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

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

Background Report Reference

AP-42 Section Number: 12.11

Background Chapter: 2

Reference Number: 33

Title: Stack Emissions from a Baghouse Serving Scrap Lead Reclaiming Operations at Delco-Remy Division, GM Corporation, New Brunswick, New Jersey

RMC Environmental Services, Inc.

March 1992

(A) #

AP-42 Section: Secondary lead Smelter Ref # 4

Date: 6/18/92 Rating:

Firm/company: Chloride Metals Secon. lead

Tested by: Radian

Test date:

Special Process: Smelter Building

Test conditions: Usual ☐, unusual ☐

Sampling Method:

Sampling location and Velocity Method:

Calibration Info: Yes ☐, No ☐

PARAMETER:	Run # 1	Run # 2	Run # 3	Avg.
Lead				
Particulate				
Sulfur Dioxide				
Arsenic				
Cadmium				

Production Data:

Emission Factors:

EVALUATOR CMC EVALUATION DATE 7/23/92

METHOD 5: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: PNT FACILITY: Delco Remy TEST DATE: 2/7-10/92

PROCESS(ES) TESTED: 2 lead smelters - revert. furnace, 2 melting pots w/o burners, drying oven, 2 conveyors, vented to common baghouse

SAMPLING DURATION 3
must have at least 3 runs, each ≥ 1 hour duration, with sampling ≥ 2 minutes at each traverse point, and total sampling volume ≥ 30 dscf

PRODUCTION RATE 3
is process or production rate during testing representative of normal rates

CONTROL DEVICE(S) 2
are devices described, and their efficiencies given

baghouse - no eff. given

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 3
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 3
are data and calculations included for moisture content determination, and is moisture content realistic [< saturation]

FIELD DATA is field data on standard forms, and does raw data correspond with printout 3

BOILER TESTS N/A
calculation of F_0 from Orsat accurate

SAMPLING TEMPERATURE 3
both probe and filter must be maintained at 248 ± 25°F or other temperature specified in NSPS

BACK-HALF 3
if any, what method was used to catch and recover condensible matter

M 12 - HNO_3 for lead

EQUIPMENT were a borosilicate glass probe liner and a glass fiber filter used 3

CALIBRATION were both pre- and post-test calibrations performed for

meter box 3

pitot tube 3

temperature sensor 3

nozzle (3 #) 2

no doc.

LEAK CHECKS both pre- and post-test 3

BLANKS were filter and reagent blanks analyzed, and were any problems addressed 3

SAMPLE PREP 3
filter desiccation and tare weights documented

ISOKINETICS within 100±10% for all runs 3

1.25 TPH ~~[illegible]~~ battery scrap (not inc. coke) ? 10 mmBtu/hr. propane

1.59 lb/hr. PM (front-half only) ~~[illegible]~~

0.47 lb/hr Pb (as PbO) ~~[illegible]~~

~~[illegible]~~ 2.33 lb/hr SO_2

~~[illegible]~~ 1.88 lb/hr SO_3 (both inconsistent)

also ran NJ ATM 3.9 (or 25A) results < detectable

1.26 lb/hr. CO (inconsistent?, missing cal/doc.)

1.0 $\frac{\text{lb CO}}{\text{ton scrap}}$ "C"

0.38 $\frac{\text{lb Pb}}{\text{ton}}$ "A"

1.5 $\frac{\text{lb } SO_3}{\text{ton}}$ "B"

1.3 $\frac{\text{lb PM}}{\text{ton}}$ "B"

1.9 $\frac{\text{lb } SO_2}{\text{ton}}$ "B"

EVALUATOR CMC EVALUATION DATE 7/23/92

METHOD 8: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: NJ FACILITY: Delco Remy TEST DATE: 2/7-10/92

PROCESS(ES) TESTED: 2° lead smelter - baghouse

SAMPLING DURATION 3
must have at least 3 runs, each ≥ 1 hour duration, with sampling ≥ 2 minutes at each traverse point, and total sampling volume ≥ 30 dscf

PRODUCTION RATE 3
was production rate during testing representative of normal production

CONTROL DEVICE(S) 2
are devices described, and their efficiencies given

baghouse - no eff. given

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 3
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 3
are data and calculations included for moisture content determination, and is moisture content realistic [< saturation]

FIELD DATA 3
is field data on standard forms, and does raw data correspond with printout

ISOKINETICS 3
within 100±10% for all runs

SAMPLING TEMPERATURE 3
filter holder must not be heated; probe must be heated to avoid condensation

EQUIPMENT 3
was a borosilicate glass probe liner used, and was a glass fiber filter inserted between the IPA and hydrogen peroxide impingers

CALIBRATION
were both pre- and post-test calibrations performed for:

meter box 3

pitot tube 3

temperature sensor 3

nozzle (3 #) 2

no doc.

LEAK CHECKS 3
both pre- and post-test

BLANKS 3
were reagent blanks analyzed, and were any problems addressed

INTERFERING AGENTS if ammonia or flourides may have been present, were measures taken to prevent interference N/A

EVALUATOR CMC EVALUATION DATE 7/23/92

METHOD 10: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: NJ FACILITY: Delco-Remy TEST DATE: 2/7-10/92

PROCESS(ES) TESTED: 2' lead smelter - baghouse

SAMPLING 3
CEMs running concurrent with other tests
Cem recording data at regular intervals
If using an integrated gas sample train, use of pitots to sample proportional to gas flow

PRODUCTION RATE 3
is production rate during testing representative of normal production

CONTROL DEVICE(S) 2
are devices described and their efficiencies given

baghouse - no eff. given

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 3
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 3
are data and calculations included for moisture content determination, and is moisture content realistic [< saturation]

FIELD DATA 3
is field data on standard forms, and does raw data correspond with printout

Finalized Data 3
Boil down of CEM data.
Results corrected to standard

Calibration Gases 2
All gases CO in N_2, all <+- 2% from Manufacturer
Span gas, 60% span, 30% span,
Zero gas(purifiedN_2)

no doc.

Equipment And Setup 2
Documentation of equipment including info. on analyzer(+-2% accuracy, +-5% accuracy on given span)
Description of equipment setup no doc.

TESTING ~~3~~ 2
Equipment warmup and cals.
System cals, biases, drifts, and response time tests,

strip charts only

See Back For Diagram

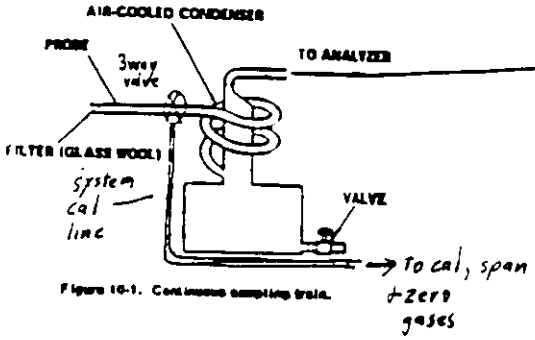


Figure 10-1. Continuous sampling train.

OR

Use pitot to measure flow and collect a representative sample

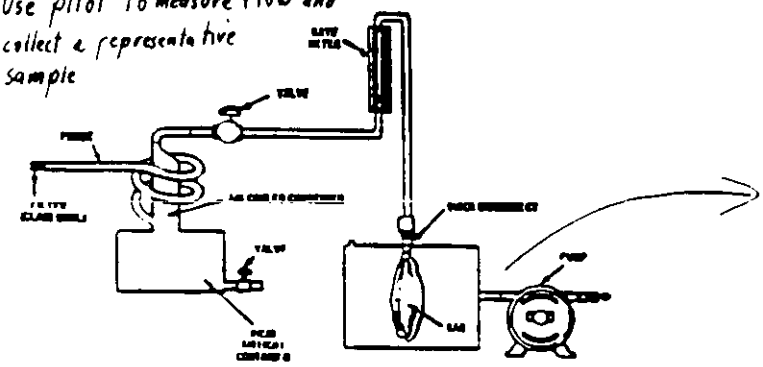
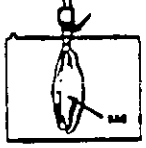


Figure 10-2. Integrated gas-sampling train. (lung system)

OR



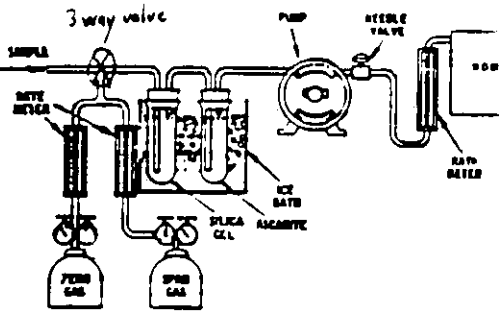


Figure 10-3. Analytical equipment.

EVALUATOR Cmc EVALUATION DATE 7/23/92

METHOD 12: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: NJ FACILITY: Delco-Remy TEST DATE: 2/7-10/92

PROCESS(ES) TESTED: 2° lead smelter - baghouse

SAMPLING DURATION 3
must have at least 3 runs, each ≥ 1 hour duration, with sampling ≥ 2 minutes at each traverse point, and total sampling volume ≥ 30 dscf

PRODUCTION RATE 3
is process or production rate during testing representative of normal rates

CONTROL DEVICE(S) 2
are devices described, and their efficiencies given

baghouse - no eff given

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 3
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 3
are data and calculations included for moisture content determination, and is moisture content realistic (< saturation)

FIELD DATA 3
is field data on standard forms, and does raw data correspond with printout

ISOKINETICS 3
within 100±10% for all runs

SAMPLING TEMPERATURE 3
both probe and filter must be maintained at 248 ± 25°F or other temperature specified in NSPS; temperature exiting last impinger ≤ 68°F

BACK-HALF 3
nitric acid used in first two impingers, silica gel in fourth
Use low metal glass filter okay for lead

EQUIPMENT 3
were a borosilicate glass probe liner and a quartz fiber filter used

CALIBRATION
were both pre- and post-test calibrations performed for:

meter box 3

pitot tube 3

temperature sensor 3

nozzle (3 #) 2

no doc.

LEAK CHECKS 3
both pre- and post-test

BLANKS 3
were both filter and reagent blanks analyzed, and were any problems addressed

BOILER TESTS N/A
calculation of F_0 from Orsat accurate

SOURCE TEST REPORT

Stack Emissions from a Baghouse
Serving Scrap Lead Reclaiming Operations
at Delco-Remy Division, GM Corporation
New Brunswick, New Jersey

7 and 10 February 1992

Prepared for:

Delco-Remy Division
GM Corporation
Jersey Avenue
New Brunswick, New Jersey 08903

Prepared By:

RMC Environmental Services, Inc.
3450 Schuylkill Road
Spring City, Pennsylvania 19475
(215)948-4700

RMC Project No. 04207

March 1992

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RMC
ENVIRONMENTAL SERVICES

State of New Jersey
Department of Environmental Protection and Energy
Air Quality Regulation Program
CN 027
Trenton, NJ 08625-0027

Scott A. Weiner
Commissioner

William O'Sullivan, P.E.
Administrator

April 30, 1992

MEMORANDUM

TO: Joe DePierro, Regional Enforcement Officer
Central Regional Enforcement Office

FROM: Michael A. Klein, Supervisor
Consultant Test Program, Bureau of Technical Services

SUBJECT: Delco Remy Division, GMC - New Brunswick
Stack Emission Test Program
APC Plant ID No. 15028
NJ Stack No. 020
P/CT No. 090037
Log No. 01883106

Stack emission tests were conducted at the above referenced facility on February 7 and 10, 1992. The purpose of the tests was to quantify the emissions of particulate, lead oxide, sulfur oxide, carbon monoxide, total hydrocarbons and sulfuric acid being emitted to the atmosphere from the "539 WA 45 Stack" compared to the allowable emission limits specified by the referenced permit/certificate and the EPA New Source Performance Standards (NSPS)- Subpart L standard for particulate.

Len Sobolewski reviewed the submitted stack test report. His review indicated that particulate, lead oxide, sulfur oxides and visual emissions were in compliance with the emission limits stated in the permit/certificate. Particulate emissions and visual emissions were in compliance with the Federal NSPS standards.

Carbon monoxide (CO) emissions exceeded the mass emission rate stated in the permit/certificate for all three test runs. However, the CO concentration was within the allowable for all three runs. Since the stack conditions were >14% oxygen, the allowable concentration limit is 50 ppmv uncorrected, not the 100 ppmv corrected to 7% oxygen stated in the permit/certificate conditions.

Sulfuric acid was detected during all three test runs. It is not listed as a contaminant in the permit/certificate application. Hydrocarbon concentrations were below the detection limit of the analytical method; therefore, the emission rates calculated for hydrocarbons can not be used for enforcement purposes.

Further review indicated that the reverberatory furnace was firing propane fuel at 10 million BTU/HR, while the permit/certificate application lists 8 million BTU/HR maximum. Additionally, charge no. I on February 10, 1992 was 11, 774 lbs/batch while the permit/certificate application lists 10,000 lbs/batch. This charge was 17.7% greater than listed.

Based on the reported test results, appropriate enforcement action is recommended for emitting sulfuric acid while not having it listed as an air contaminant from the source. Additional enforcement action is recommended for operating the reverberatory furnace with a heat input greater than specified and a charge rate greater than specified in the permit/certificate application.

Enforcement action is not recommended for the mass emission exceedances for CO since the concentration limits for CO were met. Since an alteration is required as a result of the testing, the company should modify their CO emission rate in this application. If the CO values are deemed unacceptable by BNSR, then additional enforcement action is warranted. We will be advising the company that the test results indicate exceedance of the CO allowable emission limit as well as sulfuric acid.

c: Chief Mikolajczyk
Chief Polakovic
Len Sobolewski

State of New Jersey
Department of Environmental Protection and Energy
Air Quality Regulation Program
CN 027
Trenton, NJ 08625-0027

Scott A. Weiner
Commissioner

William O'Sullivan, P.E.
Administrator

April 14, 1992

MEMORANDUM

TO: Ed Choromanski

FROM: Len Sobolewski

SUBJECT: Delco Remy Division
General Motors Corporation
New Brunswick, New Jersey
APC ID No. 15028
NJ Stack No. 20
Permit/Certificate No. 090037
Log No. 1-88-3106

Emission tests were conducted on the 539 WA 45 Stack (NJ Stack No. 20) at the above subject facility on February 7 and 10, 1992. The purpose of the testing project was to demonstrate compliance/non-compliance with the standards stated on the permit/certificate and with the Code of Federal Regulations, Part 60 NSPS, Subpart L - Standards of Performance for Secondary Lead Smelters.

The results of the aforementioned stack emission testing project utilizing the raw field data and the laboratory analysis submitted to the Bureau of Technical Services for review and evaluation is as follows:

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539 WA 45 STACK

PRODUCTION DATA

The reverberatory furnace was firing propane fuel at 10 million BTU's/Hr during the testing project. The permit lists a maximum gross heat input at 8 million BTU's/Hr.

PARTICULATE/LEAD
FEBRUARY 7, 1992

TEST NUMBER	CHARGE NUMBER	WEIGHT
1	I	7,537
2	II	9,515
3	NONE	N/A

SULFUR/HYDROCARBONS/CARBON MONOXIDE
FEBRUARY 10, 1992

TEST NUMBER	CHARGE NUMBER	WEIGHT
1	I	11,774
2	II	5,133*
3	II*	

Charge Number II occurred between test Run Numbers 2 and 3.

The above production reflects normal operational activities of the reverbertory furnace, melting Pot B and melting Pot C. The permit lists four sources (reverberatory furnace and three melting pots), on which the allowable emission rates are based. The permit also lists a maximum charge rate of 10,000 lbs/batch of which there was only one to be ± 5% variation during the tests.

Mr. Ken Lembo from the Central Regional Office was present to record and verify the production rates for Run Number 1 on 2/7/92. The field investigation assignment report submitted by Ken Lembo indicates that no problems were encountered during his investigation.

539 WA 45 STACK

EMISSION TEST RESULTS

CONTAMINANT	RUN No. 1	RUN No. 2	RUN No. 3	ALLOWABLE
PARTICULATE				
(LBS/HR)	2.03	1.41	1.33	2.70
(GR/DSCF)	0.008	0.005	0.005	0.02 Permit 0.022 NSPS
LEAD OXIDE				
(LBS/HR)	0.64	0.42	0.36	0.85
(GR/DSCF)	0.0025	0.0016	0.0014	-
TOTAL HYDROCARBONS				
(LBS/HR)	0.31	0.32	0.32	0.05
(PPMVD)	<4	<4	<4	-
CARBON MONOXIDE				
(LBS/HR)	0.95	0.39	2.43	0.27
(PPMVD)	7.1	2.8	17.6	50
SO_2				
(LBS/HR)	6.5	0.17	0.52	80.0
(PPMVD)	21	0.52	1.6	
H_2SO_4				
(LBS/HR)	0.71	0.034	4.9	-
(PPMVD)	1.5	0.07	10	-

The visible emission evaluation observed during the testing project was zero to 5% during all the test runs except for a single 10% reading during the particulate/lead test run number 2. The permit/certificate and the NSPS regulations state a maximum opacity reading no greater than 10%.

The Technical Services calculations of the raw field data and the reported results of the laboratory analysis submitted indicated substantially the same test results as reported by RMC Environmental Services, Inc.

The test results indicated that the particulate (lbs/hr) and (gr/dscf) were within the standards stated on the permit/certificate. Also, the (gr/dscf) standards prescribed by the Code of Federal Regulations - Part 60, Subpart L were in compliance during all test runs.

The test results indicated that the lead oxides (lb/hr) were within the permit/certificate standards during all test runs.

The test results indicated that the carbon monoxide (lbs/hr) exceeded the permit standards during all test runs and the concentrations (ppmvd) were within the standards during all test runs.

In conclusion, the test results also indicated that the total hydrocarbon concentration was below the detection limit of the analytical instrument. The lbs/hr emission rates were calculated using the lowest detectable ppm reported value.

These rates can not be used for enforcement purposes since the actual emission values may be lower than reported.

State of New Jersey
Department of Environmental Protection and Energy
Air Quality Regulation Program
CN 027
Trenton, NJ 08625-0027

Scott A. Weiner
Commissioner

William O'Sullivan, P.E.
Administrator

April 30, 1992

Mr. Fred L. Sprague
Environmental Engineer
Delco Remy Division
2401 Columbus Avenue
Anderson, IN 00004-6019

RE: Compliance Stack Emission Test Results
Delco Remy Division
APC Plant ID No. 15028
NJ Stack No. 020
P/CT No. 090037 (Permit Log No. 01-88-3106)

Dear Mr. Sprague:

This Bureau has completed the review of the stack emission test report dated March, 1992 prepared by RMC Environmental Services, Inc. for the compliance tests conducted on the above referenced source operation. The stack tests were conducted and the test report was submitted in accordance to the conditions of approval of the permit application.

Our review of the stack test results has indicated the following.

The test results indicate that the emissions of one or more air contaminants identified below have exceeded the allowable emission standards stated in the permit application or permit approval conditions.

____	Particulates	XX	Carbon Monoxide
____	Total Hydrocarbons	____	Nitrogen Oxides
____	Sulfur Dioxide	____	Heavy Metal(s) - _____
____	Hydrochloric Acid		_____
XX	Other : Sulfuric Acid		
____	Removal Efficiency for: _____		
____	Destruction Efficiency for: _____		
____	Specific Organics: _____		
____	Capture Efficiency for _____		

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A summary of the test results are being forwarded to the local regional enforcement office for final disposition. If you have any questions regarding our determination of the test results, please call me.

Sincerely,

Michael A. Klein
Supervisor
Bureau of Technical Services

c Joe DePierro - CRO

N.J.A.C. 7:27-8.24

"I certify under penalty of law that the information provided in this document is true, accurate, and complete. I am aware that there are significant civil and criminal penalties, including fines or imprisonment or both, for submitting false, inaccurate, or incomplete information."

Timothy M. Harvey
Signature

19 March, 1992
Date

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- Emission Testing - 7 February 1992
  - Particulates
  - Lead Oxide
  - Visible Emissions
- Emission Testing - 10 February 1992
  - $H_2SO_4/SO_3/SO_2$
  - Carbon Monoxide
  - Total Hydrocarbons

Appendix B. Laboratory Data:
- Particulate Analysis
- Lead Analysis
- H_2SO_4/SO_2 Analysis
- Total Hydrocarbon Analysis
- Carbon Monoxide Analysis

Appendix C. Test Production Data

Appendix D. Sampling Point Location, Stack Sketch, Cyclonic Flow Study

Appendix E. QA/QC, Test Equipment Calibration

Appendix F. Test Personnel

TEST PROGRAM SUMMARY

TEST PROGRAM SUMMARY

INTRODUCTION

A series of stack tests were performed at the Delco-Remy Division, GM Corporation during the period of 7 and 10 February 1992. Testing was conducted at the discharge of a baghouse serving scrap lead recovery activities. Stack gases were characterized for opacity and concentrations and emission rates of particulates, lead, surfuric acid/sulfur dioxide, total hydrocarbons, and carbon monoxide.

Delco retained RMC Environmental Services, Inc. (RMC) and NET Atlantic, Inc. to conduct the test program. Mr. Timothy Harvey, Manager of Air Quality Services for RMC, managed the project on behalf of Mr. Albert Shukis, Plant Engineer for Delco-Remy. Testing and production activities were witnessed by Ms. Richelle Burkeen, New Jersey Department of Environmental Protection (NJDEP) of Technical Services, and Mr. Kenneth Lembo, NJDEP Regional Office, Air Quality Division. Appendix F gives a complete list of test personnel.

RESULTS AND DISCUSSION

Table I summarizes the results and production activities associated with each day of testing. All field data, calculations, and nomenclature are given in Appendix A; supporting laboratory analytical data are in Appendix B.

As the table shows particulate concentrations ranged from 0.005 grn/dscf (1.3lb/hr) to 0.008 grn/dscf (2.0 lb/hr). Corresponding lead emissions ranged from 0.0014 grn/dscf to 0.0025 grn/dscf, with associated emission rates of 0.3 to 0.5 lbs/hr.

Sulfuric acid/SO_3 concentrations ranged from 0.07 to 10 ppmv, corresponding to emission ratios ranging from 0.034 to 4.9 lbs/hr. Sulfur dioxide concentrations ranged from 0.5 to approximately 20 ppmv, giving emission ratios ranging from 0.17 to 6.5 lbs/hr.

Total hydrocarbon concentrations were below detectable levels for each test run (see Test Methods section for discussion). The detection limit for hydrocarbon analysis was 2 ppm as methane, for each sample fraction (condensate and gas bag), thus the combined reported results show actual concentrations to be less than 4 ppm as methane.

