CONTRACT NO. 92-338
FINAL REPORT
APRIL 1996

Development of Toxics Emission Factors from Source Test Data Collected under the Air Toxics Hot Spots Program:

Volume 2

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

AIR RESOURCES BOARD
Research Division

DEVELOPMENT OF TOXICS EMISSION FACTORS FROM SOURCE TEST DATA COLLECTED UNDER THE AIR TOXICS HOT SPOTS PROGRAM

Final Report

Volume 2

Contract No. 92-338

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TABLE OF CONTENTS

ATTACHMENT 1
ACRONYMS

ACRONYMS

4D 2378	Same as 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
4D Other	Same as Tetrachlorodibenzo-p-dioxin other.
4D Total	Same as Tetrachlorodibenzo-p-dioxin total.
4F 2378	Same as 2,3,7,8-Tetrachlorodibenzofuran.
4F Other	Same as Tetrachlorodibenzofuran other.
4F Total	Same as Tetrachlorodibenzofuran total.
5D 12378	Same as 1,2,3,7,8-Pentachlorodibenzo-p-dioxin.
5D Other	Same as Pentachlorodibenzo-p-dioxin other.
5D Total	Same as Pentachlorodibenzo-p-dioxin total.
5F 12378	Same as 1,2,3,7,8-Pentachlorodibenzofuran.
5F 23478	Same as 2,3,4,7,8-Pentachlorodibenzofuran.
5F Other	Same as Pentachlorodibenzofuran other.
5F Total	Same as Pentachlorodibenzofuran total.
6D 123478	Same as 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin.
6D 123678	Same as 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin.
6D 123789	Same as 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin.
6D Other	Same as Hexachlorodibenzo-p-dioxin other.
6D Total	Same as Hexachlorodibenzo-p-dioxin.
6F 123478	Same as 1,2,3,4,7,8-Hexachlorodibenzofuran.
6F 123678	Same as 1,2,3,6,7,8-Hexachlorodibenzofuran.
6F 123789	Same as 1,2,3,7,8,9-Hexachlorodibenzofuran.
6F 234678	Same as 2,3,4,6,7,8-Hexachlorodibenzofuran.
6F Other	Same as Hexachlorodibenzofuran other.
6F Total	Same as Hexachlorodibenzofuran total.
7D 1234678	Same as 1,2,3,4,7,8-Heptachlorodibenzo-p-dioxin.
7D Other	Same as Heptachlorodibenzo-p-dioxin other.
7D Total	Same as Heptachlorodibenzo-p-dioxin total.
7F 1234678	Same as 1,2,3,4,6,7,8-Heptachlorodibenzofuran.
7F 1234789	Same as 1,2,3,4,7,8,9-Heptachlorodibenzofuran.
7F Other	Same as Heptachlorodibenzofuran other.
7F Total	Same as Heptachlorodibenzofuran total.
8D	Same as Octachlorodibenzo-p-dioxin.
8F	Same as Octachlorodibenzofuran.
AB2588	Air Toxics "Hot Spots" Information and Assessment Act of 1987
AB	Afterburner
AF	Air Filter
AI	Ammonia Injection
Al	Aluminum
APC	Air Pollution Control
APS	Air Pollution Control System
ATEDS	Air Toxic Emission Data System
B	Benzene
BAAQMD	Bay Area Air Quality Management District
BD	Blank Data
BF	Baffle Filter
BTX	Benzene, Toluene, and Xylene
C	Cyclone or Carbon
CD	Calibration Data
CARB	California Air Resources Board

CO	Carbon Monoxide
COC	Carbon Monoxide Oxidation Catalyst
CVAAS	Cold Vapor Atomic Absorption Spectrometry
CVR	Case Vapors Recovered
Cr	Chromium
D	Dioxins
DD	Device Description
DM	Demister
dscfm	Dry Standard Cubic Feet per Minute
dscf	Dry Standard Cubic Feet
EER	Energy and Environmental Research Corporation
EF	Emission Factor
EPA	Environmental Protection Agency
ESP	Electrostatic Precipitator
F	Formaldehyde
FBC	Fluidized Bed Combustor
FF	Fabric Filter
GFAAS	Graphite Furnace Atomic Absorption Spectrometry
H2S	Hydrogen Sulfide
HC	Hexavalent Chromium
HCHO	Formaldehyde
HCl	Hydrogen Chloride
HF	Hydrogen Fluoride
HI	Hydrogen Chloride
HNO3	Nitric acid
HO	Halogenated Organics
Hp	Horse Power
HS	Hydrogen Sulfide
HVLP	High Volume Low Pressure
ICAP	Inductively Coupled Argon Plasma
ICE	Internal Combustion Engine
IS	Internal Standards
LD	Laboratory Data or Location Data
LI	Lime Injection
lbs/MMcf	Pounds per Million Cubic Feet
lbs/Mgal	Pounds per Thousand Gallons
lbs/drum	Pounds per Drum
lbs/gal paint	Pounds per Gallon Paint
lbs/lbs powder	Pounds per Pounds Powder
lbs/lbs production	Pounds per Pounds Production
lbs/ton	Pounds per Ton
lbs/ton coke	Pounds per Ton Coke
lbs/ton production	Pounds per Ton Production
M	Metals
MMBtu	Million British Thermal Units
MC	Multicyclone
MMcf	Million Cubic Feet
MD	Method Description
MDL	Method Detection Limit
Mgal	Thousand Gallons
mg/amp-hr	Milligram per Amp-hour

