
              63.00 STO 02
              67.00 STO 03
                    RUN
DELTA H = 2.27
@@@@@@@@@@@@@@@
POINT NO. 20.
               1.35 STO 01
              62.00 STO 02
              68.00 STO 03
                    RUN
DELTA H = 2.37
```

```
@@@@@@@@@@@@@@@
POINT NO. 21.
               1.30 STO 01
              63.00 STO 02
              68.00 STO 03
                    RUN
DELTA H = 2.28
@@@@@@@@@@@@@@@
POINT NO. 22.
               1.15 STO 01
              63.00 STO 02
              68.00 STO 03
                    RUN
DELTA H = 2.01
@@@@@@@@@@@@@@@
POINT NO. 23.
                .65 STO 01
              64.00 STO 02
              68.00 STO 03
                    RUN
DELTA H = 1.14
@@@@@@@@@@@@@@@
POINT NO. 24.
                .54 STO 01
              63.00 STO 02
              66.00 STO 03
                    RUN
DELTA H = 0.94
@@@@@@@@@@@@@@@
POINT NO. 25.
                0.00    RUN
******
ISOKIN
AVG VALUES
KV=21.887
TMETER F=66.125
DELTA-H=1.785
DELTA P=0.980
FINAL METER
VOLUME FT3=?
          954.272       RUN
INITIAL=831.643
SAMPLE TIME
MIN. =?
          180.000       RUN
PSTACK RBS
IN HG=29.827
TSTACK F=63.417
******
```

```
SOURCE TYPE?
0=OTHER
1=BOILER
                0.000   RUN
% CO2 =?
                0.000   RUN
% O2 =?
               20.900   RUN
H2O GAIN KNOWN?
1=YES 0=NO
                1.000   RUN
WEIGH IMPINGERS
HIT R/S
TO CONTINUE...
                        RUN
H2O GAIN = ?
               41.700   RUN
WET METER
VOL. FT3=
                        128.912

CORRECTED
SAMPLE VOL.
VMSTD  SCF=
                        128.960

MOLE FRACT. DRY
GAS, (1-BWS) =
                          0.984

% H2O =
                          1.6

STACK GAS WET
MOL. WT. MS,
LB/LB MOL=
                         28.663

AVG VELOCITY
FPM =
                      3,171.421

STACK DRY GAS
FLOW RS  SCFM=
                     29,475.259

ACFM =
                     29,798.144

 ISOKINETIC %I =103.3

--END RUN--
```

L-2-OUT

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/16/91 LINE NO: L HARD CHROME

BASE: NAD ALAMEDA RUN NO: L-3-OUT

BUILDING NO: 32 CONTROL DEVICE: INLET (OUTLET)

PREP BY: CKY IMPINGER BOX NO: 4

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
4-1	1. 100ml 0.1N NaOH	499.01	612.28	635.96	23.68
4-2	2. 100ml 0.1N NaOH	511.76	602.80	610.11	7.31
4-3	3. Empty	503.66	—	504.91	1.25
4-4	4. 500ml silica gel		943.99	974.80	30.81
				Net Weight Gain	63.05

Filter No: 0

Silica gel condition: Before test 35% SPENT After test 76% SPENT

Nozzle No: 3/16-3 Calibrated by [illegible]

					Average
ID Before Test:	0.198	0.197	0.199	0.198	0.198
ID After Test:	0.197	0.197	0.198	0.198	0.198

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #0251Q)

A = 1353 in.2 (41.5" DIA

PLANT BLDG 32	BAROMETRIC PRESSURE, in Hg 29.92		METER BOX # 14	PROBE # (PITOT #) 5-12	NOZZLE # 3/16 11-3		
LOCATION NAD ALAMEDA	AMBIENT TEMPERATURE, °F 52		METER ΔH@ 2.126	PITOT COEF 0.819	IDEAL NOZZLE DIA, in. 0.194		
DATE 4/16/91	AVE STATIC PRESSURE, in H_2O -0.65		METER γ 0.956	PROBE LENGTH, in. 60	ACTUAL NOZZLE DIA, in. 0.198		
OPERATOR Cook	AVE VEL HEAD, in H_2O 0.908		SAMPLE BOX # 4	PROBE LINER MATERIAL GLASS	LEAK CHECK @ PITOT'S 4.2 on 5.9 in H_2O 4.4 on 4.9 in H_2O		
RUN # L-3-OUT	ASSUMED MOISTURE, % 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING N/A	PROBE HEATER SETTING N/A	LEAK RATE CFM@ in Hg for .002 @ 10 in Hg		

TRAVERSE POINT #	SAMPLING TIME min	GAS METER READING (V_m) ft^3	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	VELOCITY HEAD (MEAS) (ΔP) in H_2O (A)	STACK TEMPERATURE (Ts) °F (B)	GAS SAMPLE TEMPERATURE AT DRY GAS METER Inlet (Tm in) °F (C)	Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
1100 1	0	954.437	0.44	0.25	64	55	54	52	AMB	1	20.9	0	0	0
2	10	957.992	0.61	0.35	67	55	54	44		1				
1130 3	20	962.	1.55	0.87	65	60	57	43		2				
4	30	968.574	2.10	1.17	66	66	59	44		2.8				
5	40	976.307	2.13	1.18	67	70	61	49		2.9				
6	50	984.287	2.21	1.22	66	70	62	48		3.0				
7	60	992.502	2.48	1.37	66	70	63	48		3.1				
8	70	1001.0	2.28	1.26	66	71	63	48		3.1				
9 1200	80	1009	2.35	1.30	66	70	64	51		3.0				
10	90	1018.889	2.08	1.15	67	72	65	53		2.8				
11	100	1025.906	1.29	0.71	67	73	66	56		1.9				
12	110	1032.23 ~~1037.93~~	0.96	0.53	67	74	68	55		1.5				
1100	120	1037.554												
TOTAL														
AVE			1.71	0.941	67									

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX #	PROBE # (PITOT #)	NOZZLE #
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔI@	PITOT COEF: POST TEST	IDEAL NOZZLE DIA, in.
DATE: 4/16/91	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in.	ACTUAL NOZZLE DIA, in.
OPERATOR: D. Cook	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S: steady @ 5.4 in H_2O; @ Stack dy @ 4.8 in H_2O
RUN #: 2-3-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg: 0.002 cfm @ 6 in Hg

TRAVERSE POINT # (start ≈1110)	SAMPLING TIME min	GAS METER READING (Vm) ft^3	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	VELOCITY HEAD (MEAS) (ΔP) in H_2O (A)	STACK TEMPERATURE (Ts) °F (B)	GAS SAMPLE TEMPERATURE AT DRY GAS METER (C) Inlet (Tm in) °F	Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
13	120	1037.554	0.40	0.22	62	70	68	59	AMB	1.0	20.9	0	0	0
14	130	1041.1	0.92	0.51	67	70	68	54		1.3				
15	140	1046.025	1.67	0.92	67	72	69	52		2.3				
16	150	1053.034	2.19	1.20	66	75	69	52		2.5				
17	160	1061.028	2.21	1.21	67	77	71	55		3.0				
18	170	1069.225	2.29	1.25	67	78	72	55		3.0				
19	180	1078.1	2.32	1.27	68	78	72	55		3.0				
20	190	1086.—	2.39	1.30	68	80	73	57		3.0				
21	200	1094.63	2.30	1.25	68	82	74	49		3.0				
22	210	1103.15	1.84	1.00	68	81	75	49		2.8				
23	220	1111.2	1.29	0.70	67	81	75	51		1.5				
24	230	1117.6	0.75	0.41	68	79	75	51		1.0				
1310	240	1122.282												
TOTAL														
AVERAGE			1.71	0.894	67									

L-3-OUT

```
NORDKIN 3/91

ENTER DATA THEN PUSH R/S
  L-3-OUT
TEST NO=?
              1.     RUN
RUN NO=?
              3.     RUN
FILTER NO=?
              0.     RUN
DELTA-H=?
          2.126      RUN
GAMMA=?
           .986      RUN
STACK AREA, IN. SQ.=?
      1,353.000      RUN
STACK STATIC P, IN H20=?
           -.650     RUN
PBAR IN HG=?
         29.920      RUN
% H20=?
          1.000      RUN
STACK GAS WET
MOL. LB/LBMOL=?
         28.000      RUN
AVG STACK TEMP, F=?
         63.000      RUN
AVG DELTA-P, IN H20=?
           .900      RUN
AMB TEMP, F=?
         52.000      RUN
PITOT CSUBP=?
           .819      RUN
AVG STACK
VELOCITY FPM = 3,117.375

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.214

ACTUAL NOZZLE
DIA INCHES=?
           .198      RUN

SAMPLE CFM = 0.640

--BEGIN RUN--

ENTER DATA AS:

STO A = DELTA-P
STO B = T-STACK
STO C = T-METER
```

```
INITIAL METER
VOLUME FT3 =?
        954.437     RUN
****************
POINT NO. 1.
             .25 STO 01
           64.00 STO 02
           55.00 STO 03
                      RUN
DELTA H = 0.64
****************
POINT NO. 2.
             .35 STO 01
           67.00 STO 02
           55.00 STO 03
                      RUN
DELTA H = 0.61
****************
POINT NO. 3.
             .87 STO 01
           65.00 STO 02
           60.00 STO 03
                      RUN
DELTA H = 1.55
****************
POINT NO. 4.
            2.10 STO 01
            1.17 STO 02
            1.17 STO 01
           66.00 STO 02
           66.00 STO 03
                      RUN
DELTA H = 2.10
****************
POINT NO. 5.
            1.10 STO 01
           67.00 STO 02
           70.00 STO 03
                      RUN
DELTA H = 2.13
****************
POINT NO. 6.
            1.22 STO 01
           66.00 STO 02
           70.00 STO 03
                      RUN
DELTA H = 2.21
****************
POINT NO. 7.
            1.37 STO 01
           66.00 STO 02
           70.00 STO 03
                      RUN
DELTA H = 2.40
```

```
****************
POINT NO. 8.
            1.26 STO 01
           66.00 STO 02
           71.00 STO 03
                      RUN
DELTA H = 2.28
****************
POINT NO. 9.
            1.30 STO 01
           66.00 STO 02
           70.00 STO 03
                      RUN
DELTA H = 2.35
****************
POINT NO. 10.
            1.15 STO 01
           67.00 STO 02
           72.00 STO 03
                      RUN
DELTA H = 2.00
****************
POINT NO. 11.
             .71 STO 01
           67.00 STO 02
           73.00 STO 03
                      RUN
DELTA H = 1.29
****************
POINT NO. 12.
             .53 STO 01
           67.00 STO 02
           74.00 STO 03
                      RUN
DELTA H = 0.96
****************
POINT NO. 13.
             .22 STO 01
           62.00 STO 02
           70.00 STO 03
                      RUN
DELTA H = 0.40
****************
POINT NO. 14.
             .51 STO 01
           67.00 STO 02
           76.00 STO 03
                      RUN
DELTA H = 0.92
****************
POINT NO. 15.
             .92 STO 01
           67.00 STO 02
           72.00 STO 03
                      RUN
DELTA H = 1.67
```

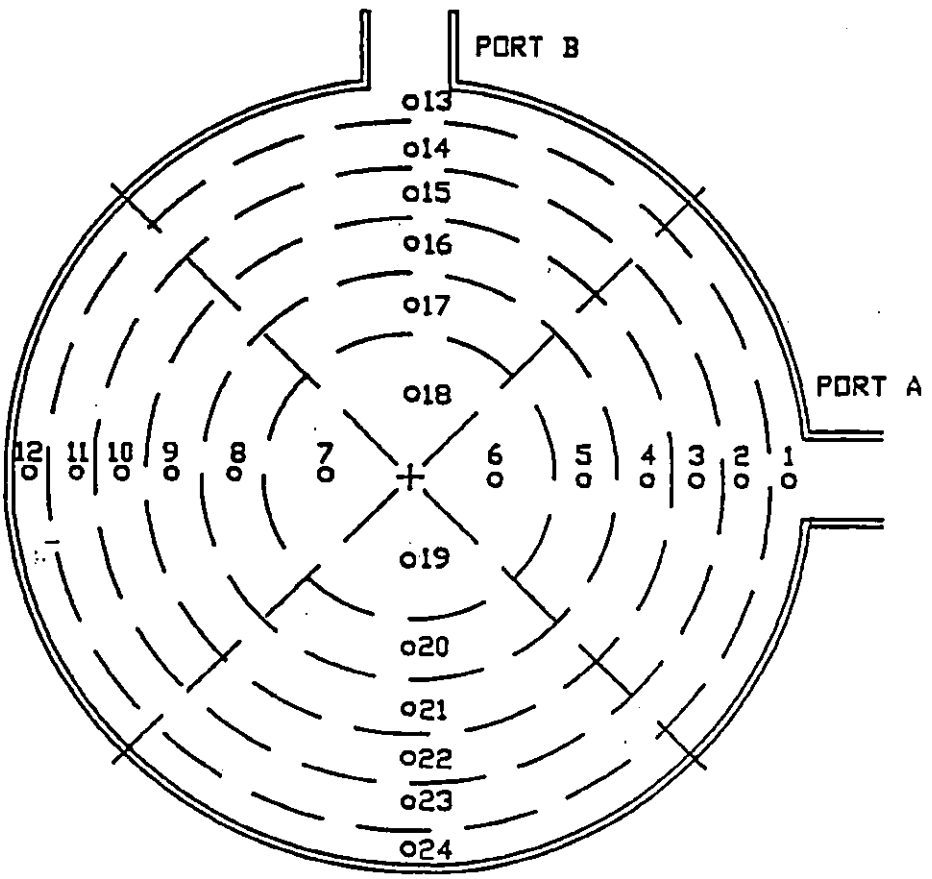
```
****************
POINT NO. 16.
            1.20 STO 01
           66.00 STO 02
           75.00 STO 03
                      RUN
DELTA H = 2.19
****************
POINT NO. 17.
            1.21 STO 01
           67.00 STO 02
           77.00 STO 03
                      RUN
DELTA H = 2.21
****************
POINT NO. 18.
            1.25 STO 01
           67.00 STO 02
           78.00 STO 03
                      RUN
DELTA H = 2.29
****************
POINT NO. 19.
           68.00 STO 02
            1.27 STO 01
                      RUN
DELTA H = 2.32
****************
POINT NO. 20.
            1.30 STO 01
           90.00 STO 03
                      RUN
DELTA H = 2.39
****************
POINT NO. 21.
             .00    CLX
            1.25 STO 01
           92.00 STO 03
                      RUN
DELTA H = 2.30
****************
POINT NO. 22.
            1.00 STO 01
           81.00 STO 03
                      RUN
DELTA H = 1.84
****************
POINT NO. 23.
           67.00 STO 02
             .70 STO 01
                      RUN
DELTA H = 1.29
```

```
****************
POINT NO. 24.
             .41 STO 01
           68.00 STO 02
           79.00 STO 03
                      RUN
DELTA H = 0.75
****************
POINT NO. 25.
              0.00     RUN
======
ISOKIN
AVG VALUES
KV=21.693
TMETER F=72.842
DELTA-H=1.712
DELTA P=0.894
FINAL METER
VOLUME FT3=?
        1,122.282      RUN
INITIAL=954.437
SAMPLE TIME
MIN. =?
          240.000      RUN
PSTACK ABS
IN HG=29.872
TSTACK F=66.542
======

SOURCE TYPE?
0=OTHER
1=BOILER
              0.000    RUN
% CO2 =?
              0.000    RUN
% O2 =?
             20.900    RUN
H2O GAIN KNOWN?
1=YES 0=NO
              1.000    RUN
WEIGH IMPINGERS
HIT R/S
TO CONTINUE...

                       RUN
H2O GAIN = ?
             63.050    RUN
WET METER
VOL. FT3=
            165.495
```

```
CORRECTED
SAMPLE VOL.
VMSTP SCF=
            163.966
MOLE FRACT. DRY
GAS, (1-BWS) =
              0.982
% H2O =
              1.8
STACK GAS WET
MOL. WT, MS,
LB/LB MOL=
             28.643
AVG VELOCITY
FPM =
          3,112.377
STACK DRY GAS
FLOW QS  SCFM=
         28,745.199
ACFM =
         29,243.376

ISOKINETIC %I =104.4

--END RUN--
    L-3-OUT
```

C-32

24 POINT SAMPLE TRAVERSE



LINE M OUTLET - HARD CHROME PLATE

STACK DIAMETER (IN.) 33.4

TRAVERSE POINT	EPA METHOD 1 (% OF DIA)	TRAVERSE POINT LOCATION (DISTANCES FROM I.D.)
1 & 13	2.1	1.0 *
2 & 14	6.7	2.2
3 & 15	11.8	3.9
4 & 16	17.7	5.9
5 & 17	25.0	8.3
6 & 18	35.6	11.9
7 & 19	64.4	21.5
8 & 20	75.0	25.0
9 & 21	82.3	27.5
10 & 22	88.2	29.4
11 & 23	93.3	31.1
12 & 24	97.9	32.4 *

* Location adjusted.

PRELIMINARY VELOCITY TRAVERSE DATA SHEET

DATE: 4/17/91	DISTURB	DISTANCE A: 0.5 ft/dia	
BASE: NAD ALAMEDA	A	DISTANCE B: 0.5 ft/dia	
BUILDING NO: 32	TEST SITE	TRAVERSE PTS REQ'D:	
LINE NO: M (Chrome Plate)		TRAVERSE PTS USED, n: 24	
SCRUBBER: INLET/OUTLET	B	CIRCULAR DIAMETER: 33 3/8 in	
READINGS BY: BAQ/DAN	DISTURB	RECTANGULAR L x W: in	

	STACK PRESSURES (inches H_2O) ΔP_{vel}	P_{stat}	$\sqrt{\Delta P}$	CYCLONIC FLOW $\lvert\alpha\rvert$°
1	0.13	-0.31	0.361	
2	0.65	-0.59	0806	1°
3	1.03	-0.74	1.015	
4	1.23	-0.96	1.109	9°
5	1.21	-0.99	1.100	
6	1.26	-0.86	1.122	4°
7	1.30	-1.10	1.14	
8	1.20	-1.15	1.095	2°
9	1.30	-1.06	1.3	
10	1.25	-1.10	1.14	2°
11	0.67	-0.59	0819	
12	0.022	-0.47	0.148	0°

	STACK PRESSURES (inches H_2O) ΔP_{vel}	P_{stat}	$\sqrt{\Delta P}$	CYCLONIC FLOW $\lvert\alpha\rvert$°
13	0.03	-.37	.173	
14	0.40	-.43	.633	1°
15	0.95	-.60	.975	
16	1.38	-.69	1.175	3°
17	1.35	-.77	1.162	
18	1.35	-.78	1.162	1°
19	1.37	-.76	1.171	
20	1.30	-.76	1.140	1°
21	1.25	-.78	1.118	
22	1.3	-.76	1.140	1°
23	1.05	-.60	1.025	
24	0.6	-0.46	0.775	2°

1.1647

AVERAGE VELOCITY HEAD $\Delta P = [(\Sigma\sqrt{\Delta P})/n]^2 =$ 0.903 ~~0.9884~~

AVERAGE STATIC PRESSURE $= (\Sigma P_{stat})/n =$ -0.737

AVERAGE CYCLONIC FLOW ANGLE $= (\Sigma\alpha)/n =$ 2.25°

8 HOUR RUN

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/17/91 LINE NO: M HARD CHROME

BASE: NAD ALAMEDA RUN NO: M-1-OUT

BUILDING NO: 32 CONTROL DEVICE: INLET (OUTLET)

PREP BY: [signature] IMPINGER BOX NO: 1

- [x] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO_3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.
- [x] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.
- [x] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.
- [x] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.
- [x] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.
- [x] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.
- [x] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
1-1	1. 100ml 0.1N NaOH	467.9	567.6	621.14	53.54
1-2	2. 100ml 0.1N NaOH	456.9	561.5	569.01	7.51
1-3	3. Empty	455.8	—	457.43	1.63
1-4	4. 500ml silica gel	467.4	881.8	944.43	62.63
				Net Weight Gain	125.31

Filter No: 0

Silica gel condition: Before test NEW After test 70% Spent

Nozzle No: 3/8-1 Calibrated by: [signature]

					Average
ID Before Test:	0.1941	0.195	0.195	0.1941	0.195
ID After Test:	0.193	0.194	0.193	0.195	0.194

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

STACK AREA 874.85 IN^2 (33.375 DIA)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg: 29.925		METER BOX #: 14	PROBE # (PITOT #): 5-7	NOZZLE #: 3/16 - 1
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 52		METER ΔH@: 2.126	PITOT COEF: 0.83	IDEAL NOZZLE DIA, in.: 0.213
DATE: 17 APR 91	AVE STATIC PRESSURE, in H_2O: -0.737		METER γ: 0.986	PROBE LENGTH, in.: 60	ACTUAL NOZZLE DIA, in.: 0.195
OPERATOR: Quin	AVE VEL HEAD, in H_2O: 0.8884		SAMPLE BOX #: 1	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S: ⊖ STEADY @ 6.2 in H_2O, ⊕ STEADY @ 5.3 in H_2O
RUN #: M-1-OUT	ASSUMED MOISTURE, %: 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER/BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM @ in Hg: 0.005 cfm @ 10 in Hg

TRAVERSE POINT # (START TIME 1131)	SAMPLING TIME min	GAS METER READING (V_m) ft^3	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	VELOCITY HEAD (MEAS) (ΔP) in H_2O	STACK TEMPERATURE (Ts) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER: Inlet (Tm in) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER: Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
1	0	122.519	0.12	0.07	53	56	56	52	AMB	1.0	20.9	0	0	0
2	10	124.43	0.49	0.28	55	62	60	50		1.3				
3	20	128.387	1.80	1.02	60	68	63	48		4.0				
4	30	135.767	2.29	1.30	65	73	64	46		4.2				
5	40	143.957	2.24	1.26	65	78	68	48		4.4				
6	50	152.267	2.36	1.33	65	77	69	48		5.0				
7	60	160.049	2.36	1.33	66	79	71	48		5.0				
8	70	169.907	2.15	1.20	66	83	73	50		5.0				
9	80	178.636	2.21	1.23	66	85	75	51		4.9				
10	90	187.091	2.15	1.20	66	84	76	50		4.2				
11	100	195.100	1.60	0.56	66	84	77	52		3.0				
12	110	199.938	0.30	0.17	66	81	76	53						
1331	120	202.175												
TOTAL														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

PLANT RUDC 32	BAROMETRIC PRESSURE, in Hg		METER BOX # 14	PROBE # (PITOT #)	NOZZLE #
LOCATION NAPA ALUMINA	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE 17 APR 91	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in.	ACTUAL NOZZLE DIA, in.
OPERATOR BYQ/DAN	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S
RUN # M-1-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
						Inlet	Outlet							
1350	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(Tm in) °F	(Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
13	120	202.175	0.16	0.09	58	73	72	60	Amb	1.0	20.9	0	0	0
14	130	264.512	0.41	0.23	58	70	70	52		1.0				
15	140	207.704	1.63	0.92	60	72	70	58		3.2				
16	150	214.6	2.29	1.30	65	73	69	47		4.0				
17	160	222.395	2.48	1.40	65	77	70	49		4.7				
18	170	230.9	2.67	1.50	65	78	71	51		5.1				
19	180	239.637	2.31	1.30	65	78	71	50		5.0				
20	190	248.15	2.40	1.35	65	78	71	46		5.0				
21	200	256.7	2.40	1.35	66	78	71	46		5.0				
22	210	265.27	2.08	1.17	66	78	71	46		4.0				
23	220	273.267	1.68	0.95	66	77	71	46		3.6				
24	230	280.466	0.64	0.36	66	77	71	46		2.0				
1550	240	285.272												
TOTAL														
AVERAGE														

2nd. TRAVERSE

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

PLANT: E4G32	BAROMETRIC PRESSURE, in Hg	METER BOX #: 14	PROBE # (PITOT #):	NOZZLE #:
LOCATION: NADALAMEDA	AMBIENT TEMPERATURE, °F	METER ΔI@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE: 18APR91	AVE STATIC PRESSURE, in H_2O	METER Y	PROBE LENGTH, in.	ACTUAL NOZZLE DIA, in.
OPERATOR: D. COOK	AVE VEL HEAD, in H_2O	SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S
RUN #: M-1-OUT (CONT)	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
				(A)	(B)	(C) Inlet	Outlet							
START 0735	min	(V_m) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(Tm in) °F	(Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
13	240	285.274	0.22	0.13	56	50	50	50	AMB	1.0	20.9	0	0	0
14	250	287.9	0.46	0.27	60	52	50	39		1.3				
15	260	291.6	1.66	0.97	~~56~~ 64	58	52	41		3.8				
16	270	297.78	2.23	1.29	65	64	55	39		4.2				
17	280	305.74	2.44	1.40	65	68	58	43		4.7				
18	290	314.06	2.63	1.5	65	71	60	42		4.9				
19	300	322.77	2.38	1.35	66	74	63	44		4.9				
20	310	331.36	2.31	1.30	64	78	66	47		4.8				
21	320	340.0	2.31	1.30	65	77	68	43		4.9				
22	330	348.9	2.13	1.20	65	78	69	45		4.5				
23	340	357.4	1.39	0.78	65	78	69	45		3.9				
24	350	364.9	0.64	0.36	65	77	70	45		3.9				
0935 STOP	360	369.492												
TOTAL														

2nd TRAVERSE

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX #: 14	PROBE # (PITOT #)	NOZZLE #
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE: 17 APRIL 91	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in.	ACTUAL NOZZLE DIA, in.
OPERATOR: D. COOK	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL: SS	LEAK CHECK @ PITOT'S #4 & #2 @ 4.9 in H_2O
RUN #: M-1 OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM @ in Hg: 0.009 @ 10 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (A) (MEAS)	STACK TEMPERATURE (B)	GAS SAMPLE TEMPERATURE AT DRY GAS METER (C)		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
START 9:50 AM	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	Inlet (Tm in) °F	Outlet (Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
1	360	369.492	0.09	0.08	64	68	68	44	AMB	1.0	20.9	0	0	0
2	370	371.49	0.53	0.30	58	68	66	44		1.5				
3	380	375.1	1.83	1.05	64	67	65	41		3.6				
4	390	382.0	2.27	1.29	64	72	66	43		4.3				
5	400	390.14	2.28	1.29	65	74	67	45		4.3				
6	410	398.2	2.57	1.45	65	77	69	49		4.7				
7	420	406.65	2.35	1.32	66	79	70	48		4.8				
8	430	415.2	2.15	1.20	65	81	72	52		4.6				
9	440	423.37	2.15	1.20	66	84	74	51		4.6				
10	450	431.6	2.16	1.20	65	85	76	51		4.6				
11	460	439.91	0.97	0.54	66	85	77	52		2.4				
12	470	445.8	0.38	0.21	65	84	78	53		1.3				
STOP 11:50	480	448.996												
TOTAL														
AVERAGE			1.691	0.862	63.8	74.3								

M-1-OUT