Actual carbon monoxide concentrations ranged from 2.8 to 17.6 ppmvd. Normalized to a flue gas oxygen concentration of 7%, CO concentrations ranged from approximately 50 to 400 ppmvd. As the flue gas analysis results in Appendix A show stack gas percent oxygen ranged from 20.2% to 20.3%. F_o factor calculations prescribed in EPA Methods 3, Section 3.4.1.1, Quality Control Procedures, indicate F_o factors in the range 1.4 to 1.5. These results are well within expected limits for propane combustion (see Source Description Section).

Table 1. Summary of Results - Delco Battery Emission Test

07-Feb-92

Test	Time	Scrap Charge	Particulate Emis. gr/dscf	Particulate Emis. #/hr	Lead Emis. (as PbO) gr/dscf	Lead Emis. (as PbO) #/hr	Lead Emis. (as PbO) #/ton
1	0930-1047	0945-1000 7537#	0.008	2.03	0.0025	0.64	0.51
2	1145-1301	1245-1305 9515#	0.005	1.41	0.0016	0.42	0.33
3	1400-1516	1.26 ton/hr	0.005	1.33	0.0014	0.36	0.29 ✓

10-Feb-92

Test/ Time	Scrap Charge	H2SO4/SO3 ppmv	H2SO4/SO3 #/hr	SO2 ppmv	SO2 #/hr	Total Hydrocarbons ppmvd	Total Hydrocarbons ppmvd 7% O2	Carbon Monoxide ppmvd	Carbon Monoxide ppmvd 7% O2
1 0915-1031	0920-0935 11,774#	1.5	0.71	21	6.5	<4	<90	7.1	162
2 1117-1232		0.07	0.034	0.52	0.17	<4	<80	2.8	56
3 1348-1502	1320-1345 5133#	10	4.9	1.6	0.52	<4	<90	17.6	410
	1.25 tph								

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On both days of testing, production activities and test timing were very similar. Each day two lead scrap charges were experienced over the three test run period. Likewise, each days' sampling included one complete charge and one partial charge during testing, along with a single test run completed during no charging. From Table 1 we see highest emissions in all categories during those times of scrap charging.

A summary of the visible emission evaluation is given in Appendix A. In every case, six minute average opacity readings were zero or less than 5%. A single maximum reading of 10% was documented during test #2, 7 February 1992.

Testing and production activities were well coordinated. All test operations and production activities ran smoothly, with no mechanical failures experienced. Sampling train leak tests on all components, for both test days were acceptable; all isokinetic sampling rates were maintained at 100 ± 100%.

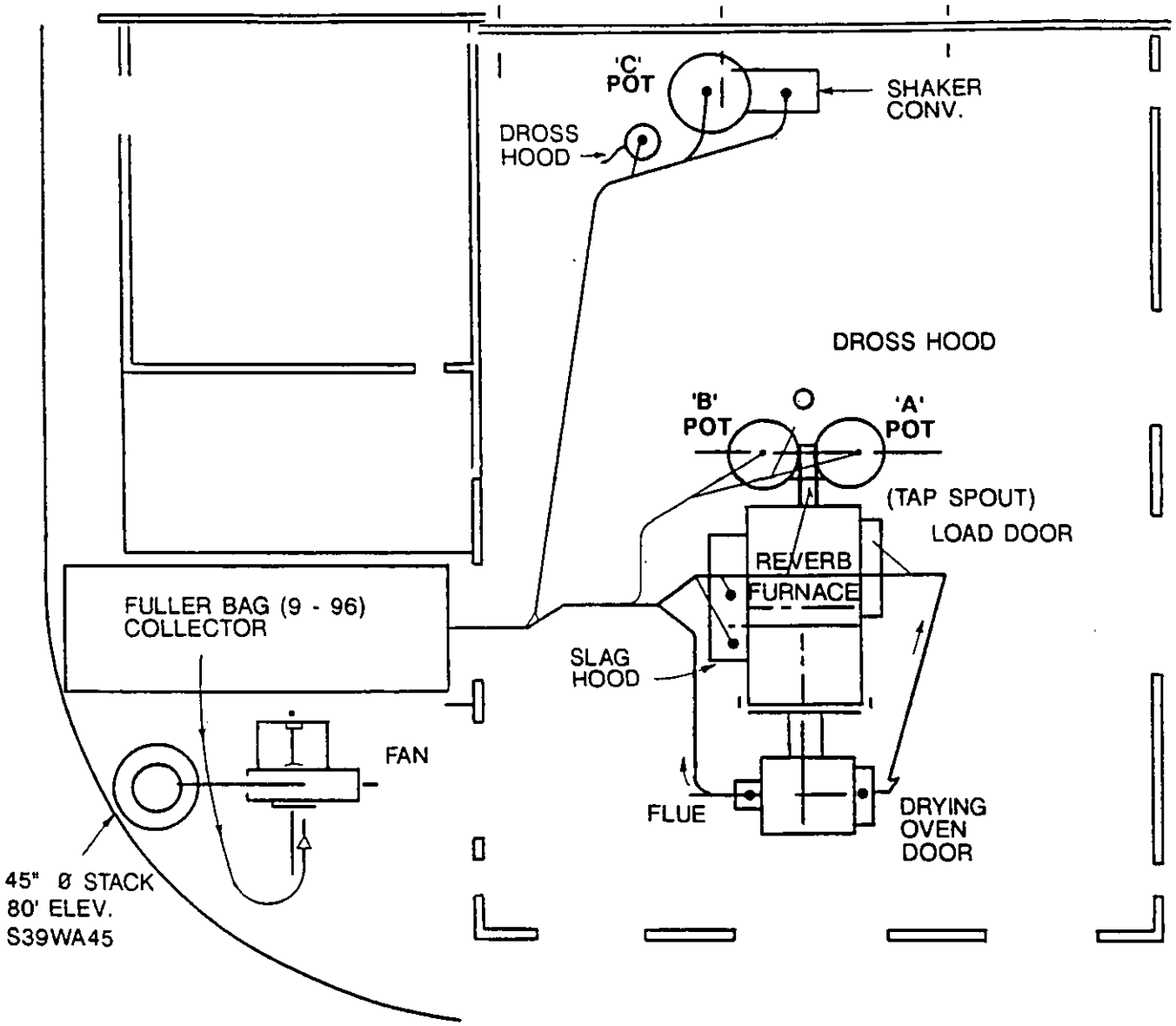
SOURCE DESCRIPTION

SOURCE DESCRIPTION

The source in question is a pulse jet baghouse that serves various operations in the lead recovery process. The unit is designed to handle 42,000 acfm, with 8,986 square feet of nomex felt bags. The subsequent air to cloth ration is 4.7 : 1.

The baghouse controls emissions from two scrap pots, a reverberatory furnace, a drying oven, and associated conveyors. The furnace utilizes propane fuel, at a design heat input of 10 million BTU's/hr, through two identical burners. The reclaim shop operates at capacity during two shifts (16 hours) per day.

Exhaust gases are ultimately vented to atmosphere through a 45 inch diameter stack. Figure 1 represents a schematic diagram of the dust collection system.



RMC ENVIRONMENTAL SERVICES

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FIGURE 1. **SOURCE SCHEMATIC**

SOURCE OPERATING CONDITIONS

SOURCE OPERATING CONDITIONS

A summary of operating activities is given in Appendix C. As shown, lead scrap process rates were very similar for both days. Approximately 1.25 tons/hour lead scrap was processed over each days' test activity period. the raw materials input log shows weights and scrap charge times for each day of testing. For purposes of determining scrap lead production rates, the sum of the addition of scrap plates, scrap paste, scrap lead, lead dust, dross, and oxide were used. The weight of coke charged was omitted.

During normal activity, as experienced during these tests, the fuel firing rate for the reverberatory furnace operated at 100% design rate. The following summary in Table 2 shows specific equipment and the energy input experienced by each, during the test activities.

Table 2. Equipment Heat Input

Equipment	Number of Burners	Total Heat Input Capacity (10^6 BTU/hr)
Reverberatory Furnace	2	10 mmBTU/hr
Melting Pot - B*	1	4 mmBTU/hr*
Melting Pot - C*	1	4 mmBTU/hr*

*Note that burners on pots B and C do NOT vent to the baghouse exhaust system.

TEST METHODS

TEST METHODS

Table 3 shows the approximate state and EPA references for all testing conducted 7 and 10 February 1992 and at Delco-Remy Division. The following discussion reiterates key portions of these reference methods.

Table 3. Test References

Test Parameters	Reference Method(s)
Determination of sampling location and numbers of traverse points	40CFR60, Appendix A, EPA Reference Method 1
Flue Gas Specific Gravity	40CFR, Appendix A, EPA Reference Method 3b
Particulate	NJAC Title 7 Chapter 27B-1, Air Test Method 1
Lead	40CFR60, Appendix A, EPA Reference Method 12
Sulfuric Acid/Sulfur Dioxide	40CFR60, Appendix A, EPA Reference Method 8
Carbon Monoxide	40CFR60, Appendix A, EPA Reference Method 10
Total Hydrocarbons	NJAC 7:27B-3.9, Air Test Method 3a

Samples were collected from the stack at a location 14 feet (3.7 diameters) downstream from the id fan breaching, and 42 feet (11.2 diameters) upstream from the stack discharge. As per EPA Method 1, a twenty-four (24) point traverse was conducted during each run. Isokinetic samples were collected for three minutes per point, giving a total 72 minutes per test. Cyclonic flow testing indicated the acceptability of this location. Appendix D shows a sketch of the sampling location, and contains the cyclonic flow field data.

Equipment utilized for isokinetic sampling was manufactured by Research Appliance Company, Division of Andersen Technologies. This equipment was utilized for sampling particulates, lead, and $H_2SO_4/SO_3/SO_2$. Test equipment utilized for hydrocarbon and CO sampling was manufactured, assembled, and configured by RMC.

Particulate and lead emission testing was conducted in accordance with 40CFR60 Appendix A, EPA Reference Methods 5 and 12. The samples were collected isokinetically. Filterable particulate and lead was removed from the sample stream with a high purity quartz glass-fiber filter. Any gaseous lead compounds were then collected in a series of impingers containing 0.1 N HNO3. Figure 2 is a schematic diagram of the sampling train.

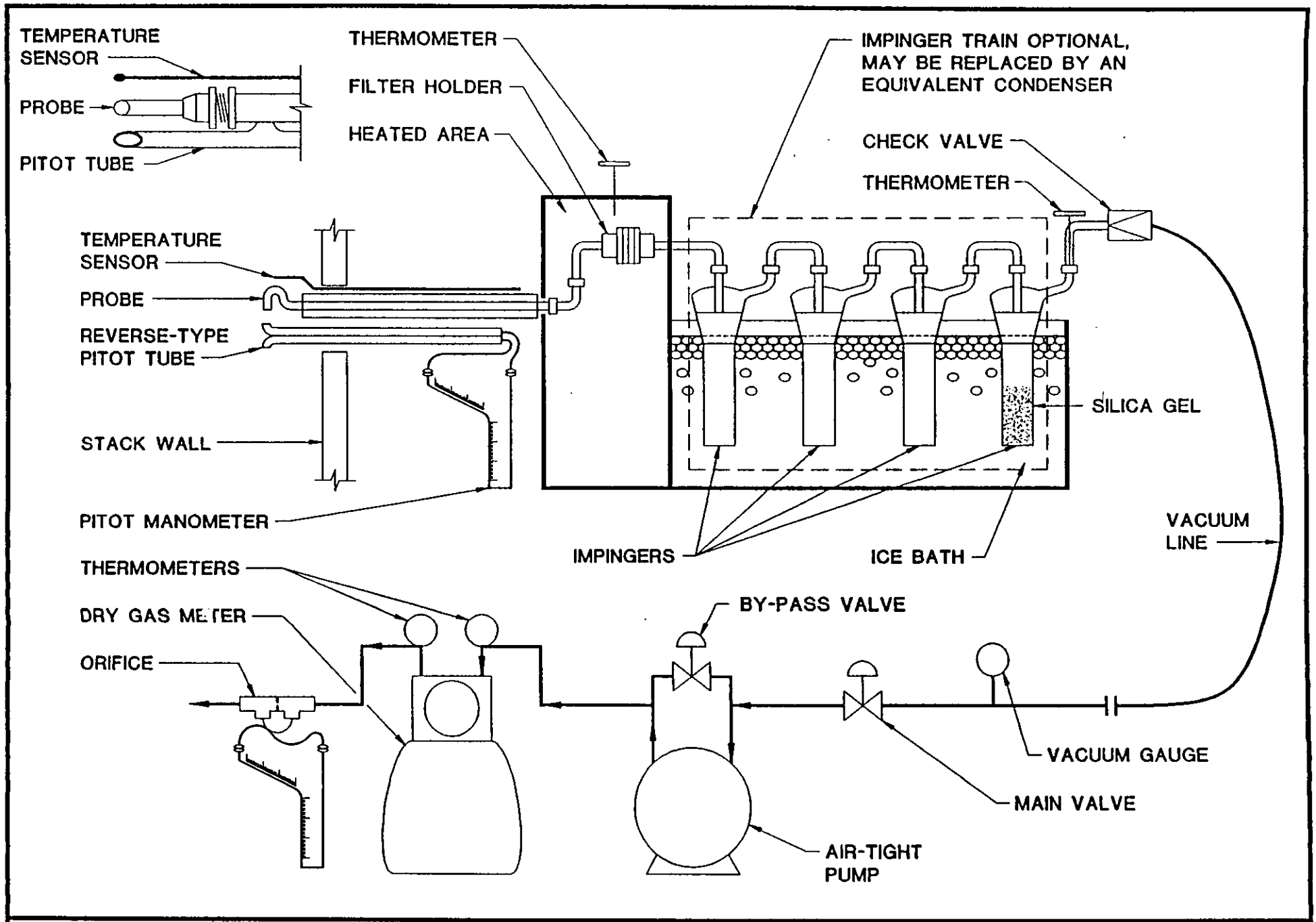

FIGURE 2. **PARTICULATE-SAMPLING TRAIN**

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SPRING CITY, PENNSYLVANIA 19475
215-948-4700

Sample retrieval was initiated by rinsing the sampling probe and all wetted surfaces upstream from the filter with reagent grade acetone. These components were then rinsed with 0.1 N HNO3. Each rinsate and associated residue was stored separately in a pre-cleaned 500 ml glass container for shipment back to the laboratory. The impinger contents were retrieved, liquid volume measured, and then stored in a pre-cleaned 500 ml glass container. The wetted surfaces of all impingers and connecting glassware were rinsed with 0.1 N HNO_3, which was included with the impinger sample.

Sample analysis was begun by evaporating the acetone rinse, and dessicating and weighing the residue to a final constant weight. The filters from each sample were also dessicated and weighed to a final weight. Then both particulate components were combined for digestion according to EPA Method 12. The impinger solutions were kept separate and underwent a separate digestion. Analysis for lead was conducted by graphite furnace atomic absorption spectrophotometry.

Sulfur oxides testing was conducted according to EPA Reference Method 8 - Determination of Sulfuric Acid Mist and Sulfur Dioxide emissions from Stationary Sources. The stack sample is collected isokinetically, with sulfuric acid mist (including sulfur trioxide) and sulfur dioxide separated in specific sampling train components. Both fractions are quantified separately by the barium-thorin titration method. Basic operation of the sampling train is according to the procedure outlined in Method 5, but post-test activities include a 15 minute clean ambient air purge of the sampling train. As the sample is collected H_2SO_4 and SO_3 is trapped in an impinger containing 10 ml 80% isopropanol. The sample gas then proceeds through a series of two impingers containing 100 ml 3% H_2O_2 each, where any SO_2 present is collected. A schematic of the sampling train is given in Figure 3.

Total hydrocarbon emission testing was conducted in accordance with the NJDEP Air Test Method 3.9. The method is based upon the principle of condensing the moisture and VOS in the source gas and subsequently collecting the dry gas sample in a Tedlar bag. The resulting condensate was analyzed by a purge and trap gas chromatography technique, with the gas bag sample analyzed by a direct injection GC technique. In both instances, the instrument was calibrated with a series of methane standards. The total area of each resulting chromatograph was compared to the methane response factors.

A representative source gas sample was drawn at a constant rate of 1 LPM through a heated sample line to a series of two midget impinger condensers in an ice bath. The dry gas sample was collected in a Tedlar bag within a rigid sampling apparatus. A static leak check of all sampling components upstream of the rigid container was conducted prior to and after each run. A precision rotameter was utilized to control the sampling rate. The rotometer was located between the impingers and the rigid container. Figure 4 is a diagram of the sampling train.

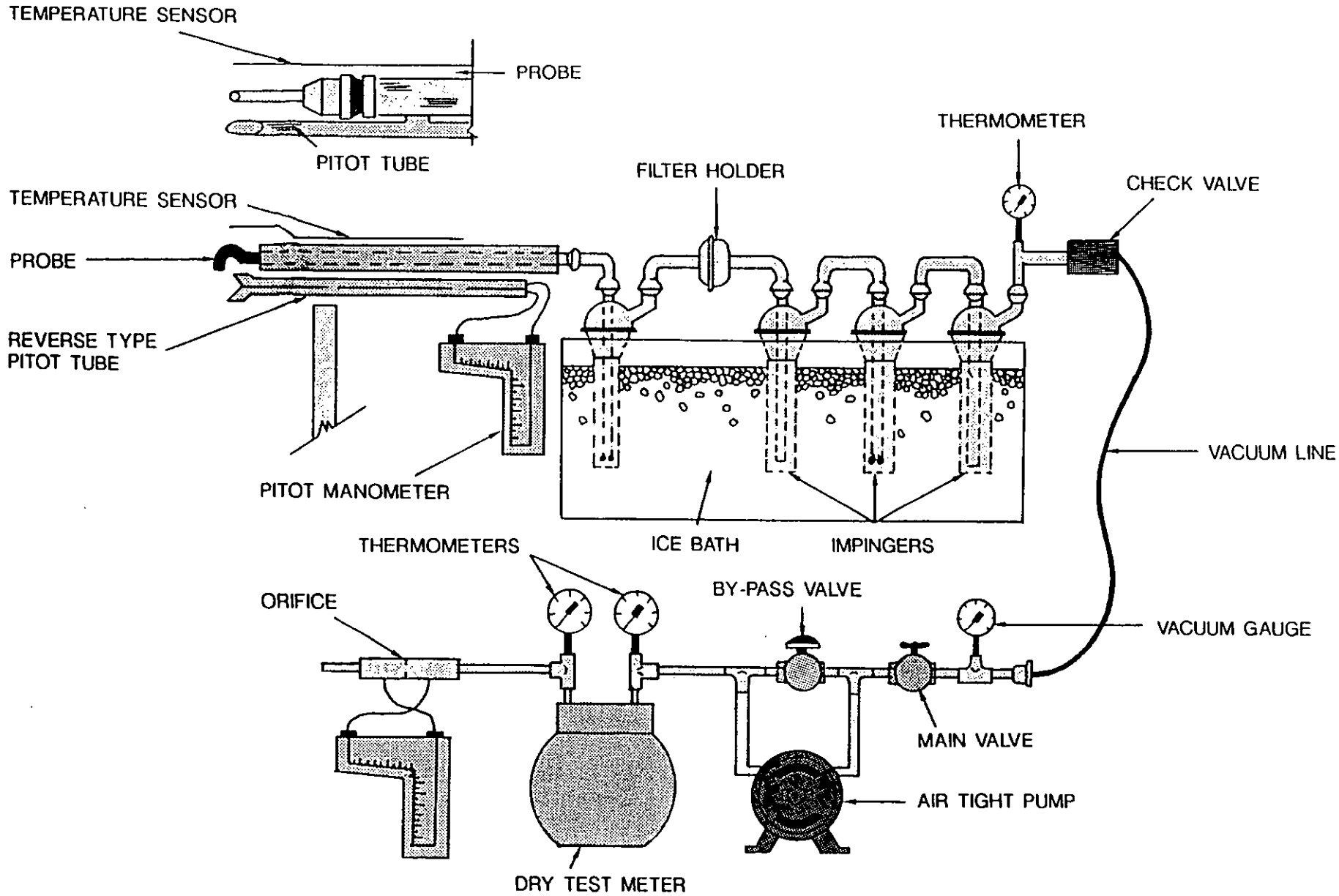

FIGURE 3. **SULFURIC ACID MIST SAMPLING TRAIN.**

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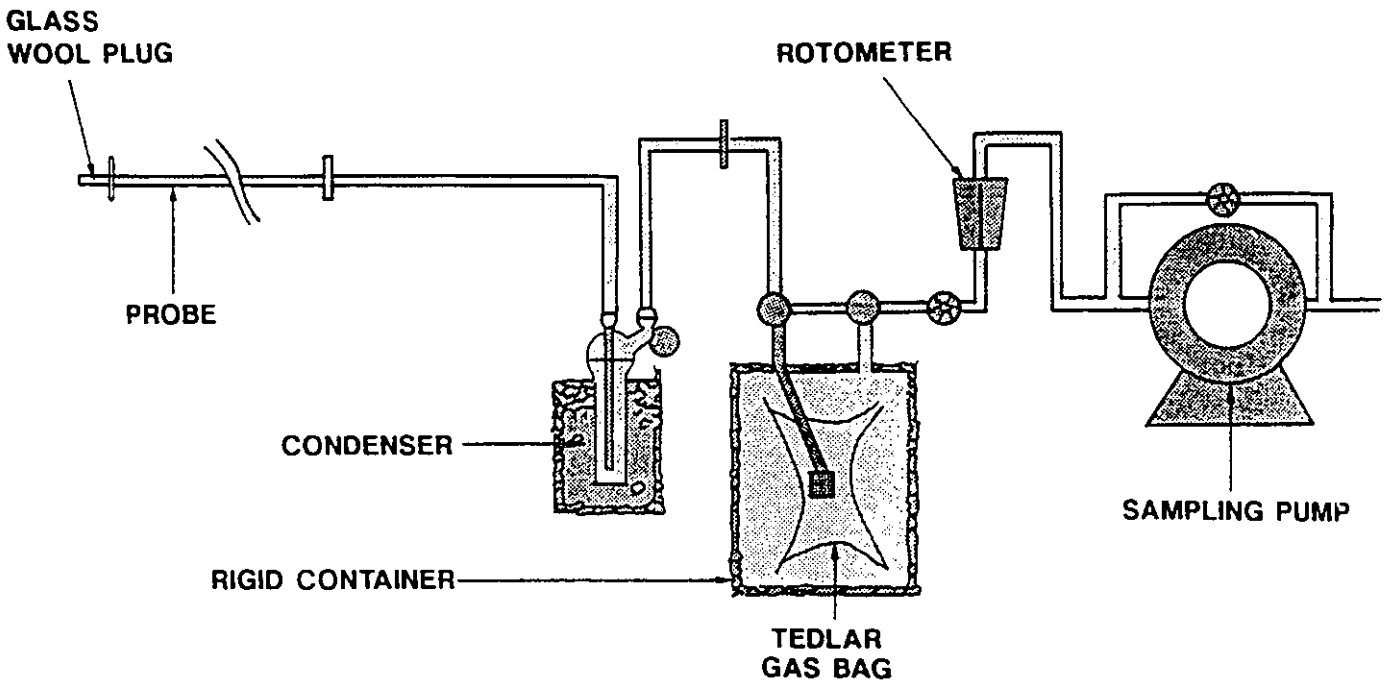

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FIGURE 4. VOS SAMPLING TRAIN

Carbon monoxide testing was conducted according to 40CFR60, Appendix A, EPA Reference Method 10. An integrated sample was collected in a Tedlar gas bag using the sampling train shown in Figure 5. The sample was collected at a rate of 1 liter per minute. Analysis was conducted at the laboratory 24 hours after collection. An NDIR analyzer calibrated with a series of certified CO standards ranging from zero to 100 ppm was utilized.