MMT	Multiple Metals Train
Ni	Nickel
NIOSH	National Institute of Occupation Safety and Hazard
NOx	Nitrogen oxides
O2	Oxygen
O	Oxygen
PA	Paint Arrestor
PB	Polyballs
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCDD	Polychlorinated Dibenzo-p-dioxin
PCDF	Polychlorinated Dibenzofuran
PE	Polyurethane
PH	Polycyclic Aromatic Hydrocarbons
ppbv	Parts per Billion Volume
PQL	Practical Quantitation Limit
PR	Process Rate
QA/QC	Quality Assurance/Quality Control
QD	Quality Assurance/Quality Control Data
RFG	Refinery Fuel Gas
ROC	Reactive Organic Compound
RSD	Relative Standard Deviation
S	Strokes per Cycle
SCAQMD	South Coast Air Quality Management District
SCC	Source Classification Code
SCR	Selective Catalytic Reduction
SD	Sample Data or Spray Dryer
SIC	Standard Industrial Classification
SO2	Sulfur Dioxide
SVOC	Semi-Volatile Organic Compounds
THC	Total Hydrocarbons
Ti	Titanium
TO	Thermal Oxidizer
VC	Vinyl Chloride
VOC	Volatile Organic Compound
WC	Water Curtain
WS	Wet Scrubber
WSN	Water Spray Nozzle
WSPA	Western States Petroleum Association
WT	Water Trough

ATTACHMENT 2
LISTING OF TEST DOCUMENTATION INFORMATION, AND SUBSTANCES QUANTIFIED IN THE FUEL AND AIR EMISSIONS

ATTACHMENT 2. LISTING OF TEST DOCUMENTATION INFORMATION AND SUBSTANCES QUANTIFIED IN THE FUEL AND AIR EMISSIONS.