```
NOMOGTN 3/91

ENTER DATA
THEN PUSH R/S
M-1-OUT
TEST NO=?
M@                    RUN
RUN NO.=?
          1.          RUN
FILTER NO=?
          0.          RUN
DELTA-H@RT = ?
       2.126          RUN
METER CRXN = ?
       .986           RUN
STACK AREA
IN. SQ. = ?
      874.050         RUN
STACK STATIC
P IN H2O=?
       -.737          RUN
PBAR IN HG=?
      29.925          RUN
% H2O=?
       1.000          RUN
STACK GAS WET
MOL WT, MS,
LB/LB MOL=?
      28.000          RUN
AVG STACK
TEMP DEG F=?
      68.000          RUN
AVG DELTA-P
IN. H2O=?
        .983          RUN
AMBIENT
TEMP F=?
      55.000          RUN
PITOT TUBE
CSUBP=?
        .830          RUN
AVG STACK
VELOCITY FPM = 3,165.633

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.213

ACTUAL NOZZLE
DIA INCHES=?
        .195          RUN

SAMPLE CFM = 0.620
```

```
INITIAL METER
VOLUME FT3 =?
      122.519         RUN
@@@@@@@@@@@@@@@
POINT NO. 1.
          .07 STO 01
        53.00 STO 02
        56.00 STO 03
                      RUN
DELTA H = 0.12
@@@@@@@@@@@@@@@
POINT NO. 2.
          .20 STO 01
        55.00 STO 02
        62.00 STO 03
                      RUN
DELTA H = 0.49
@@@@@@@@@@@@@@@
POINT NO. 3.
          1.02 STO 01
        60.00 STO 02
        68.00 STO 03
                      RUN
DELTA H = 1.00
@@@@@@@@@@@@@@@
POINT NO. 4.
          1.30 STO 01
        65.00 STO 02
        73.00 STO 03
                      RUN
DELTA H = 2.29
@@@@@@@@@@@@@@@
POINT NO. 5.
          1.26 STO 01
        65.00 STO 02
        70.00 STO 03
                      RUN
DELTA H = 2.24
@@@@@@@@@@@@@@@
POINT NO. 6.
          1.33 STO 01
        65.00 STO 02
        77.00 STO 03
                      RUN
DELTA H = 2.36
@@@@@@@@@@@@@@@
POINT NO. 7.
          1.33 STO 01
        66.00 STO 02
        79.00 STO 03
                      RUN
DELTA H = 2.36
@@@@@@@@@@@@@@@
POINT NO. 8.
          1.20 STO 01
        66.00 STO 02
        83.00 STO 03
                      RUN
DELTA H = 2.15
@@@@@@@@@@@@@@@
```

```
POINT NO. 9.
          1.23 STO 01
        66.00 STO 02
        85.00 STO 03
                      RUN
DELTA H = 2.21
@@@@@@@@@@@@@@@
POINT NO. 10.
          1.20 STO 01
        66.00 STO 02
        84.00 STO 03
                      RUN
DELTA H = 2.15
@@@@@@@@@@@@@@@
POINT NO. 11.
          .56 STO 01
        66.00 STO 02
        84.00 STO 03
                      RUN
DELTA H = 1.00
@@@@@@@@@@@@@@@
POINT NO. 12.
          .17 STO 01
        66.00 STO 02
        81.00 STO 03
                      RUN
DELTA H = 0.30
@@@@@@@@@@@@@@@
POINT NO. 13.
          .09 STO 01
        58.00 STO 02
        73.00 STO 03
                      RUN
DELTA H = 0.16
@@@@@@@@@@@@@@@
POINT NO. 14.
          .23 STO 01
        58.00 STO 02
        70.00 STO 03
                      RUN
DELTA H = 0.41
@@@@@@@@@@@@@@@
POINT NO. 15.
          .92 STO 01
        60.00 STO 02
        72.00 STO 03
                      RUN
DELTA H = 1.63
@@@@@@@@@@@@@@@
POINT NO. 16.
          1.30 STO 01
        65.00 STO 02
        73.00 STO 03
                      RUN
DELTA H = 2.29
@@@@@@@@@@@@@@@
POINT NO. 17.
          1.40 STO 01
        65.00 STO 02
        77.00 STO 03
                      RUN
DELTA H = 2.48
@@@@@@@@@@@@@@@
```

```
POINT NO. 18.
          1.50 STO 01
        65.00 STO 02
        78.00 STO 03
                      RUN
DELTA H = 2.67
@@@@@@@@@@@@@@@
POINT NO. 19.
          1.30 STO 01
        65.00 STO 02
        78.00 STO 03
                      RUN
DELTA H = 2.31
@@@@@@@@@@@@@@@
POINT NO. 20.
          1.35 STO 01
        65.00 STO 02
        78.00 STO 03
                      RUN
DELTA H = 2.40
@@@@@@@@@@@@@@@
POINT NO. 21.
          1.25 STO 01
        66.00 STO 02
                      RUN
DELTA H = 2.40
@@@@@@@@@@@@@@@
POINT NO. 22.
          1.17 STO 01
                      RUN
DELTA H = 2.08
@@@@@@@@@@@@@@@
POINT NO. 23.
          .95 STO 01
        66.00 STO 02
        77.00 STO 03
                      RUN
DELTA H = 1.68
@@@@@@@@@@@@@@@
POINT NO. 24.
          .36 STO 01
        66.00 STO 02
        77.00 STO 03
                      RUN
DELTA H = 0.64
@@@@@@@@@@@@@@@
POINT NO. 25.
          .13 STO 01
        56.00 STO 02
        58.00 STO 03
                      RUN
DELTA H = 0.22
@@@@@@@@@@@@@@@
POINT NO. 26.
          .27 STO 01
        60.00 STO 02
        52.00 STO 03
                      RUN
DELTA H = 0.46
@@@@@@@@@@@@@@@
```

```
POINT NO. 27.
          .97 STO 01
        64.00 STO 02
        58.00 STO 03
                      RUN
DELTA H = 1.66
@@@@@@@@@@@@@@@
POINT NO. 28.
          1.29 STO 01
        65.00 STO 02
        64.00 STO 03
                      RUN
DELTA H = 2.23
@@@@@@@@@@@@@@@
POINT NO. 29.
          1.40 STO 01
        65.00 STO 02
        68.00 STO 03
                      RUN
DELTA H = 2.44
@@@@@@@@@@@@@@@
POINT NO. 30.
          1.50 STO 01
        65.00 STO 02
        71.00 STO 03
                      RUN
DELTA H = 2.63
@@@@@@@@@@@@@@@
POINT NO. 31.
          1.35 STO 01
        66.00 STO 02
        74.00 STO 03
                      RUN
DELTA H = 2.30
@@@@@@@@@@@@@@@
POINT NO. 32.
          1.30 STO 01
        66.00 STO 02
        78.00 STO 03
                      RUN
DELTA H = 2.31
@@@@@@@@@@@@@@@
POINT NO. 33.
          1.30 STO 01
        65.00 STO 02
        77.00 STO 03
                      RUN
DELTA H = 2.31
@@@@@@@@@@@@@@@
POINT NO. 34.
          1.20 STO 01
        65.00 STO 02
        78.00 STO 03
                      RUN
DELTA H = 2.13
@@@@@@@@@@@@@@@
```

```
POINT NO. 35.
          .78 STO 01
        65.00 STO 02
        78.00 STO 03
                      RUN
DELTA H = 1.91
@@@@@@@@@@@@@@@
POINT NO. 36.
          .36 STO 01
        65.00 STO 02
        77.00 STO 03
                      RUN
DELTA H = 0.64
@@@@@@@@@@@@@@@
POINT NO. 37.
          .05 STO 01
        64.00 STO 02
        68.00 STO 03
                      RUN
DELTA H = 0.09
@@@@@@@@@@@@@@@
POINT NO. 38.
          .38 STO 01
        58.00 STO 02
        68.00 STO 03
                      RUN
DELTA H = 0.53
@@@@@@@@@@@@@@@
POINT NO. 39.
          1.05 STO 01
        64.00 STO 02
        67.00 STO 03
                      RUN
DELTA H = 1.83
@@@@@@@@@@@@@@@
POINT NO. 40.
          1.29 STO 01
        64.00 STO 02
        72.00 STO 03
                      RUN
DELTA H = 2.27
@@@@@@@@@@@@@@@
POINT NO. 41.
          1.29 STO 01
        65.00 STO 02
        74.00 STO 03
                      RUN
DELTA H = 2.28
@@@@@@@@@@@@@@@
POINT NO. 42.
          1.45 STO 01
        65.00 STO 02
        77.00 STO 03
                      RUN
DELTA H = 2.57
@@@@@@@@@@@@@@@
POINT NO. 43.
          1.32 STO 01
        66.00 STO 02
        79.00 STO 03
                      RUN
DELTA H = 2.35
@@@@@@@@@@@@@@@
```

```
POINT NO. 44.
          1.20 STO 01
        65.00 STO 02
        81.00 STO 03
                      RUN
DELTA H = 2.15
@@@@@@@@@@@@@@@
POINT NO. 45.
          1.20 STO 01
        66.00 STO 02
        84.00 STO 03
                      RUN
DELTA H = 2.15
@@@@@@@@@@@@@@@
POINT NO. 46.
          1.20 STO 01
        65.00 STO 02
        85.00 STO 03
                      RUN
DELTA H = 2.16
@@@@@@@@@@@@@@@
POINT NO. 47.
          .54 STO 01
        66.00 STO 02
        85.00 STO 03
                      RUN
DELTA H = 0.97
@@@@@@@@@@@@@@@
POINT NO. 48.
          .21 STO 01
        65.00 STO 02
        84.00 STO 03
                      RUN
DELTA H = 0.35
@@@@@@@@@@@@@@@
POINT NO. 49.
          0.00        RUN
'======
!SOKTN
AVG VALUES
KV=21.266
THETER F=74.333
DELTA-H=1.691
DELTA P=0.862
FINAL METER
VOLUME FT3=?
        448.996       RUN
INITIAL=122.519
SAMPLE TIME
MIN. =?
        480.000       RUN
PSTACK ABS
IN HG=29.871
TSTACK F=63.833
'======
```

```
SOURCE TYPE?
0=OTHER
1=BOILER
          0.000       RUN
% CO2 =?
          0.000       RUN
% O2 =?
         20.900       RUN
H2O GAIN KNOWN?
1=YES 0=NO
          1.000       RUN
WETCH IMPINGERS
WET R/S
TO CONTINUE...
                      RUN
H2O GAIN = ?
        125.310       RUN
NET METER
VOL. FT3=
        221.996
CORRECTED
SAMPLE VOL.
VMSTD  SCF=
        317.549
MOLE FRACT. DRY
GAS, (1-BWS) =
          0.982
% H2O =
          1.0
STACK GAS WET
MOL. WT, MS.
LB/LB MOL=
         28.638
AVG VELOCITY
FPM =
      3,091.727
STACK DRY GAS
FLOW RS  SCFM=
       10,549.271
ACFM =
       10,783.317

ISOKINETIC %I =104.4

--END RUN--
11-1-OUT
```

C-40

4 hr RUN

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/17/01 LINE NO: M HARD CHROME

BASE: NAD ALAMEDA RUN NO: M-2-OUT

BUILDING NO: 32 CONTROL DEVICE: INLET OUTLET

PREP BY: CKY IMPINGER BOX NO: 2

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
2-1	1. 100ml 0.1N NaOH	455.22	562.42	589.71	27.29
2-2	2. 100ml 0.1N NaOH	445.64	545.72	550.06	4.34
2-3	3. Empty	501.76	—	502.56	0.80
2-4	4. 500ml silica gel		903.85	932.48	28.63
				Net Weight Gain	61.06

Filter No: C

Silica gel condition: Before test 30% After test 60% Spent

Nozzle No: 3/16-2 Calibrated by: [illegible]

					Average
ID Before Test:	0.191	0.191	0.190	0.192	0.191
ID After Test:	0.192	0.191	0.191	0.192	0.1915

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

STACK AREA 874.85

PLANT: BLDG. 32	BAROMETRIC PRESSURE, in Hg: 29.925		METER BOX #: 13	PROBE # (PITOT #): S-9	NOZZLE #: 3/4G-2
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 52		METER ΔH@: 2.19	PITOT COEF: 0.827	IDEAL NOZZLE DIA, in.: 0.213
DATE: 17 APR 91	AVE STATIC PRESSURE, in H_2O: -0.737		METER Y: 1.011	PROBE LENGTH, in.: 60 in	ACTUAL NOZZLE DIA, in.: 0.191
OPERATOR: Quil	AVE VEL HEAD, in H_2O: 0.8884		SAMPLE BOX #: 2	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S: + OK @ 5.3 in H_2O - OK @ 5.2 in H_2O
RUN #: M-2-OUT	ASSUMED MOISTURE, %: 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM@ in Hg: 0.006 @ 13

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
START 1126	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(Tm in) °F	(Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
24	0	897.585	0.93	0.60	66	58	57	53	AMB	3.5	20.9	0	0	0
23	10	902.661	1.35	0.86	66	64	60	47		4.3				
22	20	909.049	1.93	1.21	67	72	63	50		5.2				
21	30	916.549	2.15	1.30	67	78	66	51		5.8				
20	40	924.563	2.06	1.27	68	82	70	54		5.7				
19	50	932.417	2.14	1.31	67	84	72	56		5.8				
18	60	940.294	2.25	1.38	67	84	74	57		5.9				
17	70	948.392	2.30	1.40	66	86	76	56		6.0				
16	80	956.672	2.14	1.30	66	87	77	56		5.7				
15	90	964.674	1.64	1.00	65	86	78	56		4.7				
14	100	971.429	0.42	0.26	65	83	78	56		2.7				
13	110	975.121	0.15	0.09	65	80	77	57		2.3				
STOP 1336	120	977.457												
TOTAL														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

PLANT BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX # 13	PROBE # (PITOT #)	NOZZLE #
LOCATION NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE 17/APR91	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in. POST	ACTUAL NOZZLE DIA, in. 0.191
OPERATOR BMQ	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S ΔH 3.6 in H_2O
RUN # M-2-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg ΔH 0.004 @ 10 in Hg

TRAVERSE POINT # 1345	SAMPLING TIME min	GAS METER READING (Vm) ft^3	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	VELOCITY HEAD (MEAS) (ΔP) in H_2O	STACK TEMPERATURE (Ts) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER Inlet (Tm in) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
12	120	977.457	0.34	0.21	65	73	72	62	AMB	2.4	20.9	0	0	6
11	130	980.672	~~0.89~~ 0.50	0.56	65	70	72	55		3.5				
~~10~~ 10	140	985.7	1.79	1.08	65	~~74~~	71	50		~~4.3~~				
9	150	991.974	1.93	1.20	65	75	71	50.		5.3				
8	160	999.191	2.01	1.25	65	75	71	52		5.6				
7	170	1007.078	2.10	1.30	65	78	71	53		5.6				
6	180	1014.992	1.96	1.21	65	78	71	54		5.4				
5	190	1022.65	2.02	1.25	65	78	71	51		5.5				
4	200	1030.30	1.98	1.22	65	78	71	49		5.5				
3	210	1037.9	1.54	0.95	66	78	71	49		4.9				
2	220	1044.7	0.45	0.28	66	76	71	49		3.0				
1	230	1048.700	0.16	0.10	61	74	70	49		2.2				
1345	240	1050.672												
TOTAL														
AVERAGE			1.52	0.96	65	~~74~~ 77								

M-2-OUT

```
NORDKIN 3/91

ENTER DATA
THEN PUSH R/S
M-2-OUT
TEST NO=?
                1.          RUN
RUN NO.=?
                2.          RUN
FILTER NO=?
                0.          RUN
DELTA-H@AT = ?
            2.119           RUN
METER GAMMA = ?
            1.011           RUN
STACK AREA
IN. SQ. = ?
          874.050           RUN
STACK STATIC
P IN H2O=?
             -.737          RUN
PBAR IN HG=?
           29.925           RUN
% H2O=?
            1.000           RUN
STACK GAS WET
MOL WT, MS,
LB/LB MOL=?
           28.000           RUN
AVG STACK
TEMP DEG F=?
           68.000           RUN
AVG DELTA-P
IN. H2O=?
             .905           RUN
AMBIENT
TEMP F=?
           55.000           RUN
PITOT TUBE
CSUBP=?
             .827           RUN
AVG STACK
VELOCITY FPM = 3,157.682

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.213

ACTUAL NOZZLE
DIA INCHES=?
             .191           RUN

SAMPLE CFM = 0.601

INITIAL METER
VOLUME FT3 =?
          897.585           RUN
****************
POINT NO. 1.
              .60 STO 01
            66.00 STO 02
            58.00 STO 03
                  RUN
DELTA H = 0.93
****************
POINT NO. 2.
              .86 STO 01
            66.00 STO 02
            64.00 STO 03
                  RUN
DELTA H = 1.35
****************
POINT NO. 3.
             1.21 STO 01
            67.00 STO 02
            72.00 STO 03
                  RUN
DELTA H = 1.93
****************
POINT NO. 4.
             1.38 STO 01
            67.00 STO 02
            70.00 STO 03
                  RUN
DELTA H = 2.10
****************
POINT NO. 5.
             1.27 STO 01
            68.00 STO 02
            82.00 STO 03
                  RUN
DELTA H = 2.06
****************
POINT NO. 6.
             1.31 STO 01
            67.00 STO 02
            84.00 STO 03
                  RUN
DELTA H = 2.14
****************
POINT NO. 7.
             1.30 STO 01
            67.00 STO 02
            84.00 STO 03
                  RUN
DELTA H = 2.25
****************
POINT NO. 8.
             1.40 STO 01
            66.00 STO 02
            86.00 STO 03
                  RUN
DELTA H = 2.30
****************
POINT NO. 9.
             1.30 STO 01
            66.00 STO 02
            87.00 STO 03
                  RUN
DELTA H = 2.14
****************
POINT NO. 10.
             1.00 STO 01
            65.00 STO 02
            86.00 STO 03
                  RUN
DELTA H = 1.64
****************
POINT NO. 11.
              .26 STO 01
            65.00 STO 02
            83.00 STO 03
                  RUN
DELTA H = 0.42
****************
POINT NO. 12.
              .09 STO 01
            65.00 STO 02
            80.00 STO 03
                  RUN
DELTA H = 0.15
****************
POINT NO. 13.
              .21 STO 01
            65.00 STO 02
            73.00 STO 03
                  RUN
DELTA H = 0.34
****************
POINT NO. 14.
              .56 STO 01
            65.00 STO 02
            70.00 STO 03
                  RUN
DELTA H = 0.89
****************
POINT NO. 15.
             1.00 STO 01
            65.00 STO 02
            74.00 STO 03
                  RUN
DELTA H = 1.74
****************
POINT NO. 16.
             1.20 STO 01
            65.00 STO 02
            75.00 STO 03
                  RUN
DELTA H = 1.93
****************
POINT NO. 17.
             1.25 STO 01
            65.00 STO 02
            75.00 STO 03
                  RUN
DELTA H = 2.01
****************
POINT NO. 18.
             1.30 STO 01
            65.00 STO 02
            78.00 STO 03
                  RUN
DELTA H = 2.10
****************
POINT NO. 19.
             1.21 STO 01
            65.00 STO 02
            78.00 STO 03
                  RUN
DELTA H = 1.96
****************
POINT NO. 20.
             1.25 STO 01
            65.00 STO 02
            78.00 STO 03
                  RUN
DELTA H = 2.02
****************
POINT NO. 21.
             1.22 STO 01
                  RUN
DELTA H = 1.98
****************
POINT NO. 22.
              .95 STO 01
            66.00 STO 02
                  RUN
DELTA H = 1.54
****************
POINT NO. 23.
              .28 STO 01
            76.00 STO 03
                  RUN
DELTA H = 0.45
****************
POINT NO. 24.
              .10 STO 01
            61.00 STO 02
            74.00 STO 03
                  RUN
DELTA H = 0.16
****************
POINT NO. 25.
             0.00           RUN
******
ISOKIN
AVG VALUES
KV=21.271
METER F=77.125
DELTA-H=1.522
DELTA P=0.861
FINAL METER
VOLUME FT3=?
         1,050.672          RUN
INITIAL=897.585
SAMPLE TIME
MIN. =?
           240.000          RUN
PSTACK RBS
IN HG=29.871
TSTACK F=65.542
******