Flue gas molecular weight was determined in accordance with EPA Method 3. An integrated gas sample was collected during each test run, and subsequently analyzed for % CO_2, % O_2, and % CO utilizing an Orsat Apparatus.

Sampling equipment was calibrated, maintained and operated according to Reference Method procedure and guidelines. Calibration data can be found in Appendix E.

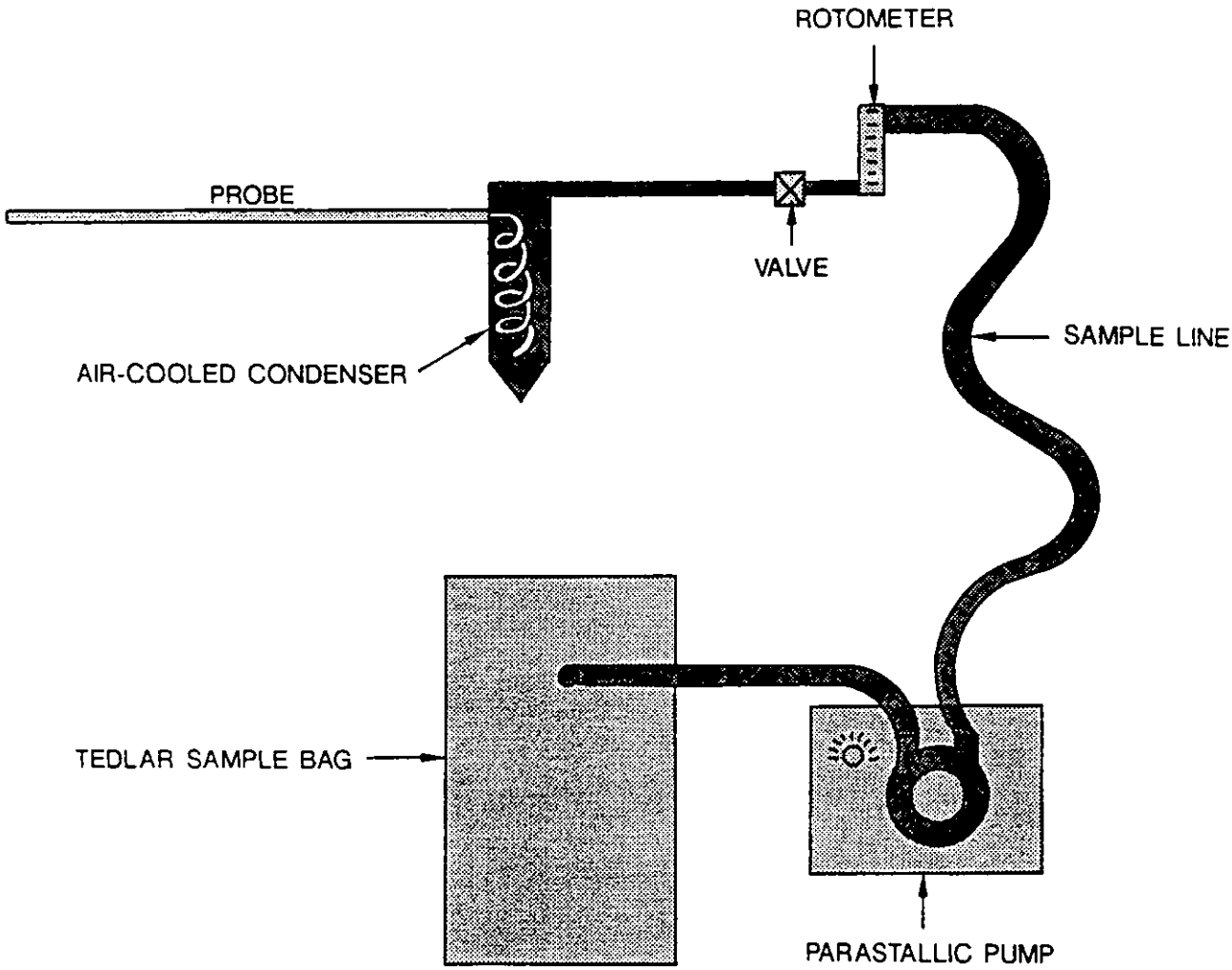

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FIGURE 5. **INTEGRATED GAS-SAMPLING TRAIN**

APPENDIX A

FIELD DATA AND CALCULATIONS

NOMENCLATURE

A	=	Flue Cross Sectional Area
ACFM	=	Actual Cubic Foot per Minute
An	=	Sampling Nozzle Cross Sectional Area; Square Feet
B_{ws}	=	Proportion by Volume of Water Vapor in Gas Stream
C_p	=	Pitot Tube Coefficient, Dimensionless
C_s	=	Particulate Concentration, Grains/Dry Standard Cubic Foot
DSCFM	=	Dry Standard Cubic Foot per Minute
D_n	=	Sampling Nozzle Diameter; Inches
E	=	Particulate Emission Rate, lbs/hr
ft/sec	=	Feet per Second
ΔH	=	Average Pressure Drop Across Orifice Meter, Inches H_2O
I	=	Isokinetic Variation, %
M_d	=	Flue Gas Molecular Weight, Dry Basis
M_s	=	Flue Gas Molecular Weight, Wet Basis
m_n	=	Total Particulate Residue Collected, Grams
P_{bar}	=	Barometric Pressure, Inches Hg
P_g	=	Stack Static Pressure, Inches H_2O
P_s	=	Stack Absolute Pressure, Inches H_g

NOMENCLATURE

P_{std}	=	Standard Absolute Pressure, 29.92 Inches H_g
$\sqrt{\Delta p}$	=	Velocity Head of Stack Gas, Inches H_2O
Q	=	Stack Gas Flow Rate, Dry Standard Cubic Foot Per Hour (dscfh)
T_m	=	Absolute Average Dry Gas Meter Temperature, °R
T_s	=	Absolute Average Stack Gas Temperature, °R
T_{std}	=	Standard Absolute Temperature, 528°R
V_{lc}	=	Total Liquid Collected in Inpingers, ml. (gm)
V_m	=	Sample Volume - As Measured by Dry Gas Meter, dcf
V_s	=	Stack Gas Velocity, ft/sec
Vm_{std}	=	Sample Volume - Corrected to Standard Conditions, dscf
Y	=	Dry Gas Meter Calibration Factor, dimensionless
Θ	=	Total Sample Time, Minutes
13.6	=	Specific Gravity of H_g

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STACK TEST CALCULATIONS

stack absolute pres, "Hg, Ps	Pg/13.6 + Pbar
sample volume, standard cond.,Vm std	$17.64 \times Vm \times Y \times Pbar + \frac{(delta\ H/13.6)}{Tm}$
water vapor volume, Vw std	V lc x 0.04071
stack gas moisture content, %, Bws	$\frac{Vw\ std}{Vm\ std + Vw\ std}$
stack gas velocity, ft/sec, vs	$85.49 \times Cp \times sq\ rt\ delta\ P \times \sqrt{\left(\frac{Ts}{Ps\ Ms}\right)}$
stack gas flow rate, dscfh, Q	$3600 \times (1-Bws) \times vs \times A \times \frac{Tstd \times Ps}{Ts\ \ Pstd}$
particulate concentration, grn/dscf, cs	mn x 15.43 / Vm std
particulate emission rate, lb/hr, E	$\frac{cs \times Q}{7000}$
flue gas molecular weight, dry, Md	0.44(%CO2) + 0.32(%O2) + 0.28(%N2 + % CO)
flue gas molecular weight, wet, Ms	Md (1-Bws) + 18.0 x Bws
isokinetic sampling rate, % I	$I = \frac{0.0944 \times Ts \times Vm\ std}{Ps \times vs \times An \times theta \times (1-Bws)}$

STACK TEST CALCULATIONS

H2SO4/SO3 concentration, lb/dscf, c H2SO4	$\frac{1.081E\text{-}5 \times (Vt\text{-}Vtb)\ N\ (Vsoln/Va)}{Vm\ std}$
H2SO4/SO3 concentration, ppmv	$\frac{c\ H2SO4 \times 385 \times 1E6}{98}$
SO2 concentration, lb/dscf, CSO2	$\frac{7.061E\text{-}5 \times (Vt\text{-}Vtb)\ N\ (Vsoln/Va)}{Vm\ std}$
SO2 concentration, ppmv	$\frac{c\ SO2 \times 385 \times 1E6}{64}$
carbon monoxide concentration, ppmvd, c CO	c CO ndir (1-F CO2) (40CFR60 App A, Eq. 10-1)
emissions corrected to 7% O2	13.9/20.9 - %O2 x e.r.

EMISSION TESTING

7 February 1992

RMC Environmental Services, Inc.

SUMMARY OF STACK TEST FIELD DATA

SOURCE: Delco Battery Pb Reclamation DATE: 7- Feb-92

	RUN#		
	1	2	3
Stack cross-sect. area, se ft (A)	11.54	11.54	11.54
Avg. stack gas temp, deg R (Ts)	578	578	577
Stack static pres., in. H2O (Pg)	0.15	0.15	0.15
Stack velocity pres. (sq rt dlta P)	0.816	0.838	0.825
Barometric pressure, in. Hg (Pbar)	29.60	29.60	29.60
Pitot tube coefficient (Cp)	0.84	0.84	0.84
Dry gas meter coefficient (Y)	1.016	1.016	1.016
Dry gas meter temp., deg R (Tm)	518	521	521
Metered sample volume, cu ft (Vm)	59.19	61.35	60.51
Water volume collected, ml/gm (Vlc)	18	20	16
Test duration, min. (theta)	72	72	72
Sampling nozzle diameter, in. (Dn)	0.250	0.250	0.250
Orifice pres. drop, in. H2O (dlta H)	2.36	2.50	2.43
Flue gas composition			
% CO2	0.4	0.4	0.5
% O2	20.3	20.4	20.2
% CO	0.0	0.0	0.0

RMC Environmental Services, Inc.

SUMMARY OF STACK TEST RESULTS

SOURCE: Delco Battery Lead Reclamation DATE: 7-Feb-92

	RUN#		
	1	2	3
Stack abs. pres., in.Hg(Ps)	29.61	29.61	29.61
Std. sample vol., scf (Vmstd)	60.974	62.856	61.985
Water vapor vol., scf (Vwstd)	0.73	0.81	0.65
Stack gas moisture, % (Bws)	1.2	1.3	1.0
Stack gas velocity, ft/s (vs)	48.28	49.59	48.74
Stack gas flow rate, dscfm (Q)	1791905	1838582	1814816
dscfm	29865	30643	30247
acfm	33431	34334	33750
FLUE GAS ANALYSIS			
Percent CO2	0.4	0.4	0.5
Percent O2	20.3	20.4	20.2
Percent CO	0.0	0.0	0.0
Percent N2	79.3	79.2	79.3
Bws	1.2	1.3	1.0
Md	28.88	28.88	28.89
Ms	28.75	28.74	28.78
STACK TEST ISOKINETIC RATE CALCULATION			
Ts	578	578	577
Ps	29.61	29.61	29.61
Bws	1.2	1.3	1.0
vs	60.97	62.86	61.99
An	0.000341	0.000341	0.000341
theta	72	72	72
I,%	96	96	96

RMC Environmental Services, Inc.

STACK TEST RESULTS - PARTICULATES

SOURCE: Delco Battery Lead Reclamation

DATE: 7-Feb-92

	RUN#		
LABORATORY DATA			
	1	2	3
Particulate matter collected			
filter + rinse residue, gm	0.0313	0.0218	0.0206
back half condensible	na	na	na
back half total	na	na	na
back half dissolved	na	na	na
Total residue weight, gm (mn)	0.0313	0.0218	0.0206
EMISSION CALCULATIONS			
Particulate concentration, grn/dscf (cs)	0.008	0.005	0.005
front half only (filterable)	na	na	na
total residue (incl. back half)	na	na	na
Particulate emission rate, actual, #/hr (E)	2.03	1.41	1.33

Back 1/2 & filterable NA

RMC Environmental Services, Inc.

STACK TEST RESULTS - LEAD AS PbO

SOURCE: Delco Battery Lead Reclamation DATE: 7-Feb-92

	RUN#		
LABORATORY DATA			
	1	2	3
A. contaminant mass collected,mg			
lead	9.005	6.111	5.408
LEAD EMISSION CALCULATION			
B. contaminant concentration, gr/dscf	0.0025	0.0016	0.0014
$\frac{A \times 0.01543 \times 1.077}{Vm\ std}$			
C. contaminant emission rate, lb/hr	0.64	0.42	0.36
$\frac{B \times Q}{7000}$			

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City New Brunswick
Location Furnace Baghouse
Operator D.N.
Date 2-7-92
Run number 1 particulate
Stack diam, mm (in.)

Sample box number
Meter box number RAC-02
Meter ΔH@ 1.81

Meter calibration (Y) 1.016
Pitot tube (C_p) 0.84
Probe length 5'
Probe liner material Pyrex
Probe heater setting
Ambient temperature
Barometric pressure (P_b) 29.60 mm (in.) Hg
Assumed moisture 2%
Static pressure (P_s) +0.15 mm (in.) H_2O
C Factor 0.53
Reference ΔP 0.54 mm (in.) H_2O

Sheet 1 of 2
Nozzle identification number
Nozzle diameter 0.25 mm (in.)
Thermometer number
Final leak rate 0 m^3/min (cfm)
Vacuum during leak check 8 1st Hg HP mm (in.) Hg
Filter number
Remarks

Traverse point number	Sampling time, (θ), min	Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3)	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
		9:30 start					918.48				
Port A inside to start 1	3		7	114	0.72	2.50	921.00	38	38	50	225
2	6		8	116	0.77	2.70	923.50	50	38	50	225
3	9		8	116	0.80	2.80	926.30	58	38	50	225
4	12		8	122	0.77	2.70	928.40	62	38	50	225
5	15		7	122	0.70	2.45	931.35	66	39	50	225
6	18		7	119	0.72	2.50	934.00	69	40	50	225
7	21		7	119	0.70	2.45	936.50	72	42	50	225
8	24		8	119	0.75	2.65	939.10	74	43	51	225
9	27		7	118	0.72	2.50	941.75	75	45	51	225
10	30		8	118	0.75	2.65	944.35	76	46	51	225
11	33		7	117	0.70	2.45	946.00	78	47	51	225
12	36		5	115	0.60	2.10	948.98	77	48	52	225
		10:06 End									
	Total		Max	Avg			Total 30.50	Avg	Avg	Max	

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location Furnace Baghouse
Operator DN
Date 2-7-92
Run number 1 particulate
Stack diam, mm (in.)

Sample box number
Meter box number
Meter ΔH@

Meter calibration (Y)
Pitot tube (C_p)
Probe length
Probe liner material
Probe heater setting
Ambient temperature
Barometric pressure (P_b) mm (in.) Hg
Assumed moisture
Static pressure (P_s) ~~0.30~~ mm (in.) H_2O
C Factor Static +0.15
Reference ΔP mm (in.) H_2O

Sheet 2 of 2
Nozzle identification number
Nozzle diameter mm (in.)
Thermometer number
Final leak rate 0 m^3/min (cfm)
Vacuum during leak check 10 mm (in.) Hg
Filter number
Remarks

Final Leak Rate 0.00 CFM

Port B start Inside

Traverse point number	Sampling time, (θ), min	Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3) 949.04	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
		10:11 Start									
1	39		8	115	0.77	2.70	951.60	65	49	52	225
2	42		8	118	0.83	2.90	954.40	69	49	52	225
3	45		9	118	0.86	3.00	957.25	75	50	52	225
4	48		8	118	0.80	2.80	960.00	78	51	52	225
5	51		8	120	0.75	2.65	962.55	79	51	53	225
6	54		7	120	0.70	2.45	965.15	80	52	53	225
7	57		6	119	0.51	1.80	967.40	79	52	53	225
8	60		5	117	0.46	1.60	969.50	76	53	53	225
9	63		5	116	0.46	1.60	971.60	74	53	53	225
10	66		5	115	0.46	1.60	973.65	73	53	53	225
11	69		5	115	0.46	1.60	975.80	73	54	53	225
12	72		5	114	0.40	1.40	977.73	71	54	53	225
		10:47 End									
	Total		Max	Avg 118	$\sqrt{\Delta p}$ = .816	2.36	Total 28.69	Avg	Avg	Max	

578 R 59.19 63

(56)
518 R

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location Furnace Baghouse
Operator
Date 2-7-92
Run number 2 particulate
Stack diam, mm (in.)

Sample box number
Meter box number
Meter ΔH@

Meter calibration (Y)
Pitot tube (C_p)
Probe length
Probe liner material
Probe heater setting
Ambient temperature
Barometric pressure (P_b) mm (in.) Hg
Assumed moisture
Static pressure (P_s) mm (in.) H_2O
C Factor
Reference ΔP mm (in.) H_2O

Sheet 1 of 2
Nozzle identification number
Nozzle diameter mm (in.)
Thermometer number
Final leak rate 0 m^3/min (cfm)
Vacuum during leak check 10 1st Hg HR mm (in.) Hg
Filter number
Remarks

Traverse point number (Port B)	Sampling time, (θ), min	Clock time, (24 h) 11:45 start	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3) 978.18	Gas sample temperature at dry gas meter Inlet, °C(°F)	Gas sample temperature at dry gas meter Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
1	3		5	118	0.87	3.00	981.00	47	43	~~23~~ 50	225
2	6		5	118	0.95	3.30	983.50	57	43	50	225
3	9		5	119	0.90	3.15	986.70	64	43	50	225
4	12		5	119	0.85	3.00	989.40	69	44	50	225
5	15		5	120	0.80	2.80	992.10	71	45	50	225
6	18		5	121	0.75	2.65	994.75	72	46	51	225
7	21		4	120	0.55	1.90	997.00	72	48	51	225
8	24		3	120	0.50	1.75	999.20	72	48	51	225
9	27		3	120	0.50	1.75	1001.38	71	49	51	225
10	30		3	118	0.47	1.65	1003.45	71	50	51	225
11	33		3	116	0.42	1.45	1005.47	70	51	51	225
12	36		3	115	0.42	1.45	1007.47	69	51	51	225
		12:21 End									
	Total		Max	Avg			Total 29.29	Avg	Avg	Max	

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location
Operator
Date 2-7-92
Run number 2 particulate
Stack diam, mm (in.)

Sample box number
Meter box number
Meter ΔH@

Meter calibration (Y)
Pitot tube (C_p)
Probe length
Probe liner material
Probe heater setting
Ambient temperature
Barometric pressure (P_b) mm (in.) Hg
Assumed moisture
Static pressure (P_s) mm (in.) H_2O
C Factor
Reference ΔP mm (in.) H_2O

Sheet 2 of 2
Nozzle identification number
Nozzle diameter mm (in.)
Thermometer number
Final leak rate 0 m^3/min (cfm)
Vacuum during leak check 13 mm (in.) Hg
Filter number
Remarks

Final Leak Rate: 0.00 CFm

Inside start Port A

2nd charge

Traverse point number	Sampling time, (θ), min	Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3)	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
		12:25 start					~~007.47~~ 1007.54				
1	39		4	116	0.67	2.35	1010.00	67	51	51	225
2	42		5	116	0.75	2.65	1012.60	68	51	52	225
3	45		5	117	0.75	2.65	1015.30	72	52	52	225
4	48		5	118	0.75	2.65	1017.90	76	52	52	225
5	51		5	119	0.75	2.65	1020.58	77	53	52	225
6	54		5	119	0.70	2.45	1023.18	77	53	53	225
7	57		5	120	0.70	2.45	1025.80	77	54	53	225
8	60		5	118	0.71	2.50	1028.35	76	54	54	225
9	63		5	118	0.80	2.80	1031.10	78	55	54	225
10	66		5	116	0.85	3.15	1034.05	79	55	54	225
11	69		5	116	0.90	3.15		81	55	54	225
12	72	1:01 end	5	116	0.75	2.65	1039.60	81	56	54	225
	Total		Max	Avg 117	$\sqrt{\Delta p}$ = .838	2.50	Total 32.06	Avg 61.35	Avg 65	Max (61)	

578 R

(Should have been 3.00)

521 R

PARTICULATE FIELD DATA FORM

Plant: Delco Remy
City:
Location: Furnace Baghouse
Operator:
Date: 2-7-92
Run number: 3 particulate
Stack diam, mm (in.):

Sample box number:
Meter box number:
Meter ΔH@:

Meter calibration (Y):
Pitot tube (C_p):
Probe length:
Probe liner material:
Probe heater setting:
Ambient temperature:
Barometric pressure (P_b): mm (in.) Hg
Assumed moisture:
Static pressure (P_s): mm (in.) H_2O
C Factor:
Reference ΔP: mm (in.) H_2O

Sheet 1 of 2
Nozzle identification number:
Nozzle diameter: .250 mm (in.)
Thermometer number:
Final leak rate: m^3/min (cfm)
Vacuum during leak check: mm (in.) Hg
Filter number:
Remarks:

Inside Port A

Traverse point number	Sampling time, (θ), min	Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3)	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
		start 2:00					1039.77				
1	3		5	114	0.70	2.45	1042.30	45	43	~~54~~ 45	225
2	6		5	114	0.70	2.45	1044.80	58	43	45	225
3	9		6	116	0.76	2.65	1047.40	60	43	45	225
4	12		6	118	0.76	2.65	1050.10	63	44	45	225
5	15		6	119	0.73	2.55	1052.70	67	45	45	225
6	18		6	120	0.73	2.55	1055.27	69	45	47	225
7	21		6	119	0.71	2.50	1057.90	71	47	47	225
8	24		6	~~120~~ 118	0.71	2.50	1060.45	72	47	47	225
9	27		6	118	0.80	2.80	1063.20	75	49	47	225
10	30		6	117	0.85	3.00	1066.00	78	50	48	225
11	33		6	117	0.91	3.20		79	51	48	225
12	36	2:36 End	6	112	0.81	2.85	1071.65	79	52	48	225
	Total		Max	Avg			Total 31.88	Avg	Avg	Max	

Dave Nonemaker 0.15

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location Furnace Baghouse
Operator
Date 2-7-92
Run number 3 particulate
Stack diam, mm (in.)