Device	Material	Search Case	Number of Tests	Control Device Used	Report ID	Report Information										Report Year	Sample Location	Substance Group											
						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
?	?	7	7	Y	2065A	N	Y	Y	Y	Y	Y	Y	N	Y	N	1990	STACK		Y										
?	?	7	1	Y	2080A	N	Y	Y	Y	N	Y	Y	Y	N	N	0	STACK						Y						Y
?	?	7	1	?	2301A	N	Y	Y	Y	N	N	Y	Y	N	N	1990	STACK	Y	Y										
?	?	7	2	N	2369A	N	Y	N	Y	N	N	N	N	N	N	1990	STACK										Y		Y
?	?	7	1	Y	2435A	N	Y	Y	Y	N	N	Y	Y	Y	N	1990	STACK			Y		Y	Y						
AGGREGATE, BLEACHER	?	7	1	Y	2084A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y				Y	Y						Y
AGGREGATE, CONE CRUSHER	AGGREGATE	6	1	N	2077A	N	Y	Y	Y	N	Y	N	N	Y	N	1991	STACK												Y
AGGREGATE, PLANT	AGGREGATE	7	1	Y	2089A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y											Y
AGGREGATE, PREDRYER	?	7	1	Y	2091A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y											Y
AGGREGATE, SCREENING PLANT	AGGREGATE	6	1	N	2077B	N	Y	Y	Y	N	Y	N	N	Y	N	1991	STACK												Y
AGGREGATE, SCREENING PLANT	AGGREGATE	7	1	Y	2092A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y											Y
ASPHALT PRODUCTION	AGGREGATE	3	1	?	2169A	N	Y	Y	Y	N	Y	Y	Y	Y	N	1992	STACK			Y		Y							Y
ASPHALT PRODUCTION	AGGREGATE	3	1	?	2194A	Y	N	Y	Y	N	N	Y	N	Y	N	1990	STACK										Y		Y
ASPHALT PRODUCTION	AGGREGATE	3	1	Y	2582A	N	N	N	N	N	N	N	N	Y	N	1989	STACK	Y				Y	Y						
ASPHALT PRODUCTION, CRUSHER	AGGREGATE	3	1	?	2099A	Y	Y	Y	N	N	N	N	Y	Y	Y	1992	DUST												Y
ASPHALT PRODUCTION, CRUSHER	AGGREGATE	3	1	Y	2149A	N	Y	N	Y	N	N	N	N	Y	Y	1992	DUST		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
ASPHALT PRODUCTION, DRYER/MIXER	AGGREGATE	7	1	N	2371A	Y	Y	Y	Y	Y	N	Y	Y	N	N	1990	STACK			Y		Y					Y		Y
ASPHALT PRODUCTION, HANDLING	AGGREGATE	7	1	N	2453A	Y	Y	N	Y	Y	Y	N	Y	N	N	1991	STACK	Y											
ASPHALT PRODUCTION, HOT OIL HEATER	AGGREGATE	7	1	N	2371B	Y	Y	Y	Y	Y	N	Y	Y	N	N	1990	STACK			Y		Y	Y						Y
ASPHALT PRODUCTION, MIXER	AGGREGATE	3	1	Y	2588A	Y	Y	N	Y	N	N	N	N	Y	N	1991	STACK	Y					Y						Y
ASPHALT PRODUCTION, MIXER	AGGREGATE	3	1	Y	2592A	Y	Y	N	N	N	N	N	N	Y	N	1991	STACK	Y				Y	Y						
ASPHALT PRODUCTION, MIXER	AGGREGATE	7	1	Y	2345A	N	Y	Y	Y	N	N	Y	N	N	N	1992	DUCT												Y
ASPHALT PRODUCTION, ROTARY DRYER	AGGREGATE	3	1	Y	2364A	Y	Y	Y	N	Y	Y	Y	Y	Y	N	1990	STACK	Y		Y		Y						Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	AGGREGATE	7	1	Y	2382A	Y	N	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y		Y		Y	Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	DIESEL/AGGREGATE	1	1	Y	2372A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y		Y		Y	Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	DIESEL/AGGREGATE	1	1	Y	2449A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	DIESEL/AGGREGATE	2	1	Y	2008A	Y	Y	Y	Y	N	N	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	DIESEL/AGGREGATE	2	1	Y	2567A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y					Y						
