Background Report Reference

AP-42 Section Number: 12.20

Background Chapter: 4

Reference Number: 47

Title: Embee Plating Test, 2136 South Hathaway, Santa Ana, CA 92705

Environmental Research Group

April 1986

ELECTROPLATING
REF. 4-47

TRUESDAIL LABORATORIES, INC.
Source Test of Intermetro Industries
9393 Arrow Highway
Cucamonga, California 91730

UNACCEPTABLE

Page 1 of the report describes cyclonic flow that was found at the outlet. The page also mentions that sampling was done at the angle of maximum velocity head which was 45 degrees. When testing for cyclonic flow, the angle of maximum delta p is not the angle of flow. The angle of flow is 90 degrees from the null reading on the pitot tube which is not the same as the angle of maximum delta p. When cyclonic flow is present, the sampling time per point must also be adjusted based on the angle. If all the angles are the same, the time adjustment is not necessary, however, in this case, it is not possible to know what the true angles were.

EMBEE PLATING TEST
2136 South Hathaway
Santa Ana, California 92705

UNACCEPTABLE

This report should not be used. First, there are not enough data sheets and related forms/sheets to tell how precisely the test was performed. On System 1, the moisture content was given at 3.7 percent. Saturation moisture content at 70 degrees F is 2.47 percent Emission data based on 3.7 percent are incorrect. The text also mentions that a piece of 3/8 inch Teflon tubing was used to collect the sample. There is no mention of a nozzle so it must be assumed that the tubing is also the nozzle. To sample isokinetically, the sample size should have been around 90 cubic feet an hour. The sample volume was about half that so the sampling was not within the acceptable isokinetic limits. For System 2, the runs are not within the isokinetic limits that the Agency requires.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

122 [illegible]

MEMORANDUM

SUBJECT: Acceptability of Test Reports for Use as a Data Base for Chromium NESHAP

FROM: Frank R. Clay FRC
Field Testing Section, EMB, TSD (MD-14)

TO: Andrew Smith
Industrial Studies Branch, ESD (MD-13)

I have reviewed the test reports that are attached. Some of the reports are acceptable while others are not. The reports are listed below, and unacceptable reports are described in detail as to why they should not be used. I will continue to review the other reports that you have given to me and will send another group of reports as soon as the review has been completed.

TRUESDAIL LABORATORIES, INC.
Test of Dames and Moore
222 E. Annapamu
Santa Barbara, California 93101

UNACCEPTABLE

In reviewing the data, the outlet location gives the moisture content at the outlet as 2.50 percent. At 66°F, saturation moisture content at the absolute stack pressure and this temperature is 2.16 percent.

There are no meter box calibration sheets present, and consequently, no meter box correction factor.

There are no delta p values on the field data sheets to determine the point velocities during sampling.

The nozzles do not appear to have been measured with a micrometer.

CHEVROLET LIVONIA BUMPER PLANT
No. 4 Heil Evaporator
Tested by the Chevrolet Central Office of Environmental Engineering Department
Tested September 24, 1979

UNACCEPTABLE

This report is unacceptable for the following reasons: First, the necessary field data sheets to determine the correctness of the values in the report are not available. Second, all points at the inlet were not sampled (see further comments). Third, this test effort was made to gather data to correct emission problems, not to sample the control device in normal operating conditions. Fourth, there appears to be a large discrepancy between the volumetric flow rates found by the EMB test and this test.

This facility has been tested by EMB, but only at the inlet location. EMB testing performed in the normal production mode. The test done by the Chevrolet environmental group was done in an effort to maximize collection efficiency, and two parameters of the evaporator operation were monitored and/or altered to simulate conditions which could exist within the system, possibly causing an upset in the collection efficiency of the unit. Thus data generated on this test may not be typical of normal operating conditions.

The Chevrolet test sampled the inlet location at only two ports and chose sampling points of average velocity. While the points may be of average velocity, it does not necessarily follow that the distribution of chromium in the duct is uniform. Furthermore, the outlet volumetric flow rate was also used to determine emissions at the inlet. If leakage occurs between the inlet and outlet, the mass emission rates at the inlet will be biased high and the control device efficiency will also be biased high. When comparing the inlet volumetric flow rates, the EMB flows are about 28 percent lower than company flows.

In checking the outlet data, there are no field data sheets or other associated data sheets that were generated at the site; only typewritten data are provided. It appears that the calculations were done based on 70 degrees as standard temperature rather than 68.

It appears that the outlet data might be usable if the data sheets from the test could be provided. One item to consider, however, is whether or not this test represents process conditions that could be used in determining chromium emission standards.

SOURCE EMISSION TESTING AND INDUSTRIAL VENTILATION SURVEY
OF BUILDING 210 PLATING SHOP
Long Beach Naval Shipyard
Long Beach, California
7 May - 2 June 1984

ACCEPTABLE

SOURCE EMISSION TESTING OF THE BUILDING 195 PLATING SHOP
Norfolk Naval Shipyard
Portsmouth, Virginia
11-18 March 1985

ACCEPTABLE

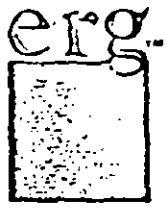
Project

EMBEE PLATING

2136 SO. HATHAWAY SANTA ANA, CA 92705
(714) 546-9842 (213) 585-5973

ENVIRONMENTAL RESEARCH GROUP, INC.