Sample box number
Meter box number
Meter ΔH@

Meter calibration (Y)
Pitot tube (C_p)
Probe length
Probe liner material
Probe heater setting
Ambient temperature
Barometric pressure (P_b) mm (in.) Hg
Assumed moisture
Static pressure (P_s) ~~0.28~~ mm (in.) H_2O
C Factor Static + 0.15
Reference ΔP mm (in.) H_2O

Sheet 2 of 2
Nozzle identification number
Nozzle diameter .250 mm (in.)
Thermometer number
Final leak rate 0 m^3/min (cfm)
Vacuum during leak check 8 mm (in.) Hg
Final Leak Rate = 0.00 CFM
Filter number
Remarks

Traverse point number	Sampling time, (θ), min	Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3) 1071.73	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
1	39		6	116	0.85	3.00	1074.55	68	51	48	225
2	42		6	116	0.85	3.00	1077.40	73	52	48	225
3	45		6	119	0.90	3.15	1080.26	77	53	49	225
4	48		6	119	0.83	2.90	1083.05	79	53	49	225
5	51		6	120	0.75	2.65	1085.70	79	53	49	225
6	54		5	118	0.70	2.45	1088.25	79	54	49	225
7	57		4	118	0.50	1.75	1090.45	77	54	50	225
8	60		4	116	0.40	1.40	1092.35	74	54	51	225
9	63		4	116	0.40	1.40	1094.30	73	54	51	225
10	66		4	115	0.45	1.60	1096.40	73	55	52	225
11	69		4	115	0.40	1.40	1098.40	73	55	52	225
12	72	3:16 End	4	115	0.40	1.40	1100.36	72	55	52	225
	Total		Max	Avg 117	$\sqrt{\Delta p}$ = .825	2.43	Total 28.63	Avg	Avg	Max	

577R 60.51 64

$\bar{x}$ = 61

521R

EPA Reference Method 9 - VE six (6) minute averages

	Test 1	Test 2	Test 3
0 - 6	0	<5	0
6 - 11	<5	<5	0
12 - 17	0	<5	0
18 - 23	0	<5	0
24 - 29	0	<5	0
30 - 35	<5	0	0
36 - 41	<5	0	0
42 - 47	<5	0	0
48 - 53	<5	0	0
54 - 59	0	0	0
60 - 65	0	<5	0
66 - 71	0	0	0
72 - 77	0	0	0
Max Reading	5	10	0

JACA CORP.

Page 1 of ~~X~~ 2 PAB.

VISIBLE EMISSION REPORT

Date: 2/7/92

Observer: Paul Butsavage

Signature: Paul A. Butsavage

Start Time: 0929 End Time: 1029

Plant Name: DELCO REMY

Plant Location: NEW BRUNSWICK NJ

Source ID: Reverb Furnace Stack - Battery Plant

Company Rep: Al Shukis

Observation Point: Approx 175' south of stack in grassy area

Stack -- Distance from: 175' Height: 80'

Wind -- Speed: 10-15 MPH Direction: EAST

Temperature: 30°F Humidity: <50%

Sky Condition: overcast

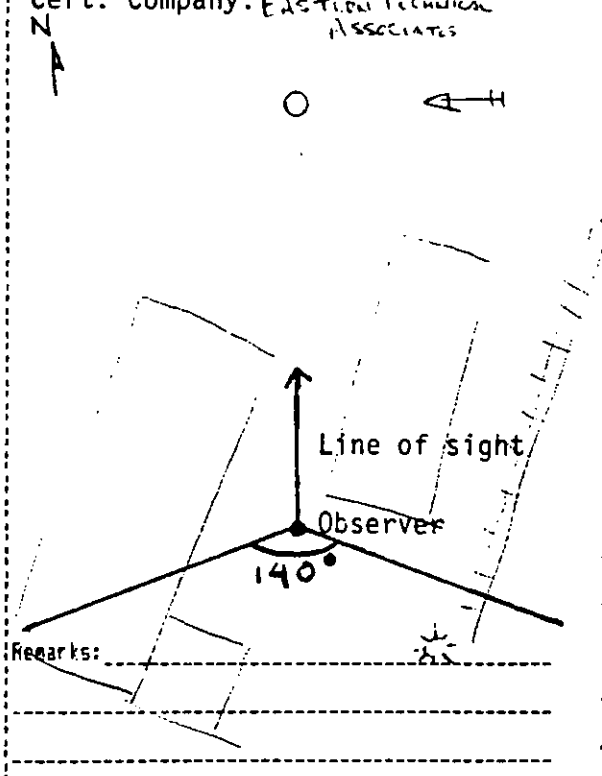
Background: Clouds / Sky

Smoke Color: light gray

Drawing of Observation Site
(include: observer location, sun position, wind direction, and stack location)

Cert. Date: October 2, 1991

Cert. Company: Eastern Technical Associates



	0	15	30	45		0	15	30	45
0	0	0	0	0	30	0	5	5	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	5	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	5	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	5
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	5	5	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0

Remarks:

Abbreviations:

My watch is ~ 2 minutes behind RMC stopwatch. PAB

JACA CORP.

VISIBLE EMISSION REPORT

Date: 2/7/92

Observer: PAUL BUTSAVAGE

Signature: Paul A. Butsavage

Start Time: 1029 End Time: 1047

Plant Name: DELCO REMY

Plant Location: NEW BRUNSWICK NJ

Source ID: Reverb Furnace Stack - Battery Plant

Company Rep: Al Shukis

Observation Point: approx 175' south of stack in grassy area

Stack -- Distance from: ~~[illegible]~~ 175' Height: 80'

Wind -- Speed: 5-10 MPH Direction: ~~5-10 MPH~~ EAST

Temperature: 30°F Humidity: <50%

Sky Condition: MOSTLY CLOUDY

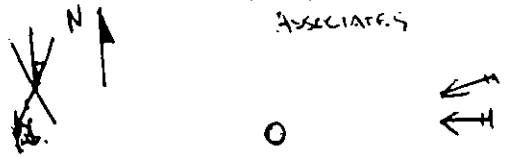
Background: Clouds

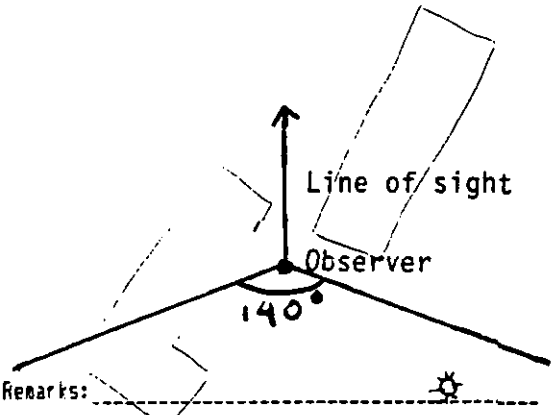
Smoke Color: None observed

Drawing of Observation Site
(include: observer location, sun position, wind direction, and stack location)

Cert. Date: OCTOBER 2, 1991

Cert. Company: EASTERN TECHNICAL ASSOCIATES





Remarks: sun is going in + out of clouds

Abbreviations:

	0	15	30	45		0	15	30	45
60	0	0	0	0	30				
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	0	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
70	0	0	0	0	40				
71	0	0	0	0	41				
72	0	0	0	0	42				
13	0	0	0	0	43				
14	0	0	0	0	44				
15	0	0	0	0	45				
16	0	0	0	0	46				
17	0	0	0	0	47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				

JACA CORP.

VISIBLE EMISSION REPORT

Date: February 7, 1992

Observer: Ron Butsavage

Signature: Ronald A Butsavage

Start Time: 1144 End Time: 1244

Plant Name: DELCO REMY

Plant Location: New Brunswick, NJ

Source ID: Reverb Furnace Stack - Battery Plant

Company Rep: Al Shukis

Observation Point: Approx 175' south of stack in grassy area

Stack -- Distance from: ~175' Height: 80'

Wind -- Speed: 10-15 MPH Direction: EAST

Temperature: 32°F Humidity: <50%

Sky Condition: Overcast

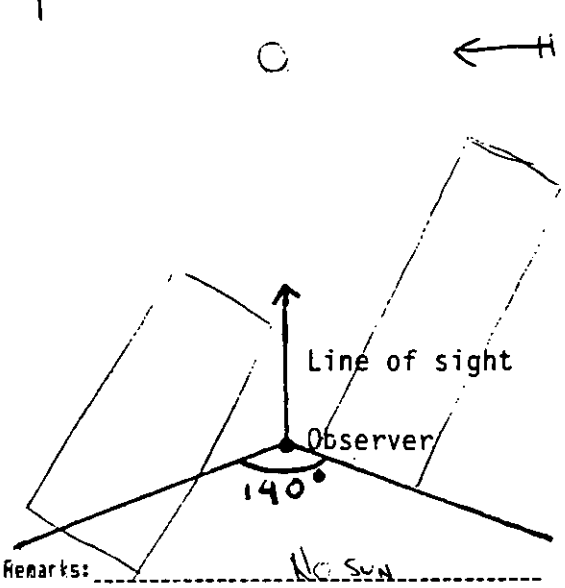
Background: clouds

Smoke Color: whitish-grey

Drawing of Observation Site
(include: observer location, sun position, wind direction, and stack location)

Cert. Date: October 2, 1991

Cert. Company: Eastern Technical Associates



Remarks: No Sun

Abbreviations:

	0	15	30	45		0	15	30	45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	5	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	5	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	5	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	10	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	5	49	0	0	0	0
20	5	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	5	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0

JACA CORP.

VISIBLE EMISSION REPORT

Date: February 7, 1992

Observer: Paul Butsavage

Signature: Paul A Butsavage

Start Time: 1244 End Time: 1300

Plant Name: DELCO - REMY

Plant Location: New Brunswick NJ

Source ID: Reverts Furnace Stack - Battery Plant

Company Rep: Al Shukis

Observation Point: Approx 175' south of stack in grassy area

Stack -- Distance from: ~175' Height: 50'

Wind -- Speed: 5-10 MPH Direction: EAST

Temperature: 32°F Humidity: <50%

Sky Condition: Overcast, some sky visible (<10%)

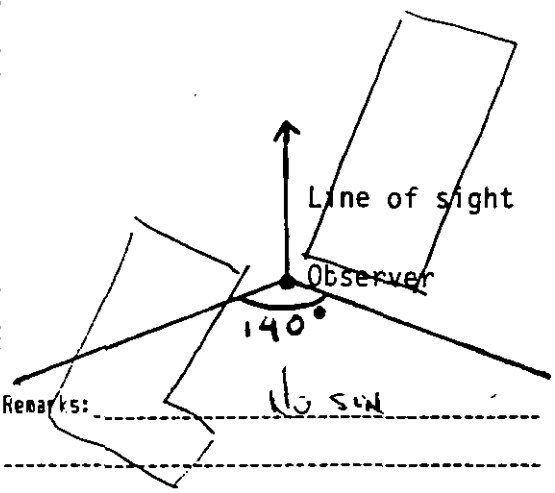
Background: Clouds / Sky

Smoke Color: whitish gray

Drawing of Observation Site
(include: observer location, sun position, wind direction, and stack location)

Cert. Date: October 2 1991

Cert. Company: EASTERN TECHNICAL ASSOCIATES



Remarks:

Abbreviations:

	0	15	30	45		0	15	30	45
0	0	0	0	0	30				
1	0	0	0	0	31				
2	0	0	0	0	32				
3	0	0	0	0	33				
4	0	0	0	0	34				
5	0	0	0	5	35				
6	0	0	0	0	36				
7	0	0	0	0	37				
8	0	0	0	0	38				
9	0	0	0	0	39				
10	0	0	0	0	40				
11	0	0	0	0	41				
12	0	0	0	0	42				
13	0	0	0	0	43				
14	0	0	0	0	44				
15	0	0	0	0	45				
16	0	0			46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				

JACA CORP.

VISIBLE EMISSION REPORT

Date: February 7, 1992

Observer: Paul Butsavage

Signature: Paul A Butsavage

Start Time: 1400 End Time: 1500

Plant Name: Delco - Remy

Plant Location: New Brunswick NJ

Source ID: Reverb Furnace Stack - Battery Plant

Company Rep: Al Shukis

Observation Point: Approx 175' south of stack in grassy area

Stack -- Distance from: 175' Height: 60'

Wind -- Speed: 5-10MPH Direction: NE

Temperature: 35°F Humidity: <50%

Sky Condition: Overcast

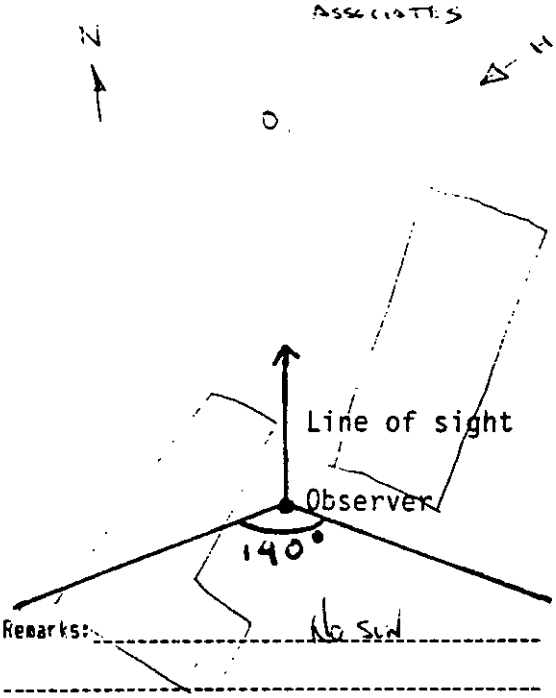
Background: clouds

Smoke Color: none observed

Drawing of Observation Site
(include: observer location, sun position, wind direction, and stack location)

Cert. Date: October 2, 1991

Cert. Company: Eastern Technical Associates



Remarks: No Sun

Abbreviations:

	0	15	30	45		0	15	30	45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0

JACA CORP.

VISIBLE EMISSION REPORT

Date: February 7, 1992

Observer: Paul Butsavage

Signature: Paul A. Butsavage

Start Time: 1500 End Time: 1516

Plant Name: DELCO - REMY

Plant Location: NEW BRUNSWICK, NJ

Source ID: Reverb Furnace Stack - Battery Dal

Company Rep: Al Shukis

Observation Point: Approx 175' south of stack in grassy area

Stack -- Distance from: 175' Height: 80'

Wind -- Speed: 3-5 MPH Direction: NE

Temperature: 35°F Humidity: < 50%

Sky Condition: Overcast

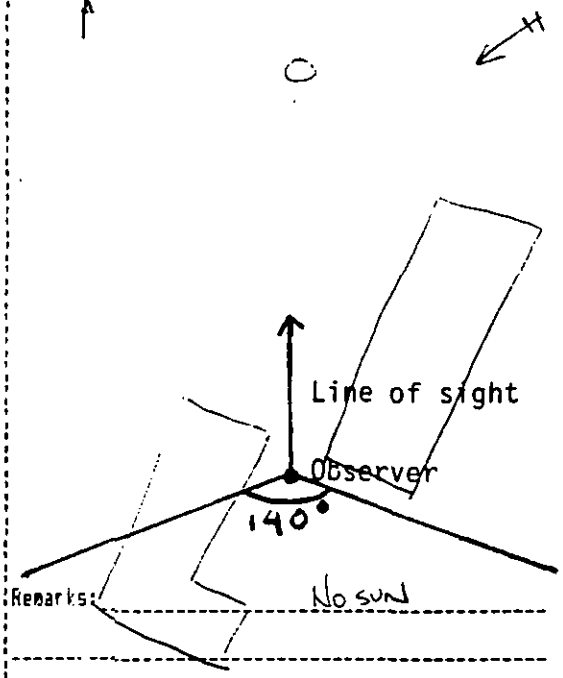
Background: Clouds

Smoke Color: None observed

Drawing of Observation Site
(include: observer location, sun position, wind direction, and stack location)

Cert. Date: OCTOBER 2, 1991

Cert. Company: EASTERN TECHNICAL ASSOCIATES



Remarks:

Abbreviations:

	0	15	30	45		0	15	30	45
0	O	O	O	O	30				
1	O	O	O	O	31				
2	O	O	O	O	32				
3	O	O	O	O	33				
4	O	O	O	O	34				
5	O	O	O	O	35				
6	O	O	O	O	36				
7	O	O	O	O	37				
8	O	O	O	O	38				
9	O	O	O	O	39				
10	O	O	O	O	40				
11	O	O	O	O	41				
12	O	O	O	O	42				
13	O	O	O	O	43				
14	O	O	O	O	44				
15	O	O	O		45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Paul Sutsavage

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

Thomas Hose
President

Vice President

David Savage
Program Manager

231288
Certificate Number

Allentown
Location

October 12, 1991
Date of Issue

© GOES 445

LITHO IN U.S.A.

EMISSION TESTING

10 February 1992

RMC Environmental Services, Inc.

SUMMARY OF STACK TEST FIELD DATA

SOURCE: Delco Battery Lead Reclamation DATE: 10-Feb-92

	RUN#		
	1	2	3
Stack cross-sect. area, sq ft (A)	11.54	11.54	11.54
Avg. stack gas temp, deg R (Ts)569	572	578	
Stack static pres., in. H2O (Pg)	0.31	0.30	0.29
Stack velocity pres. (sq rt dlta P)	0.822	0.855	0.855
Barometric pressure, in. Hg (Pbar)	30.47	30.47	30.47
Pitot tube coefficient (Cp)	0.84	0.84	0.84
Dry gas meter coefficient (Y)	1.016	1.016	1.016
Dry gas meter temp., deg R (Tm)	513	523	517
Metered sample volume, cu ft (Vm)	58.680	61.400	61.440
Water volume collected, ml/gm (Vlc)	18	20	16
Test duration, min. (theta)	72	72	72
Sampling nozzle diameter, in. (Dn)	0.250	0.250	0.250
Orifice pres. drop, in. H2O (dlta H)	2.42	2.59	2.60
Flue gas composition			
% CO2	0.4	0.5	0.4
% O2	20.3	20.2	20.3
% CO	0.0	0.0	0.0

RMC Environmental Services, Inc.

SUMMARY OF STACK TEST RESULTS

SOURCE: Delco Battery Lead Reclamation

DATE: 10-Feb-92

	RUN#		
	1	2	3
Stack abs. pres., in.Hg(Ps)	30.49	30.49	30.49
Std. sample vol., scf (Vmstd)	62.830	64.512	65.304
Water vapor vol., scf (Vwstd)	0.73	0.81	0.65
Stack gas moisture, % (Bws)	1.2	1.2	1.0
Stack gas velocity, ft/s (vs)	47.55	49.59	49.82
Stack gas flow rate, dscfm (Q)	1846590	1913788	1907729
dscfm	30776	31896	31795
acfm	32923	34334	34495
FLUE GAS ANALYSIS			
Percent CO2	0.4	0.5	0.4
Percent O2	20.3	20.2	20.3
Percent CO	0.0	0.0	0.0
Percent N2	79.3	79.3	79.3
Bws	1.2	1.2	1.0
Md	28.88	28.89	28.88
Ms	28.75	28.76	28.77
STACK TEST ISOKINETIC RATE CALCULATION			
Ts	569	572	578
Ps	30.49	30.49	30.49
Bws	1.2	1.2	1.0
Vm std	62.83	64.51	65.30
vs	47.55	49.59	49.82
An	0.000341	0.000341	0.000341
theta	72	72	72
I%	95	95	97

RMC Environmental Services, Inc.

STACK TEST RESULTS - H2SO4/SO3 & SO2

SOURCE: Delco Battery Lead Reclamation

DATE: 10-Feb-92

STACK TEST RESULTS - H2SO4/SO3

LABORATORY DATA	RUN #		
	1	2	3
Vol of sample solution, Vsoln, ml	250	250	250
Vol of aliquot titrated, Va, ml	100	100	10
Titrant volume for sample, Vt, ml	8.525	0.500	5.950
Titrant volume for blank, Vtb, ml	0.100	0.100	0.100
Titrant normality, N, meq/ml	0.0106	0.0106	0.0106
EMISSION CALCULATIONS			
H2SO4/SO3 concentration, lb/dscf	3.84E-7	1.77E-8	2.56E-6
ppmv	1.5	0.07	10.0
H2SO4/SO3 emission rate, lb/hr	0.71	0.034	4.9

STACK TEST RESULTS - SO2

LABORATORY DATA			
Vol of sample solution, Vsoln, ml	1000	1000	1000
Vol of aliquot titrated, Va, ml	140	10	10
Titrant volume for sample, Vt, ml	3.038	0.175	1.338
Titrant volume for blank, Vtb, ml	0.100	0.100	0.100
Titrant normaliy, N, meq/ml	0.0106	0.0106	0.0106
EMISSION CALCULATION			
SO2 concentration, lb/dscf	3.50E-6	8.70E-8	2.73E-7
ppmv	21	0.52	1.6
SO2 emission rate, lb/hr	6.46	0.17	0.52

RMC Environmental Services, Inc.

STACK TEST RESULTS - TOTAL HYDROCARBONS

SOURCE: Delco Battery Lead Reclamation DATE: 10-Feb-92

	RUN #		
	1	2	3
Sample concentration, ppmvd, condensible, as methane	<2	<2	<2
Sample concentration, ppmvd, gas bag, as methane	<2	<2	<2
Total sample concentration, ppmvd	<4	<4	<4
Flue gas %O2	20.3	20.2	20.3
Sample hydrocarbon concentration, ppmvd, @ 7% O2	<90	<80	<90

RMC Environmental Services, Inc.