SOURCE TYPE?
0=OTHER
1=BOILER
             0.000          RUN
% CO2 =?
             0.000          RUN
% O2 =?
            20.900          RUN
H2O GAIN KNOWN?
1=YES 0=NO
             1.000          RUN

WEIGH IMPINGERS
HIT R/S
TO CONTINUE...
                            RUN
H2O GAIN = ?
            61.860          RUN
WET METER
VOL. FT3=
                          154.771
CORRECTED
SAMPLE VOL.
VRSTD  SCF=
                          151.882
MOLE FRACT. DRY
GAS, (1-BWS) =
                            0.981
% H2O =
                              1.9
STACK GAS WET
MOL. WT, MS,
LB/LB MOL=
                           28.635
AVG VELOCITY
FPM =
                        3,881.452
STACK DRY GAS
FLOW RS  SCFM=
                       18,421.218
ACFM =
                       18,720.891

ISOKINETIC %I =104.9

--END RUN--

M-2-OUT
```

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: April 18 91

BASE: NAD ALAMEDA

BUILDING NO: 32

PREP BY: Cook

LINE NO: M HARD CHROME

RUN NO: M-3-OUT

CONTROL DEVICE: INLET OUTLET

IMPINGER BOX NO: 3

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
3-1	1. 100ml 0.1N NaOH	514.18	613.89	634.14	20.25
3-2	2. 100ml 0.1N NaOH	521.78	629.40	632.78	3.38
3-3	3. Empty	459.09	—	459.34	0.25
3-4	4. 500ml silica gel	—	810.22	839.59	29.37
				Net Weight Gain	53.25

Filter No: 0

Silica gel condition: Before test NEW After test 40% spent

Nozzle No: 3/16-4 Calibrated by: D NEWTON

					Average
ID Before Test:	0.184	0.187	0.187	0.186	0.186
ID After Test:	0.184	0.187	0.186	0.185	0.186

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

$A = 874.85 IN^2 (33.375") DIA$

PLANT: BLDG-32	BAROMETRIC PRESSURE, in Hg: 29.980		METER BOX #: 13	PROBE # (PITOT #): S-20	NOZZLE #: 3/16-4
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 49		METER ΔH@: 2.119	PITOT COEF: 0.847	IDEAL NOZZLE DIA, in.: 0.212
DATE: 18APR91	AVE STATIC PRESSURE, in H_2O: -0.737		METER γ: 1.011	PROBE LENGTH, in.: 60	ACTUAL NOZZLE DIA, in.: 0.186
OPERATOR: CYRIL	AVE VEL HEAD, in H_2O: 0.8884		SAMPLE BOX #: 3	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S #2 @ 5.2 in H_2O #1 @ 5.2 in H_2O
RUN: M-3 @ OUT	ASSUMED MOISTURE, %: 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM@ in Hg: 0.002 @ 10.5 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
START 0730	min	(Vm) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(B) (Ts) °F	(C) Inlet (Tm in) °F	Outlet (Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
12	0	50.8	0.48	0.33	64	52	50	41	AMB	1.5	20.9	0	0	0
11	10	54.52	0.93	0.64	65	53	50	41		2.1				
10	20	59.70	1.66	1.12	63	59	51	37		3.2				
9	30	66.6	1.86	1.25	64	64	54	40		3.7				
8	40	73.97	1.94	1.30	65	67	56	42		4.0				
7	50	81.65	2.02	1.35	65	68	59	43		4.0				
6	60	89.44	1.93	1.28	64	70	60	43		4.0				
5	70	97.2	1.89	1.25	65	72	62	45		3.9				
4	80	104.67	1.88	1.24	64	73	63	45		3.9				
3	90	112.09	1.50	0.99	64	72	64	44		2.9				
2	100	118.02	0.50	0.33	59	71	64	44		1.5				
1	110	121.2	0.21	0.14	55	66	64	43						
0980 STOP	120	123.167												
TOTAL														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

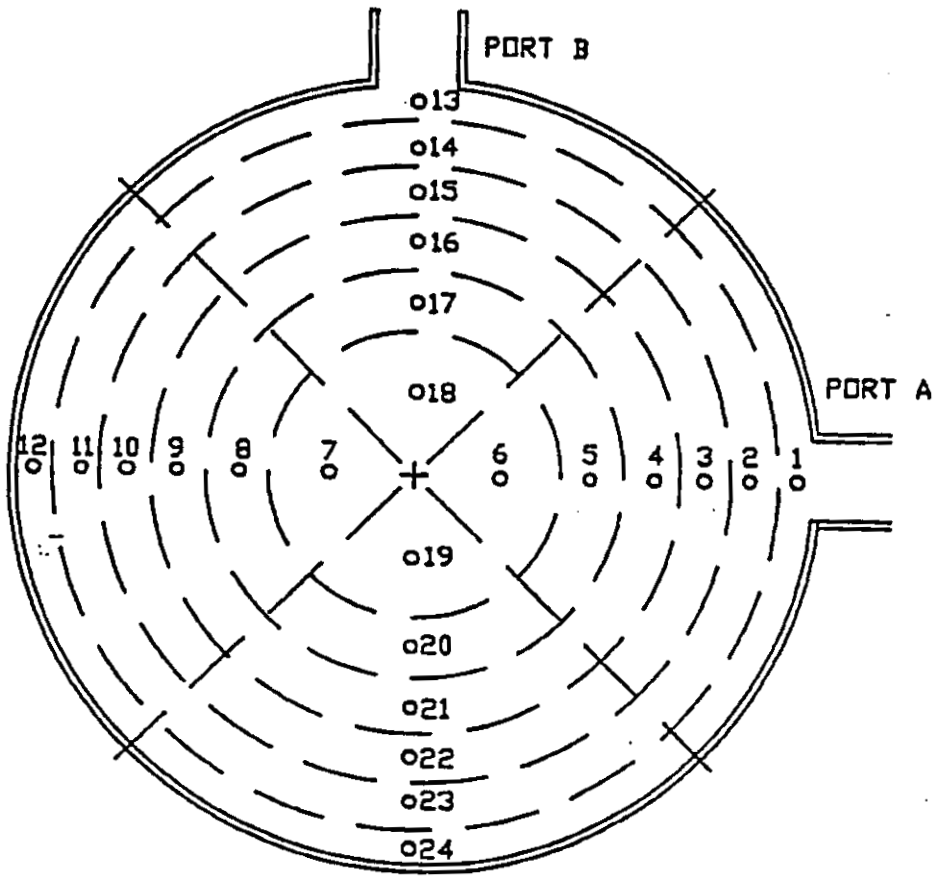
PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX #: 13	PROBE # (PITOT #):	NOZZLE #:
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔH@	PITOT COEF	IDEAL NOZZLE DIA, in.
DATE: 18 APRIL 91	AVE STATIC PRESSURE, in H_2O		METER T	PROBE LENGTH, in. 905	ACTUAL NOZZLE DIA, in.
OPERATOR: D. Cook	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL	LEAK CHECK @ PITOT'S: PC or @ 6.4 in H_2O; #4 ok @ 6.4 in H_2O
RUN #: M-3-OUT	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM@ in Hg: 0.001 @ 14 mm Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	VELOCITY HEAD (MEAS)	STACK TEMPERATURE	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
						Inlet	Outlet							
START 945	min	(V_m) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(Tm in) °F	(Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
1 24	120	123.167	0.37	0.25	64	64	63	44	AMB	0.5	20.9	0	0	0
23	130	126.32	~~0.86~~	0.58	64	63	62	44		1.0				
22	140	131.4	1.78	1.2	65	66	62	42		3.0				
21	150	138.2	2.11	1.4	64	69	63	44		3.8				
20	160	145.0	2.19	1.45	65	71	63	43		4.0				
19	170	154.0	2.06	1.36	64	73	65	48		4.1				
18	180	161.9	2.18	1.43	65	77	67	49		4.5				
17	190	170.13	2.14	1.40	65	78	69	51		4.5				
16	200	178.4	1.96	1.28	66	81	71	53		4.5				
15	210	186.7	1.53	0.99	64	84	74	54		4.0				
14	220	194.29	0.39	0.25	63	84	75	52		1.5				
13	230	197.7	0.17	0.11	59	80	77	56		1.0				
STOP 1195	240	199.228												
TOTAL														
AVERAGE			1.44	0.872	63.5	69.75								

M-3-OUT

```
NOMOGRN 3/81

ENTER DATA THEN PUSH R/S
M-3-OUT
TEST NO=?
M1.          RUN
RUN NO=?
             3.    RUN
FILTER NO=?
             0.    RUN
DELTA-H=?
          2.119    RUN
GAMMA=?
          1.011    RUN
STACK AREA, IN. SQ.=?
        874.850    RUN
STACK STATIC P, IN H2O=?
           -.737   RUN
PBAR IN HG=?
         29.990    RUN
% H2O=?
          1.000    RUN
STACK GAS WET
MW, LB/LBMOL=?
         28.000    RUN
AVG STACK TEMP, F=?
         65.000    RUN
AVG DELTA-P, IN H2O=?
           .980    RUN
RMB TEMP, F=?
         50.000    RUN
PITOT CSUBP=?
           .847    RUN
AVG STACK
VELOCITY FPM = 3,212.968

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.212

ACTUAL NOZZLE
DIA INCHES=?
           .186    RUN

SAMPLE CFM = 0.577

INITIAL METER
VOLUME FT3 =?
         50.000    RUN
**********
POINT NO. 1.
             .33 STO 01
           64.00 STO 02
           52.00 STO 03
                 RUN
DELTA H = 0.48
**********
POINT NO. 2.
             .64 STO 01
           65.00 STO 02
           53.00 STO 03
                 RUN
DELTA H = 0.93
**********
POINT NO. 3.
            1.12 STO 01
           63.00 STO 02
           59.00 STO 03
                 RUN
DELTA H = 1.66
**********
POINT NO. 4.
            1.25 STO 01
           64.00 STO 02
           64.00 STO 03
                 RUN
DELTA H = 1.86
**********
POINT NO. 5.
            1.30 STO 01
           65.00 STO 02
           67.00 STO 03
                 RUN
DELTA H = 1.94
**********
POINT NO. 6.
            1.35 STO 01
           65.00 STO 02
           68.00 STO 03
                 RUN
DELTA H = 2.02
**********
POINT NO. 7.
            1.20 STO 01
           64.00 STO 02
           70.00 STO 03
                 RUN
DELTA H = 1.93
**********
POINT NO. 8.
            1.25 STO 01
           65.00 STO 02
           72.00 STO 03
                 RUN
DELTA H = 1.89
**********
POINT NO. 9.
            1.24 STO 01
           64.00 STO 02
           73.00 STO 03
                 RUN
DELTA H = 1.88
**********
POINT NO. 10.
             .99 STO 01
           64.00 STO 02
           72.00 STO 03
                 RUN
DELTA H = 1.50
**********
POINT NO. 11.
             .33 STO 01
           59.00 STO 02
           71.00 STO 03
                 RUN
DELTA H = 0.50
**********
POINT NO. 12.
             .14 STO 01
           55.00 STO 02
           66.00 STO 03
                 RUN
DELTA H = 0.21
**********
POINT NO. 13.
             .25 STO 01
           64.00 STO 02
           64.00 STO 03
                 RUN
DELTA H = 0.37
**********
POINT NO. 14.
             .50 STO 01
           63.00 STO 03
                 RUN
DELTA H = 0.86
**********
POINT NO. 15.
            1.20 STO 01
           65.00 STO 02
           66.00 STO 03
                 RUN
DELTA H = 1.79
**********
POINT NO. 16.
            1.40 STO 01
           64.00 STO 02
           69.00 STO 03
                 RUN
DELTA H = 2.11
**********
POINT NO. 17.
            1.45 STO 01
           65.00 STO 02
           71.00 STO 03
                 RUN
DELTA H = 2.19
**********
POINT NO. 18.
            1.36 STO 01
           64.00 STO 02
           73.00 STO 03
                 RUN
DELTA H = 2.06
**********
POINT NO. 19.
            1.43 STO 01
           65.00 STO 02
           77.00 STO 03
                 RUN
DELTA H = 2.18
**********
POINT NO. 20.
            1.40 STO 01
           65.00 STO 02
           78.00 STO 03
                 RUN
DELTA H = 2.14
**********
POINT NO. 21.
            1.20 STO 01
           66.00 STO 02
           81.00 STO 03
                 RUN
DELTA H = 1.96
**********
POINT NO. 22.
             .99 STO 01
           64.00 STO 02
           84.00 STO 03
                 RUN
DELTA H = 1.53
**********
POINT NO. 23.
             .25 STO 01
           63.00 STO 02
           84.00 STO 03
                 RUN
DELTA H = 0.39
**********
POINT NO. 24.
             .11 STO 01
           59.00 STO 02
           80.00 STO 03
                 RUN
DELTA H = 0.17
**********
POINT NO. 25.
            0.00    RUN
******
ISOKIN
AVG VALUES
KV=21.373
TMETER F=69.875
DELTA-H=1.440
DELTA P=0.872
FINAL METER
VOLUME FT3=?
         199.220    RUN
INITIAL=50.000
SAMPLE TIME
MIN. =?
         240.000    RUN
PSTACK ABS
IN HG=29.926
TSTACK F=63.542
******

SOURCE TYPE?
0=OTHER
1=BOILER
            0.000    RUN
% CO2 =?
            0.000    RUN
% O2 =?
           20.900    RUN
H2O GAIN KNOWN?
1=YES 0=NO
            1.000    RUN
WEIGH IMPINGERS
HIT R/S
TO CONTINUE...
                     RUN
H2O GAIN = ?
           53.250    RUN
NET METER
VOL. FT3=
                   150.861
CORRECTED
SAMPLE VOL.
VOLUME SCF=
                   149.550
MOLE FRACT. DRY
GAS, (1-BWS) =
                     0.904
% H2O =
                     1.6
STACK GAS WET
MOL. WT, MS,
LB/LB MOL=
                    28.657
AVG VELOCITY
FPM =
                 3,167.050
STACK DRY GAS
FLOW RS  SCFM=
                19,000.704
ACFM =
                19,240.930

ISOKINETIC %I =105.1

--END RUN--
M-3-OUT
```

24 POINT SAMPLE TRAVERSE



LINE M MIDDLE - HARD CHROME PLATE

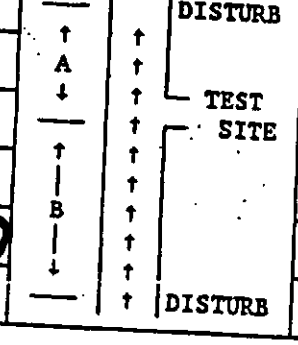
STACK DIAMETER (IN.) 33.9

TRAVERSE POINT	EPA METHOD 1 (% OF DIA)	TRAVERSE POINT LOCATION (DISTANCES FROM I.D.)
1 & 13	2.1	1.0 *
2 & 14	6.7	2.3
3 & 15	11.8	4.0
4 & 16	17.7	6.0
5 & 17	25.0	8.5
6 & 18	35.6	12.1
7 & 19	64.4	21.8
8 & 20	75.0	25.4
9 & 21	82.3	27.9
10 & 22	88.2	29.9
11 & 23	93.3	31.6
12 & 24	97.9	32.9 *

* Location adjusted.

BTWN WET SCRUBBER & FIBER BED FILTER

PRELIMINARY VELOCITY TRAVERSE DATA SHEET

DATE: 4/17/91		DISTANCE A: 0.5 ft/dia	
BASE: NAD ALAMEDA		DISTANCE B: 3 ft/dia	
BUILDING NO: 32		TPAVERSE PTS REQ'D: 24	
LINE NO: M (Chrome Plate)		TRAVERSE PTS USED, n: 24	
SCRUBBER: ~~MID~~ MID		CIRCULAR DIAMETER: 33.7/8 in	
READINGS BY: COCK		RECTANGULAR L x W: in	

MID

	STACK PRESSURES (inches H_2O) ΔP_{vel}	P_{stat}	$\sqrt{\Delta P}$	CYCLONIC FLOW $\lvert\alpha\rvert°$
1	0.52	4.1	.72	
2	0.52	3.99	.72	
3	0.60	3.98	.78	
4	0.66	4.03	.81	
5	0.74	4.10	.86	
6	0.81	4.11	.9	
7	0.86	4.15	.93	
8	0.80	4.13	.89	
9	0.71	4.12	.84	
10	0.66	4.10	.81	
11	0.63	4.10	.79	
12	0.62	4.09	.79	

	STACK PRESSURES (inches H_2O) ΔP_{vel}	P_{stat}	$\sqrt{\Delta P}$	CYCLONIC FLOW $\lvert\alpha\rvert°$
13	0.50		.707	
14	0.41		.640	
15	0.59		.768	
16	0.66		.812	
17	0.74		.860	
18	0.80		.894	
19	0.85		.922	
20	0.81		.900	
21	0.71		.843	
22	0.68		.825	
23	0.65		.806	
24	0.63		.794	

.733

AVERAGE VELOCITY HEAD $\Delta P = [(\Sigma\sqrt{\Delta P})/n]^2 =$ 0.668

AVERAGE STATIC PRESSURE $= (\Sigma P_{stat})/n =$ 4.083

AVERAGE CYCLONIC FLOW ANGLE $= (\Sigma\alpha)/n =$ _____

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/16/91

LINE NO: M

BASE: NAD ALAMEDA

RUN NO: M-1-MID

BUILDING NO: 32

CONTROL DEVICE: ~~PRE-TEST~~

PREP BY: [illegible]

IMPINGER BOX NO: 4

[✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO_3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.

[✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.

[✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.

[✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.

[✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.

[✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.

[ ] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
4-1	1. 100ml 0.1N NaOH	500.7	611.53	635.64	24.11
4-2	2. 100ml 0.1N NaOH	512.8	618.34	632.32	~~14.0~~ 13.98
4-3	3. Empty	502.91	—	505.10	2.19
4-4	4. 500ml silica gel	—	916.03	957.13	41.10
				Net Weight Gain	81.38

Filter No: 0

Silica gel condition: Before test KEW After test 50% SPENT

Nozzle No: Q#11 Calibrated by: [illegible]

					Average
ID Before Test:	0.234	0.234	0.233	0.233	0.234
ID After Test:	0.234	0.233	0.232	0.233	0.233

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

A = 901.26 in² (33.875 DIA)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg: 29.925		METER BOX #: 17	PROBE # (PITOT #): 3-7	NOZZLE #: @ #11
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 71		METER ΔH@: 2.007	PITOT COEF: 0.833	IDEAL NOZZLE DIA, in.: 0.227
DATE: 4/17/91	AVE STATIC PRESSURE, in H_2O: -4.08		METER γ: 1.012	PROBE LENGTH, in.: 36	ACTUAL NOZZLE DIA, in.: 0.234
OPERATOR: D. COOK	AVE VEL HEAD, in H_2O: 0.668		SAMPLE BOX #: 2	PROBE LINER MATERIAL: GLASS	LEAK CHECK @ PITOT'S: @ Steady @ 4.7 in H_2O + " 5.3 in H_2O
RUN #: M-1 + MID	ASSUMED MOISTURE, %: 1.8	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A	LEAK RATE CFM@ in Hg: 0.005 cfm @ 15 in Hg

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC)	(A) VELOCITY HEAD (MEAS)	STACK TEMPERATURE (B)	GAS SAMPLE TEMPERATURE AT DRY GAS METER		IMPINGER TEMPERATURE	SAMPLE BOX TEMPERATURE	SAMPLE VACUUM	O_2	CO_2	CO	NOX
1335	min	(V_m) ft^3	(ΔH) in H_2O	(ΔP) in H_2O	(Ts) °F	(C) Inlet (Tm in) °F	Outlet (Tm out) °F	°F	°F	in Hg	%	%	ppm	ppm
12	0	660.897	2.23	0.67	70	60	70	63	AMB.	3.0	20.9	0	0	0
11	10	669.0	2.44	0.70	60	75	72	52		3.0				
10	20	677.22	2.46	0.70	60	78	71	58		3.0				
9	30	685.77	2.72	0.77	60	81	73	61.		3.4				
8	40	694.51	2.98	0.84	60	84	75	63		3.5				
7	50	703.59	3.25	0.91	60	87	78	60		3.8				
6	60	713.15	3.01	0.84	60	90	80	60		3.6				
5	70	722.5	2.61	0.73	61	90	81	57		3.1				
4	80	731.31	2.41	0.67	60	91	82	57		3.0				
3	90	739.74	2.08	0.58	61	91	83	57		2.8				
2	100	747.53	1.58	0.44	61	92	84	58		2.2				
1	110	754.4	2.15	0.60	61	90	84	57		2.8				
1535	120	761.963												
TOTAL														

SOURCE EMISSION TESTING DATA SHEET

(SJS rev11/88, #02510)

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg		METER BOX #	PROBE # (PITOT #)	NOZZLE #		
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F		METER ΔI@	PITOT COEF	IDEAL NOZZLE DIA, in.		
DATE: 4/17/91	AVE STATIC PRESSURE, in H_2O		METER γ	PROBE LENGTH, in.	ACTUAL NOZZLE DIA, in.		
OPERATOR: D. COOK	AVE VEL HEAD, in H_2O		SAMPLE BOX #	PROBE LINER MATERIAL: SS	LEAK CHECK @ PITOT'S: steady @ 6 in H_2O		
RUN #: M-1-MID	ASSUMED MOISTURE, %	SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)	HEATER BOX SETTING	PROBE HEATER SETTING	LEAK RATE CFM @ in Hg: 0.007 cfm @ 11 in Hg		

TRAVERSE POINT #	SAMPLING TIME	GAS METER READING	ORIFICE PRESSURE (CALC) (A) (ΔH) in H_2O	VELOCITY HEAD (MEAS) (ΔP) in H_2O	STACK TEMPERATURE (D) (Ts) °F	GAS SAMPLE TEMPERATURE AT DRY GAS METER (C) Inlet (Tm in) °F	Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
START 15:45	min	(Vm) ft^3												
24	120	761.963	2.41	0.68	60	83	83	59	AMB	3.0	20.9	0	0	0
23	130	770.27	2.52	0.71	60	85	81	50		3.0				
22	140	778.79	2.63	0.74	60	85	80	53		3.2				
21	150	787.5	2.78	0.78	59	85	80	51		3.2				
20	160	796.37	2.95	0.83	60	85	79	52		3.5				
19	170	805.53	3.18	0.89	60	87	80	55		3.7				
18	180	815.0	2.98	0.83	60	90	81	57		3.6				
17	190	824.32	2.65	0.74	62	91	82	58		3.2				
16	200	833.13	2.41	0.67	60	91	83	57		3.0				
15	210	841.53	2.04	0.57	61	91	84	58		2.8				
14	220	849.30	1.58	0.44	62	91	84	59		2.3				
13	230	856.19	3.00	0.84	62	90	84	59		3.5				
STOP 17:45	240	865.319												
TOTAL	A	206.875												
AVERAGE			2.53	0.706	60.8	86.0								

M-1-MID