117 N. First Ann Arbor, Michigan 48104 (313) 662-3104



April 11, 1986

Harrington Plastics
168 Freedom Ave.
Anaheim, CA 92801

Attention: Mr. Larry Whittacer

Report #7531

Subject: Summary of results from source emissions testing of two wet scrubbers for chromium and for pollutant reduction efficiency across the scrubbers.

Sampling Location: Embee Plating, Santa Ana, CA.

Sampling Date: March 31, 1986.

Sampling Personnel: Robert D. Swanson and Robert P. Worthington of Environmental Research Group, Inc.

Sampling Methods: Sampling and analysis for chromium in air was performed using a modified NIOSH Method, Chromium in air, NIOSH Manual of Analytical Methods, 2nd Edition, Volume 1, page 182-1.

Source Sampling:

Samples at the inlet and outlet of each scrubber were collected using modified EPA "Method 5" sampling train. Three all-glass Smith-Greenburg impingers were used; the first two contained 200 ml of 5% HNO_3 absorbing solution; a three inch in-line glass fiber filter was placed at the outlet of impinger two to capture any Cr breakthrough. The filter was followed by the third impinger filled with silica gel.

The probe consisted of 6' of 3/8" teflon tube leading to the ground-glass joint of the first impinger. Following the impinger train was a leak-tight aspiration pump followed by a dry, gas test meter.

During each test period, the probe was moved to each of the twelve specified traverse points in five minute intervals with meter temperature and pressure, then recorded.

Ambient Sampling: Samples were collected at two rooftop locations near the outlets of the demisters of the two scrubber systems to determine ambient levels of chromium resulting from the plant operations.

Samples were collected over a seven (7) hour period using two midget impingers containing a 5% HNO_3 absorbing solution.

Volumetric Air Flow: Air flow and stack gas velocities were determined at each of the sixteen (16) specified traverse points be a special pitot tube and Dwyer magnehelic differential pressure gauges. The temperatures were measured with a potentiometer and thermocouple.

Analytical Methods: Chromium concentrations were determined for each sample by ICAP emission spectrophotometry.

Summary of Results:

Ambient Sampling:

Location	Sample Volume (Liters)	Concentration ($\mu g/m^3$)
Site 1	385	4.3
Site 2	337	6.2

Source Sampling:

Location	Air Flow (SDCFM)	Concentration ($\mu g/m^3$)	Efficiency (%)
System 1 inlet		171	
outlet	14,700	25	82.8
System 2 inlet		38	
outlet	27,780	9	76.3

Discussion: Ambient levels of chromium in the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard (ASHRAE 62-181) is established at 1.5 $\mu g/m^3$. Ambient levels found on the rooftop exceeded this standard as reported at 4.3 and 6.2 $\mu g/m^3$. However, a ten (10) to one hundred fold dilution of this concentration would reasonably be expected in the surrounding ambient air.

NOTES: All field data sheets air flow calculations and lab bench sheets are appended to this report. Tabulated results are presented in Tables 1,2.

Submitted by:

Robert D. Swanson
Project Supervisor

Reviewed by:

Eugene H. Gallagher
Manager, Professional Services

RDS:EHG:sml

Report #7531

ENVIRONMENTAL RESEARCH GROUP, INC.

Report Date: April 11, 1986

AIR POLLUTION ANALYSIS

Client: Embee Plating

Location Tested: System 1

Test No:

Test Date: March 31, 1986

--TABULATED RESULTS--

Test	A	B	C	Avg.
Test Times	1051-1151	1210-1310	1320-1420	
Test Duration, min.	60	60	60	
Stack Temperature, ^{o}F				70^{o}
Air Velocity, Ft/sec.				32.7
Air Flow, CFM				15,460
Air Flow, SDCFM				14,703
Moisture Content				3.7
Corrected Sample volume, inlet CFM	40.13	35.28	28.82	
Corrected Sample volume, outlet, CFM	34.05	29.33	26.49	
Chromium concentration, inlet, $\mu g/m^3$	199	185	128	171
Chromium concentration outlet, $\mu g/m^3$	31	30	15	25
Chromium Reduction efficienty, %	82.0	80.1	86.4	82.8

Report # 7531

ENVIRONMENTAL RESEARCH GROUP, INC.

Report Date: April 11, 1986

AIR POLLUTION ANALYSIS

Client: Embee Plating

Location Tested: System 2

Test No:

Test Date: March 31, 1986

--TABULATED RESULTS--

Test	D	E	F	Avg.
Test Times	1436-1536	1550-1650	1657-1737	
Test Duration	60	60	40	
Stack Temperature				78
Air Velocity, Ft./sec.				24.6
Air Flow, CFM				28,973
Air Flow, SDCFM				27,776
Moisture Content, %				1.6
Corrected Sample volume, inlet, CF	32.85	28.62	24.54	
Corrected Sample volume, outlet, CF	29.96	28.38	18.22	
Chromium Concentration inlet, $\mu g/m^3$	53	29	32	38
Chromium Concentration outlet, $\mu g/m^3$	15	7	6	9
Chromium Reduction Efficiency, %	68.8	80.0	76.9	76.3