STACK TEST RESULTS - CARBON MONOXIDE

SOURCE:Delco battery Lead Reclamation DATE: 10-Feb-92

	RUN #		
	1	2	3
Sample concentration, by NDIR, ppmv	7.1	2.8	17.7
Flue gas % CO2	0.4	0.5	0.4
Flue gas CO concentration, ppmvd, EPA Method 10, Eqn. 10-1	7.1	2.8	17.6
Flue gas % O2	20.3	20.2	20.3
Flue gas CO concentration, ppmvd, @ 7% O2	162	56	410

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location Furnace Baghouse
Operator D.N.
Date 2-10-92
Run number 1 H2SO4
Stack diam, mm (in.)

Sample box number
Meter box number RAC-02
Meter ΔH@ 1.81

Meter calibration (Y) 1.016
Pitot tube (C_p) 0.84
Probe length 5'
Probe liner material pyrex
Probe heater setting
Ambient temperature
Barometric pressure (P_b) 30.47 mm (in.) Hg
Assumed moisture <2%
Static pressure (P_s) mm (in.) H_2O
C Factor 0.53
Reference ΔP mm (in.) H_2O

Sheet 1 of 2
Nozzle identification number
Nozzle diameter 0.25 mm (in.)
Thermometer number
Final leak rate m^3/min (cfm)
Vacuum during leak check
mm (in.) Hg
Filter number
Remarks

Traverse point number	Sampling time, (θ), min	9:15 start Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	111.61 Gas sample volume (V_m), m^3 (ft^3)	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
Port B 1	3		8	106	0.81	2.85	114.25	37	28	40	
2	6		9	104	0.85	3.15	116.50	48	29	40	
3	9		9	105	0.95	3.35	119.75	61	31	40	
4	12		9	105	0.85	3.15	122.65	63	31	42	
5	15		8	105	0.82	2.85	125.20	67	33	46	
6	18		8	105	0.75	2.65	127.75	69	34	46	
7	21		6	105	0.55	1.95	129.99	67	36	48	
8	24		5	108	0.45	1.60	132.00	66	37	48	
9	27		5	110	0.45	1.60	134.00	65	38	48	
10	30		5	109	0.45	1.60	136.00	64	38	49	
11	33		5	110	0.48	1.70	138.10	64	39	49	
12	36		4	116	0.40	1.40	140.02	64	40	49	
	Total		Max	Avg			Total 28.41	Avg	Avg	Max	

48

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location Furnace Baghouse
Operator
Date 2-10-92
Run number 1 H_2SO_4
Stack diam, mm (in.)
Sample box number
Meter box number
Meter ΔH@

Meter calibration (Y)
Pitot tube (C_p)
Probe length
Probe liner material
Probe heater setting
Ambient temperature
Barometric pressure (P_b) mm (in.) Hg
Assumed moisture
Static pressure (P_a) mm (in.) H_2O
C Factor
Reference ΔP mm (in.) H_2O

Sheet 2 of 2
Nozzle identification number
Nozzle diameter mm (in.)
Thermometer number
Final leak rate 0 m^3/min (cfm)
Vacuum during leak check 15 mm (in.) Hg
Filter number
Remarks

Leak Rate = 0.00 CFM

Port A

Traverse point number	Sampling time, (θ), min	Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3) 140.08	Gas sample temperature at dry gas meter Inlet, °C(°F)	Gas sample temperature at dry gas meter Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
1	39	9:54 Start	6	121	0.54	2.25	142.45	60	40	42	
2	42		7	116	0.71	2.50	144.90	65	41	43	
3	45		8	108	0.75	2.65	~~144.750~~	69	42	43	
4	48		7	104	0.71	2.50	~~145.00~~ 150	71	43	45	
5	51		7	108	0.71	2.50	152.55	73	44	46	
6	54		7	108	0.70	2.45	155.05	73	45	47	
7	57		7	110	0.70	2.45	157.50	73	45	47	
8	60		6	109	0.60	2.10	159.95	73	45	48	
9	63		7	111	0.73	2.55	162.40	75	46	48	
10	66		8	110	0.75	2.65	165.00	77	46	49	
11	69		8	106	0.80	2.80	167.75	76	47	50	
12	72	10:31 End	8	108	0.80	2.80	170.35	76	48	50	
	Total		Max	Avg 109	$\sqrt{\Delta p}$ = .822	2.42	Total 30.27	Avg	Avg	Max	

569 R 58.68 58

$\bar{x}$ 53
513 R

PARTICULATE FIELD DATA FORM

Plant: Delco Remy
City:
Location: Furnace Baghouse
Operator:
Date: 2-10-92
Run number: 2 H_2SO_4
Stack diam, mm (in.): 1
Sample box number:
Meter box number:
Meter ΔH@:

Meter calibration (Y):
Pitot tube (C_p):
Probe length:
Probe liner material:
Probe heater setting:
Ambient temperature:
Barometric pressure (P_b) ____ mm (in.) Hg
Assumed moisture:
Static pressure (P_a) +0.31 mm (in.) H_2O
C Factor:
Reference ΔP ____ mm (in.) H_2O

Sheet 1 of 2
Nozzle identification number:
Nozzle diameter 0.25 (in.)
Thermometer number:
Final leak rate ____ m^3/min (cfm)
Vacuum during leak check ____ mm (in.) Hg
Filter number:
Remarks:

Traverse point number	Sampling time, (θ), min	Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3) 182.62	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
Port A 1	3	11:17 Start	7	108	0.73	2.55	185.10	48	43	42	
2	6		7	110	0.73	2.55	187.70	57	43	42	
3	9		7	110	0.81	2.85	—	65	44	43	
4	12		7	111	0.81	2.85	193.00	70	44	43	
5	15		7	111	0.83	2.90	195.70	73	45	43	
6	18		7	111	0.81	2.85	198.40	77	47	44	
7	21		7	108	0.71	2.50	200.95	77	47	44	
8	24		7	108	0.80	2.80	203.60	79	49	45	
9	27		8	110	0.87	3.05	206.40	81	50	46	
10	30		8	107	0.91	3.20	209.25	81	50	46	
11	33		8	115	0.93	3.25	212.10	83	51	47	
12	36	11:53 End	8	116	0.89	3.10	214.91	84	51	48	
	Total		Max	Avg			Total 32.29	Avg	Avg	Max	

60

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location Furnace Outlet
Operator
Date 2-10-92
Run number 2 H_2SO_4
Stack diam, mm (in.)

Sample box number
Meter box number
Meter ΔH@

Meter calibration (Y)
Pitot tube (C_p)
Probe length
Probe liner material
Probe heater setting
Ambient temperature
Barometric pressure (P_b) mm (in.) Hg
Assumed moisture
Static pressure (P_s) +0.30 mm (in.) H_2O
C Factor
Reference ΔP mm (in.) H_2O

Sheet 2 of 2
Nozzle identification number
Nozzle diameter mm (in.)
Thermometer number
Final leak rate 0 m^3/min (cfm)
Vacuum during leak check 11 mm (in.) Hg
Filter number
Remarks

Port B

Traverse point number	Sampling time, (θ), min	Clock time, (24 h) 11:56 Start	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	Gas sample volume (V_m), m^3 (ft^3) 214.96	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
1	39		7	114	0.81	2.85	217.50	75	52	45	
2	42		8	115	0.86	3.00	220.30	78	53	46	
3	45		8	114	0.91	3.20	223.20	82	54	47	
4	48		8	114	0.91	3.20	226.05	83	54	48	
5	51		7	114	0.80	2.80	228.70	81	54	48	
6	54		7	114	0.71	2.50	231.25	81	54	49	
7	57		5	112	0.49	1.70	233.35	77	53	50	
8	60		5	112	0.51	1.80	235.52	76	53	50	
9	63		5	112	0.51	1.80	237.70	76	53	51	
10	66		5	111	0.52	1.90	239.95	77	53	52	
11	69		4	112	0.46	1.60	242.00	75	54	53	
12	72	12:32 End	4	111	0.46	1.60	244.07	75	53	55	
	Total		Max	Avg 112	$\sqrt{\Delta p}$ = .855	2.59	Total 29.11	Avg	Avg	Max	

572 R 61.40 66

63 $\bar{x}$

523 R

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location Furnace Baghouse
Operator
Date 2·10·92
Run number 3 H_2SO_4
Stack diam, mm (in.)

Sample box number
Meter box number
Meter ΔH@

Meter calibration (Y)
Pitot tube (C_p)
Probe length
Probe liner material
Probe heater setting
Ambient temperature
Barometric pressure (P_b) mm (in.) Hg
Assumed moisture
Static pressure (P_s) ± 0.29 mm (in.) H_2O
C Factor
Reference ΔP mm (in.) H_2O

Sheet 1 of 2
Nozzle identification number
Nozzle diameter mm (in.)
Thermometer number
Final leak rate m^3/min (cfm)
Vacuum during leak check
mm (in.) Hg
Filter number
Remarks

Port B

Traverse point number	Sampling time, (θ), min	1:48 start Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	254.47 Gas sample volume (V_m), m^3 (ft^3)	Gas sample temperature at dry gas meter Inlet, °C(°F)	Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
1	3		4	119	0.91	3.20 ~~0.32~~	257.25	45	39	42	
2	6		4	120	0.91	3.20	260.05	52	39	42	
3	9		4	122	0.91	3.20	262.85	60	39	42	
4	12		4	130	0.83	2.90	265.55	65	40	44	
5	15		4	132	0.74	2.60	268.10	69	41	44	
6	18		4	127	0.74	2.60	270.65	69	41	45	
7	21		3	120	0.51	1.80	272.80	68	42	46	
8	24		3	118	0.46	1.60	274.85	69	43	46	
9	27		3	115	0.54	1.90	277.10	70	44	47	
10	30		3	117	0.51	1.80	279.25	70	45	48	
11	33		3	115	0.47	1.65	281.30	68	45	49	
12	36	2:24 End	3	113	0.47	1.65	283.40	67	45	50	
	Total		Max	Avg			Total 28.93	Avg	Avg	Max	

PARTICULATE FIELD DATA FORM

Plant Delco Remy
City
Location
Operator
Date 2-10-92
Run number 3 H_2SO_4
Stack diam, mm (in.)

Sample box number
Meter box number
Meter ΔH@

Meter calibration (Y)
Pitot tube (C_p)
Probe length
Probe liner material
Probe heater setting
Ambient temperature
Barometric pressure (P_b) mm (in.) Hg
Assumed moisture
Static pressure (P_s) mm (in.) H_2O
C Factor
Reference ΔP mm (in.) H_2O

Sheet 2 of 2
Nozzle identification number
Nozzle diameter mm (in.)
Thermometer number
Final leak rate 0 m^3/min (cfm)
Vacuum during leak check 5 mm (in.) Hg
Filter number
Remarks

Port A

Traverse point number	Sampling time, (θ), min	2:26 start Clock time, (24 h)	Vacuum, mm (in.) Hg	Stack temperature (T_s), °C(°F)	Velocity head (ΔP_s), mm (in.) H_2O	Pressure differential across orifice meter (ΔH), mm (in.) H_2O	~~254.47~~ 283.40 Gas sample volume (V_m), m^3 (ft^3)	Gas sample temperature at dry gas meter: Inlet, °C(°F)	Gas sample temperature at dry gas meter: Outlet, °C(°F)	Temperature of gas leaving condenser or last impinger, °C (°F)	Filter temp, °C(°F)
1	39		4	116	0.71	2.50		65	45	48	
2	42		4	117	0.77	2.70	288.55	69	46	49	
3	45		4	116	0.83	2.90	291.30	72	47	50	
4	48		4	115	0.83	2.90	294.05	74	47	50	
5	51		4	116	0.74	2.60	296.60	76	48	51	
6	54		4	116	0.75	2.65	299.20	77	49	52	
7	57		4	117	0.75	2.65	301.85	75	49	52	
8	60		4	115	0.80	2.80	304.55	75	50	53	
9	63		4	115	0.83	2.90	307.25	76	50	54	
10	66		4	113	0.89	3.10	310.10	76	50	55	
11	69		4	116	0.94	3.30	313.05	77	50	55	
12	72	3:02 End	4	115	0.94	3.30	315.91	79	50	56	
	Total		Max ~~118~~	Avg 118	$\sqrt{\Delta P}$ = .855	2.60	Total 32.51	Avg	Avg	Max	

578 R

61.44

61

57 F

517 R

APPENDIX B

PARTICULATE ANALYSIS

CERTIFICATE OF ANALYSIS

RMC
ENVIRONMENTAL SERVICES
Tri-County Business Campus
88 Robinson Street
Pottstown, PA 19464
215 • 327 • 4850
215 • 327 • 4852 FAX

T. Harvey - RMC
3450 Schuylkill Road
Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1122
Sample Description: DELCO #1 FILTER

Repl	Parameter	Result	Date Anl Completed	Analyst	Method
1	NET WEIGHT FILTER	10.4 MG	02/21/92	DMK	EPA METHOD 5

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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T. Harvey - RMC
3450 Schuylkill Road
Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1123
Sample Description: DELCO #1 ACETONE RINSE

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	ACETONE RINSE RESIDUE	25.1 MG	02/20/92	DMK	

Approved By:

Twila E. Dixon
Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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3450 Schuylkill Road
Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1126
Sample Description: DELCO #2 FILTER

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	NET WEIGHT FILTER	6.4 MG	02/21/92	DMK	EPA METHOD 5

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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T. Harvey - RMC
3450 Schuylkill Road
Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1127
Sample Description: DELCO #2 ACETONE RINSE

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	ACETONE RINSE RESIDUE	19.6 MG	02/20/92	DMK	

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1130
Sample Description: DELCO #3 FILTER

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	NET WEIGHT FILTER	5.6 MG	02/21/92	DMK	EPA METHOD 5

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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T. Harvey - RMC
3450 Schuylkill Road
Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1131
Sample Description: DELCO #3 ACETONE RINSE

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	ACETONE RINSE RESIDUE	19.2 MG	02/20/92	DMK	

Approved By:
Twila E. Dixon
Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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T. Harvey - RMC
3450 Schuylkill Road
Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1134
Sample Description: BLANK FILTER

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	NET WEIGHT FILTER	0.1 MG	02/21/92	DMK	EPA METHOD 5

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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T. Harvey - RMC
3450 Schuylkill Road
Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1135
Sample Description: BLANK ACETONE

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	ACETONE RINSE RESIDUE	4.1 MG	02/20/92	DMK	

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

LEAD ANALYSIS

RMC
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CERTIFICATE OF ANALYSIS

T. Harvey - RMC
3450 Schuylkill Road
Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/27/92
P.O. Number: N/A

RMC Number : 1124
Sample Description: DELCO #1 NITRIC/FILTER/ACETONE

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	LEAD, TOTAL	9 MG	02/25/92	BAK	EPA 7421

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

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Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1125
Sample Description: DELCO #1 NITRIC BACK HALF

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	LEAD, TOTAL	0.005 MG	02/25/92	BAK	EPA 7421

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

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Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/27/92
P.O. Number: N/A

RMC Number : 1128
Sample Description: DELCO #2 NITRIC/FILTER/ACETONE

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	LEAD, TOTAL	6.1 MG	02/25/92	BAK	EPA 7421

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1129
Sample Description: DELCO #2 NITRIC BACK HALF

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	LEAD, TOTAL	0.011 MG	02/25/92	BAK	EPA 7421

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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CERTIFICATE OF ANALYSIS

T. Harvey - RMC
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Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/27/92
P.O. Number: N/A

RMC Number : 1132
Sample Description: DELCO #3 NITRIC/FILTER/ACETONE

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	LEAD, TOTAL	5.4 MG	02/25/92	BAK	EPA 7421

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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Spring City, PA 19475

Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1133
Sample Description: DELCO #3 NITRIC BACK HALF

Repl	Parameter	Result	Date Ani Completed	Ana-lyst	Method
1	LEAD, TOTAL	0.008 MG	02/25/92	BAK	EPA 7421

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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Spring City, PA 19475

Report No. : 920437
Sample Date: N/A
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1144
Sample Description: BLANK ACETONE/FILTER

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	LEAD, TOTAL	<0.0025 MG	02/25/92	BAK	EPA 7421

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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T. Harvey - RMC
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Report No. : 920437
Sample Date: 02/07/92
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1136
Sample Description: BLANK NITRIC

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	LEAD, TOTAL	<0.0025 MG	02/25/92	BAK	EPA 7421

Approved By:
Twila E. Dixon
Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

H_2SO_4/SO_2 ANALYSIS

NET Atlantic, Inc.

The following table identifies all samples submitted to NET for analysis.

Client: RMC ENVIRONMENTAL LAB Job No: 92.0425

NET ID	Client ID	Sampling Date	Date Received	MATRIX
84195	DELCO 1A-S03	02/10/1992	02/13/1992	MS
84196	DELCO 1B-S02	02/10/1992	02/13/1992	MS
84197	DELCO 2A-S03	02/10/1992	02/13/1992	MS
84198	DELCO 2B-S02	02/10/1992	02/13/1992	MS
84199	DELCO 3A-S03	02/10/1992	02/13/1992	MS
84200	DELCO 3B-S02	02/10/1992	02/13/1992	MS
84201	BLANK 80% ISOPROPANOL S03	02/10/1992	02/13/1992	MS
84202	BLANK 10% H202 S02	02/10/1992	02/13/1992	MS

SO_2/SO_3 TITRATIONS

Job Number	Sample	Client ID	Vol.	Alkq.	T1	T2	Delta T	Avg. T
92.0425	Blank			100ml	0.0	0.05	0.05	0.075
92.0425	Blank			100ml	0.05	0.15	0.10	
92.0425	84195	Delco 1A-SO_3	250ml	100ml	0.0	8.55	8.55	8.525
92.0425	84195	Delco 1A-SO_3	250ml	100ml	0.0	8.50	8.50	
92.0425	84196	Delco 1B-SO_2	1000ml	10ml	0.0	3.025	3.025	3.038
92.0425	84196	Delco 1B-SO_2	1000ml	10ml	3.05	6.10	3.05	
92.0425	84197	Delco 2A-SO_3	250ml	100ml	0.0	0.50	0.50	0.50
92.0425	84197	Delco 2A-SO_3	250ml	100ml	0.50	1.00	0.50	
92.0425	84198	Delco 2B-SO_2	1000ml	10ml	1.00	1.175	0.175	0.175
92.0425	84198	Delco 2B-SO_2	1000ml	10ml	1.12	1.375	0.175	
92.0425	84199	Delco 3A-SO_3	250ml	10ml	0.0	5.95	5.95	5.95
92.0425	84199	Delco 3A-SO_3	250ml	10ml	0.0	5.95	5.95	
92.0425	84200	Delco 3B-SO_2	1000ml	10ml	0.0	0.35	0.35	0.338
92.0425	84200	Delco 3B-SO_2	1000ml	10ml	0.35	0.675	0.325	
92.0425	84201	Blk 80% Isop.SO_3	250ml	100ml	0.70	1.05	0.35	0.325
92.0425	84201	Blk 80% Isop.SO_3	250ml	100ml	2.00	2.30	0.30	
92.0425	84202	Blk 10% H_2O_2 SO_2	1000ml	10ml	2.30	2.40	0.10	0.100
92.0425	84202	Blk 10% H_2O_2 SO_2	1000ml	10ml	2.40	2.50	0.10	

TOTAL HYDROCARBON ANALYSIS

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Report No. : 920437
Sample Date: N/A
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1137
Sample Description: DELCO #1 HYDROCARBONS AQ.

Repl	Parameter	Result	Date Anl Completed	Analyst	Method
1	TOTAL HYDROCARBONS IN WATER (BY GC)	<2.0 PPM AS METHANE	02/11/92	SDF	ASTM D 3328

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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Report No. : 920437
Sample Date: N/A
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1138
Sample Description: DELCO #1 HYDROCARBONS GAS

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	TOTAL HYDROCARBONS IN AIR (BY GC)	<2.0 PPM AS METHANE	02/11/92	SDF	ASTM D 33258

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

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Report No. : 920437
Sample Date: N/A
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1139
Sample Description: DELCO #2 HYDROCARBONS AQ.

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	TOTAL HYDROCARBONS IN WATER (BY GC)	<2.0 PPM AS METHANE	02/11/92	SDF	ASTM D 3328

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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Spring City, PA 19475

Report No. : 920437
Sample Date: N/A
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1140
Sample Description: DELCO #2 HYDROCARBONS GAS

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	TOTAL HYDROCARBONS IN AIR (BY GC)	<2.0 PPM AS METHANE	02/11/92	SDF	ASTM D 33258

Approved By:
Twila E. Dixon
Twila E. Dixon
Laboratory Operations Manager

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CERTIFICATE OF ANALYSIS

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Report No. : 920437
Sample Date: N/A
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1141
Sample Description: DELCO #3 HYDROCARBONS AQ.

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	TOTAL HYDROCARBONS IN WATER (BY GC)	<2.0 PPM AS METHANE	02/11/92	SDF	ASTM D 3328

Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

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Report No. : 920437
Sample Date: N/A
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1142
Sample Description: DELCO #3 HYDROCARBONS GAS

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	TOTAL HYDROCARBONS IN AIR (BY GC)	<2.0 PPM AS METHANE	02/11/92	SDF	ASTM D 33258

Approved By:
Twila E. Dixon
Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

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CERTIFICATE OF ANALYSIS

T. Harvey - RMC
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Spring City, PA 19475

Report No. : 920437
Sample Date: N/A
Sampled By : TMH
Received : 02/11/92
Reported : 02/26/92
P.O. Number: N/A

RMC Number : 1143
Sample Description: TRIP BLANK AQ.