ASPHALT PRODUCTION, ROTARY DRYER	NATURAL GAS/AGGREGATE	1	1	Y	2370A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y		Y			Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	NATURAL GAS/AGGREGATE	1	1	Y	2387A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y			Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	NATURAL GAS/AGGREGATE	2	1	Y	2008C	Y	Y	Y	Y	N	N	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	NATURAL GAS/AGGREGATE	2	1	Y	2008D	Y	Y	Y	Y	N	N	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	OIL/AGGREGATE	1	1	Y	2391A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	PROCESS OIL 70/AGGREGATE	2	1	Y	2008B	Y	Y	Y	Y	N	N	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER	NATURAL GAS/AGGREGATE	3	1	Y	2150A	Y	Y	N	N	Y	N	Y	N	Y	Y	1991	STACK	Y		Y		Y	Y				Y		Y
ASPHALT PRODUCTION, ROTARY DRYER/MIXER	AGGREGATE	1	1	Y	2393A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y			Y					Y	Y
ASPHALT PRODUCTION, ROTARY DRYER/MIXER	AGGREGATE	3	1	Y	2365A	Y	Y	Y	N	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	Y
ASPHALT RECOVERY INCINERATOR	ASPHALT FUMES	2	2	Y	2599L	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y				Y	Y	Y
ASPHALT ROOFING	ROOFING MATERIAL	5	1	Y	2587A	Y	Y	Y	Y	N	N	Y	Y	Y	N	1991	STACK			Y		Y	Y					Y	Y
ASPHALT ROOFING PLANT, APPLICATOR VAC	?	7	1	N	2499A	N	Y	Y	Y	Y	N	Y	Y	N	N	1991	STACK					Y							
ASPHALT ROOFING PLANT, CONTROL VAC-TEIP	?	7	1	N	2499B	N	Y	Y	Y	Y	N	Y	Y	N	N	1991	STACK					Y							
BALL MILL	PC BOARDS	7	1	?	2163C	N	N	Y	Y	N	N	Y	Y	N	N	1988	STACK	Y										Y	Y
BATCH-MIXING OF POLYESTER RESIN	FORMALDEHYDE	7	1	Y	2307A	Y	Y	N	Y	Y	Y	Y	Y	N	N	1991	STACK					Y							
BATTERY, CRUSHING SYSTEM	BATTERIES	7	1	Y	2069A	Y	Y	Y	Y	N	Y	Y	N	N	N	1988	STACK	Y											
BATTERY, GRID CASTER	BATTERIES	7	1	Y	2170B	N	N	Y	Y	N	Y	Y	N	N	N	1990	STACK												Y
BATTERY, PRODUCTION FACILITY	METAL	6	11	Y	2304A	Y	Y	Y	Y	Y	Y	Y	N	Y	N	1991	STACK	Y											Y
BATTERY, PRODUCTION FACILITY	METAL	7	1	N	2170A	N	N	Y	Y	N	Y	Y	N	N	N	1990	STACK												Y
BATTERY, PRODUCTION FACILITY	METAL	7	1	Y	2303A	N	Y	N	N	N	N	N	N	N	N	1989	STACK	Y											Y
BICARBONATE FLUID BED	BORAX, SALT CAKE	6	1	Y	2094B	N	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y											Y
BICARBONATE MILLING/SCREENING	BORAX, SALT CAKE	6	1	Y	2094A	N	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y											Y
BIOVENTING SYSTEM	VAPOR	7	1	Y	2468A	N	Y	Y	Y	N	Y	N	N	N	N	1993	STACK						Y						Y

Report Information:	DD-Device Description, MD-Method Decription, SD-Sample Data, LD-Lab Data, QD-QA/QC Data, CD-Calibration Data, LD-Location Data, BD-Blank Data, PR-Process Rate, EF-Emission Factor
Substance Group:	M-Metals, HI-HCl, PH-PAH, D-Dioxins, F-Formaldehyde, B-Benzene, VC-Vinyl Chloride, PB-PCB, HO-Halgenated Organics, HS-H2S, HC-Hex Chromium, O-Other
Other Comments:	NR - Not required, Y - Yes, N - No, Blank - No, ? - Additional investigation required.