```
MONOKIN 3/91

ENTER DATA THEN PUSH R/S
M-1-MID
TEST NO=?
M.K.                    RUN
RUN NO=?
1.                      RUN
FILTER NO=?
0.                      RUN
DELTA-H=?
2.087                   RUN
GAMMA=?
1.012                   RUN
STACK AREA, IN. SQ.=?
0.000                   CLX
901.268                 RUN
STACK STATIC P, IN H2O=?
-4.000                  RUN
PBAR IN HG=?
29.925                  RUN
% H2O=?
1.000                   RUN
STACK GAS WET
MW, LB/LBMOL=?
28.000                  RUN
AVG STACK TEMP, F=?
60.000                  RUN
AVG DELTA-P, IN H2O=?
.660                    RUN
AMB TEMP, F=?
70.000                  RUN
PITOT CSUBP=?
.833                    RUN
AVG STACK
VELOCITY FPM = 2,743.886

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.227

ACTUAL NOZZLE
DIA INCHES=?
.234                    RUN

SAMPLE CFM = 0.000

--BEGIN RUN--

ENTER DATA AS:

STO A = DELTA-P
STO B = T-STACK
STO C = T-METER

TO CORRECT
ERROR, RE-ENTER
ALL VALUES AS
NEGATIVES

TO CHECK
ISOKIN, HIT
SST, R/S

TO END RUN,
HIT 0, R/S

INITIAL METER
VOLUME FT3 =?
660.097                 RUN
**********
POINT NO. 1.
.67 STO 01
70.00 STO 02
60.00 STO 03
RUN
DELTA H = 2.23
**********
POINT NO. 2.
.70 STO 01
60.00 STO 02
75.00 STO 03
RUN
DELTA H = 2.44
**********
POINT NO. 3.
70.00 STO 03
RUN
DELTA H = 2.46
**********
POINT NO. 4.
.77 STO 01
81.00 STO 03
RUN
DELTA H = 2.72
**********
POINT NO. 5.
.84 STO 01
84.00 STO 03
RUN
DELTA H = 2.98
**********
POINT NO. 6.
.91 STO 01
87.00 STO 03
RUN
DELTA H = 3.25
**********
POINT NO. 7.
.84 STO 01
90.00 STO 03
RUN
DELTA H = 3.01
**********
POINT NO. 8.
.73 STO 01
61.00 STO 02
RUN
DELTA H = 2.61
**********
POINT NO. 9.
.67 STO 01
60.00 STO 02
91.00 STO 03
RUN
DELTA H = 2.41
**********
POINT NO. 10.
.50 STO 01
61.00 STO 02
RUN
DELTA H = 2.00
**********
POINT NO. 11.
.44 STO 01
92.00 STO 03
RUN
DELTA H = 1.58
**********
POINT NO. 12.
.60 STO 01
90.00 STO 03
RUN
DELTA H = 2.15
**********
POINT NO. 13.
.68 STO 01
60.00 STO 02
83.00 STO 03
RUN
DELTA H = 2.41
**********
POINT NO. 14.
.71 STO 01
85.00 STO 03
RUN
DELTA H = 2.52
**********
POINT NO. 15.
.74 STO 01
RUN
DELTA H = 2.63
**********
POINT NO. 16.
.78 STO 01
59.00 STO 02
RUN
DELTA H = 2.78
**********
POINT NO. 17.
.83 STO 01
60.00 STO 02
RUN
DELTA H = 2.95
**********
POINT NO. 18.
.89 STO 01
87.00 STO 03
RUN
DELTA H = 3.18
**********
POINT NO. 19.
.83 STO 01
90.00 STO 03
RUN
DELTA H = 2.90
**********
POINT NO. 20.
.74 STO 01
62.00 STO 02
91.00 STO 03
RUN
DELTA H = 2.65
**********
POINT NO. 21.
.67 STO 01
60.00 STO 02
RUN
DELTA H = 2.41
**********
POINT NO. 22.
.57 STO 01
61.00 STO 02
RUN
DELTA H = 2.04
**********
POINT NO. 23.
.44 STO 01
62.00 STO 02
RUN
DELTA H = 1.58
**********
POINT NO. 24.
.84 STO 01
90.00 STO 03
RUN
DELTA H = 3.00
**********
POINT NO. 25.
0.00    RUN
======
ISOKIN
AVG VALUES
KV=19.225
TMETER F=85.958
DELTA-H=2.544
DELTA P=0.710
FINAL METER
VOLUME FT3=?
865.319     RUN
INITIAL=660.097
SAMPLE TIME
MIN. =?
240.000     RUN
PSTACK ABS
IN HG=29.625
TSTACK F=60.833
======

SOURCE TYPE?
0=OTHER
1=BOILER
0.000       RUN
% CO2 =?
0.000       RUN
% O2 =?
20.900      RUN
H2O GAIN KNOWN?
1=YES 0=NO
1.000       RUN
WEIGH IMPINGERS
HIT R/S
TO CONTINUE...
RUN
H2O GAIN = ?
81.300      RUN
WET METER
VOL. FT3=
205.875

CORRECTED
SAMPLE VOL.
VMSTD  SCF=
198.086

MOLE FRACT. DRY
GAS. (1-BWS) =
0.981
% H2O =
1.9
STACK GAS WET
MOL. WT. MS,
LB/LB MOL=
28.630
AVG VELOCITY
FPM =
2,817.165
STACK DRY GAS
FLOW QS  SCFM=
17,355.399
ACFM =
17,631.930

ISOKINETIC %I =99.6

--END RUN--
```

CHROMIUM EMISSION TEST
IMPINGER BOX SET UP & NOZZLE CALIBRATION SHEET

DATE: 4/18/91 LINE NO: M HARD CHROME

BASE: NAD ALAMEDA RUN NO: M-2-MID

BUILDING NO: 32 CONTROL DEVICE: ~~INLET OUTLET~~

PREP BY: C Yee IMPINGER BOX NO: 2

- [✓] 1. Initially wash all glassware as follows; detergent wash, deionized water rinse, 1:1 HNO3 solution rinse, deionized water rinse, and 0.1N NaOH solution rinse. Sample recovery preps glassware for next use.
- [✓] 2. Add 100ml 0.1N NaOH solution in the first two impingers (standard Greenburg-Smith impingers). Record initial weights.
- [✓] 3. The third impinger (modified Greenburg-Smith) is dry. Record initial weight.
- [✓] 4. The fourth impinger (modified Greenburg-Smith) contains about 1 liter of indicating type silica gel. Record initial weight.
- [✓] 5. Place teflon coated filter into filter holder and install between the third and fourth impingers. Record filter number. It is not necessary to weigh filter.
- [✓] 6. Assemble impinger bottles and glass elbows (180s) so that air flows from a smaller to larger holes (if applicable). Do not use grease on balljoint fittings.
- [✓] 7. Calibrate nozzle by measuring four IDs with a micrometer.

Impinger No.	Contents	Tare	Initial	Final	Condensate
2-1	1. 100ml 0.1N NaOH	455.19	556.39	586.65	30.26
2-2	2. 100ml 0.1N NaOH	445.32	550.25	555.69	5.44
2-3	3. Empty	500.69	—	501.34	0.65
2-4	4. 500ml silica gel	—	859.50	848.00	38.50
				Net Weight Gain	74.85

Filter No: 0

Silica gel condition: Before test NEW After test 60% Spent

Nozzle No: Q-11 Calibrated by: DAC

					Average
ID Before Test:	0.234	0.233	0.232	0.233	0.233
ID After Test:	0.234	0.233	0.232	0.233	0.233

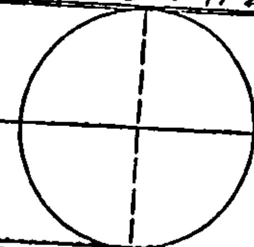
(SJS rev11/88, #02510)

SOURCE EMISSION TESTING DATA SHEET

A = 901.26 IN² (33.875) DIA

PLANT: BLDG 32	BAROMETRIC PRESSURE, in Hg: 29.980	METER BOX #: 17	PROBE # (PITOT #): 3N-200
LOCATION: NAD ALAMEDA	AMBIENT TEMPERATURE, °F: 57°	METER ΔH@: 2.007	PITOT COEF: 0.826
DATE: 4/18/91	AVE STATIC PRESSURE, in H2O: -4.08	METER γ: 1.012	PROBE LENGTH, in.: 36
OPERATOR: Quil	AVE VEL HEAD, in H2O: 0.706	SAMPLE BOX #: 2	PROBE LINER MATERIAL: GLASS
RUN #: M-2-MID	ASSUMED MOISTURE, %: 1.9	HEATER BOX SETTING: N/A	PROBE HEATER SETTING: N/A
NOZZLE #: Q#11	IDEAL NOZZLE DIA, in.: 0.226	ACTUAL NOZZLE DIA, in.: 0.233	LEAK CHECK @ PITOT'S: [illegible] ok [illegible] @ 5.9 in H2O
LEAK RATE CFM@ in Hg: 0.003 @ 10 in Hg			

SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)



TRAVERSE POINT #	SAMPLING TIME (min)	GAS METER READING (Vm) ft³	ORIFICE PRESSURE (CALC) (ΔH) in H2O	VELOCITY HEAD (MEAS) (ΔP) in H2O	STACK TEMPERATURE (Ts) °F	GAS SAMPLE TEMP AT DRY GAS METER Inlet (Tm in) °F	Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O2 %	CO2 %	CO ppm	NOX ppm
START TIME 0730														
12	0	865.566	2.23	0.67	58	66	65	54	AMB	5.7	20.9	0	0	0
11	10	873.3	2.24	0.67	58	70	67	46		6.0				
10	20	881.256	2.40	0.71	57	76	69	49		6.2				
9	30	[illegible]1.657	2.93	0.86	59	80	71	50		7.4				
8	40	899.2	2.78	0.81	59	84	74	51		7.2				
7	50	908.332	2.49	0.72	59	88	77	53		6.7				
6	60	910.127	1.66	0.48	59	88	78	51		5.0				
5	70	924.287	1.83	0.53	59	87	77	56		5.2				
4	80	931.551	1.55	0.45	63	89	81	51		5.0				
3	90	935.65	1.84	0.54	64	87	81	52		5.3				
2	100	946.162	1.95	0.57	65	88	82	51		5.8				
1	110	954.149	2.28	0.67	68	89	83	52		5.9				
STOP TIME 0930	120	962.356												
TOTAL														

(SJS rev11/88, #02510)

SOURCE EMISSION TESTING DATA SHEET

PLANT BLDG 32	BAROMETRIC PRESSURE, in Hg	METER BOX #	PROBE # (PITOT #)
LOCATION NAD ALAMEDA	AMBIENT TEMPERATURE, °F	METER ΔH@	PITOT COEF
DATE 4/18/91	AVE STATIC PRESSURE, in H_2O	METER γ	PROBE LENGTH, in.
OPERATOR Gaul	AVE VEL HEAD, in H_2O	SAMPLE BOX #	PROBE LINER MATERIAL SS
RUN # M-2-MID (CONT)	ASSUMED MOISTURE, %	HEATER BOX SETTING	PROBE HEATER SETTING

NOZZLE #

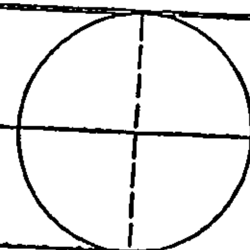
IDEAL NOZZLE DIA, in.

ACTUAL NOZZLE DIA, in.

LEAK CHECK @ PITOT'S: OK @ 6.5 in Hg / OK @ 5 in Hg

LEAK RATE CFM@ in Hg: 0.004 cfm @ 10 in Hg

SCHEMATIC OF STACK CROSS SECTION (SHOW TRAVERSE PTS)



TRAVERSE POINT #	SAMPLING TIME min	GAS METER READING (Vm) ft³	ORIFICE PRESSURE (CALC) (ΔH) in H_2O	(A) VELOCITY HEAD (MEAS) (ΔP) in H_2O	(B) STACK TEMPERATURE (Ts) °F	(C) GAS SAMPLE TEMPERATURE AT DRY GAS METER Inlet (Tm in) °F	Outlet (Tm out) °F	IMPINGER TEMPERATURE °F	SAMPLE BOX TEMPERATURE °F	SAMPLE VACUUM in Hg	O_2 %	CO_2 %	CO ppm	NOX ppm
START TIME 0935														
24	120	962.396	2.16	0.63	58	83	83	53						
23	130	970.438	2.24	0.65	59	87	83	45	AMB	5.8	20.9	0	0	0
22	140	978.786	2.39	0.69	59	90	83	47		6.0				
21	150	987.712	2.56	0.72	59	91	84	47		6.3				
20	160	996.668	2.72	0.78	59	93	85	49		6.7				
19	170	1005.751	2.91	0.855	59	92	85	48		7.0				
18	180	1015.700	2.68	0.77	58	92	85	48		7.4				
17	190	1024.780	2.13	0.61	58	92	86	48		6.9				
16	200	1033.000	1.65	0.475	60	92	86	49		6.0				
15	210	1040.327	1.42	0.41	60	92	86	48		5.0				
14	220	1046.871	1.18	0.34	60	91	86	49		4.6				
13	230	1052.763	1.07	0.31	60	90	86	48		4.0				
STOP 1135	240	1058.632												
TOTAL														
AVERAGE			2.135	0.611	60	86.5								

M-2-MID

```
HOMOKIN 3/91

ENTER DATA
THEN PUSH R/S

TEST NO=?
          M    RUN
RUN NO.=?
          2.   RUN
FILTER NO=?
          0.   RUN
DELTA-H@AT = ?
        2.007  RUN
METER GAMMA = ?
        1.012  RUN
STACK AREA
IN. SQ. = ?
       901.268 RUN
STACK STATIC
P IN H2O=?
       -4.888  RUN
PBAR IN HG=?
       29.980  RUN
% H2O=?
        1.980  RUN
STACK GAS WET
MOL WT. MS,
LB/LB MOL=?
       28.880  RUN
AVG STACK
TEMP DEG F=?
       58.888  RUN
AVG DELTA-P
IN. H2O=?
         .786  RUN
AMBIENT
TEMP F=?
       59.888  RUN
PITOT TUBE
CSUBP=?
         .826  RUN
AVG STACK
VELOCITY FPM = 2,767.964

FOR 0.75 CFM
IDEAL NOZZLE
DIA INCHES= 0.226

ACTUAL NOZZLE
DIA INCHES=?
         .233  RUN

SAMPLE CFM = 0.798
```

MID

```
INITIAL METER
VOLUME FT3 =?
       865.566  RUN
••••••••••••••••
POINT NO. 1.
          .67 STO 01
        58.00 STO 02
        66.00 STO 03
              RUN
DELTA H = 2.23
••••••••••••••••
POINT NO. 2.
          .67 STO 01
        58.00 STO 02
        70.00 STO 03
              RUN
DELTA H = 2.24
••••••••••••••••
POINT NO. 3.
          .71 STO 01
        59.00 STO 02
        76.00 STO 03
              RUN
DELTA H = 2.40
••••••••••••••••
POINT NO. 4.
          .86 STO 01
        59.00 STO 02
        80.00 STO 03
              RUN
DELTA H = 2.93
••••••••••••••••
POINT NO. 5.
          .81 STO 01
        59.00 STO 02
        84.00 STO 03
              RUN
DELTA H = 2.78
••••••••••••••••
POINT NO. 6.
          .72 STO 01
        59.00 STO 02
        88.00 STO 03
              RUN
DELTA H = 2.49
••••••••••••••••
POINT NO. 7.
          .48 STO 01
        59.00 STO 02
        88.00 STO 03
              RUN
DELTA H = 1.66
••••••••••••••••
POINT NO. 8.
          .53 STO 01
        59.00 STO 02
        87.00 STO 03
              RUN
DELTA H = 1.83
••••••••••••••••
POINT NO. 9.
          .45 STO 01
        63.00 STO 02
        89.00 STO 03
              RUN
DELTA H = 1.55
••••••••••••••••
POINT NO. 10.
          .54 STO 01
        64.00 STO 02
        87.00 STO 03
              RUN
DELTA H = 1.84
••••••••••••••••
POINT NO. 11.
          .57 STO 01
        63.00 STO 02
        88.00 STO 03
              RUN
DELTA H = 1.95
••••••••••••••••
POINT NO. 12.
          .67 STO 01
        60.00 STO 02
        89.00 STO 03
              RUN
DELTA H = 2.28
••••••••••••••••
POINT NO. 13.
          .63 STO 01
        58.00 STO 02
        83.00 STO 03
              RUN
DELTA H = 2.16
••••••••••••••••
POINT NO. 14.
          .65 STO 01
        59.00 STO 02
        87.00 STO 03
              RUN
DELTA H = 2.24
••••••••••••••••
POINT NO. 15.
          .69 STO 01
        59.00 STO 02
        90.00 STO 03
              RUN
DELTA H = 2.39
••••••••••••••••
POINT NO. 16.
          .72 STO 01
        59.00 STO 02
        91.00 STO 03
              RUN
DELTA H = 2.50
••••••••••••••••
POINT NO. 17.
          .70 STO 01
        59.00 STO 02
        93.00 STO 03
              RUN
DELTA H = 2.72
••••••••••••••••
POINT NO. 18.
         .835 STO 01
        59.00 STO 02
        92.00 STO 03
              RUN
DELTA H = 2.91
••••••••••••••••
POINT NO. 19.
          .77 STO 01
        58.00 STO 02
        92.00 STO 03
              RUN
DELTA H = 2.68
••••••••••••••••
POINT NO. 20.
          .61 STO 01
        58.00 STO 02
        92.00 STO 03
              RUN
DELTA H = 2.13
••••••••••••••••
POINT NO. 21.
         .475 STO 01
        60.00 STO 02
        92.00 STO 03
              RUN
DELTA H = 1.65
••••••••••••••••
POINT NO. 22.
          .41 STO 01
        60.00 STO 02
        92.00 STO 03
              RUN
DELTA H = 1.42
••••••••••••••••
POINT NO. 23.
          .34 STO 01
        60.00 STO 02
        91.00 STO 03
              RUN
DELTA H = 1.18
••••••••••••••••
POINT NO. 24.
          .31 STO 01
        60.00 STO 02
        90.00 STO 03
              RUN
DELTA H = 1.07
••••••••••••••••
POINT NO. 25.
          0.00  RUN
======
ISOKIN
AVG VALUES
KV=17.021
TMETER F=86.542
DELTA-H=2.135
DELTA P=0.611
FINAL METER
VOLUME FT3=?
       1,058.632  RUN
INITIAL=865.566
SAMPLE TIME
MIN. =?
         240.000  RUN
PSTACK ABS
IN HG=29.680
TSTACK F=59.075
======

SOURCE TYPE?
0=OTHER
1=BOILER
          0.000  RUN
% CO2 =?
          0.000  RUN
% O2 =?
         20.900  RUN

H2O GAIN KNOWN?
1=YES 0=NO
          1.000  RUN
WEIGH IMPINGERS
HIT R/S
TO CONTINUE...