Repl	Parameter	Result	Date Anl Completed	Ana-lyst	Method
1	TOTAL HYDROCARBONS IN WATER (BY GC)	<2.0 PPM AS METHANE	02/11/92	SDF	ASTM D 3328

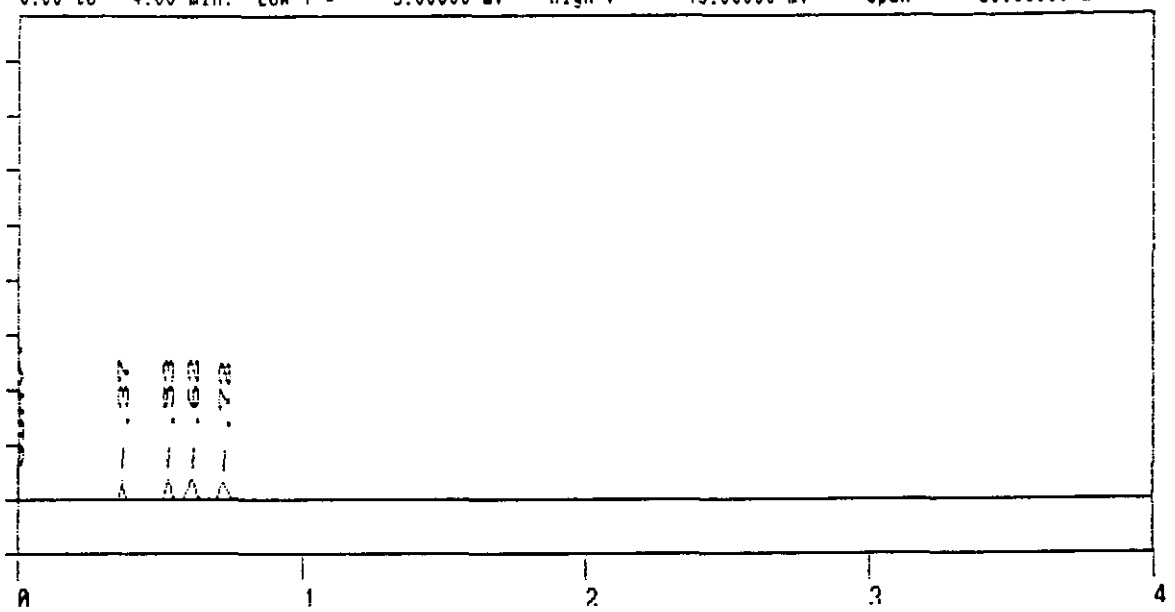
Approved By:

Twila E. Dixon

Twila E. Dixon
Laboratory Operations Manager

PA DER LAB ID: 46-253 • NJ DEP LAB ID: 77434 • VA DGS LAB ID: 00298 • CT DHS LAB ID: PH-0667 • MD DHS LAB ID: 150 • WV DH LAB ID: 40 • DE HSS: CERTIFIED • MI DPH: CERTIFIED

File=c:\cp\data1\ME92042.17R Date printed = 02-13-1992 Time = 16:14:23
0.00 to 4.00 min. Low Y = -5.00000 mv High Y = 45.00000 mv Span = 50.00000 mv



2.0 PPM METHANE STD.(REPEAT)

FEB 13, 1992 16:04:23

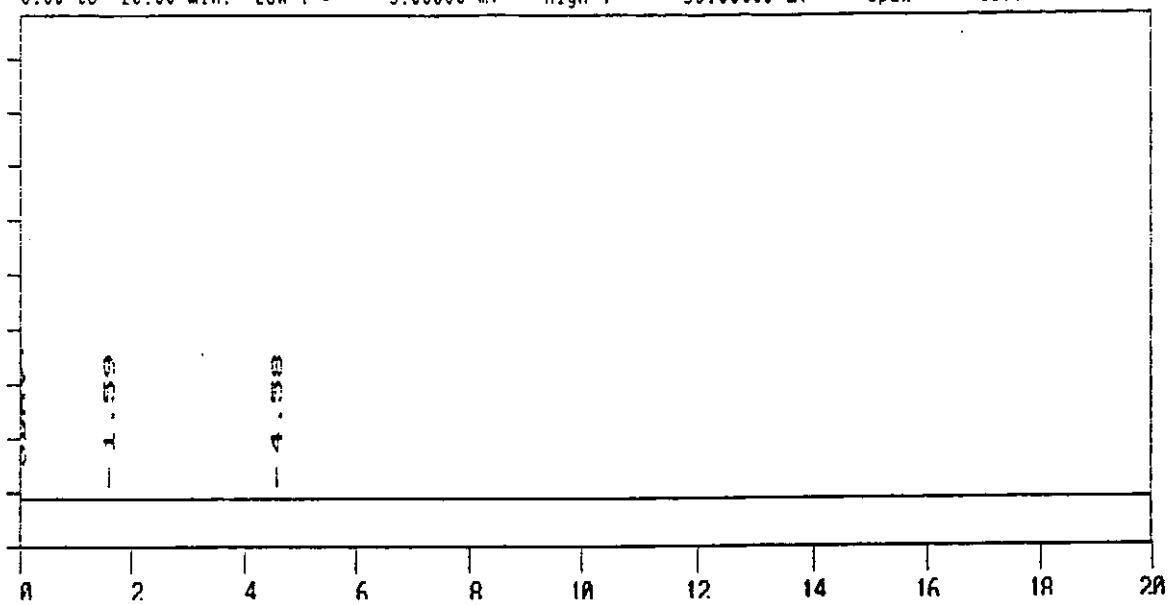
METHANE
1% SP-1000 CARBOPACK B
HP 5890 #3 FID SDF/JAI
METHOD c:\cp\data1\ME92042.METCALIBRATION c:\cp\data1\ME92042.CAL

DATA TABLE

Ret Time (min)	Peak Name	Peak Area	Amount mg/m3	Ret Time (min)	Peak Name	Peak Area	Amount mg/m3
0.370	METHANE	2050	-1.18	0.615		3448	0.00
0.530		2851	0.00	0.720		3419	0.00

Initial Weight/Volume 1
Final Volume 1

File=c:\cp\data1\ME92042.11R Date printed = 02-12-1992 Time = 15:19:11
0.00 to 20.00 min. Low Y = -5.00000 mv High Y = 50.00000 mv Span = 55.00000 mv



RMC 1137 METHANE TIM HARVEY RPT 0437 (THC#1)

FEB 11, 1992 16:05:26

METHANE
1% SP-1000 CARBOPACK B
HP 5890 #3 FID SDF/JAI
METHOD c:\cp\data1\ME92042.METCALIBRATION c:\cp\data1\ME92042.CAL

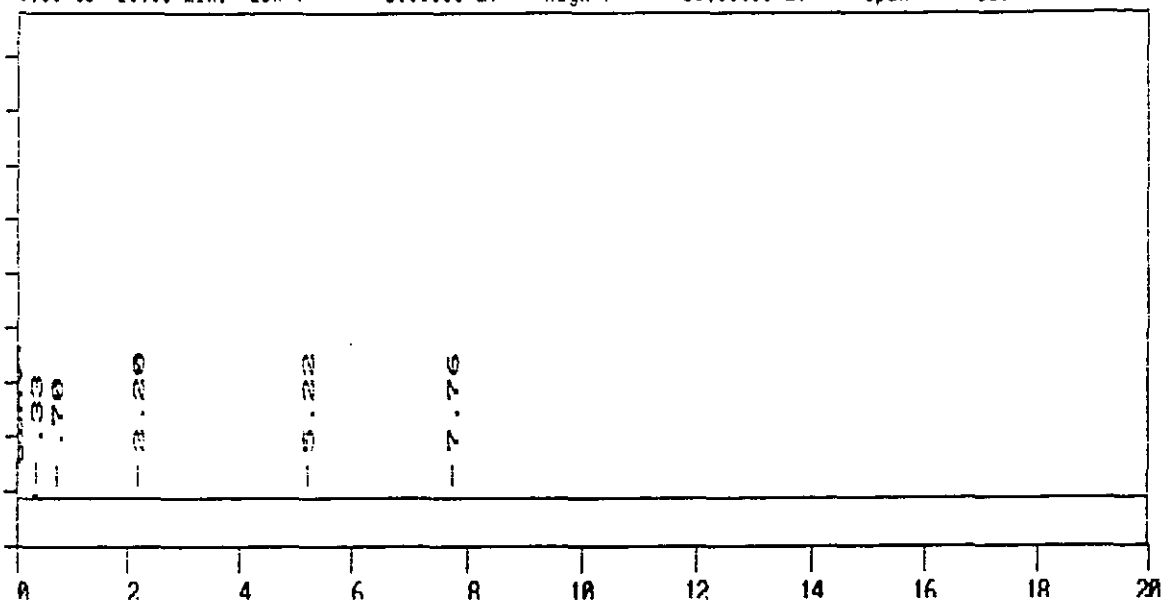
DATA TABLE

Ret Time (min)	Peak Name	Peak Area	Amount mg/m3	Ret Time (min)	Peak Name	Peak Area	Amount mg/m3
1.590		401	0.00	4.580		1029	0.00

Initial Weight/Volume 1
Final Volume 1

File=c:\cp\data1\ME92042.07R Date printed = 02-12-1992 Time = 11:24:49

0.00 to 20.00 min. Low Y = -5.00000 mv High Y = 50.00000 mv Span = 55.00000 mv



RMC 1138 METHANE TIM HARVEY RPT 0437

FEB 11, 1992 13:53:41

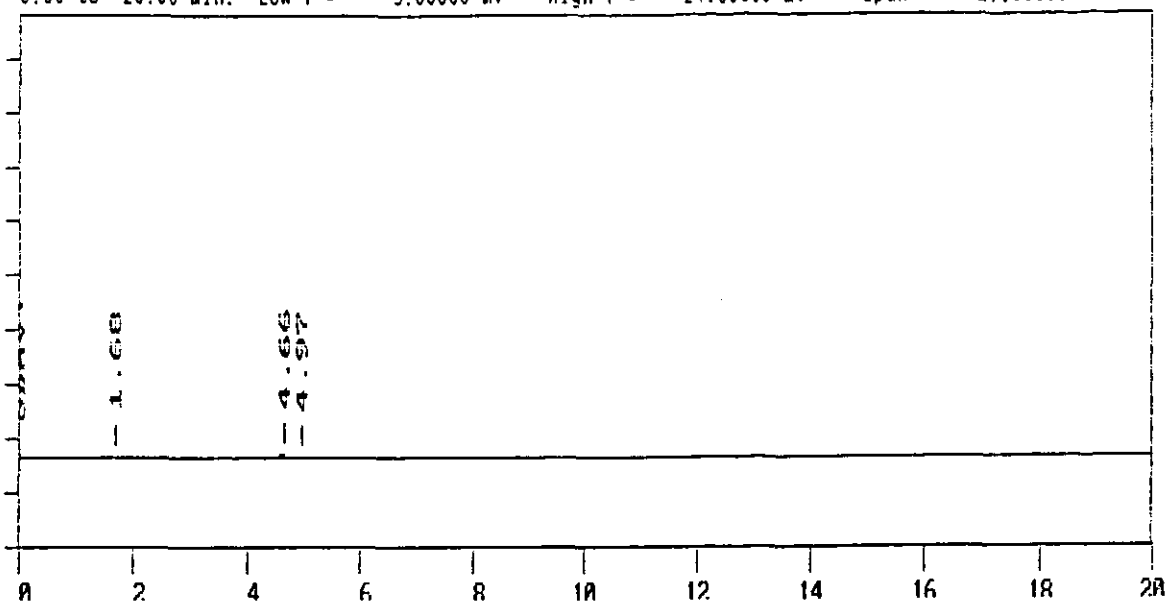
METHANE
1% SP-1000 CARBOPACK B
HP 5890 #3 FID SDF/JAI
METHOD c:\cp\data1\ME92042.METCALIBRATION c:\cp\data1\ME92042.CAL

DATA TABLE

Ret Time (min)	Peak Name	Peak Area	Amount mg/m3	Ret Time (min)	Peak Name	Peak Area	Amount mg/m3
0.330		1755	0.00	5.215		516	0.00
0.700		197	0.00	7.760		326	0.00
2.195		171	0.00				

Initial Weight/Volume 1
Final Volume 1

File=c:\cp\data1\ME92042.12R Date printed = 02-12-1992 Time = 15:22:03
0.00 to 20.00 min. Low Y = -5.00000 mv High Y = 24.00000 mv Span = 29.00000 mv



RMC 1139 METHANE TIM HARVEY RPT 0437 (THC#2)

FEB 11, 1992 16:30:53

METHANE
1% SP-1000 CARBOPACK B
HP 5890 #3 FID SDF/JAI
METHOD c:\cp\data1\ME92042.METCALIBRATION c:\cp\data1\ME92042.CAL

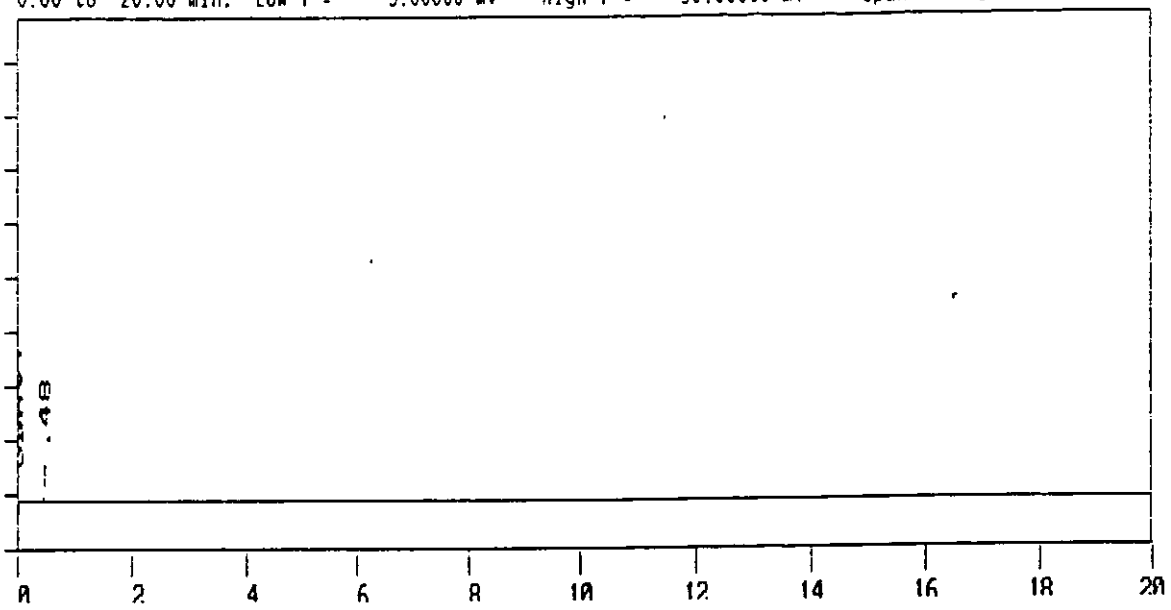
DATA TABLE

Ret Time (min)	Peak Name	Peak Area	Amount mg/m3	Ret Time (min)	Peak Name	Peak Area	Amount mg/m3
1.680		665	0.00	4.965		201	0.00
4.655		626	0.00				

Initial Weight/Volume 1
Final Volume 1

File=c:\cp\data1\ME92042.08R Date printed = 02-12-1992 Time = 11:27:08

0.00 to 20.00 min. Low Y = -5.00000 mv High Y = 50.00000 mv Span = 55.00000 mv



RMC 1140 METHANE TIM HARVEY RPT 0437

FEB 11, 1992 14:18:39

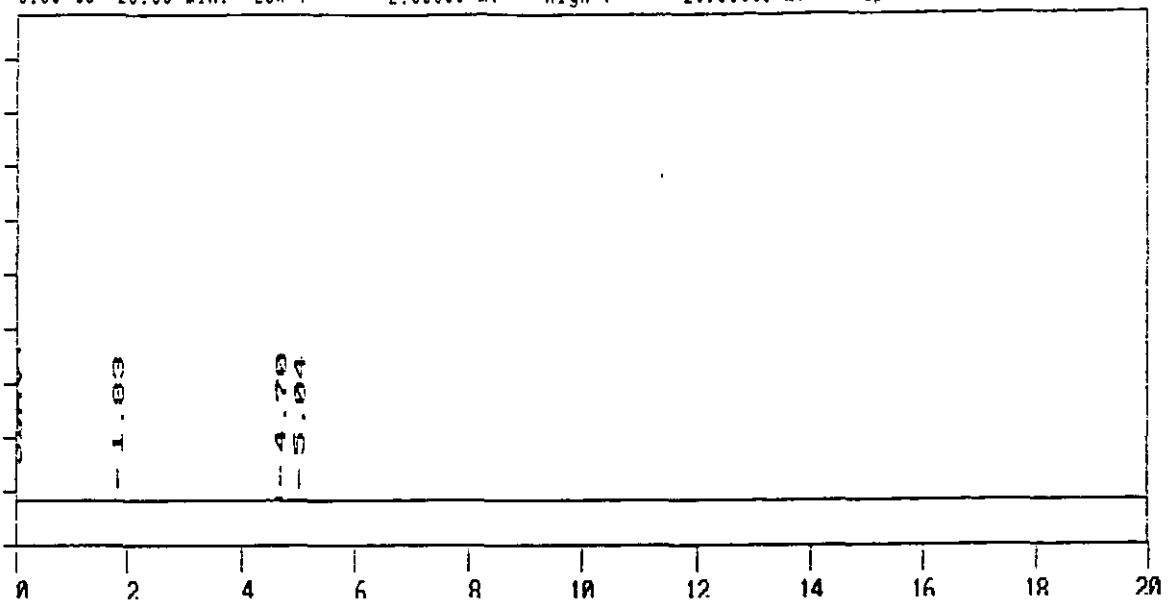
METHANE
1% SP-1000 CARBOPACK B
HP 5890 #3 FID SDF/JAI
METHOD c:\cp\data1\ME92042.METCALIBRATION c:\cp\data1\ME92042.CAL

DATA TABLE

Ret Time (min)	Peak Name	Peak Area	Amount mg/m3	Ret Time (min)	Peak Name	Peak Area	Amount mg/m3
0.475		558	0.00				

Initial Weight/Volume 1
Final Volume 1

File=c:\cp\data1\ME92042.13R Date printed = 02-12-1992 Time = 15:40:15
0.00 to 20.00 min. Low Y = -2.00000 mv High Y = 20.00000 mv Span = 22.00000 mv



RMC 1141 METHANE TIM HARVEY RPT 0437 (THC#3)

FEB 11, 1992 16:55:58

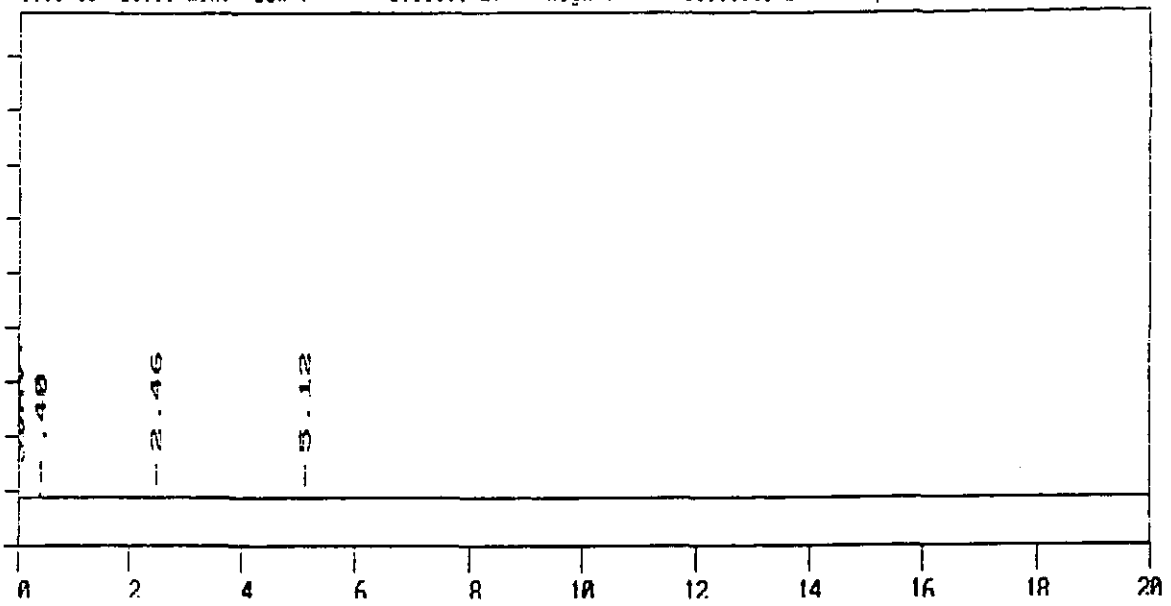
METHANE
1% SP-1000 CARBOPACK B
HP 5890 #3 FID SDF/JAI
METHOD c:\cp\data1\ME92042.METCALIBRATION c:\cp\data1\ME92042.CAL

DATA TABLE

Ret Time (min)	Peak Name	Peak Area	Amount mg/m3	Ret Time (min)	Peak Name	Peak Area	Amount mg/m3
1.830		280	0.00	5.040		120	0.00
4.700		1434	0.00				

Initial Weight/Volume 1
Final Volume 1

File=c:\cp\data1\ME92042.09R Date printed = 02-12-1992 Time = 11:09:27
0.00 to 20.00 min. Low Y = -5.00000 mv High Y = 50.00000 mv Span = 55.00000 mv



RMC 1142 METHANE TIM HARVEY RPT 0437

FEB 11, 1992 14:49:45

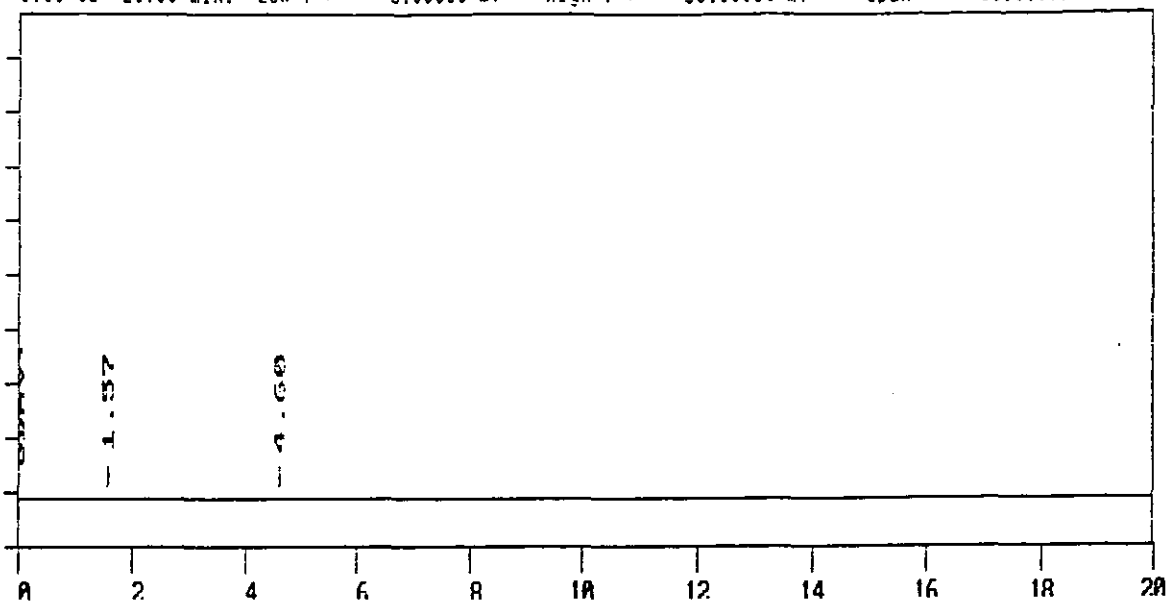
METHANE
1% SP-1000 CARBOPACK B
HP 5890 #3 FID SDF/JAI
METHOD c:\cp\data1\ME92042.METCALIBRATION c:\cp\data1\ME92042.CAL