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Device	Material	Search Case	Number of Tests	Control Device Used	Report ID	Report Information										Report Year	Sample Location	Substance Group											
						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
BOILER	?	6	1	N	2023A	Y	N	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	
BOILER	?	7	1	?	2040B	Y	Y	Y	Y	Y	N	Y	Y	N	N	1990	STACK					Y							Y
BOILER	?	7	1	N	2379A·	N	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK	Y		Y		Y	Y						Y
BOILER	?	7	1	N	2505A	N	Y	Y	Y	N	Y	Y	Y	N	N	1993	STACK	Y		Y		Y	Y					Y	Y
BOILER	COAL/NATURAL GAS	3	1	?	2095A	N	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y		Y	Y	Y	Y						Y
BOILER	COKE	7	1	Y	2570A	Y	Y	Y	Y	Y	Y	Y	N	N	N	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
BOILER	COKE	7	1	Y	2570A	Y	Y	Y	Y	Y	Y	Y	N	N	N	1991	STACK	Y	Y	Y	Y	Y	Y					Y	Y
BOILER	CRUDE OIL	1	1	N	2487A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1992	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
BOILER	CRUDE OIL	1	1	N	2487A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1992	STACK												
BOILER	DIESEL	1	3	N	2395B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK			Y		Y						Y	Y
BOILER	DIESEL	1	1	N	2426A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1989	STACK			Y	Y								
BOILER	DIESEL	1	1	N	2450A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK			Y		Y						Y	Y
BOILER	DIESEL	1	1	N	2596A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
BOILER	DIESEL	1	1	N	2596A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK			Y		Y							
BOILER	DIESEL	2	1	N	2101B	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1993	STACK			Y		Y	Y						
BOILER	DIESEL/PITCH	7	2	N	2051A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
BOILER	DIESEL/PITCH	7	2	N	2051A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1991	STACK			Y		Y							
BOILER	DUST/NATURAL GAS/FUEL OIL	3	1	Y	2577A	Y	Y	Y	Y	N	N	Y	N	Y	N	1990	STACK	Y				Y	Y						Y
BOILER	FUEL OIL	2	1	N	2531A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y		Y	Y	Y							
BOILER	FUEL OIL	2	1	Y	2549B	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1992	DUCT			Y		Y							
BOILER	FUEL OIL	2	1	Y	2549B	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1992	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	Y
BOILER	FUEL OIL NO.6	1	1	?	2001B	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	
BOILER	FUEL OIL NO.6	1	1	N	2011A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK	Y		Y		Y	Y					Y	
BOILER	FUEL OIL NO.6	1	1	N	2026A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK	Y		Y		Y	Y					Y	Y
BOILER	FUEL OIL NO 6	1	1	N	2552A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
BOILER	FUEL OIL NO.6	1	1	N	2552A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK	Y		Y		Y	Y						
BOILER	FUEL OIL NO.6	3	1	N	2483A	N	Y	Y	Y	Y	N	Y	Y	N	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
BOILER	FUEL OIL NO.6	3	1	N	2483A	N	Y	Y	Y	Y	N	Y	Y	N	Y	1990	STACK	Y		Y		Y	Y						Y
BOILER	FUEL OIL NO.6	3	1	N	2533A	Y	Y	N	Y	Y	Y	N	Y	Y	N	1991	STACK	Y		Y		Y	Y					Y	Y
BOILER	FUEL OIL NO.6/NATURAL GAS	3	1	N	2572A	N	Y	Y	Y	Y	Y	Y	N	Y	N	1992	STACK	Y		Y		Y	Y						Y
BOILER	FUEL OIL NO.6/NATURAL GAS/WOOD	3	1	N	2572B	N	Y	Y	Y	Y	Y	Y	N	Y	N	1992	STACK	Y		Y		Y	Y						Y
BOILER	LANDFILL GAS	5	1	N	2317B	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
BOILER	LANDFILL GAS	5	1	N	2317B	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	STACK	Y	Y	Y		Y						Y	Y
BOILER	LANDFILL GAS	6	1	N	2484A	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK	Y		Y	Y	Y	Y						
BOILER	LANDFILL GAS	6	1	N	2563A	Y	Y	Y	Y	N	N	Y	N	Y	N	1990	STACK						Y	Y			Y		Y
BOILER	LANDFILL GAS/BIOMAS	6	1	Y	2153A	N	Y	Y	Y	Y	N	Y	Y	Y	N	1991	STACK				Y		Y			Y			Y
BOILER	NATURAL GAS	7	1	Y	2570B	Y	Y	Y	Y	Y	Y	Y	N	N	N	1991	STACK	Y	Y	Y	Y	Y	Y					Y	Y
BOILER	REFINERY GAS	4	5	N	2300A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
BOILER	REFINERY GAS	4	5	N	2300A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK			Y									
BOILER	REFINERY GAS	5	1	N	2599E	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
BOILER	REFINERY GAS	5	1	N	2599E	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK			Y		Y	Y						
BOILER	REFINERY GAS	5	1	N	2599F	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
BOILER	REFINERY GAS	5	1	N	2599F	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y				Y	Y	Y
BOILER	REFINERY GAS	5	1	N	2599G	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
BOILER	REFINERY GAS	5	1	N	2599G	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK			Y		Y	Y						
BOILER	REFINERY GAS	5	1	N	2599H	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
BOILER	REFINERY GAS	5	1	N	2599H	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK			Y		Y	Y						
BOILER	RESIDUAL OIL	3	1	N	2396A	N	N	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK	Y		Y		Y	Y					Y	Y
BOILER	RICE HULL	7	1	N	2579A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1992	STACK	Y		Y	Y	Y						Y	Y
BOILER	WOOD	1	1	Y	2493A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1993	STACK			Y	Y	Y							Y
BOILER	WOOD	3	1	Y	2571A	Y	N	N	N	N	N	N	N	Y	Y	1990	STACK	Y			Y		Y						