                 RUN
H2O GAIN = ?
         74.850  RUN
WET METER
VOL. FT3=
        195.383
CORRECTED
SAMPLE VOL.
VMSTD  SCF=
        187.229
MOLE FRACT. DRY
GAS. (1-BWS) =
          0.902
% H2O =
          1.0
STACK GAS WET
MOL. WT, MS,
LB/LB MOL=
         28.636
AVG VELOCITY
FPM =
      2,586.026
STACK DRY GAS
FLOW RS  SCFM=
       16,883.571
ACFM =
       16,190.299

ISOKINETIC %I =103.0
M-2-MID
--END RUN--
```

APPENDIX D

TEST RESULTS
SAMPLE CALCULATIONS

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TEST RESULTS BASED ON TMA/ARLI TOTAL CHROME ANALYSIS

TEST	CHROMIUM SAMPLE WEIGHT (mg)	AIR SAMPLE VOLUME (m3)	CHROMIUM EMISSION RATE (mg/hr)	AVERAGE AMPERES (Amp)	CHROMIUM EMISSION FACTOR (mg/Amp-hr)
G-1-OUT	< 0.00038	4.583	< 4.066	996	< 0.0041
G-2-OUT	< 0.00038	4.428	< 4.347	996	< 0.0044
G-3-OUT	< 0.00042	4.047	< 4.969	1274	< 0.0039
G-4-OUT	< 0.00047	4.302	< 5.375	1274	< 0.0042
AVERAGE			< 4.689		< 0.0041
L-1-OUT	< 0.00040	3.160	< 6.528	9812	< 0.0007
L-2-OUT	0.00128	3.426	18.662	9812	0.0019
L-3-OUT	< 0.00045	4.644	< 4.701	10640	< 0.0004
AVERAGE			< 9.964		< 0.0010
M-1-OUT	0.00322	8.993	11.280	9387	0.0012
M-2-OUT	< 0.00048	4.301	< 3.524	9406	< 0.0004
M-3-OUT	< 0.00042	4.235	< 3.194	9362	< 0.0003
AVERAGE			< 5.999		< 0.0006
M-1-MID	0.78738	5.610	4139.2	9406	0.4401
M-2-MID	1.03569	5.302	5311.6	9362	0.5674
AVERAGE			4725.4		0.5037

CHROMIUM EMISSION TEST DATA

TEST	DATE	NOZZLE DIA. (in.)	SAMPLE TIME (min.)	AIR SAMPLE VOLUME (dscf)	% H2O (%)	STACK FLOW (dscfm)	STACK VELOCITY (fpm)	ISOKIN (%)
G-1-OUT	15APR91	0.198	240	161.82	1.8	28727	3106	103.1
G-2-OUT	15APR91	0.192	240	156.37	1.7	30090	3247	101.2
G-3-OUT	16APR91	0.186	240	142.90	1.9	28263	3061	104.9
G-4-OUT	16APR91	0.191	240	151.91	1.9	28705	3115	104.1
L-1-OUT	15APR91	0.184	180	111.57	1.7	30432	3284	103.6
L-2-OUT	15APR91	0.195	180	120.96	1.6	29475	3171	103.3
L-3-OUT	16APR91	0.198	240	163.97	1.8	28745	3112	104.4
M-1-OUT	17APR91	0.195	480	317.55	1.8	18549	3092	104.4
M-2-OUT	17APR91	0.191	240	151.88	1.9	18421	3081	104.9
M-3-OUT	18APR91	0.186	240	149.55	1.6	19081	3167	105.1
M-1-MID	17APR91	0.234	240	198.09	1.9	17355	2817	99.6
M-2-MID	18APR91	0.233	240	187.23	1.8	16004	2587	103.0

RESULTS BASED ON ATI TOTAL CHROME ANALYSIS

TEST	CHROMIUM SAMPLE WEIGHT (mg)	AIR SAMPLE VOLUME (m3)	CHROMIUM EMISSION RATE (mg/hr)	AVERAGE AMPERES (Amp)	CHROMIUM EMISSION FACTOR (mg/Amp-hr)
G-1-OUT	< 0.00191	4.583	< 20.3	996	< 0.0204
G-2-OUT	< 0.00215	4.428	< 24.9	996	< 0.0249
G-3-OUT	< 0.00209	4.047	< 24.8	1274	< 0.0195
G-4-OUT	< 0.00237	4.302	< 26.9	1274	< 0.0211
AVERAGE			< 24.2		< 0.0215
L-1-OUT	< 0.00199	3.160	< 32.6	9812	< 0.0033
L-2-OUT	< 0.00199	3.426	< 29.1	9812	< 0.0030
L-3-OUT	< 0.00223	4.644	< 23.5	10640	< 0.0022
AVERAGE			< 28.4		< 0.0028
M-1-OUT	< 0.00297	8.993	< 10.4	9387	< 0.0011
M-2-OUT	< 0.00257	4.301	< 18.7	9406	< 0.0020
M-3-OUT	< 0.00209	4.235	< 16.0	9362	< 0.0017
AVERAGE			< 15.0		< 0.0016
M-1-MID	0.79832	5.610	4196.7	9406	0.4462
M-2-MID	1.06030	5.302	5437.8	9362	0.5808
AVERAGE			4817.3		0.5135

TEST RESULTS BASED ON ATI HEX CHROME ANALYSIS

TEST	CHROMIUM AIR SAMPLE WEIGHT (mg)	CHROMIUM SAMPLE VOLUME (m3)	EMISSION RATE (mg/hr)	CHROMIUM AVERAGE AMPERES (Amp)	EMISSION FACTOR (mg/Amp-hr)
G-1-OUT	< 0.00382	4.583	< 40.657	996	< 0.0408
G-4-OUT	< 0.00474	4.302	< 53.750	1274	< 0.0422
AVERAGE			< 47.204		< 0.0415
L-2-OUT	< 0.00398	3.426	< 58.119	9812	< 0.0059
L-3-OUT	< 0.00447	4.644	< 47.012	10640	< 0.0044
AVERAGE			< 52.565		< 0.0052
M-1-OUT	< 0.00556	8.993	< 19.499	9387	< 0.0021
M-3-OUT	< 0.00417	4.235	< 31.944	9362	< 0.0034
AVERAGE			< 25.722		< 0.0027
M-1-MID	0.68196	5.610	3585	9406	0.3811
M-2-MID	0.83503	5.302	4282	9362	0.4574
AVERAGE			3934		0.4193

EMISSION RESULTS
SAMPLE CALCULATIONS
TEST M-1-OUTLET (TOTAL CHROMIUM)

CHROMIUM WEIGHT = Σ_n [analysis volume (l) * lab analysis (mg/l)]
Where: n = probe, impinger 1, and impinger 2

Example:
Emission Weight = [0.1945 (l) * 0.0100 (mg/l)] + [0.1737 (l) * 0.0040 (mg/l)]
+ [0.1882 (l) * 0.0040 (mg/l)] = 0.0032 (mg)

EMISSION CONCENTRATION = chromium weight (mg) / air sample volume (DSCF)

Example:
Emission Concentration = 0.0032 (mg) / 317.55 (DSCF)
= 1.014E-5 (mg/DSCF)

EMISSION RATE = emission concentration (mg/DSCF) * stack flow rate (DSCFM)
* 60 (min/hr)

Example:
Emission Rate = 1.014E-5 (mg/DSCF) * 18549 (DSCFM)
* 60 (min/hr) = 11.28 (mg/hr)

EMISSION RATE = emission rate (mg/hr) / average amperes (Amp)

Example:
Emission Rate = 11.28 (mg/hr) / 9387 (Amp) = 0.0012 (mg/Amp-hr)

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APPENDIX E

MISCELLANEOUS DOCUMENTS

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT

January 4, 1990

Commander, Western Division
Naval Facilities Engineering Command
P.O. Box 727
San Bruno, CA 94066-0720

Attention: Ron Sommer, Code 1824RS

Application Number: 574
Equipment Location: NAS, Alameda

Gentlemen:

This is your Authority to Construct the following:

S3201	Chrome Anodizing Tank (G1), 2400 gal., 2000 amperes, Bldg 32, abated by A3207, Scrubber/Fiber Filter System, Viron, 23,976 CFM;
S3202	Chrome Anodizing Tank (G2), 1200 gal., 1500 amperes, Bldg 32, abated by A3207, Scrubber/Fiber Filter System, Viron, 23,976 CFM;
S3203	Chrome Plating Tank (L1), 1400 gal., 5000 amperes, Bldg 32, abated by A3212, Scrubber/Fiber Filter System, Viron, 24,785 CFM;
S3204	Chrome Plating Tank (L2), 1400 gal., 5000 amperes, Bldg 32, abated by A3212, Scrubber/Fiber Filter System, Viron, 24,785 CFM;
S3205	Chrome Plating Tank (L3/4), 1500 gal., 5000 amperes, Bldg 32, abated by A3212, Scrubber/Fiber Filter System, Viron, 24,785 CFM;
S3206	Chrome Plating Tank (M1), 700 gal., 2500 amperes, Bldg 32, abated by A3213, Scrubber/Fiber Filter System, Viron, 14,285 CFM;
S3207	Chrome Plating Tank (M2), 700 gal., 2500 amperes, Bldg 32, abated by A3213, Scrubber/Fiber Filter System, Viron, 14,285 CFM;
S3208	Chrome Plating Tank (M3), 700 gal., 2500 amperes, Bldg 32, abated by A3213, Scrubber/Fiber Filter System, Viron, 14,285 CFM;
S3209	Chrome Plating Tank (M4), 700 gal., 2500 amperes, Bldg 32, abated by A3213, Scrubber/Fiber Filter System, Viron, 14,285 CFM;
S3210	Vapor Solvent Cleaner (H1) with freezing freeboard chiller, Bldg 32;
S3211	Vapor Solvent Cleaner (S9) with freezing freeboard chiller, Bldg 32;

Enclosure (1)

939 ELLIS STREET • SAN FRANCISCO, CALIFORNIA 94109 • (415) 771-6000

S3212 Solvent Wipe Cleaning Operations, Bldg 32;

S3221 Abrasive Blasting Glovebox, Universal ABM, PDH-DC500, Bldg 32, abated by A3221, Cyclone/Baghouse, Universal, 900 CFM;

S3222 Abrasive Blasting Glovebox, Universal ABM, PDH-DC500, Bldg 32, abated by A3222, Cyclone/Baghouse, Universal, 900 CFM;

S3223 Abrasive Blasting Glovebox, Universal ABM, PDH-DC500, Bldg 32, abated by A3223, Cyclone/Baghouse, Universal, 900 CFM;

S3224 Abrasive Blasting Glovebox, Universal ABM, PDH-DC200, Bldg 32, abated by A3224, Cyclone/Baghouse, Universal, 900 CFM;

S3225 Abrasive Blasting Glovebox, Universal ABM, PDH-DC200, Bldg 32, abated by A3225, Cyclone/Baghouse, Universal, 900 CFM.

Operation of this equipment will be subject to the specific conditions attached to this Conditional Authority to Construct.

Notification

Please notify the District by letter at least three days before the initial operation of the equipment is to take place so that we may observe the equipment in operation and verify conformance with the Authority to Construct. Operation includes any start-up of the source for testing or other purposes. Operation of equipment without prior written notification to the District or beyond the start-up period without a Permit to Operate may result in enforcement action.

Start-Up Period

After receipt of the start-up letter required above, this Authority to Construct authorizes operation during the start-up period from the date of initial operation noted in your start-up letter until the Permit to Operate is issued, up to a maximum of 60 days. All conditions (specific or implied) of the Authority to Construct are in effect during the start-up period.

Fees

District Regulation 3 requires a fee for each new Permit to Operate. You will be invoiced upon receipt of your start-up letter. No permits will be issued until all outstanding fees are paid.

Implied Conditions

In the absence of specific permit conditions to the contrary, the throughputs, fuel and material consumptions, capacities, and hours of operation described in your permit application will be considered maximum allowable limits. A new permit will be required before any increase in these parameters, or change in raw material handled, may be made.

Expiration

In accordance with Regulation 2-1-407, this Authority to Construct expires two years from the date of issuance unless substantial use of the authority has begun.

Exempt Sources

Attached is a list of sources that have been evaluated and are currently exempt from permit requirements. These sources will be entered in our files as exempt sources.

These exemptions are not permanent; a change in equipment operation or in District regulations may require permits in the future. In addition, source test data required by this Authority to Construct may initiate further permit review if significant emissions are found to occur. Please note that these exemptions only apply to permits. Equipment must be operated and maintained in compliance with any applicable District Regulation.

Correspondence

Please include your application number with any correspondence with the District regarding this matter. If you have any questions on this matter, please call Scott Lutz, Air Quality Engineer, at (415) 771-6000, exension 212.

Very truly yours,

Milton Feldstein
Air Pollution Control Officer

by _____
Permit Services Division

cc: Mike James, Department of Health Services

CONDITIONS OF AUTHORITY TO CONSTRUCT NO. 574

S3201-3209:

1. Chrome Anodizing Tanks, S3201 and S3202, shall not be operated unless emissions of hexavalent chromium from S3201 and S3202 are abated by A3207, Scrubber/Fiber Filter System. The ventilation and abatement systems shall be properly maintained and kept in good operating condition. Hexavalent chromium emissions from S3201 and S3202 combined shall not exceed 0.015 mg/amp-hr.

2. Chrome Plating Tanks, S3203, S3204, and S3205, shall not be operated unless emissions of hexavalent chromium from S3203-3205 are abated by A3212, Scrubber/Fiber Filter System. The ventilation and abatement systems shall be properly maintained and kept in good operating condition. Hexavalent chromium emissions from S3203, S3204, and S3205 combined shall not exceed 0.015 mg/amp-hr.

3. Chrome Plating Tanks, S3206, S3207, S3208, and S3209, shall not be operated unless emissions of hexavalent chromium from S3206-3209 are abated by A3213, Scrubber/Fiber Filter System. The ventilation and abatement systems shall be properly maintained and kept in good operating condition. Hexavalent chromium emissions from S3206, S3207, S3208, and S3209 combined shall not exceed 0.015 mg/amp-hr.

4. Naval Aviation Depot, Alameda shall submit an operations and maintenance plan to the Permit Services Division within 90 days of full operation or within 180 days of start-up of the plating lines (S3201-3209). This plan shall be subject to District approval and shall include items to regularly monitor such as water circulation rates or water flushing intervals for demisters, scrubbers, and fiber filters; scrubber bleed water quality; differential pressure across components of the abatement systems; and a schedule of replacement for critical components such as the fiber-filter elements or criteria for such replacements. Vendor recommendations should be followed for operational and maintenance items. This document shall include action limits and/or alarm set-points, and plans to test appropriate parameters regularly.

5. Pressure drop across each Fiber Filter unit shall be maintained at a differential pressure not less than 6 inches w.c. and not greater than 12 inches w.c. Pressure shall be measured weekly upstream of each demister, downstream of each water scrubber, and upsteam of each fiber filter unit for each chrome abatement system (A3207, A3212, and A3213). These pressure measurements shall be recorded weekly and shall comply with the limits above or approved alternative limits stipulated in the operations and maintenance plan.

6. Chrome Plating and Anodizing Tanks, S3201-3209, shall not emit greater than 908 grams (2.0 lb) of hexavalent chromium per calendar year on a combined basis.

7. Chrome Plating and Anodizing Tanks, S3201-3209, shall not consume greater than 60,000,000 amp-hours per calendar year on a combined basis.

8. Totalizing amp-hour meters shall be installed on each of the Chrome Plating and Anodizing Tanks, S3201-3209. These amp-hour meters shall be properly maintained and kept in good operating condition . A tank shall not be operated unless its associated totalizing amp-hour meter is recording properly. Amp-hour readings shall be recorded in a process log for each plating and anodizing tank on a monthly basis. These records shall show compliance with Condition 7 above.

9. An emissions report shall be submitted to the Permit Services Division within 30 days of the end of each calendar quarter for the two years of operation and on an annual basis thereafter. These reports shall indicate the number of amp-hr/month for each tank (S3201-3209); the total number of amp-hours during the calendar year for each line; and a calculated emission rate of hexavalent chromium in grams for each month and the year-to-date emission in grams for each line. The monthly amp-hour consumption and emission factor based on the results of the most recent source test required by Conditions 10 and 11 below shall be used to calculate the mass of hexavalent chromium emitted for each line.

10. Within 60 days of the start-up of Chrome Plating and Anodizing Tanks, S3201-3209, Naval Aviation Depot, Alameda shall perform a District approved source test of these tanks and their associated abatement systems A3207, A3212, and A3213. This source test shall determine the mass emission of total and hexavalent chromium in g/hr and mg/amp-hr for each anodizing and plating line as emitted after abatement. A complete report shall be submitted to the District's Source Test Manager and Permit Services Division within 30 days of this source test and shall demonstrate compliance with Conditions 1, 2, and 3 above.

11. Naval Aviation Depot, Alameda shall perform an annual District approved source test of Chrome Plating and Anodizing Tanks, S3201-3209, and their associated abatement systems A3207, A3212, and A3213. These source tests shall determine the mass emission of total and hexavalent chromium in g/hr and mg/amp-hr for each anodizing and plating line as emitted after abatement. A complete report shall be submitted to the District's Source Test Manager and Permit Services Division within 30 days of each annual source test and shall demonstrate compliance with Conditions 1, 2, and 3 above.

12. Within 90 days of the start-up of this facility, Naval Aviation Depot, Alameda shall perform District approved source tests (tanks: C3, E4, E6, K6, K8, J11, N1-3, N6, O4, P6-8 and emission point, P3220, for fugitive cadmium plating emissions) to determine the uncontrolled emissions of the following air contaminants: chromium, cadmium, nickel, and cyanide. Tanks equiped with air agitation shall be tested with air on and without air. Cadmium plating tanks are not directly vented and occupational testing results shall be submitted with the results of the above source tests. These source tests shall be used to support the Navy's contention that uncontrolled emissions (exclusive of the chromium plating and anodizing lines) are indeed insignificant. If any emissions of air contaminants are found to be of significant quantities, Naval Aviation Depot may be required to modify their risk assessment to account for these significant emissions and to modify this facility by the addition of abatement equipment. Additional permit review shall be evaluated as if this facility had not yet been constructed and operated. A complete report shall be submitted to the District's Source Test Manager and Permit Services Division within 30 days of these source tests. This report shall also include all other compounds analyzed by the Navy that were not specifically required by this condition.