DATA TABLE

Ret Time (min)	Peak Name	Peak Area	Amount mg/m3	Ret Time (min)	Peak Name	Peak Area	Amount mg/m3
0.395	METHANE	487	-1.73	5.120		244	0.00
2.460		210	0.00				

Initial Weight/Volume 1
Final Volume 1

File=c:\cp\data1\ME92042.10R Date printed = 02-12-1992 Time = 15:14:53
0.00 to 20.00 min. Low Y = -5.00000 mv High Y = 50.00000 mv Span = 55.00000 mv



RMC 1143 METHANE (TRIP BLNK) TIM HARVEY RPT 0437

FEB 11, 1992 15:37:49

METHANE
1% SP-1000 CARBOPACK B
HP 5890 #3 FID SDF/JAI
METHOD c:\cp\data1\ME92042.METCALIBRATION c:\cp\data1\ME92042.CAL

DATA TABLE

Ret Time (min)	Peak Name	Peak Area	Amount mg/m3	Ret Time (min)	Peak Name	Peak Area	Amount mg/m3
1.570		937	0.00	4.600		2944	0.00

Initial Weight/Volume 1
Final Volume 1

RMC USE ONLY

CHAIN OF CUSTODY RECORD

Tri-County Business Campus
88 Robinson Street
Pottstown, PA 19464
(215) 327-4850
FAX (215) 327-4852

RMC ENVIRONMENTAL SERVICES

Client: T. Harvey
Sampler (Initials): TMH.
Job No.:
Client Contact: TMH
Phone: Spring City Office

Refrigerator #												
No./Type of Containers												
Volume of Containers												
Preservative												
General Analysis Group Requested →				Particulate	lead							
RMC Only Lab ID	Sample Identification	Matrix Code	Date/Time Collected									
1122	Delco #1 Filter		#2-7	✓	✓							
1123	Acetone Rinse	Aq		✓	✓							
1124	Nitric Front Half	Aq			✓							
1125	Nitric Back Half	Aq			✓							
1126	Delco #2 Filter			✓	✓							
1127	Aceton Rinse	Aq		✓	✓							
1128	Nitric Front Half	Aq			✓							
1129	Nitric Back Half	Aq			✓							
1130	Delco #3 Filter			✓	✓							
1131	Acetone Rinse	Aq		✓	✓							
1132	Nitric Front Half	Aq			✓							
1133	Nitric Back Half	Aq			✓							
1134	Blank Filter			✓	✓							
1135	Acetone	Aq		✓	✓							
1136	Nitric	Aq			✓							

ligest
ul

* 1144 Blank Filter/Acetone

MATRIX CODES:
S — Soil
SE — Sediment
SO — Solid
SL — Sludge
WS — Solid Waste
DS — Drum Solids
GW — Groundwater
SW — Surface Water
WW — Waste Water
PW — Potable Water
DL — Drum Liquids
BI — Biological
O — Oil
A — Air
F — Fish
X — Other
G — Grab
C — Composite

BOTTLE CODES:
G — Glass
P — Plastic

Special Instructions: ✓

Sample Containers Prepared By: Total No. Containers:	Relinquished at Laboratory By:	Date	Time	Received By	For (Company)

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
	TM Harvey	L Netrick	2/11/92	1032					

RMC Use Only

Samples Were:
1 Shipped or Hand Delivered
NOTES:
2 Ambient or Chilled
NOTES:
3 Received Broken/Leaking (Improperly Sealed) Y N
NOTES:
4 Properly Preserved Y N/A N
NOTES: TM H 2/11/92
5 Received Within Holding Times Y N
NOTES:

COC Tape Was:
1 Present on Outer Package Y N
2 Unbroken on Outer Package Y N
3 Present on Sample Y N
4 Unbroken on Sample Y N
NOTES:

Discrepancies Between Sample Labels and COC Record? Y N
NOTES:

RMC reserves the right to charge $50.00 for unreturned preservative kits. Original: Laboratory Yellow: Client

RMC USE ONLY

CHAIN OF CUSTODY RECORD

Tri-County Business Campus
88 Robinson Street
Pottstown, PA 19464
(215) 327-4850
FAX (215) 327-4852

RMC ENVIRONMENTAL SERVICES

Client: T. Harvey
Sampler (Initials): TMH
Job No.:
Client Contact: TMH.
Phone:

Refrigerator #									
No./Type of Containers									
Volume of Containers									
Preservative									
General Analysis Group Requested →	Total hyd. by G/C.								

RMC Only Lab ID	Sample Identification	Matrix Code	Date/Time Collected	Total hyd. by G/C.
1137	Delco #1 Hydrocarbons Aq.			✓
1138	Gas			✓
1139	Delco #2 Hydrocarbons Aq.			✓
1140	Gas			✓
1141	Delco #3 Hydrocarbons Aq.			✓
1142	Gas			✓
1143	Trip Blank Aq.			✓

MATRIX CODES:
S — Soil; SE — Sediment; SO — Solid; SL — Sludge; WS — Solid Waste; DS — Drum Solids
GW — Groundwater; SW — Surface Water; WW — Waste Water; PW — Potable Water; DL — Drum Liquids
BI — Biological; O — Oil; A — Air; F — Fish; X — Other
G — Grab; C — Composite

BOTTLE CODES:
G — Glass
P — Plastic

Special Instructions:

Sample Containers Prepared By: ____ Total No. Containers: ____	Relinquished at Laboratory By: ____	Date	Time	Received By	For (Company)

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
	TM Harvey	L. Hetrick	2/11/92	1032					

RMC Use Only

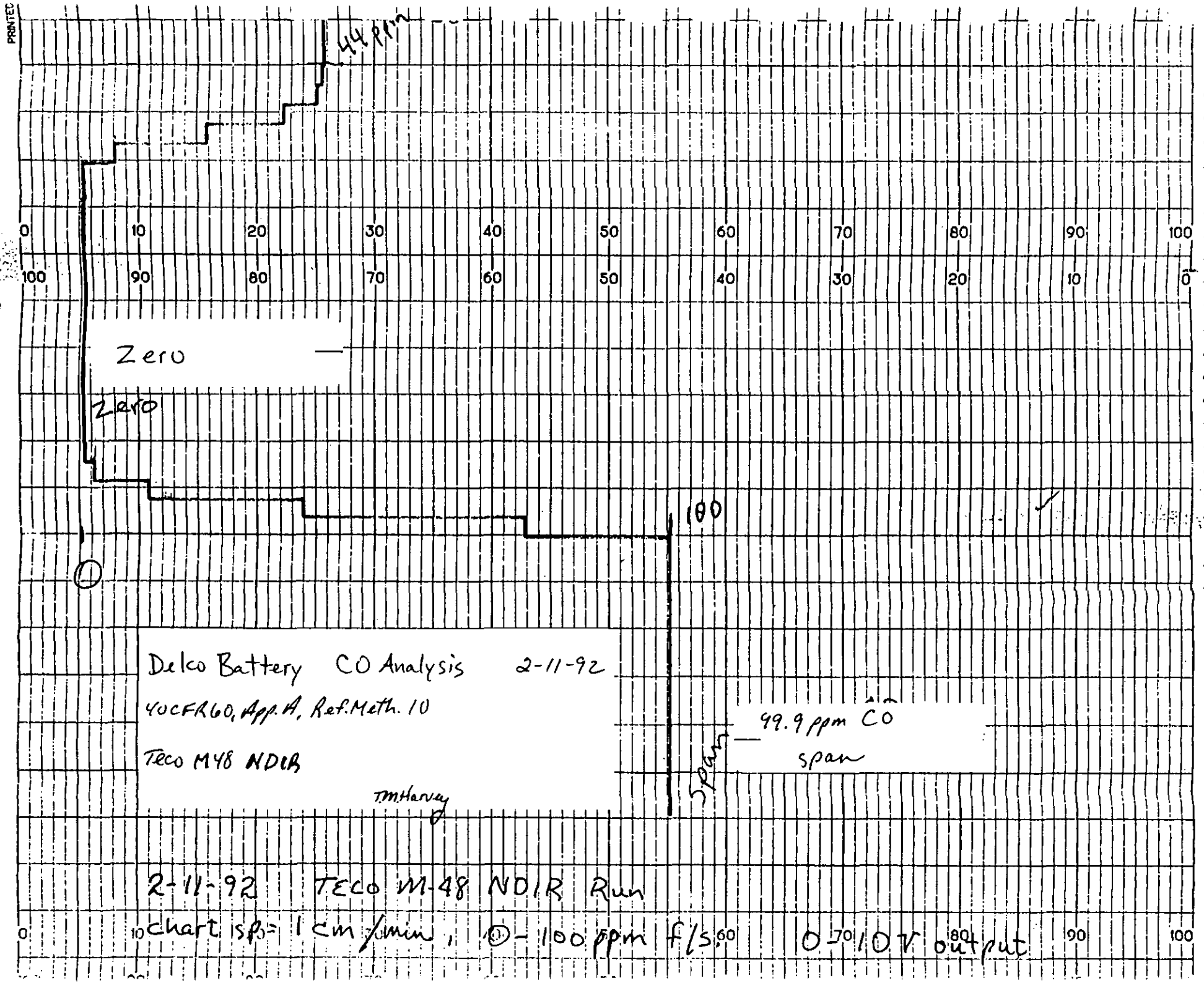
Samples Were:
1 Shipped or Hand Delivered (Hand)
NOTES:
2 Ambient or Chilled
NOTES:
3 Received Broken/Leaking (Improperly Sealed)
Y (N)
NOTES:
4 Properly Preserved
Y N/A N
NOTES: TMH 2/11/92
5 Received Within Holding Times
(Y) N
NOTES:

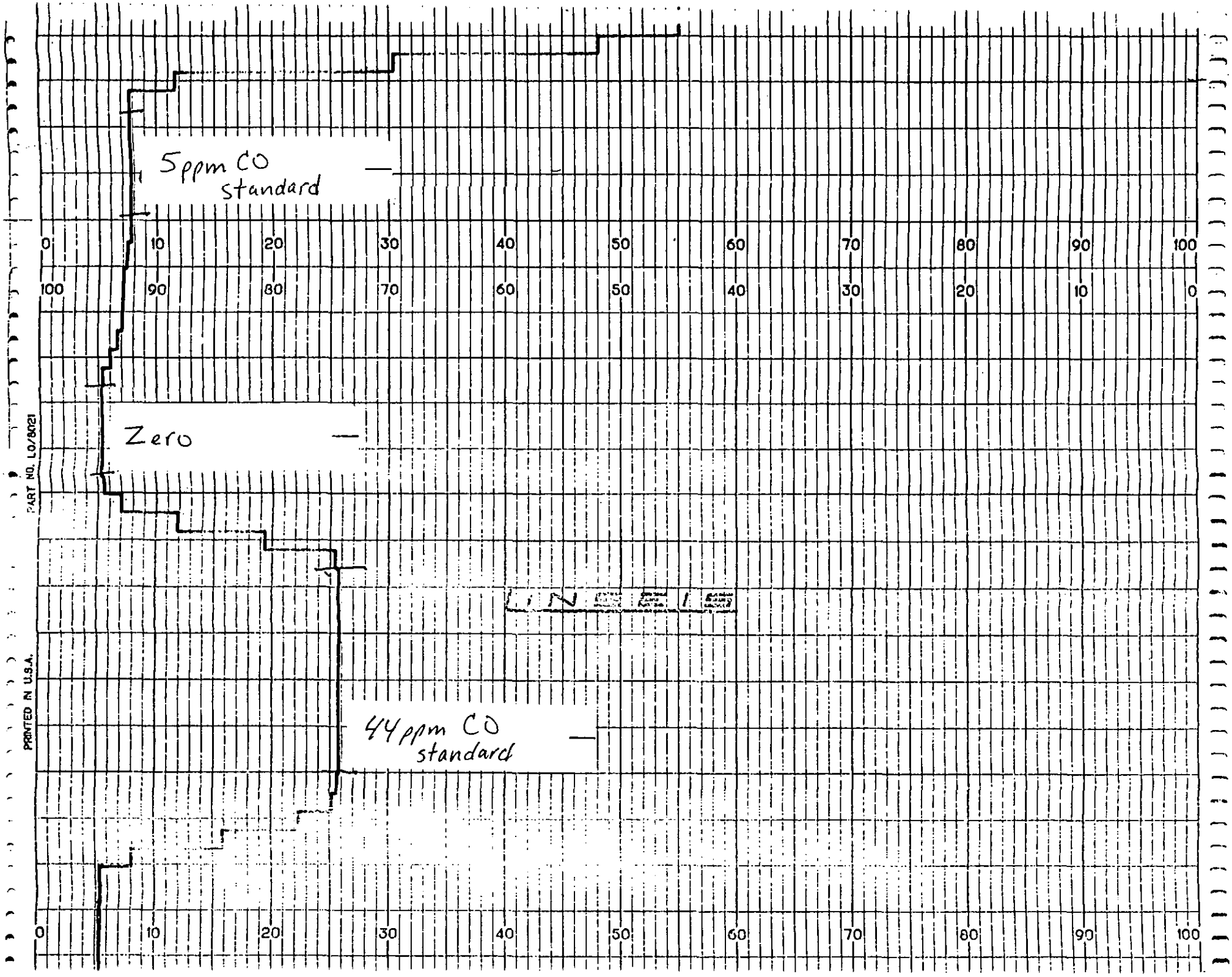
COC Tape Was:
1 Present on Outer Package Y (N)
2 Unbroken on Outer Package Y N
3 Present on Sample Y (N)
4 Unbroken on Sample Y N
NOTES:

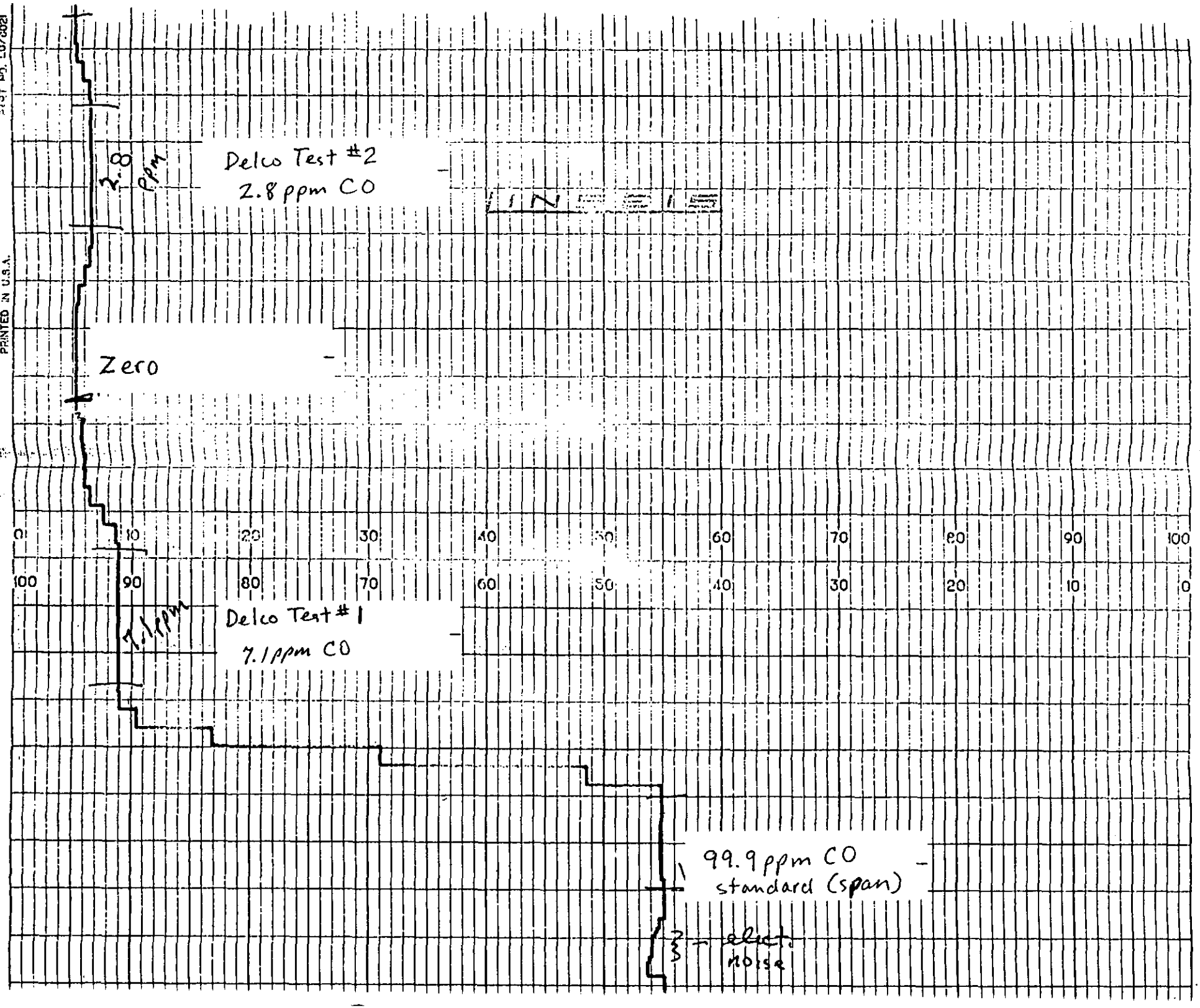
Discrepancies Between Sample Labels and COC Record? Y (N)
NOTES:

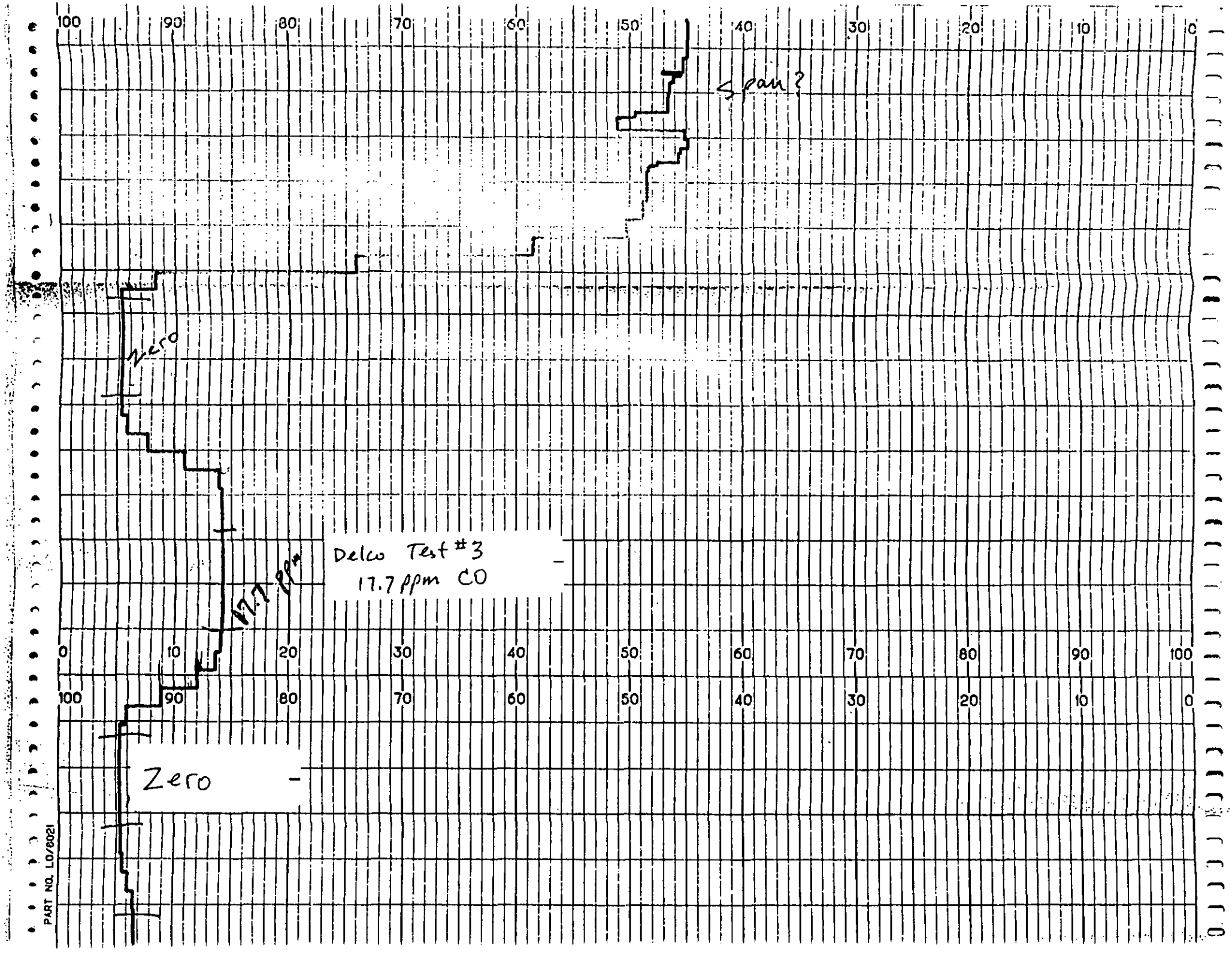
RMC reserves the right to charge $50.00 for unreturned preservative kits. Original: Laboratory Yellow: Client