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						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
BOILER	WOOD	7	1	Y	2535A	N	Y	Y	Y	N	Y	Y	Y	N	N	1992	STACK	Y		Y	Y	Y	Y					Y	Y
BOILER	WOOD WASTE/NATURAL GAS	3	1	N	2577B	Y	Y	Y	Y	N	N	Y	N	Y	N	1990	STACK	Y				Y	Y						Y
BOILER	WOOD/BIOMASS	1	1	Y	2512A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK	Y	Y	Y	Y		Y	Y				Y	Y
BOILER, CO	?	7	1	?	2122A	N	Y	Y	Y	N	N	Y	Y	N	N	1990	STACK	Y		Y		Y	Y					Y	
BOILER, CO	COKE	7	1	?	2122B	N	Y	Y	Y	N	N	Y	Y	N	N	1990	STACK	Y				Y	Y					Y	
BOILER, REBOILER	GAS	5	1	N	2494A	Y	Y	Y	Y	Y	N	N	Y	Y	Y	1990	STACK						Y						Y
BOILER, REBOILER	GAS	6	1	Y	2492A	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	1992	STACK					Y	Y						Y
BOILER, REBOILER	GAS	6	1	N	2492B	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	1992	STACK												Y
BOILER, RENDERING PLANT	?	7	4	Y	2518A	N	Y	Y	Y	N	Y	Y	N	N	N	1994	STACK					Y	Y						Y
BOILER, UTILITY	FUEL OIL NO.6	1	1	N	2027B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y					Y	Y
BOILER, UTILITY	FUEL OIL NO.6	1	1	N	2525A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y		Y		Y	Y						
BOILER, UTILITY	FUEL OIL NO.6	2	1	N	2378A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK	Y		Y		Y	Y					Y	Y
BOILER, UTILITY	FUEL OIL NO.6/NATURAL GAS	1	2	N	2419A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y					Y	Y
BOILER, UTILITY	FUEL OIL NO.6/NATURAL GAS	1	2	N	2424A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y					Y	Y
BOILER, UTILITY	NATURAL GAS	1	1	N	2027A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK					Y	Y						
BOILER, UTILITY	NATURAL GAS	2	1	N	2378B	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK					Y	Y						
BORAX DRYER	BORAX	6	1	Y	2093A	N	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK					Y	Y						Y
BORAX DRYER	BORAX, SALT CAKE	6	1	Y	2094C	N	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y											Y
BORIC ACID REACTOR	ORE, SULFURIC ACID & LIQUOR	6	1	Y	2177A	Y	N	Y	Y	N	Y	Y	Y	Y	N	1990	STACK										Y		Y
BROMINE LIQUID RING	?	7	1	Y	2037B	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK												Y
BROMINE STORAGE TANK	?	7	1	Y	2037A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK												Y
BULK TERMINAL	GASOLINE	7	1	N	2447A	Y	N	Y	Y	Y	Y	Y	N	N	N	1991	STACK						Y						Y
BULK TERMINAL (VAPOR RECOVERY)	GASOLINE	3	1	Y	2578A	Y	Y	N	Y	N	N	N	N	Y	N	1989	STACK												Y
BURN PLATFORM	?	7	1	?	2175A	Y	Y	N	Y	N	N	N	N	N	N	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
BURNER	GAS	6	1	N	2410A	Y	Y	Y	Y	Y	Y	N	N	N	Y	1991	STACK						Y				Y		Y
CARBON CANISTER	CARBON	6	1	N	2411A	Y	N	Y	N	N	Y	Y	N	Y	N	1992	STACK						Y						Y
CATALYTIC OXIDIZER	?	7	1	Y	2462A	N	Y	Y	Y	N	Y	N	N	N	N	1993	STACK						Y						Y
CATALYTIC REFORMER	NAPHTHAS	2	1	Y	2406A	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	1991	STACK				Y								
CATALYTIC REFORMER	OIL	7	1	N	2408A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK	Y	Y		Y							Y	Y
CHEMICAL PROCESS	?	7	1	?	2029A	Y	Y	Y	Y	Y	Y	N	N	N	N	1991	STACK												Y
CHLORINATOR/CLARIFICATION TANKS	CHLORINE	7	2	N	2312C	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	DUCT									Y			
COATING OPERATION	ALUMINUM	7	1	N	2360A	Y	Y	Y	Y	N	Y	Y	N	N	N	1992	STACK											Y	Y
COATING OPERATION	MAGNETIC TAPE	7	1	Y	2565A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK												Y
COATING OPERATION	PAINT	7	1	Y	2346A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK						Y	Y					Y
COATING OPERATION, DIPPING LINES	SOLVENTS AND SILICON SOLIDS	7	2	N	2465A	Y	Y	Y	Y	Y	Y	Y	N	Y	N	1993	STACK												Y
COATING OPERATION, PAINT BOOTH	PAINT	4	1	Y	2333A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK											Y	Y
COATING OPERATION, PAINT BOOTH	PAINT	4	1	N	2334A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK											Y	Y
COATING OPERATION, PAINT BOOTH	PAINT	4	1	N	2529B	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y										Y	Y
COATING OPERATION, PAINT BOOTH	PAINT	6	1	Y	2195A	N	N	Y	Y	N	N	Y	N	Y	N	1989	STACK												Y
COATING OPERATION, PAINT BOOTH	PAINT	6	1	N	2197A	Y	N	Y	Y	N	N	Y	N	Y	Y	1991	STACK												Y
COATING OPERATION, PAINT BOOTH	PAINT	7	1	Y	2031A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK		Y										Y
COATING OPERATION, PAINT BOOTH	PAINT	7	1	N	2044A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK	Y										Y	
COATING OPERATION, PAINT BOOTH	PAINT	7	8	Y	2060A	N	Y	N	Y	Y	N	N	Y	N	N	1991	STACK												Y
COATING OPERATION, PAINT BOOTH	PAINT	7	1	Y	2066A	Y	Y	N	Y	N	Y	Y	Y	N	N	1990	STACK	Y	Y			Y	Y	Y				Y	Y
COATING OPERATION, PAINT BOOTH	PAINT	7	1	N	2328A	Y	Y	Y	Y	Y	Y	N	N	N	N	1992	STACK												Y
COATING OPERATION, PAINT BOOTH	PAINT	7	8	N	2335A	N	Y	Y	Y	Y	N	Y	Y	N	N	1989	STACK	Y											Y
COATING OPERATION, PAINT BOOTH	PAINT	7	1	Y	2336A	Y	Y	Y	Y	Y	Y	Y	N	N	N	1989	STACK												Y
COATING OPERATION, PAINT BOOTH	PAINT	7	1	N	2555A	N	N	Y	Y	N	Y	Y	Y	N	N	1991	STACK	Y										Y	
COATING OPERATION, PAINT BOOTH	PRIMER/POLYURETHANE	5	14	Y	2473A	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1993	STACK											Y	Y
COATING OPERATION, PINE	PAINT/NATURAL GAS	7	2	N	2572D	N	Y	Y	Y	Y	Y	Y	N	N	N	1992	STACK			Y		Y	Y						Y
COATING OPERATION, PLASMA ARC	POWDER COATINGS	4	4	N	2140A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1989	STACK											Y	Y