13. Naval Aviation Depot, Alameda shall receive approval from the District's Source Test Manager for installation of testing ports and source testing procedures. A written protocol shall be submitted prior to the initial source tests. The District's Source Test Manager and Permit Services Division shall be given written notification at least two weeks prior to any source test.

S3210:

1. The net solvent used at Vapor Solvent Cleaner, S3210, shall not exceed 185 gallons per calendar year. The Navy shall maintain solvent usage records that indicate all quantities of solvent added to the equipment, solvent recovered for disposal or reclamation, and net solvent usage. These records shall be summarized on a quarterly basis and on an annual basis. These records must be retained for at least two years and be available for review by the BAAQMD.

2. Whenever S3210, vapor solvent cleaner, is in operation, the refrigerant contained in the freeboard chiller shall be maintained at a temperature of less than minus 10°F (except for normal defrost periods). Naval Aviation Depot shall install and maintain a temperature indicator that demonstrates compliance with this temperature limitation.

S3211:

1. The net solvent used at Vapor Solvent Cleaner, S3211, shall not exceed 185 gallons per calendar year. The Navy shall maintain solvent usage records that indicate all quantities of solvent added to the equipment, solvent recovered for disposal or reclamation, and net solvent usage. These records shall be summarized on a quarterly basis and on an annual basis. These records must be retained for at least two years and be available for review by the BAAQMD.

2. Whenever S3211, vapor solvent cleaner, is in operation, the refrigerant contained in the freeboard chiller shall be maintained at a temperature of less than minus 10°F (except for normal defrost periods). Naval Aviation Depot shall install and maintain a temperature indicator that demonstrates compliance with this temperature limitation.

S3212: The net solvent used at Solvent Wipe Cleaning Operation, S3212, shall not exceed 410 gallons of Non-Precursor Organic Compounds (NPOC) and 30 gallons of Precursor Organic Compounds (POC) per calendar year. The Navy shall maintain solvent usage records that indicate all quantities of solvent used at the equipment, solvent recovered for disposal or reclamation, and net solvent usage. These records shall be summarized on a quarterly basis and on an annual basis. These records must be retained for at least two years and be available for review by the BAAQMD.

S3221: Abrasive Blasting Glovebox, S3221, shall not be operated unless emissions of particulate matter from S3221 are abated by A3221, Dust Filtration System. This abatement equipment shall be properly maintained and kept in good operating condition at all times.

S3222: Abrasive Blasting Glovebox, S3222, shall not be operated unless emissions of particulate matter from S3222 are abated by A3222, Dust Filtration System. This abatement equipment shall be properly maintained and kept in good operating condition at all times.

S3223: Abrasive Blasting Glovebox, S3223, shall not be operated unless emissions of particulate matter from S3223 are abated by A3223, Dust Filtration System. This abatement equipment shall be properly maintained and kept in good operating condition at all times.

S3224: Abrasive Blasting Glovebox, S3224, shall not be operated unless emissions of particulate matter from S3224 are abated by A3224, Dust Filtration System. This abatement equipment shall be properly maintained and kept in good operating condition at all times.

S3225: Abrasive Blasting Glovebox, S3225, shall not be operated unless emissions of particulate matter from S3225 are abated by A3225, Dust Filtration System. This abatement equipment shall be properly maintained and kept in good operating condition at all times.

EXEMPT SOURCES, APPLICATION 574:

Based on the data submitted in this application, the following sources are currently exempt from permit requirements in accordance with the indicated Regulation:

S3231 Anodic Strip Tank (C1), air agitated, 600 gal., 12.5% CrO_3/6% H_3PO_4, Bldg 32 (exempt per Reg. 2-1-127.3);

S3232 Chromic Pickle Tank (E4), air agitated, 400 gal., 19% CrO_3, Bldg 32 (exempt per Reg. 2-1-118.5);

S3233 Magnesium Conversion Coating Tank (E6), air agitated, 600 gal., Dow 7 (19% $Na_2Cr_2O_7$), Bldg 32 (exempt per Reg. 2-1-118.5, 2-1-119.2.2);

S3234 Aluminum Conversion Coating Tank (F4), air agitated, 800 gal., Iridite (1% CrO_3), Bldg 32 (exempt per Reg. 2-1-118.5, 2-1-119.2.2);

S3235 Chromic Acid Oxidizing Tank (J4), 250 gal., Bldg 32 (exempt per Reg. 2-1-118.5, 2-1-119.2.2);

S3236 Cadmium Conversion Coating Tank (Q3), 300 gal., 1% $Na_2Cr_2O_7$, Bldg 32 (exempt per Reg. 2-1-118.5, 2-1-119.2.2);

S3237 Miscellaneous Cleaning and Activation tanks (K1, K3, & K4), Bldg 32, abated by A3211, Water Scrubber, Viron, 13,376 CFM (exempt per Reg. 2-1-118.5);

S3238 Stainless Steel Passivate Tank (K6), 21% HNO_3/2% $Na_2Cr_2O_7$, Bldg 32, abated by A3211, Water Scrubber, Viron, 13,376 CFM (exempt per Reg. 2-1-118.5);

S3239 Copper Bright Dip Tank (K8), 20% CrO_3, Bldg 32, abated by A3211, Water Scrubber, Viron, 13,376 CFM (exempt per Reg. 2-1-118.5);

S3240 Cadmium Plating Tanks (T3 and T4), 3% Cadmium/14% NaCN/2.5% NaOH, Bldg 32 (exempt per Reg. 2-1-127.3);

S3241 Nickel Acetate Tank (J11), air agitated, 600 gal., Bldg 32 (exempt per Reg. 2-1-118.5);

S3242 Nickel Sulfamate Plating Tanks (N1, N2, N3, N6, O6, O7, & S7), air agitated, 34% Nickel Sulfamate, Bldg 32 (exempt per Reg. 2-1-127.3);

S3243 Electroless Nickel Plating Tanks (P6, P7, & P8), 2% Nickel Sulfamate, Bldg 32 (exempt per Reg. 2-1-127.3);

S3244 Nickel Strike Tanks (O4, P4, & R4), 25% $NiCl_2$, Bldg 32 (exempt per Reg. 2-1-118.5);

S3245 Copper, Tin, and Silver Plating Tanks, (R6, R8, U2, & U3), Bldg 32 (exempt per Reg. 2-1-127.3);

S3246 Caustic Electroclean and Stripping Tanks (B1, B3, & B4), Bldg 32, abated by A3202, Water Scrubber, Viron, 11,368 CFM (exempt per Reg. 2-1-118.5, 2-1-127.3);

S3247 Alkaline Electroclean and Acid Etching Tanks (D1, & D3-7), Bldg 32, abated by A3204, Water Scrubber, Viron, 29,096 CFM (exempt per Reg. 2-1-118.5, 2-1-127.4);

S3248 Sulfuric Acid Anodizing and Dye Tanks (I1-8), Bldg 32, abated by A3209, Water Scrubber, Viron, 14,970 CFM (exempt per Reg. 2-1-119.2.2);

S3249 Oil Dip Tanks, (A8 & J6), Bldg 32 (exempt per Reg. 2-1-119.4);

S3250 Miscellaneous Etching and Stripping Tanks (A1, A3, C3, C5, C7, O3, P3, Q1, R3, S3, S5, U6, U8, & U9), Bldg 32 (exempt per Reg. 2-1-127.3 & 4);

S3251 Miscellaneous Cleaning and Surface Preparation Tanks (E1, F1, H2, H5, J2, J8, O1, P1, R1, S1, T5, T7, & U1) Bldg 32 (exempt per Reg. 2-1-118.5);

S3252 Space Heater (MU1), 3.75 MMBtu/hr, Natural Gas, Bldg 32 (exempt per Reg. 2-1-114.2);

S3253 Space Heater (MU2), 3.75 MMBtu/hr, Natural Gas, Bldg 32 (exempt per Reg. 2-1-114.2);

S3254 Space Heater (MU3), 3.75 MMBtu/hr, Natural Gas, Bldg 32 (exempt per Reg. 2-1-114.2);

S3255 Space Heater (MU4), 3.75 MMBtu/hr, Natural Gas, Bldg 32 (exempt per Reg. 2-1-114.2);

S3256 Space Heater (MU5), 0.8 MMBtu/hr, Natural Gas, Bldg 32 (exempt per Reg. 2-1-114.2);

S3257 Space Heater (UH1), 0.1 MMBtu/hr, Natural Gas, Bldg 32 (exempt per Reg. 2-1-114.2);

S3258 Space Heater (FUR1), 0.1 MMBtu/hr, Natural Gas, Bldg 32 (exempt per Reg. 2-1-114.2);

S3259 Heat Treat Ovens, Electric, Five Units (OV1-5), Bldg 32 (exempt per Reg. 2-1-116.3);

S3260 Plastic Dip Tanks, (TWX1 & TWX2), Bldg 32 (exempt per Reg. 2-1-119.4).

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 727
SAN BRUNO, CALIFORNIA 94066-0720

IN REPLY REFER TO:

5090
Ser 1824TH/00502
09 APR 1991

Bay Area Air Quality Management District
Ms. Gail Karels, Permit Division
900 Ellis Street
San Francisco, CA 94109

Subj: RETEST SCHEDULE FOR LINE G, L, AND M OF THE NEW CHROMIUM PLATING SHOP AT NAVAL AIR STATION ALAMEDA

Dear Madam,

This letter is to notify you of our schedule for retesting of lines G, L, and M at the new plating shop at Naval Air Station (NAS) Alameda. As agreed during our meeting on 8 March, 1991 with Mr. Scott Lutz at the Bay Area Air Quality Management District (BAAQMD), we will contract with the Naval Energy Environmental Service Activity (NEESA) to perform the retest. Following is the proposed schedule:

Begin Source Test	15 April, 1991
Finish Source Test	19 April, 1991
Source Test Report Submitted	17 May, 1991

The above schedule was accepted by Mr. Scott Lutz during his telephone conversation with Ms. Trang Ha from WESTDIV on 27 March, 1991. We recently discovered that the scrubbers in lines G, L, and M were improperly installed causing excess water to accumulate in the demister. Enclosure (1), the field investigation report, was faxed to Mr. Lutz on 27 March, 1991 for review. Another copy is forwarded for your record. On 30 March, San Francisco Public Works Center (PWC) decontaminated the whole system by washing it with water. The construction contractor is repairing the deficiencies in the system identified in the enclosed report. We are confident that we will have the system corrected in time for the source test scheduled above.

The initial source test results showed high chromium emissions from the chromium plating lines. After the deficiencies are corrected we want to redo the source tests in order to demonstrate that the new scrubbers will perform as designed, in reducing chromium emissions.

Subj: RETEST SCHEDULE FOR LINE G, L, AND M OF THE NEW CHROMIUM PLATING SHOP AT NAVAL AIR STATION ALAMEDA

If you have any questions regarding the above matter, please contact Ms. Trang Ha at (415) 244-2567.

Sincerely,

Peter Shogan for

CARL SCHWAB
Head, Air/Water Section

Encl
(1) Investigation Report for the Excessive Water In Demisters of Lines G, L, and M at NAS Alameda's Plating Shop

Copy to:
NAS Alameda (Randy Cate, Code 52)
NADEP Alameda (Paul Pentony, Code 612)

RCP 9/11/91

MIDWEST RESEARCH INSTITUTE
Suite 350
401 Harrison Oaks Boulevard
Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

KOEPF & LANGE INC.
CONSULTING ENGINEERS
971 DEWING AVENUE
LAFAYETTE, CALIFORNIA 94549
(415) 284-4650
FAX 415-284-7594

March 18, 1991

520-685

ROICC, SFBA
P. O. Box 23300
Oakland Army Base
Oakland, CA 94623

Attention: Mr. Marcus Chan

Subject: Plating Shop P-783
NAS Alameda, CA
520

Dear Sir:

We have completed our investigation for the cause of excessive water in Demister VD13 sump and a much smaller similar accumulation in Demister VD7 and 12 sumps. Since the source of water and the probable solution is within the scrubber demister units, we are reporting this to you so it can be properly addressed to the Contractor and Vendor for concurrence and resolution. Our analysis of the situation is as follows, using the attached sketch for key number points.

A. The scrubber spray system uses nozzles (1) to distribute water to the scrubber fill (2). When the flow rates from each row are changed, there is very little effect on the situation, so we can rule out the nozzle pattern as a cause.

B. When the water leaves the fill to drop to the basin, a large proportion runs down the wall at (3), drops off the turn at (4) and impacts on the separation shelf at (5). Some of this water then runs into the demister sump behind and through the chevrons (6) and (7).

C. The water flow at the demister is sufficient to fill the demister sump in 20 minutes to level (8) where the water will backflow into the scrubber sump. This equates to about 8GPM.

D. The problem in VD7 and 12 is smaller because the air velocity (10) is about 30 percent higher to push the water curtain closer to the scrubber sump.

E. There is no observed leakage from the demister irrigation or from water flow from the ducts.

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(919) 677-0065

Marcus Chan
K&L 520-685

March 18, 1991

Expressed in terms of the Contract specifications 15806-2.1.2, the efficiencies of the TMA test are as follows. The required efficiency of removal is 98.0 percent.

Removal Efficiency, TMA Test, November 1990

LINE	HEXAVALENT CHROMIUM TEST 1	HEXAVALENT CHROMIUM TEST 2	TOTAL CHROMIUM TEST 1	TOTAL CHROMIUM TEST 2
G (a)	95.98	74.34	95.63	58.54
L	99.87	97.82	99.85	93.93
M	99.98	98.89	99.34	98.92

(a) Test results represent a "Semi Plating" operation, and not "Anodizing" as required.

Special care is required in evaluating these results as the detection limit tolerances are low. The indicated inlet quantities on Line G are very low. Even a small amount of water carry-over can effect these results.

Suggestions for correction of the problem can include any or all of the following items.

1. Backslope the fill slightly to carry a higher percentage of the fill drain to the rear.
2. Add a drip louver at point (4), extending into the scrubber space far enough to make the water curtain fall into the scrubber.
3. Provide a dam behind the demister at (6) to make the splash drain to the scrubber and increase the air velocity to help push the water curtain into the scrubber.
4. Add a set of rain louvers across the opening from (4) to (5).

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FAX (919) 677-0065

Marcus Chan
K&L 520-685

March 18, 1991

We have been advised that a new set of tests are scheduled to be done by NEESA in about one month. This correction should be completed prior to that test. If it is not done, the results can be affected again.

Yours very truly,

KOEPF & LANGE, INC.

A.H. Koepf

AHK:aa

c: M. J. Lum
Charles Davidoff
Luann Tetirick

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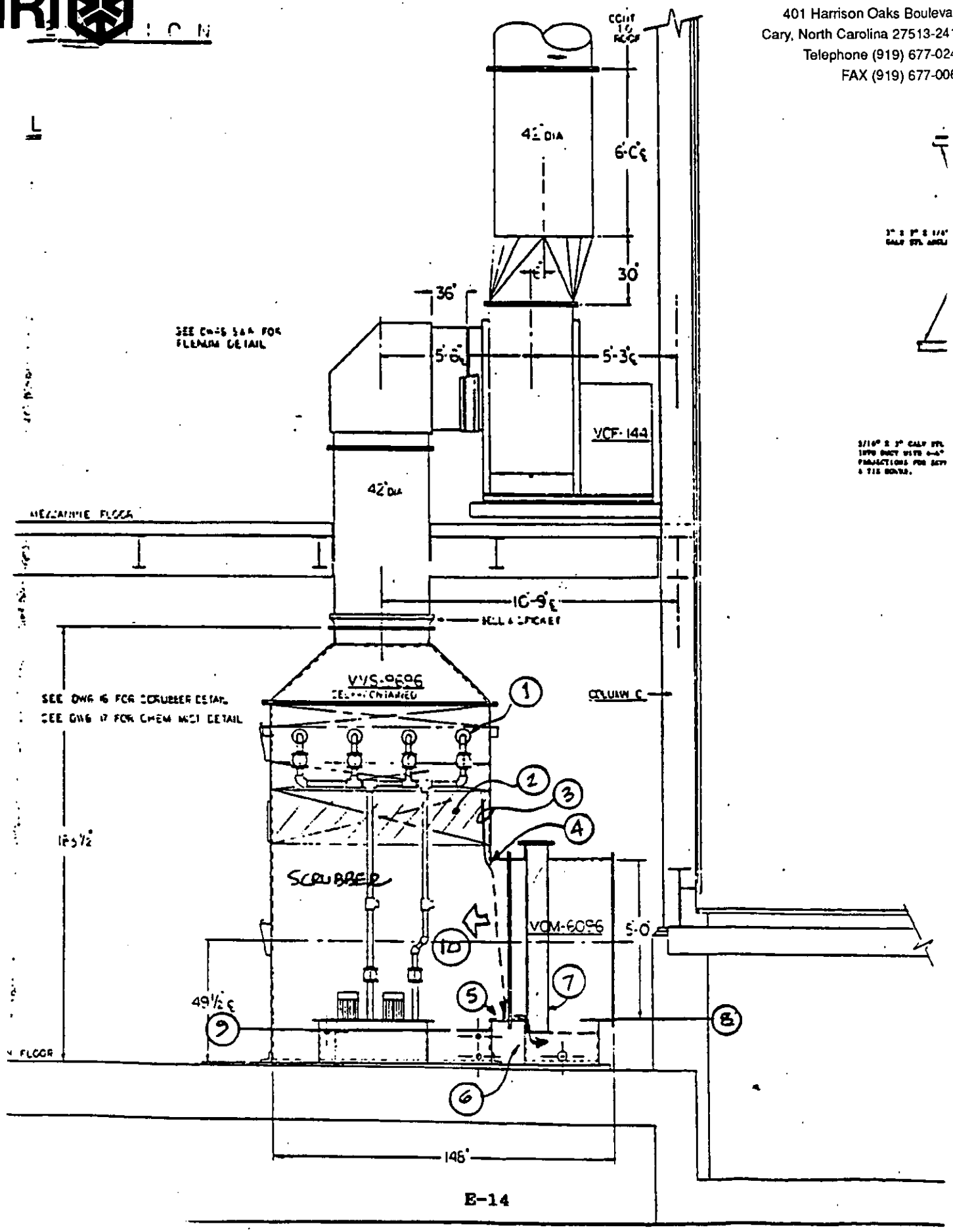

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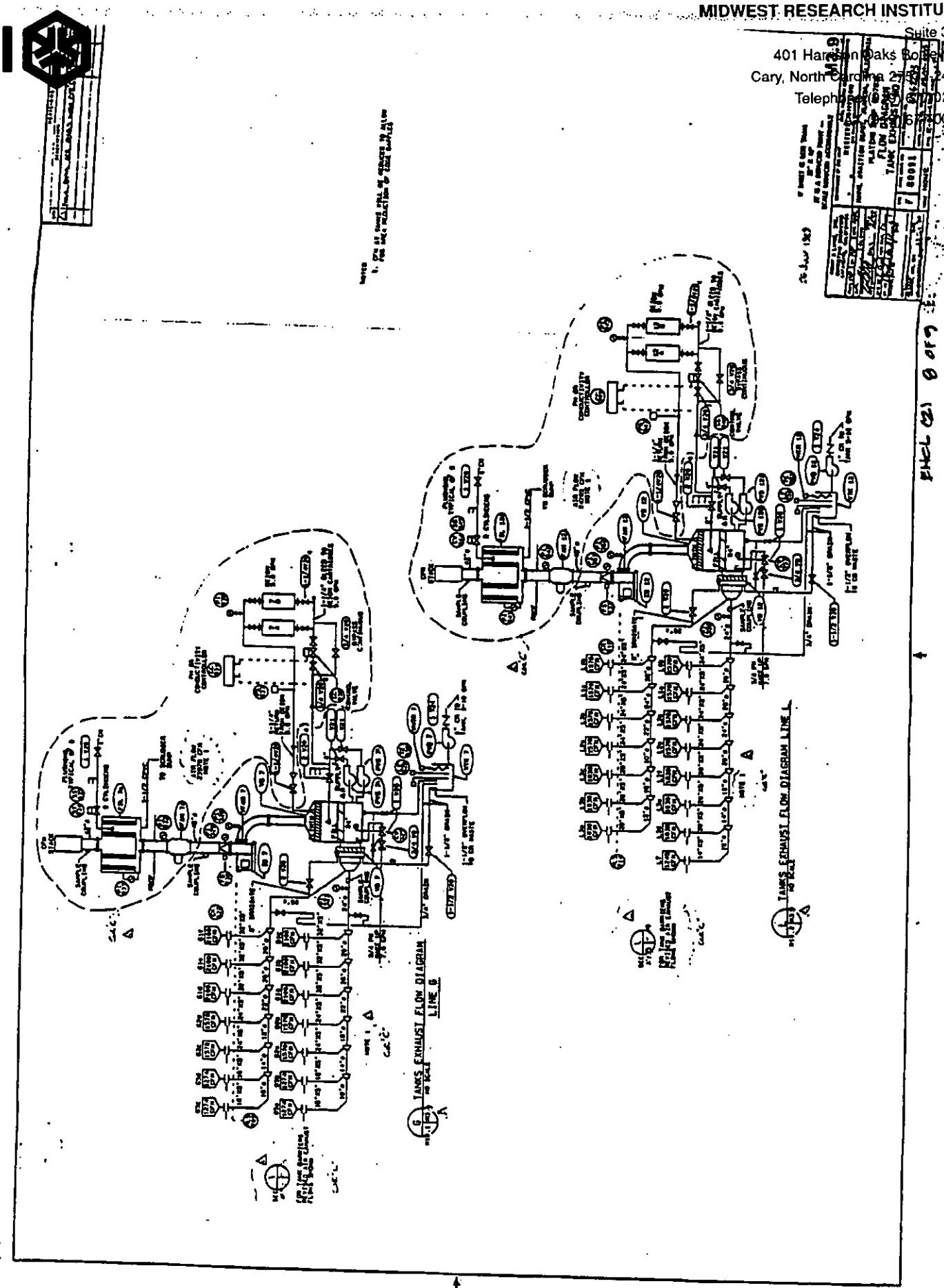

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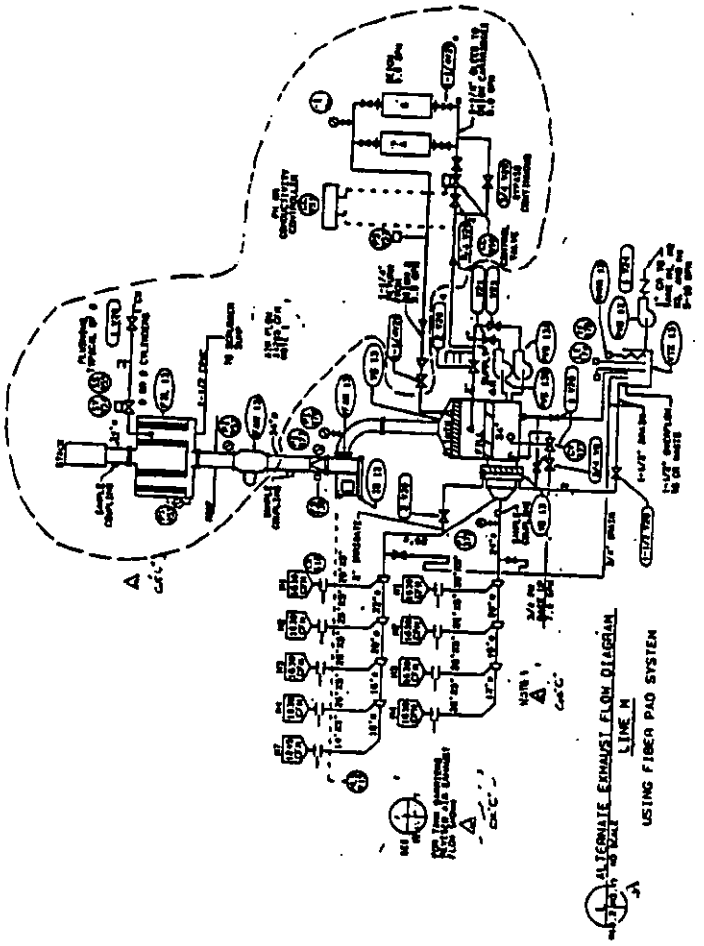

ALTERNATE EXHAUST FLOW DIAGRAM
LINE M
USING FIBER PAD SYSTEM

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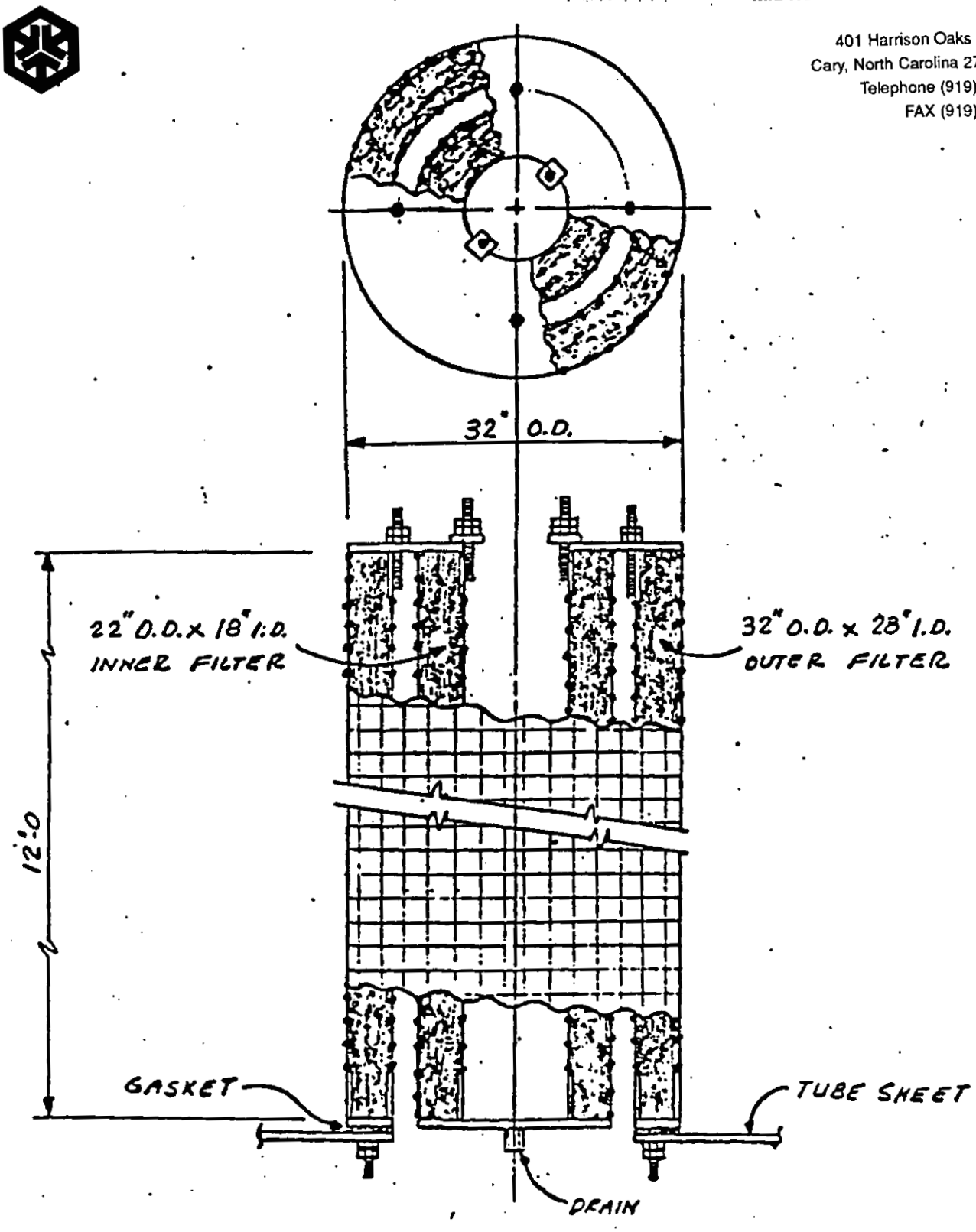
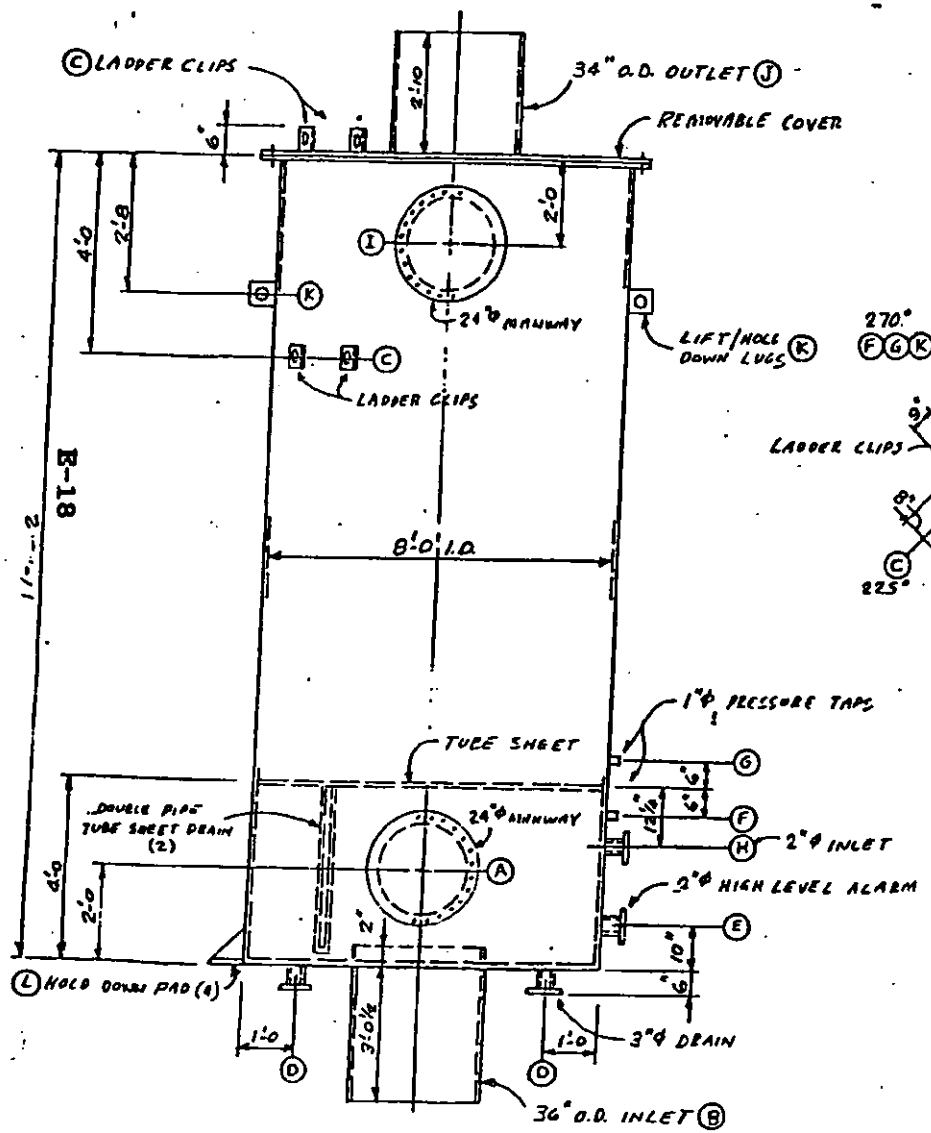
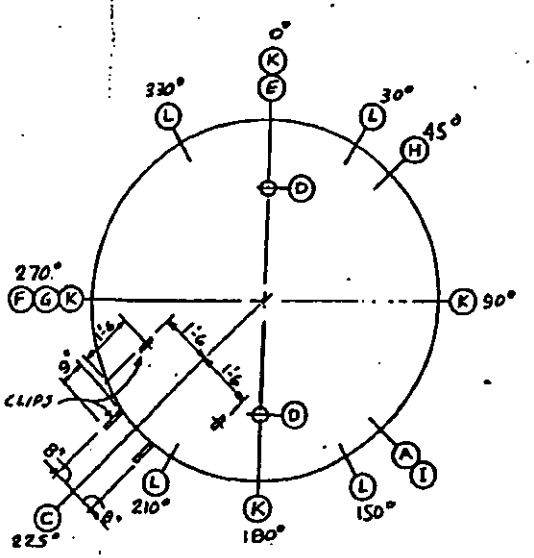


"TWIN-PAK" FILTER ASSEMBLY (PATENT PENDIN

MARELICH MECHANICAL CO., INC.-SAN FRANCISCO, CA

FILTERS, INC.	CECO JOB NO. C020-02120	REV. 0	DWG NO





ORIENTATION PLAN

SEE DWG C-1198-5 FOR SPECIFICATIONS

CECO FILTERS, INC.
CONSHOHOCKEN, PA

CECO JOB NO. C020-02120

MARELICH MECHANICAL CO, INC
SAN FRANCISCO, CA

P.O. NO.

F.IL13A FILTER UNIT

BY: EWM	DRAWING NO. C-1198-1	
SCALE:		

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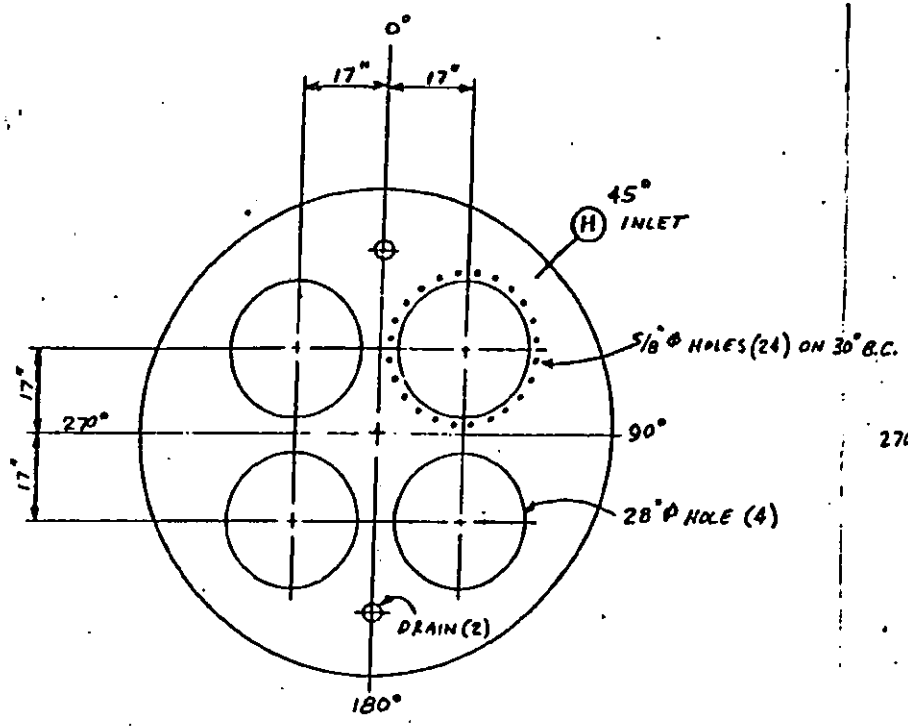
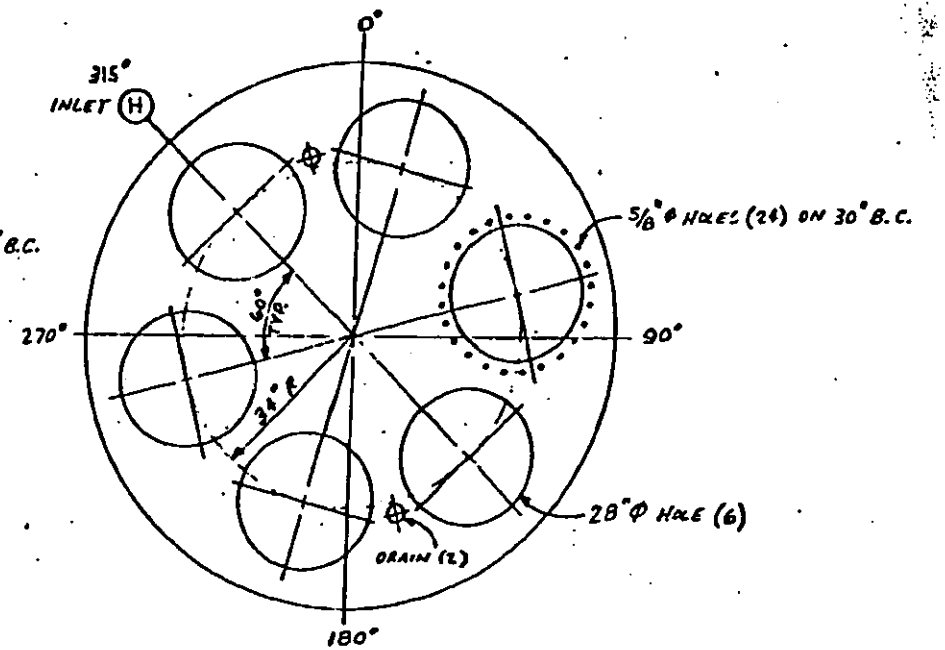


8'-0Φ TUBE SHEET LAYOUT
(FIL13A FILTER UNIT)



9'-0Φ TUBE SHEET LAYOUT
(FIL7A & FIL12A FILTER UNITS)

CECO FILTERS, INC.
CONSHOHOCKEN, PA

CECO JOB NO. C020-02120

MARELICH MECHANICAL CO. IN
SAN FRANCISCO, CA

P.O. NO.

TUBE SHEET LAYOUT

BY: EWH	DRAWING NO. C-1198-2	DATE 10-19-90
SCALE:		

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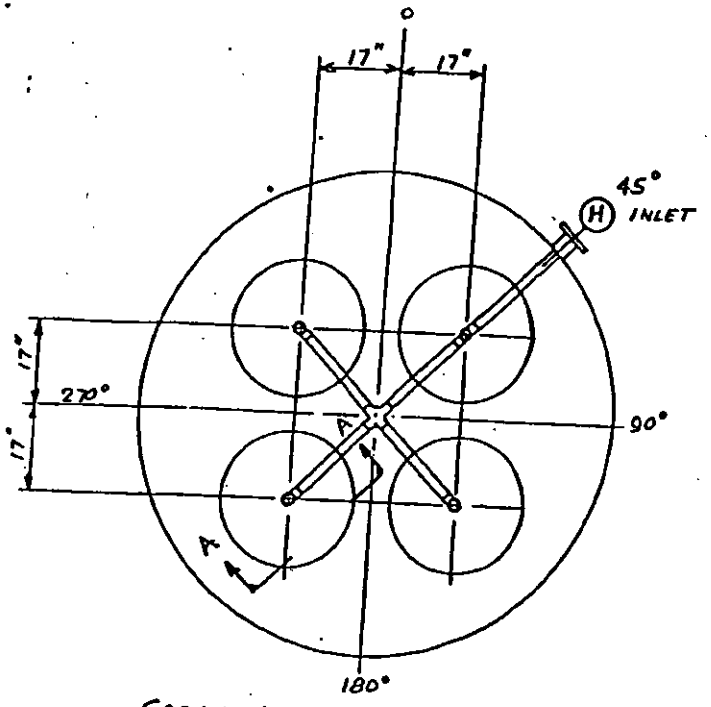
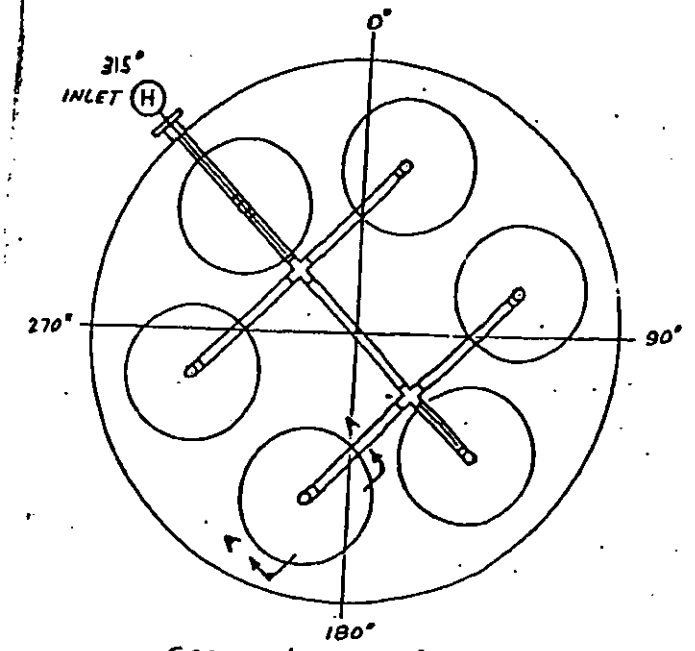
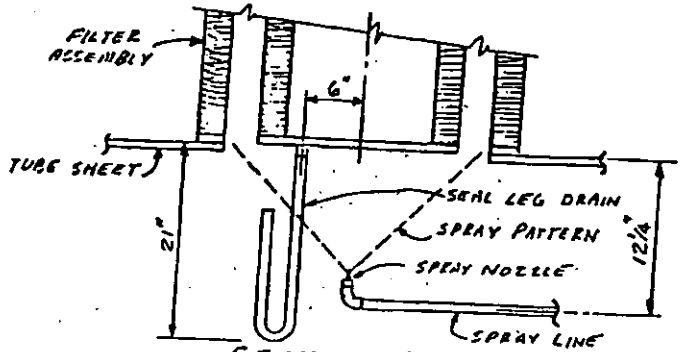


SPRAY NOZZLE LAYOUT
(FIL13A FILTER UNIT)



SPRAY NOZZLE LAYOUT
(FIL7A & FIL12A FILTER UNITS)



SECTION A-A

SEE DWG C-1198-5 FOR SPECIFICATIONS

CECO FILTERS, INC.
CONSHOHOCKEN, PA

CECO JOB NO. C020-02120

MARELICH MECHANICAL CO., INC.
SAN FRANCISCO, CA

P.O. NO.

SPRAY NOZZLE LAYOUT

BY: EWM	DRAWING NO.	DATE 5-17-96	REV. 0
SCALE:	C-1198-4		

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APPENDIX F

"NOMOKIN" SAMPLING PROGRAM
EPA CONSTANTS AND EQUATIONS

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MRI EPA METHOD 5 HP/41CX CALCULATOR PROGRAM