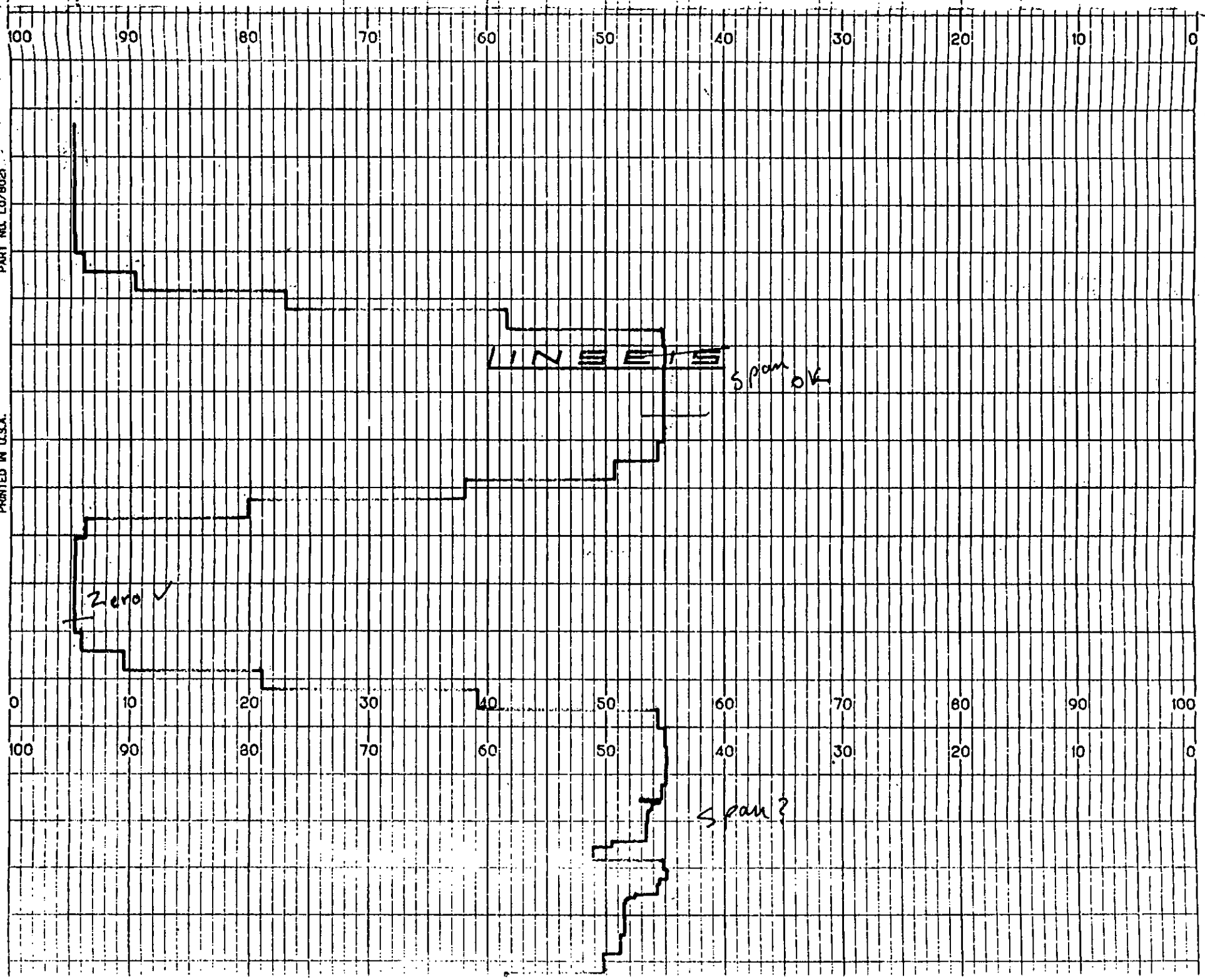
CARBON MONOXIDE ANALYSIS


44 ppm
0 10 20 30 40 50 60 70 80 90 100
100 90 80 70 60 50 40 30 20 10 0
Zero
Zero
100
0
Delco Battery CO Analysis 2-11-92
40CFR60, App.A, Ref.Meth. 10
Teco M48 NDIR
T.M.Harvey
99.9 ppm CO
span
span
2-11-92 TECO M-48 NDIR Run
chart sp = 1 cm/min, 0-100 ppm f/s, 0-10V output


5ppm CO standard
Zero
44ppm CO standard
LINEAR
0 10 20 30 40 50 60 70 80 90 100
100 90 80 70 60 50 40 30 20 10 0
PART NO. LO/8021
PRINTED IN U.S.A.


PRINTED IN U.S.A.
2.8 ppm
Delco Test #2
2.8 ppm CO
Zero
0 10 20 30 40 50 60 70 80 90 100
100 90 80 70 60 50 40 30 20 10 0
7.1 ppm
Delco Test #1
7.1 ppm CO
99.9 ppm CO
standard (span)
elect. noise


100 90 80 70 60 50 40 30 20 10 0
Span?
Zero
17.7 ppm
Delco Test #3
17.7 ppm CO
0 10 20 30 40 50 60 70 80 90 100
100 90 80 70 60 50 40 30 20 10 0
Zero
PART NO. LO/8021



PRINTED IN U.S.A. PART NO. LO/8021

APPENDIX C

Delco-Remy Production Rate Summary

Date	Test Number	Time	Lead Charge Time	Weight (lb)	
7 February 1992 - Partic/Lead					
	1	0930	0945		
				7,537	
		1047	1000		
	2	1145	1245		
				9,515	
		1301	1305		
	3	1400			
		1516			
Total		6.77 hrs		17,052	1.26 TPH
10 February 1992 - H_2SO_4/SO_2, THC, CO					
	1	0915	0920		
				11,774	
		1031	0935		
	2	1117	1320		
				5,133	
		1232	1345		
	3	1348			
		1502			
Total		6.78 hrs		16,907	

QUILL®
SELF STICK NOTES
2" X 3" • YELLOW
100 SHEETS
REORDER NO
7-386-YW

RECEIVED FEB 2 . 1992

G.M.C., DELCO REMY DIVISION
760 Jersey Avenue
New Brunswick, N.J. 08903

RECLAIM EMISSIONS TEST RAW MATERIALS INPUT

Test Date 92/02/07

Input Times Gross Weights

Material	9:45 - 10:00am	12:45-1:05pm
Scrap Plates	950	1400
" "	1229*	520
" "	1300	720*
" "	810*	1550
" "	1225	1400
" "	1520	1235
" "	1484	1000
" "	-	1020
Scrap Paste	724	-
" "	1200	-
Scrap Lead	-	1800
Lead Dust	275*	-
" "	300*	-
Dross	-	1660
Oxide	-	1380
Coke	578	-

Test Date 92/02/10

	9:20-9:35am	1:20-1:45pm
Scrap Plates	630*	700
" "	640*	610*
" "	860	523*
" "	970	634*
" "	955	1200
" "	990	1260
" "	-	923
" "	-	1042
" "	-	1151

G.M.C., DELCO REMY DIVISION
760 Jersey Avenue
New Brunswick, N.J. 08903

RECLAIM EMISSIONS TEST RAW MATERIAL INPUT

Test Date 92/02/10

Material	Input Times Gross Weights 9:20-9:30am	1:20-1:45pm
Scrap Paste	1363	-
" "	886	-
" "	1455	-
Lead Dust	1560	-
" "	1200	-
" "	380*	-
" "	265*	-
Dross	1700	-
"	3000	-
Coke	578	-

Heavy Hopper - 400 Tare
Light Hopper - 170 Tare (designated by *)

All weights in Pounds

RMC ENVIRONMENTAL SERVICES

Project Delco Battery
Subject Production Rate
Prepared by TM H. Checked by _____

Job No. _____
Sheet No. _____ of _____
Sketch No. _____
Date _____

Date/Test/Time		Lead Charge
2-7-92	0930	
	0945	
	1000	7,537 lbs
test 1	1015	
	1030	
	1045	
	1100	
	1115	
	1130	
	1145	
	1200	
	1215	
test 2	1230	
	1245	
	1300	9,115 lbs
	1315	
	1330	
	1345	
	1400	
	1415	
	1430	
test 3	1445	
	1500	
	1515	
	1530	

RMC ENVIRONMENTAL SERVICES

Project Delco Battery
Subject Production Rate
Prepared by TMH. Checked by _____

Job No. _____
Sheet No. _____ of _____
Sketch No. _____
Date _____

Date / Test / Time		Lead Charge
2-10-92	0915	
test 1	0930	11,774 lbs
	0945	
	1000	
	1015	
	1030	
	1045	
	1100	
test 2	1115	
	1130	
	1145	
	1200	
	1215	
	1230	
	1245	
	1300	
	1315	
	1330	5,133 lbs
test 3	1345	
	1400	
	1415	
	1430	
	1445	
	1500	
	1515	

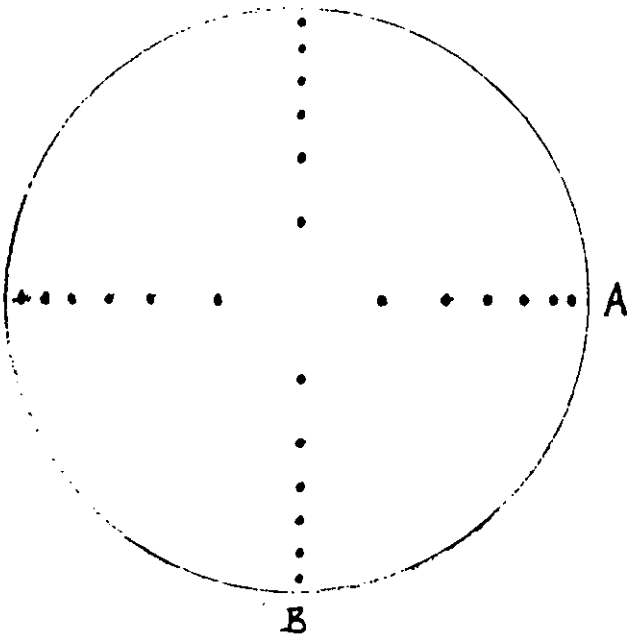
APPENDIX D

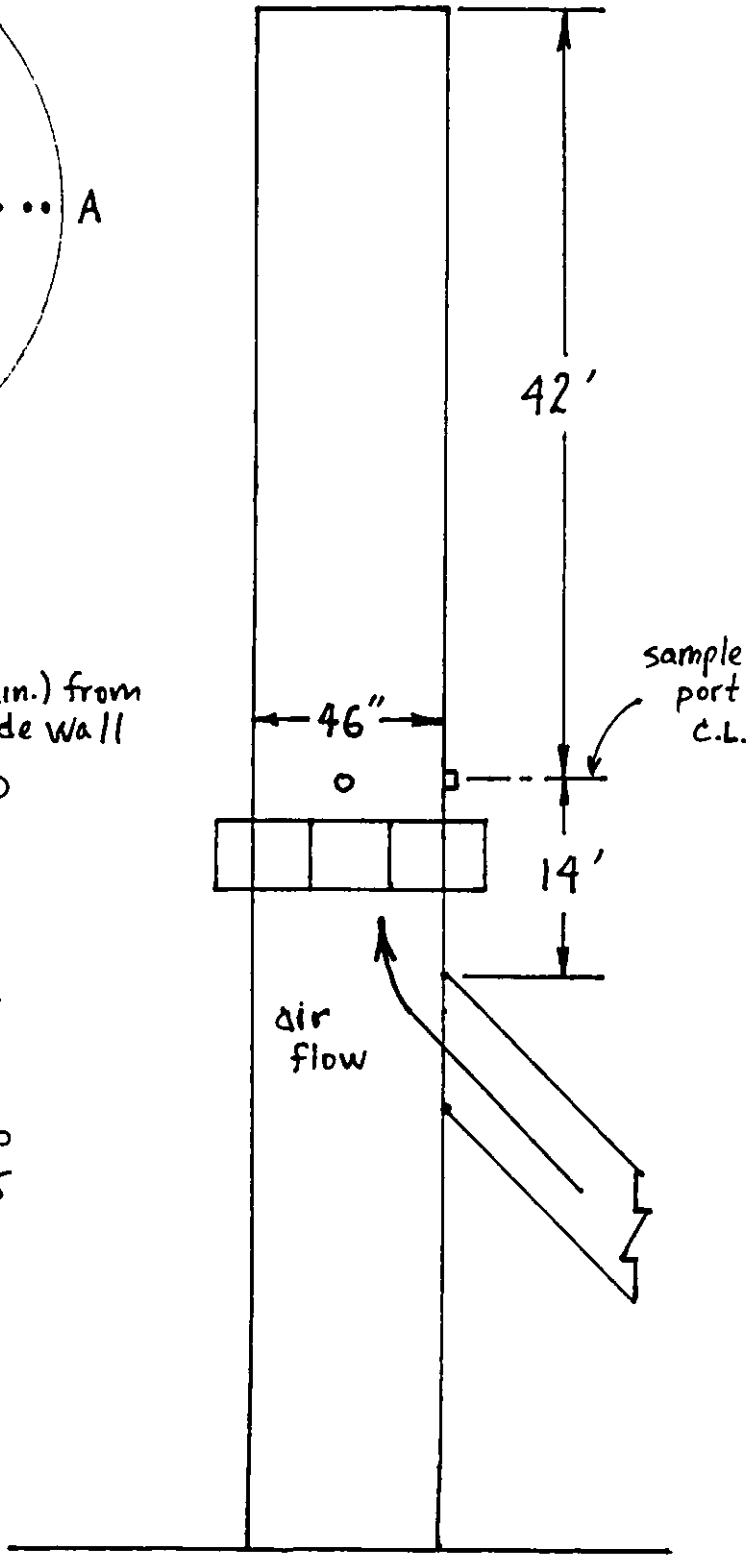
RMC ENVIRONMENTAL SERVICES

Project Delco Battery Reverb. Furn.
Subject Stack test sampling location
40 CFR 60 App. A, Ref. Meth 1
Prepared by TMH Checked by _____

Job No. _____
Sheet No. _____ of _____
Sketch No. _____
Date _____

scale = none





Sample Pt	% Dia.	Dist. (in.) from inside wall
1	2.1	1.0
2	6.7	3.1
3	11.8	5.4
4	17.7	8.1
5	25.0	11.5
6	35.6	16.4
7	64.4	29.6
8	75.0	34.5
9	82.3	37.8
10	88.2	40.6
11	93.3	42.9
12	97.9	45.0

METHOD 2 GAS VELOCITY AND VOLUME DATA FORM

Plant and city	Run date
Delco Remy, New Brunswick	0 1 1 7 9 2

Sampling location	Clock time
Reverb Furnace	

Run number	Operator	Amb. temp., °F	Bar. press., in. Hg	Static press., in. H_2O
	TMH			

Molecular wt.	Stack inside dimension, in. Diam. of side 1	Stack inside dimension, in. side 2	Pitot tube (C_p)

Field data

Traverse point number	Position, in.	Velocity head (Δp_s), in. H_2O	Stack temp., °F	Cyclonic flow determination: Δp_s at 0° reference	Cyclonic flow determination: Angle (α) which yields a null Δp
B 1		.42			5
2		.42			5
3		.50			0
4		.54			4
5		.48			3
6		.48			0
7		.50			0
8		.48			0
9		.55			0
10		.65			1
11		.60			5
12		.60			5
				Average angle (α)[a]	3

[a] Average of α must be <10 degrees to be acceptable.

METHOD 2 GAS VELOCITY AND VOLUME DATA FORM

Plant and city	Run date
Delco-Remy	0 1 1 7 9 2

Sampling location	Clock time
Reverb. Furnace	

Run number	Operator	Amb. temp., °F	Bar. press., in. Hg	Static press., in. H_2O
	TMH			

Molecular wt.	Stack inside dimension, in. Diam. of side 1	side 2	Pitot tube (C_p)
	46	46	.84

Field data

Traverse point number	Position, in.	Velocity head (Δp_s), in. H_2O	Stack temp., °F	Cyclonic flow determination: Δp_s at 0° reference	Cyclonic flow determination: Angle (α) which yields a null Δp
A 1		.46			5
2		.40			5
3		.45			5
4		.55	145		0
5		.65			0
6		.65			0
7		.60			0
8		.48			6
9		.48			8
10		.48			5
11		.49			5
12		.49			0
					5

Average angle (α)[a] 4

a

APPENDIX E

RMC ENVIRONMENTAL SERVICES, Inc.

RMC ENVIRONMENTAL SERVICES

3450 Schuylkill Road
Spring City, PA 19475

215•948•4700
215•948•4752 FAX

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes _____ no

Pitot tube openings damaged? _____ yes (explain below) ✓ no

α_1 = 4 ° (<10°), α_2 = 3 ° (<10°), β_1 = 1 ° (<5°),
β_2 = 2 ° (<5°)

γ = 1 °, θ = 0 °, A = .992 cm (in.)

z = A sin γ = .02 cm (in.); <0.32 cm (<1/8 in.),
w = A sin θ = 0.0 cm (in.); <.08 cm (<1/32 in.)

P_A .496 cm (in.) P_b .496 cm (in.)

D_t = .375 cm (in.)

Comments: geometric verification, Cp = 0.84
Timothy Harvey
1-28-92

Calibration required? _____ yes X no

pitot P-60-02 (pum)

METER BOX CALIBRATION DATA AND CALCULATION FORM

Date 1-28-92 Meter box number RMC-02

Barometric pressure, P_b = 30.02 in. Hg Calibrated by TMH

Orifice manometer setting (ΔH), in. H_2O	Gas volume: ~~Wet~~ test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperatures: ~~Wet~~ test meter (t_w), °F	Temperatures: Dry gas meter: Inlet (t_{d_i}), °F	Temperatures: Dry gas meter: Outlet (t_{d_o}), °F	Temperatures: Dry gas meter: Avg[a] (t_d), °F	Time (θ), min	Y_i	$\Delta H@_i$ in. H_2O
0.5	~~8~~ 3.93	3.99	520R 60F			531	10	1.00 ~~1.03~~	1.74
1.0	~~8~~ 5.42	5.52	520			536	10	1.01	1.81
1.5	~~10~~ ~~7.55~~	~~7.69~~	5						
2.0	~~10~~ 7.55	7.69	52~~2~~			545	10	1.02	1.85
3.0	~~10~~ 9.28	9.51	52~~2~~			549	10	1.02	1.83
4.0	~~10~~ 10.68	10.94	52~~2~~			550	10	1.03	1.83
							Avg	1.016	1.81

Initial leak test - pass

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_w + 460)}$	$\Delta H@_i = \frac{0.0317\ \Delta H}{P_b\ (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
1.5	0.110		
2.0	0.147		
3.0	0.221		
4.0	0.294		

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d.

1-28-92
Timothy M. Hardy

RMC ENVIRONMENTAL SERVICES, Inc.

RMC ENVIRONMENTAL SERVICES

3450 Schuylkill Road
Spring City, PA 19475

215-948-4700
215-948-4752 FAX

TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 1-28-92 Thermocouple number TC-12-1

Ambient temperature 60 °F Barometric pressure 30.02 in. Hg

Calibrator TMH Reference: mercury-in-glass ASTM 8F

other _____

Reference point number	Source[a] (specify)	Reference thermometer temperature, °F	Thermocouple potentiometer temperature, °F	Temperature difference,[b] %
	ice bath	33	35	0.4 %
	ambient	60	60	0.0 %
	oven	500	495	0.5 %

[a] Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °F} + 460) - (\text{test thermom temp, °F} + 460)}{\text{ref temp, °F} + 460}\right] 100 \leq 1.5\%.$

RMC ENVIRONMENTAL SERVICES, Inc.

RMC ENVIRONMENTAL SERVICES

3450 Schuylkill Road
Spring City, PA 19475

215•948•4700
215•948•4752 FAX

TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 1-28-92 Thermocouple number TC-72-01

Ambient temperature 60 °F Barometric pressure ~~29.70~~ in. Hg 30.02

Calibrator TMH Reference: mercury-in-glass ASTM 8F

other _____

Reference point number	Source[a] (specify)	Reference thermometer temperature, °F	Thermocouple potentiometer temperature, °F	Temperature difference,[b] %
	ice bath	33	32	.2%
	ambient	60	59	.2%
	oven	500	506	.6%

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °F} + 460) - (\text{test thermom temp, °F} + 460)}{\text{ref temp, °F} + 460}\right] 100 \leq 1.5\%.$

RMC ENVIRONMENTAL SERVICES, Inc.

3450 Schuylkill Road
Spring City, PA 19475

215•948•4700
215•948•4752 FAX

TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 1-28-92 Thermocouple number DGM-02-in

Ambient temperature 60 °F Barometric pressure 30.02 in. Hg

Calibrator TmH Reference: mercury-in-glass ASTM 8F

Timothy Harvey other _____

Reference point number	Source[a] (specify)	Reference thermometer temperature, °F	Thermocouple potentiometer temperature, °F	Temperature difference,[b] %
	ice	33	32	.2%
	ambient	60	60	0.0%
	boil. water	214	215	0.1%

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °F} + 460) - (\text{test thermom temp, °F} + 460)}{\text{ref temp, °F} + 460}\right] 100 \leq 1.5\%.$

RMC ENVIRONMENTAL SERVICES, Inc.

RMC ENVIRONMENTAL SERVICES

3450 Schuylkill Road
Spring City, PA 19475

215•948•4700
215•948•4752 FAX

TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 1-28-92 Thermocouple number DGM-02-out

Ambient temperature 60 °F Barometric pressure 30.02 in. Hg

Calibrator TMH Reference: mercury-in-glass ASTM 8F

other _____

Reference point number	Source[a] (specify)	Reference thermometer temperature, °F	Thermocouple potentiometer temperature, °F	Temperature difference,[b] %
	ice bath	33	33	0.0%
	ambient	60	60	0.0%
	boil, H_2O	214	212	0.3%

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °F} + 460) - (\text{test thermom temp, °F} + 460)}{\text{ref temp, °F} + 460}\right] 100 \leq 1.5\%$.

RMC ENVIRONMENTAL SERVICES, Ir

3450 Schuylkill Road
Spring City, PA 19475

215-948-4700
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TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 1-28-92 Thermocouple number imp-out. 1

Ambient temperature 60 °F Barometric pressure 30.02 in. Hg

Calibrator TMH Reference: mercury-in-glass ASTM 8F

other _____

Reference point number	Source[a] (specify)	Reference thermometer temperature, °F	Thermocouple potentiometer temperature, °F	Temperature difference,[b] %
	ice	33	32	0.2%
	ambient	60	60	0.0%
	boil. water	214	216	0.3%

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °F} + 460) - (\text{test thermom temp, °F} + 460)}{\text{ref temp, °F} + 460}\right] 100 \leq 1.5\%$.

APPENDIX F

TEST PERSONNEL

Name	Affiliation	Task
Timothy M. Harvey	RMC Environmental Services, Inc.	Project Manager/ Test Supervisor
David J. Nonemaker	NET Atlantic, Inc.	Sr. Environmental Technician
Albert Shukis	Delco-Remy Div. GM Corp.	Source Engineering & Production Coordinator
Paul Butsavage	JACA Corporation	Visible Emissions Evaluation
Kenneth Lembo	NJDEPE Regional Office	Admin/Enforcement Inspector
Richelle S. Burkeen	NJDEPE Bureau of Technical Services	Admin/Enforcement Inspector