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						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
COATING OPERATION, PLASMA ARC	POWDER COATINGS	6	3	Y	2397A	Y	N	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK												Y
COATING OPERATION, TOW COATING LINE	CARBON FIBERS	5	1	N	2160A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	STACK												Y
COGENERATION	?	6	1	N	2506A	N	Y	Y	Y	Y	Y	Y	N	Y	N	1992	STACK			Y			Y						Y
COGENERATION	?	7	1	?	2126A	N	Y	Y	Y	N	Y	Y	Y	N	N	1991	STACK					Y							Y
COGENERATION	DIESEL	7	2	?	2151A	N	Y	N	Y	N	N	N	Y	N	N	1987	STACK												Y
COGENERATION	DIESEL	7	2	?	2151B	N	Y	N	Y	N	N	N	Y	N	N	1987	STACK												Y
COGENERATION	DIESEL/NATURAL GAS	7	1	N	2366A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y				Y	Y						Y
COGENERATION	NATURAL GAS	7	1	N	2354A	N	Y	Y	Y	Y	Y	N	Y	N	N	1992	STACK					Y	Y						
COGENERATION	NATURAL/DIGESTER GAS	7	1	N	2581A	Y	Y	Y	Y	N	Y	Y	N	N	N	1993	STACK					Y	Y						Y
COKER	COKE	7	1	N	2327A	Y	Y	N	Y	Y	Y	N	Y	N	N	1992	STACK	Y		Y								Y	
COOLING TOWER	POLYSULFIDE/POLYURETHANE	7	1	N	2180A	Y	Y	Y	Y	Y	N	Y	Y	N	N	1991	STACK	Y				Y						Y	Y
DEGREASING OPERATION	?	7	1	N	2343A	N	N	Y	N	N	Y	Y	Y	N	N	1991	STACK												Y
DEHYDRATOR	SLUDGE - DRY METAL	6	1	Y	2118A	Y	Y	Y	Y	N	N	Y	N	Y	N	1987	STACK	Y											Y
DEHYDRATORS	VEGETABLE	7	2	N	2584A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK					Y	Y	Y			Y		Y
DRYER	BORIC ACID	7	1	Y	2079A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y				Y	Y			Y			Y
DRYER	DRY PET FOOD	7	1	Y	2532A	Y	Y	Y	Y	N	Y	Y	N	N	N	1993	STACK	Y											Y
DRYER	FIBERBOARD	2	1	Y	2575A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y		Y		Y	Y						Y
DRYER, MOLDED LINE	NATURAL GAS/STEAM	6	1	N	2572C	N	Y	Y	Y	Y	Y	Y	N	Y	N	1992	STACK	Y		Y		Y	Y						Y
EVACUATED STERILIZATION CHAMBER	ETHYLENE OXIDE	5	1	Y	2050A	Y	Y	Y	Y	N	Y	N	Y	Y	N	1990	STACK												Y
FEED MILL CYCLONE	GAS	6	1	N	2483B	N	Y	Y	Y	Y	N	Y	Y	Y	Y	1990	STACK	Y										Y	
FERMENTATION TANKS	YEAST	7	2	N	2479A	Y	Y	Y	Y	Y	Y	N	Y	N	N	1991	STACK					Y							
FERTILIZER PELLETIZING UNIT	SLUDGE	7	1	Y	2120A	Y	Y	Y	Y	N	N	Y	N	N	N	1991	STACK	Y											Y
FLARE	?	7	1	?	2154A	N	Y	N	Y	N	Y	N	N	N	N	1990	STACK						Y	Y		Y			Y
FLARE	LANDFILL GAS	4	1	N	2316A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
FLARE	LANDFILL GAS	4	1	N	2316A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK			Y	Y		Y	Y	Y				Y
FLARE	LANDFILL GAS	5	1	N	2317A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
FLARE	LANDFILL GAS	5	1	N	2317A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	STACK	Y	Y	Y		Y						Y	Y
FLARE	LANDFILL GAS	5	1	N	2350A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
FLUID CATALYTIC CRACKING UNIT	CARBON & HYDROCARBONS	3	1	Y	2326A	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y				Y	Y	Y
FLUID CATALYTIC CRACKING UNIT	CARBON & HYDROCARBONS	7	1	?	2068A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y				Y	Y						Y
FLUID CATALYTIC CRACKING UNIT	CARBON & HYDROCARBONS	7	1	?	2122C	N	Y	Y	Y	N	N	Y	Y	N	N	1990	STACK	Y		Y		Y	Y				Y	Y	Y
FLUID CATALYTIC CRACKING UNIT	CARBON & HYDROCARBONS	7	1	N	2125A	N	N	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y		Y		Y	Y				Y	Y	Y
FLUID CATALYTIC CRACKING UNIT	CARBON & HYDROCARBONS	7	1	Y	2320A	N	Y	Y	Y	Y	N	Y	Y	N	N	1991	STACK	Y				Y	Y						Y
FLUIDIZED BED COMBUSTOR	AGRICULTURAL WASTE	3	1	Y	2537A	N	Y	Y	Y	N	N	Y	Y	Y	N	1991	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
FLUIDIZED BED COMBUSTOR	AGRICULTURAL WASTE	3	1	Y	2537A	N	Y	Y	Y	N	N	Y	Y	Y	N	1991	STACK	Y	Y	Y	Y	Y	Y	Y					
FLUIDIZED BED COMBUSTOR	COAL	1	1	Y	2491A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK			Y		Y							Y
FLUIDIZED BED COMBUSTOR	COAL	1	1	Y	2500A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y	Y	Y	Y					Y	Y
FLUIDIZED BED COMBUSTOR	COAL	1	1	Y	2550A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y	Y	Y	Y	Y	Y					Y	
FLUIDIZED BED COMBUSTOR	COAL	2	1	Y	2544A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
FLUIDIZED BED COMBUSTOR	COAL	2	1	Y	2544A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK	Y	Y	Y	Y	Y						Y	Y
FLUIDIZED BED COMBUSTOR	COAL	2	1	Y	2549A	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1992	DUCT	Y	Y	Y	Y	Y						Y	Y
FLUIDIZED BED COMBUSTOR	COAL	3	1	Y	2116A	N	N	Y	Y	N	Y	Y	Y	Y	Y	1992	STACK	Y	Y	Y	Y	Y						Y	
FLUIDIZED BED COMBUSTOR	COKE	1	1	Y	2421A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK	Y	Y	Y			Y					Y	
FLUIDIZED BED COMBUSTOR	COKE	1	1	Y	2425A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y	Y	Y								Y	Y
FLUIDIZED BED COMBUSTOR	COKE	1	1	Y	2547B	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK	Y	Y	Y	Y	Y	Y					Y	Y
FLUIDIZED BED COMBUSTOR	COKE/NATURAL GAS	1	1	Y	2547A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
FLUIDIZED BED COMBUSTOR	COKE/NATURAL GAS	1	1	Y	2547A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK	Y	Y	Y	Y	Y	Y					Y	Y
FLUIDIZED BED COMBUSTOR	WOOD WASTE	1	1	Y	2508A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1993	STACK			Y	Y	Y							Y
FUGITIVES	CRUDE OIL	7	1	?	2145A	N	Y	Y	Y	Y	Y	N	Y	N	N	1991	STACK					Y	Y				Y		Y
FUGITIVES	NATURAL GAS	7	1	N	2439A	N	Y	N	Y	Y	N	N	Y	N	N	1990	STACK	Y		Y			Y				Y		Y
FUGITIVES, AIR ANALYSIS AT LANDFILL	LANDFILL GAS	5	1	N	2204A	Y	Y	Y	Y	Y	N	N	Y	Y	N	1992	STACK						Y			Y			Y