```
01*LBL "NOMOKIN"
02 CLRG
03 FIX 0
04 "METHOD 5 NOMO"
05 AVIEW
06 ADV
07 "ENTER DATA"
08 AVIEW
09 "THEN PUSH R/S"
10 AVIEW
11 ADV
12 "TEST NO.=?"
13 PROMPT
14 "RUN NO.=?"
15 PROMPT
16 "FILTER NO.=?"
17 PROMPT
18 FIX 3
19 "INITIAL METER"
20 AVIEW
21 "VOLUME FT3=?"
22 PROMPT
23 STO 22
24 "DELTA-H@AT = ?"
25 PROMPT
26 STO 12
27 "METER GAMMA = ?"
28 PROMPT
29 STO 13
30 "STACK AREA"
31 AVIEW
32 "IN. SQ. = ?"
33 PROMPT
34 STO 25
35 "STACK STATIC"
36 AVIEW
37 "P IN H2O=?"
38 PROMPT
39 13.6
40 /
41 "PBAR IN HG=?"
42 PROMPT
43 STO 27
44 +
45 STO 26
46 1
47 "% H2O=?"
48 PROMPT
49 100
50 /
51 -
52 STO 28
53 "STACK GAS WET"
54 AVIEW
55 "MOL WT. MS,"
56 AVIEW
57 "LB/LB MOL=?"
58 PROMPT
59 STO 05
60 "AVG STACK"
61 AVIEW
62 "TEMP DEG F=?"
63 PROMPT
64 460
65 @
66 STO 06
67 "AVG DELTA-P"
68 AVIEW
69 "IN. H2O=?"
70 PROMPT
71 STO 24
72 "AMBIENT"
73 AVIEW
74 "TEMP F=?"
75 PROMPT
76 460
77 @
78 STO 08
79 "PITOT TUBE"
80 AVIEW
81 "CSUBP=?"
82 PROMPT
83 STO 09
84 ADV
85 "AVG STACK"
86 AVIEW
87 "VELOCITY FPM="
88 AVIEW
89 RCL 06
90 RCL 24
91 *
92 RCL 26
93 /
94 RCL 05
95 /
96 SQRT
97 5123.2
98 *
99 *
100 STO 10
101 VIEW X
102 "FOR 0.75 CFM"
103 AVIEW
104 "IDEAL NOZZLE"
105 AVIEW
106 "DIA INCHES= "
107 432
108 RCL 06
109 *
110 RCL 27
111 *
112 PI
113 RCL 28
114 *
115 RCL 10
116 *
117 RCL 03
118 *
119 RCL 26
120 *
121 /
122 SQRT
123 ARCL X
124 AVIEW
125 ADV
126 X@2
127 "ACTUAL NOZZLE"
128 AVIEW
129 "DIA INCHES=?"
130 PROMPT
131 STO 11
132 X@2
133 /
134 1/X
135 .75
136 *
137 ADV
138 "SAMPLE CFM = "
139 ARCL X
140 AVIEW
141 1/X
142 30
143 *
144 ADV
145 "MINIMUM RUN"
146 AVIEW
147 "TIME, MIN. = "
148 ARCL X
149 AVIEW
150 ADV
151 "******"
152 AVIEW
153 "--BEGIN RUN--"
154 AVIEW
155 ADV
156 "ENTER DATA AS:"
157 AVIEW
158 ADV
159 "STO A = DELTA-P"
160 AVIEW
161 "STO B = T-STACK"
162 AVIEW
163 "STO C = T-METER"
164 AVIEW
165 ADV
166 "TO CORRECT"
167 AVIEW
168 "ERROR, RE-ENTER"
169 AVIEW
170 "ALL VALUES AS"
171 AVIEW
172 "NEGATIVES"
173 AVIEW
174 ADV
175 "TO CHECK"
176 AVIEW
177 "ISOKIN, HIT"
178 AVIEW
179 "500, R/S"
180 AVIEW
181 ADV
182 "TO END RUN,"
183 AVIEW
184 "HIT 0, R/S"
185 AVIEW
186 ADV
187 "******"
188 AVIEW

189*LBL 01
190 ADV
191 RCL 07
192 1
193 +
194 FIX 0
195 "POINT NO. "
196 ARCL X
197 AVIEW
198 FIX 2
199 STOP
200 500
201 X=Y?
202 GTO 40
203 RDN
204 0
205 X>Y?
206 GTO 30
207 X<>Y
208 X=0?
209 GTO 02
210 1
211 ST+ 07
212 RCL 02
213 460
214 +
215 ST+ 20
216 STO 16
217 RCL 03
218 ST+ 17
219 460
220 +
221 STO 18
222 RCL 01
223 SQRT
224 ST+ 19
225 RCL 01
226 RCL 16
227 *
228 SQRT
229 ST+ 23

230*LBL 31
231 "DELTA H="
232 AVIEW
233 "IN. H2O...."
234 AVIEW
235 S51
236 RCL 09
237 RCL 28
```

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```
238 *
239 X↑2
240 *
241 RCL 12
242 *
243 RCL 26
244 *
245 RCL 27
246 /
247 RCL 18
248 *
249 RCL 16
250 /
251 RCL 11
252 4
253 Y↑X
254 *
255 RCL 01
256 *
257 ST+ 15
258 VIEW X
259 "********"
260 AVIEW
261 GTO 01

262*LBL 30
263 "CORRECTING"
264 AVIEW
265 1
266 ST- 07
267 RCL 02
268 CHS
269 460
270 +
271 ST- 20
272 STO 16
273 RCL 03
274 CHS
275 ST- 17
276 460
277 +
278 STO 18
279 RCL 01
280 CHS
281 SQRT
282 ST- 19
283 RCL 01
284 CHS
285 RCL 16
286 *
287 SQRT
288 ST- 23
289 GTO 31

290*LBL 40
291 "LAST MTR VOL ?"
292 PROMPT
293 RCL 22
294 -
295 RCL 13
296 *
297 RCL 17
298 RCL 07
299 /
300 460
301 +
302 /
303 "TIME ?"
304 PROMPT
305 /
306 RCL 20
307 *
308 RCL 28
309 /
310 RCL 11
311 X↑2
312 /
313 RCL 23
314 /
315 RCL 09
316 /
317 RCL 05
318 RCL 26
319 *
320 SQRT
321 *
322 3.579
323 *
324 ADV
325 "PRESENT ISOKIH="
326 ARCL X
327 AVIEW
328 ADV
329 "CONTINUE RUN .."
330 AVIEW
331 ADV
332 "******"
333 AVIEW
334 GTO 01

335*LBL 02
336 "======"
337 AVIEW
338 ADV
339 "ISOKIN"
340 AVIEW
341 "AVG VALUES"
342 AVIEW
343 FIX 3
344 RCL 23
345 RCL 07
346 /
347 STO 23
348 "KV="
349 ARCL X
350 AVIEW
351 RCL 17
352 RCL 07
353 /
354 "TMETER F="
355 ARCL X
356 AVIEW
357 460
358 *
359 STO 17
360 RCL 15
361 RCL 07
362 /
363 STO 04
364 "DELTA-H="
365 ARCL X
366 AVIEW
367 RCL 19
368 RCL 07
369 /
370 X↑2
371 STO 19
372 "DELTA P="
373 ARCL X
374 AVIEW
375 "FINAL METER"
376 AVIEW
377 "VOLUME FT3=?"
378 PROMPT
379 STO 21
380 "INITIAL="
381 ARCL 22
382 AVIEW
383 "SAMPLE TIME"
384 AVIEW
385 "MIN. =?"
386 PROMPT
387 STO 14
388 "PSTACK ABS"
389 AVIEW
390 "IN HG="
391 ARCL 26
392 AVIEW
393 RCL 20
394 RCL 07
395 /
396 STO 28
397 460
398 -
399 "TSTACK F="
400 ARCL X
401 AVIEW
402 ADV
403 "======"
404 AVIEW
405 ADV
406 "SOURCE TYPE?"
407 AVIEW
408 "0=OTHER"
409 AVIEW
410 "1=BOILER"
411 PROMPT
412 STO 06
413 "% CO2 =?"
414 PROMPT
415 STO 01
416 "PABS(IN-HG)"
417 PROMPT
418 STO 02
419 "H2O GAIN KNOWN?"
420 AVIEW
421 "1=YES 0=NO"
422 PROMPT
423 STO 00
424 X=0?
425 GTO C
426 "AWAITING"
427 AVIEW
428 "RECOVERY DATA."
429 AVIEW
430 ADV
431 "HIT R/S"
432 AVIEW
433 "TO CONTINUE..."
434 AVIEW
435 ADV
436 STOP
437 "H2O GAIN=?"
438 PROMPT
439 STO 29

440*LBL C
441 "NET METER "
442 AVIEW
443 "VOL. FT3="
444 AVIEW
445 RCL 21
446 RCL 22
447 -
448 RCL 13
449 *
450 VIEW X
451 "CORRECTED"
452 AVIEW
453 "SAMPLE VOL."
454 AVIEW
455 "VMSTD SCF="
456 AVIEW
457 RCL 26
458 RCL 17
459 /
460 17.646
461 *
462 *
463 STO 32
464 VIEW X
465 "MOLE FRACT. DRY"
466 AVIEW
467 "GAS, (1-BWS) ="
468 AVIEW
469 RCL 00
470 X=0?
471 GTO 03
472 RCL 29
473 RCL 22
```

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```
474 .0471
475 /
476 RCL 29
477 +
478 /
479 CHS
480 1
481 +
482 STO 28
483 VIEW X

484*LBL 04
485 "% H2O = "
486 AVIEW
487 1
488 -
489 CHS
490 100
491 *
492 FIX 1
493 VIEW X
494 FIX 3
495 GTO 11

496*LBL 03
497 RCL 28
498 VIEW X
499 GTO 04

500*LBL 11
501 "STACK GAS WET"
502 AVIEW
503 "MOL. WT, MS."
504 AVIEW
505 "LB/LB MOL="
506 AVIEW
507 RCL 01
508 .44
509 *
510 RCL 02
511 .32
512 *
513 +
514 100
515 RCL 01
516 RCL 02
517 +
518 -
519 .28
520 *
521 +
522 RCL 28
523 *
524 1
525 RCL 28
526 -
527 18
528 *
529 +
530 VIEW X

531 "AVG VELOCITY "
532 AVIEW
533 "FPM ="
534 AVIEW
535 RCL 26
536 *
537 1/X
538 SQRT
539 RCL 23
540 *
541 RCL 09
542 *
543 5123.2
544 *
545 STO 10
546 VIEW X
547 "STACK DRY GAS"
548 AVIEW
549 "FLOW QS  SCFM="
550 AVIEW
551 RCL 18
552 .1225
553 *
554 RCL 25
555 *
556 RCL 28
557 *
558 RCL 26
559 *
560 RCL 20
561 /
562 VIEW X
563 "ACFM ="
564 AVIEW
565 RCL 18
566 RCL 25
567 *
568 144
569 /
570 VIEW X
571 RCL 06
572 X=0?
573 GTO 08
574 "EXCESS AIR % ="
575 AVIEW
576 100
577 RCL 02
578 -
579 RCL 01
580 -
581 .264
582 *
583 RCL 02
584 -
585 1/X
586 RCL 02
587 *
588 100
589 *
590 VIEW X

591*LBL 08
592 ADV
593 "**********"
594 ADV
595 AVIEW
596 RCL 22
597 RCL 20
598 *
599 1833
600 *
601 RCL 28
602 /
603 RCL 26
604 /
605 RCL 14
606 /
607 RCL 10
608 /
609 RCL 11
610 X12
611 /
612 FIX 1
613 ADV
614 "ISOKINETIC %I ="
615 ARCL X
616 AVIEW
617 ADV
618 "**********"
619 AVIEW
620 .END.
```

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MEMORY REGISTER ASSIGNMENTS FOR NOMOKIN CALCULATOR PROGRAM

STO	ASSIGNED VARIABLE	UNITS	@ LINE NO.	CHANGE	2ND ASSIGNED VARIABLE	UNITS	@ LINE NO.	
00	H2O GAIN KNOWN?	1=YES 0=NO	423					PROGRAM LOGIC GATE
01	$(\Delta P)_n$	"WC	195	→	% CO2		414	VELOCITY PRESSURE
02	$(t_s)_n$	°F	195	→	% O2		417	STACK TEMPERATURE
03	$(t_m)_n$	°F	195					CONTROL BOX METER TEMPERATURE
04	ΔH_{avg}	"WC	360					PRESSURE DROP ACROSS METER BOX ORIFICE
05	M_s	lb/lb mole	59					WET STACK GAS MOLECULAR WEIGHT
06	$t_{s(avg)}$	°R	66					AVERAGE STACK TEMPERATURE
07	Σn		207					COUNTER
08	t_{amb}	°R	78					AMBIENT AIR TEMPERATURE
09	C_p		83					PITOT TUBE COEFF.
10	$V_{s(avg)}$	fpm	100	→	V_s (actual)	fpm	545	STACK GAS VELOCITY
11	D_n	in.	131					NOZZLE DIAMETER
12	$\Delta H@$	"WC	26					
13	γ		29					
14	T_t	min.	384					DRY GAS METER CORRECTION FACTOR
15	$\Sigma \Delta H$		253					NET TIME OF TEST
16	$(t_s)_n$	°R	212					
17	$\Sigma(t_m)$	°F	214	→	$(t_m)_{avg}$	R	356	
18	$(t_m)_n$	°R	217					
19	$\Sigma\sqrt{\Delta P}$		220	→	$(\Delta P)_{avg}$		368	
20	$\Sigma(t_s)$	°R	211	→	$(t_s)_{avg}$	R	393	
21	$V_{M(final)}$	ft^3						FINAL METER VOLUME
22	$V_{M(initial)}$	ft^3	22	→	$V_{m(scd)}$		463	INITIAL METER VOLUME
23	$\Sigma\sqrt{\Delta P \cdot t_s}$		225	→	$\sqrt{\Delta P \cdot t_s}$	(AVG)	344	
24	ΔP_{avg}		24					PRESSURE DROP ACROSS PITOT TUBE
25	A_s	in^2	34					STACK CROSS-SECTIONAL AREA
26	P_s	"HG	45					ABSOLUTE STACK PRESSURE
27	P_b	"HG	43					BAROMETRIC PRESSURE
28	estimated $(1-B_{ws})$		52	→	actual $(1-B_{ws})$		482	MOLE FRACTION DRY GAS
29	H2O gain	grams	439					WATER GAIN OF IMPINGERS

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-- EPA CONSTANTS --

Symbol	Unit	Description
g	32.1725 ft/sec^2	Acceleration due to gravity
g/lb	453.59237	Conversion factor
K_p	85.39 $\frac{ft}{sec}\left[\frac{(lb/lb\text{-}mole)(in.\ Hg)}{(^oR)(in.\ H_2O)}\right]1/2$	Pitot tube constant (METHOD II)
K_1	0.4710 ft^3/ml	Conversion factor (METHOD IV)
K_2	0.04718 ft^3/ml	Conversion factor (METHOD IV)
K_3	17.65 $^oR/in\ Hg$	Standardizes temperature and pressure (METHOD IV)
K_1	17.65 $^oR/in\ Hg$	Standardizes temperature and pressure (METHOD V)
K_2	0.04710 ft^3/ml	Conversion factor (METHOD V)
K_4	0.09444 $\frac{(min)(in\ Hg)}{(^oR)\ (sec)}$	Constant for standard pressure and temperature (METHOD V)
MW_{air}	28.9641 lb/lb-mole	Molecular weight of air
MW_{H_2O}	18.01534 lb/lb-mole	Molecular weight of water
P_{std}	29.92126 "Hg	Absolute standard pressure
P_{air}	0.0752236 lb/ft^3	Density of air at 20°C
P_{H_2O}	0.99824 g/ml	Density of water at 20°C
P_{H_2O}	62.31639 lb/ft^3	Density of water at 20°C
T_{std}	528°R	Standard absolute temperature

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-- STANDARD EPA PARTICULATE CALCULATIONS

1. Volume of dry gas in cubic feet sampled at standard conditions.*

$$V_{m_{std}} = V_m \left(\frac{T_{std}}{t_m + 460} \right) \left[\frac{P_b + \frac{\Delta H}{13.6}}{P_{std}} \right]$$

$$V_{m_{std}} = 17.646\ V_m \left(\frac{P_b + \frac{\Delta H}{13.6}}{t_m + 460} \right) = \text{ft.}^3$$

2. Volume of water vapor in cubic feet collected at standard conditions.*

By volume measurement:

$$V_{w_{gas}} = \frac{(V_w)\ \rho_{H_2O}\ R\ T_{std}}{P_{std}\ MW_{H_2O}\ 453.59237}$$

$$V_{w_{gas}} = 0.0471\ V_w$$

By mass measurement:

$$V_{w_{gas}} = \frac{(m_w)\ R\ T_{std}}{P_{std}\ MW_{H_2O}\ 453.59237}$$

$$V_{w_{gas}} = 0.0472\ m_w$$

3. Percent moisture in stack gas

$$\%M = \frac{V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}} \times 100$$

4. Mole fraction of dry gas

$$M_d = \frac{100 - \%M}{100}$$

* 528°R, 29.92126 in. Hg

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5. Average molecular weight of dry stack gas.

$$MW_d = \left[0.44\ (\%CO_2)\right] + \left[0.32\ (\%O_2)\right] + \left[0.28(100 - \%O_2 - \%CO_2)\right] = \text{lb/lb mole}$$

6. Molecular weight of stack gas.

$$MW = MW_d \times M_d + 18\ (1-M_d) = \frac{\text{lb}}{\text{lb-mole}}$$

7. Stack pressure, "Hg Absolute

$$P_s = P_b + \frac{\text{stack pressure } "H_2O}{13.6}$$

8. Stack velocity at stack conditions, fpm

$$V_s = C_p\ 60 \left[\frac{(2G)(\rho H_2O)(P_{std})(MW_{air})(ts + 460)(\Delta P)}{12\ (\rho_{air})(P_s)(MW)(T_{std})}\right]^{\frac{1}{2}}$$

$$V_s = 5123.2\ C_p \left[\frac{(t_s + 460)\ \ (\Delta P_s)}{(P_s)\ (MW)}\right]^{\frac{1}{2}} = \text{fpm}$$

9. Stack gas volume at standard conditions, SCFM*

$$Q_s = \frac{V_s\ A_s\ M_d\ T_{std}\ P_s}{144\ (t_s + 460)\ P_{std}}$$

$$Q_s = \frac{0.1225\ V_s\ A_s\ M_d\ Ps}{t_s + 460} = \text{DSCFM}$$

10. Percent isokinetic

$$\%I = \frac{V_{m_{std}}\ (t_s + 460)\ P_{std}\ 100}{M_d\ T_{std}\ P_s\ T_t\ V_s\left[\frac{\pi\ (D_n)^2}{4\ (144)}\right]}$$

$$\%I = \frac{1039\ V_{m_{std}}\ (t_s + 460)}{M_d\ P_s\ T_t\ V_s\ D_n^{\ 2}}$$

* 528°R, 29.92126 "Hg

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11. Particulate - probe, cyclone, and filter, grains/SCF.

$$C_{an} = \left[\frac{m_f}{V_{m_{std}}}\right]\left[\frac{15.432\ gr}{gram}\right]$$

$$C_{an} = 15.432\ \frac{m_f}{V_{m_{std}}} = gr/SCF$$

12. Particulate total, grains/SCF

$$C_{ao} = 15.432\left[\frac{m_t}{V_{m_{std}}}\right] = gr/SCF$$

13. Particulate - probe, cyclone and filter, gr/CF at stack conditions

$$C_{at} = C_{an}\left[\frac{P_s}{P_{std}}\right]\left[\frac{T_{std}}{(t_s + 460)}\right] M_d$$

$$C_{at} = \frac{17.646\ C_{an}\ P_s\ M_d}{t_s + 460} = gr/CF$$

14. Particulate - total, gr/CF at stack conditions

$$C_{au} = \frac{17.646\ C_{ao}\ P_s\ M_d}{(t_s + 460)} = gr/CF$$

15. Particulate - probe, cyclone and filter, lbs/hr

$$C_{aw} = C_{an}\ Q_s\left(\frac{60\ min.}{1\ hr.}\right)\left(\frac{1\ lb}{7000\ gr}\right)$$

$$C_{aw} = 0.008571\ C_{an}\ Q_s = lbs/hr$$

16. Particulate - total, lbs/hr

$$C_{ax} = 0.008571\ C_{ao}\ Q_s = lbs/hr$$

17. Percent excess air at sampling point

$$\%\ EA = \frac{100\ (O_2)}{26.4 - 1.264\ (O_2) - 0.264\ (CO_2)}$$

NOTE: Assumes CO concentration is approximately zero compared to O_2 and CO_2

* 528°R, 29.92126 "Hg

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APPENDIX G

EQUIPMENT CALIBRATION SHEETS

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S-TYPE PITOT TUBE CALIBRATION WORKSHEET 04APR91
CALIBRATED BY: R.T.M. TEMP: 62 F PBAR: 30.14 in Hg

S-TYPE PITOT NO.	SIDE	RUN NO.	VELOCITY PRESSURES ORI-STD* (IN H2O)	S-TYPE (IN H2O)	CP(S)	CP(S) MEAN	DEV.	COMMENTS
5-12	A	1	0.350	0.225	0.811	0.819	-0.009	
		2	0.650	0.420	0.809		-0.011	
		3	1.000	0.630	0.819		-0.000	
		4	2.000	1.200	0.839		0.020	
5-7	A	1	0.350	0.215	0.829	0.831	-0.002	
		2	0.650	0.400	0.829		-0.003	
		3	1.000	0.615	0.829		-0.003	
		4	2.000	1.200	0.839		0.008	
5-9	A	1	0.350	0.220	0.820	0.827	-0.007	
		2	0.650	0.405	0.823		-0.004	
		3	1.000	0.620	0.826		-0.001	
		4	2.000	1.200	0.839		0.012	
5-20	A	1	0.350	0.210	0.839	0.847	-0.008	
		2	0.650	0.385	0.845		-0.002	
		3	1.000	0.590	0.846		-0.001	
		4	2.000	1.150	0.857		0.010	
3-7	A	1	0.350	0.210	0.839	0.833	0.006	
		2	0.650	0.400	0.829		-0.005	
		3	1.000	0.620	0.826		-0.008	
		4	2.000	1.200	0.839		0.006	
3N-200	A	1	0.350	0.220	0.820	0.826	-0.006	
		2	0.650	0.405	0.823		-0.003	
		3	1.000	0.625	0.822		-0.004	
		4	2.000	1.200	0.839		0.013	

* Calibrated Orifice Standard (Cp=0.65)

S-TYPE PITOT TUBE CALIBRATION WORKSHEET 08MAY91

CALIBRATED BY: Dave Rowney TEMP: 67 F PBAR: 29.86 in Hg

S-TYPE PITOT NO.	SIDE	RUN NO.	VELOCITY PRESSURES ORI-STD* (IN H2O)	S-TYPE (IN H2O)	CP(S)	CP(S) MEAN	DEV.	COMMENTS
5-12	A	1	0.350	0.220	0.820	0.830	-0.010	
		2	0.750	0.460	0.830		-0.000	
		3	1.000	0.610	0.832		0.002	
		4	2.000	1.200	0.839		0.009	
5-7	A	1	0.350	0.220	0.820	0.821	-0.001	
		2	0.750	0.470	0.821		0.001	
		3	1.000	0.630	0.819		-0.002	
		4	2.000	1.250	0.822		0.002	
5-9	A	1	0.350	0.230	0.802	0.805	-0.003	
		2	0.750	0.490	0.804		-0.000	
		3	1.000	0.650	0.806		0.002	
		4	2.000	1.300	0.806		0.002	
5-20	A	1	0.350	0.225	0.811	0.823	-0.013	
		2	0.750	0.470	0.821		-0.002	
		3	1.000	0.625	0.822		-0.001	
		4	2.000	1.200	0.839		0.016	
3-7	A	1	0.350	0.215	0.829	0.831	-0.002	
		2	0.750	0.460	0.830		-0.001	
		3	1.000	0.620	0.826		-0.005	
		4	2.000	1.200	0.839		0.008	
3N-200	A	1	0.350	0.230	0.802	0.822	-0.020	
		2	0.750	0.470	0.821		-0.001	
		3	1.000	0.620	0.826		0.004	
		4	2.000	1.200	0.839		0.017	

* Calibrated Orifice Standard (Cp=0.65)

DRY GAS METER CALIBRATION

BOX NUMBER: 13
DATE: 03-19-1991
BAROMETRIC PRESSURE: 29.730
OPERATOR: dP

LEAKRATE (CFM): 0.000

Delta-H	5.00	3.00	2.00	1.00	0.50
Avg Dry Gas Mtr Temp.	82.0	80.0	79.0	77.0	76.5
Avg Wet Test Mtr Temp	68.0	68.0	69.0	71.0	71.0
Init Dry Gas Mtr Vol.	553.452	560.411	568.402	579.435	586.504
Final Dry Gas Mtr Vol	558.418	565.402	573.414	584.381	591.547
Net Dry Gas Mtr Vol..	4.966	4.991	5.012	4.946	5.043
Net Wet Test Mtr Vol.	5.000	5.000	5.000	5.000	5.000
Run Time (min.sec)...	4.23	5.38	6.55	9.33	13.10
GAMMA	1.021	1.017	1.011	1.020	1.001
DH@	2.108	2.096	2.119	2.042	1.943

DRY GAS METER CALIBRATION

BOX NUMBER: 14
DATE: 03-25-1991
BAROMETRIC PRESSURE: 29.927
OPERATOR: dP

LEAKRATE (CFM): 0.000

Delta-H	5.00	3.00	2.00	1.00	0.50
Avg Dry Gas Mtr Temp.	81.0	79.2	80.2	81.0	80.7
Avg Wet Test Mtr Temp	81.0	79.0	80.0	80.0	81.0
Init Dry Gas Mtr Vol.	523.388	529.408	535.472	541.525	547.599
Final Dry Gas Mtr Vol	528.403	534.460	540.518	546.583	552.653
Net Dry Gas Mtr Vol..	5.015	5.052	5.046	5.058	5.054
Net Wet Test Mtr Vol.	5.000	5.000	5.000	5.000	5.000
Run Time (min.sec)...	4.19	5.33	6.49	9.22	12.57
GAMMA	0.985	0.983	0.986	0.988	0.987
DH@	2.136	2.110	2.126	2.004	1.923

DRY GAS METER CALIBRATION

BOX NUMBER: 17
DATE: 03-25-1991
BAROMETRIC PRESSURE: 30.248
OPERATOR: d

LEAKRATE (CFM): 0.000

Delta-H	5.00	3.00	2.00	1.00	0.50
Avg Dry Gas Mtr Temp.	77.0	78.0	78.7	78.0	77.8
Avg Wet Test Mtr Temp	75.0	76.0	76.0	76.0	78.0
Init Dry Gas Mtr Vol.	164.632	170.542	176.483	182.418	188.379
Final Dry Gas Mtr Vol	169.550	175.497	181.423	187.384	193.345
Net Dry Gas Mtr Vol..	4.918	4.955	4.940	4.966	4.966
Net Wet Test Mtr Vol.	5.000	5.000	5.000	5.000	5.000
Run Time (min.sec)...	4.15	5.26	6.42	9.09	12.47
GAMMA	1.008	1.006	1.012	1.008	1.005
DH@	2.018	1.983	2.007	1.874	1.843

DRY GAS METER CALIBRATION

BOX NUMBER: 13
DATE: 04-24-1991
BAROMETRIC PRESSURE: 30.910
OPERATOR: dP

LEAKRATE (CFM): 0.000

Delta-H	5.00	3.00	2.00	1.00	0.50
Avg Dry Gas Mtr Temp.	89.2	86.8	87.0	88.5	88.5
Avg Wet Test Mtr Temp	81.0	81.0	82.0	83.0	83.0
Init Dry Gas Mtr Vol.	227.382	233.392	239.388	245.388	250.377
Final Dry Gas Mtr Vol	232.392	238.391	244.385	250.377	255.388
Net Dry Gas Mtr Vol..	5.010	4.999	4.997	4.989	5.011
Net Wet Test Mtr Vol.	5.000	5.000	5.000	5.000	5.000
Run Time (min.sec)...	4.20	5.33	6.47	9.22	12.56
GAMMA	1.001	1.004	1.005	1.010	1.007
DH@	2.053	2.029	2.027	1.935	1.844

DRY GAS METER CALIBRATION

BOX NUMBER: 14
DATE: 04-30-1991
BAROMETRIC PRESSURE: 29.980
OPERATOR: dP

LEAKRATE (CFM): 0.000

Delta-H	5.00	3.00	2.00	1.00	0.50
Avg Dry Gas Mtr Temp.	86.2	84.5	84.7	84.2	81.5
Avg Wet Test Mtr Temp	85.0	85.0	84.0	84.0	82.0
Init Dry Gas Mtr Vol.	491.178	497.217	504.268	510.311	516.373
Final Dry Gas Mtr Vol	496.208	502.258	509.302	515.368	521.406
Net Dry Gas Mtr Vol..	5.030	5.041	5.034	5.057	5.033
Net Wet Test Mtr Vol.	5.000	5.000	5.000	5.000	5.000
Run Time (min.sec)...	4.18	5.30	6.46	9.20	12.52
GAMMA	0.984	0.984	0.990	0.987	0.991
DH@	2.126	2.094	2.104	2.004	1.899

DRY GAS METER CALIBRATION

BOX NUMBER: 17
DATE: 04-30-1991
BAROMETRIC PRESSURE: 29.970
OPERATOR: dP

LEAKRATE (CFM): 0.000

Delta-H	5.00	3.00	2.00	1.00	0.50
Avg Dry Gas Mtr Temp.	85.2	85.5	85.8	85.7	84.7
Avg Wet Test Mtr Temp	84.0	85.0	84.0	84.0	83.0
Init Dry Gas Mtr Vol.	77.668	83.598	89.530	95.458	100.415
Final Dry Gas Mtr Vol	82.614	88.537	94.475	100.415	105.373
Net Dry Gas Mtr Vol..	4.946	4.939	4.945	4.957	4.958
Net Wet Test Mtr Vol.	5.000	5.000	5.000	5.000	5.000
Run Time (min.sec)...	4.13	5.25	6.39	9.04	12.39
GAMMA	1.001	1.006	1.010	1.009	1.010
DH@	2.042	2.028	2.029	1.886	1.832

APPENDIX H

RESUMES OF TEST PERSONNEL

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RESUME

DREK A. NEWTON, P.E.	Mechanical Engineer
1984	B.S. Mechanical Engineering Cal Poly State University San Luis Obispo, CA
1984-1986	Research and Development Engineer VETCO Offshore, Inc. Ventura, CA
1987-Present	Mechanical Engineer Coal/Air Department Naval Energy and Environmental Support Activity Port Hueneme, CA

RESUME

DAVID J. COOK — Environmental Engineer

1990 — B.S. Environmental Engineering
Cal Poly State University
San Luis Obispo, CA

1990-Present — Environmental Engineer
Coal/Air Department
Naval Energy and Environmental
Support Activity
Port Hueneme, CA

RESUME

BRIAN Y. QUIL, P.E.	Mechanical Engineer
1985	B.S. Engineering and Chemistry California State University Northridge Northridge, CA
1985-1987	Mechanical Engineer Mobile Utilities Support Equipment Office Naval Energy and Environmental Support Activity Port Hueneme, CA
1987-Present	Mechanical Engineer Coal/Air Department Naval Energy and Environmental Support Activity Port Hueneme, CA

RESUME

CHARLES K. YEE, P.E.	Mechanical Engineer
1963	B.S. Chemical Engineering Auburn University Auburn, AL
1969	M.S. Environmental Systems Engineering Clemson University Clemson, SC
1965-1972	Public Health Engineer Air Pollution Control Commission State Health Department Montgomery, AL
1972-Present	Chemical Engineer Coal/Air Department Naval Energy and Environmental Support Activity Port Hueneme, CA