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FUGITIVES, AIR ANALYSIS AT LANDFILL	LANDFILL GAS	5	1	N	2206A	Y	Y	Y	Y	Y	N	N	Y	Y	N	1992	STACK						Y			Y	Y		Y
FUGITIVES, ANALYSIS OF PRODUCED GAS	PRODUCED GAS	6	1	N	2438A	N	Y	N	N	Y	N	N	N	Y	N	1990	STACK						Y				Y		
FUGITIVES, BUTADIENE PROCESS LINES	1,3-BUTADIENE	7	1	N	2323A	Y	Y	Y	N	Y	N	N	N	N	N	1992	FUGITIVES		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
FUGITIVES, CRUDE OIL STORAGE TANK VAPOR	GAS	7	1	N	2466A	Y	Y	N	Y	Y	Y	N	Y	N	N	1990	STACK	Y					Y						Y
FUGITIVES, DIESEL REFUEL STATION	BENZENE?	6	1	N	2483D	N	Y	Y	Y	Y	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
FUGITIVES, GASOLINE LOADING OPERATION	GASOLINE	6	1	Y	2064A	Y	Y	Y	Y	N	N	N	N	Y	Y	1988	STACK												Y
FUGITIVES, NATURAL GAS FUEL LINE	NATURAL GAS	5	1	N	2101D	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1993	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
FUGITIVES, OIL SAMPLE	OIL	7	1	N	2466B	Y	Y	N	Y	Y	Y	N	Y	N	N	1990	DUST		NR	NR	NR	NR	Y	NR	NR	NR	Y		Y
FUGITIVES, WELL	PETROLEUM	7	1	N	2054A	Y	Y	Y	Y	Y	Y	Y	N	N	N	1990	STACK						Y						Y
FURNACE	ALUMINUM	7	1	N	2517B	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y				Y	Y					Y	Y
FURNACE	ALUMINUM CANS	7	1	Y	2368B	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK										Y	Y	
FURNACE	ALUMINUM CANS	7	1	Y	2368C	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y								Y			
FURNACE	ALUMINUM DROSS	7	1	Y	2368D	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y	Y	Y						Y		Y	Y
FURNACE	BRASS	7	1	Y	2339A	Y	Y	Y	N	N	N	Y	N	N	N	1991	STACK	Y											
FURNACE	CAST IRON	7	1	N	2517A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y				Y	Y					Y	Y
FURNACE	DIESEL	1	1	N	2129A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK			Y		Y							
FURNACE	GOLD, SILVER	7	2	Y	2176A	Y	Y	Y	Y	Y	N	Y	Y	N	N	1992	DUST	Y	NR	Y	Y	NR	Y	NR	NR	NR	NR	Y	
FURNACE	GOLD, SILVER	7	2	Y	2176A	Y	Y	Y	Y	Y	N	Y	Y	N	N	1992	STACK						Y						Y
FURNACE	LIGHT HYDROCARBON	7	1	N	2432A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK	Y		Y		Y					Y	Y	
FURNACE	MAGNESIUM DROSS	7	1	Y	2368A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y	Y	Y						Y			Y
FURNACE	METAL	7	1	Y	2309A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	BAPCD	Y									Y		
FURNACE	PC BOARDS	6	1	Y	2164A	N	N	Y	N	N	N	Y	N	Y	N	1989	STACK	Y											
FURNACE	SOLID	2	1	?	2010A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK			Y		Y	Y						Y
FURNACE	STEEL	7	1	N	2517C	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y				Y	Y					Y	Y
FURNACE	STEEL	7	1	N	2517D	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y				Y	Y					Y	Y
FURNACE, ALLUMINUM IGNOTS	ALUMINUM	7	3	N	2338A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y									Y	Y	Y
FURNACE, ANNELING	METAL	7	1	Y	2381D	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK												Y
FURNACE, ARC	STEEL	3	1	Y	2131A	N	Y	N	Y	N	N	Y	Y	Y	Y	1990	STACK	Y											Y
FURNACE, ASPHALT ROOFING PLANT	?	7	1	N	2499C	N	Y	Y	Y	Y	N	Y	Y	N	N	1991	STACK					Y							
FURNACE, BATTERY PRODUCTION	METAL	1	1	Y	2560A	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	1993	STACK			Y	Y	Y	Y				Y		
FURNACE, BRASS MELTING	BRASS	3	1	Y	2310A	Y	Y	Y	Y	N	Y	N	N	Y	N	1993	STACK	Y											
FURNACE, CHARCOAL	ACTIVATED CARBON & NATURAL GAS	7	1	Y	2312B	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y	Y	Y	Y	Y	Y	Y				Y	Y
FURNACE, CHIP MELTER	ALUMINUM	2	1	Y	2025B	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y									Y	Y	
FURNACE, CLEAN METALS SURFACES	55 GAL DRUMS	4	1	Y	2161A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK	Y	Y	Y		Y	Y	Y				Y	Y
FURNACE, CRUCIBLE	STEEL WOOL & GOLD	7	1	N	2203A	Y	Y	Y	Y	Y	N	Y	Y	N	N	1991	STACK	Y									Y	Y	Y
FURNACE, CUPOLA	GREY IRON	7	1	Y	2433A	N	Y	Y	Y	N	Y	Y	Y	N	N	1992	STACK	Y	Y	Y	Y	Y						Y	Y
FURNACE, CUPOLA	IRON, COKE, LIMESTONE	3	1	Y	2134A	Y	N	Y	Y	N	Y	Y	Y	Y	N	1992	STACK	Y	Y	Y	Y	Y						Y	Y
FURNACE, DROSS	ALUMINUM	2	1	Y	2053B	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y	Y			Y	Y				Y		
FURNACE, ELECTRIC INDUCTION	ALLOY STOCK	1	1	N	2004A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y									Y	Y	
FURNACE, ELECTRIC INDUCTION	BRASS/BRONZE INGOT,SCRAP	2	1	Y	2514A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	STACK	Y										Y	Y
FURNACE, FLOAT GLASS	SILICA SAND, DOLOMITE, ETC.	3	1	N	2551A	N	Y	N	Y	N	N	N	Y	Y	N	1990	STACK	Y	Y			Y	Y					Y	
FURNACE, GLASS	GLASS	7	4	?	2128A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK											Y	Y
FURNACE, GLASS	GLASS	7	1	N	2359A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1993	STACK	Y										Y	
FURNACE, GLASS	GLASS	7	1	N	2417B	N	Y	Y	Y	Y	Y	Y	Y	N	N	1993	STACK					Y							Y
FURNACE, GLASS	GLASS	7	2	N	2417C	N	Y	Y	Y	Y	Y	Y	Y	N	N	1993	STACK											Y	Y
FURNACE, GLASS	GLASS	7	2	N	2538A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y										Y	
FURNACE, GLASS	LIMESTONE, SODA ASH	7	1	N	2373A	Y	Y	N	Y	N	N	N	N	N	N	1985	STACK	Y										Y	Y
FURNACE, GLASS	SAND, LIMESTONE, SODA ASH	1	1	N	2041A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK											Y	Y
FURNACE, GLASS	SAND, LIMESTONE, SODA ASH	2	2	Y	2340A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1991	STACK											Y	Y
FURNACE, GLASS	SAND/LIMESTONE/SODA	3	1	N	2548A	Y	Y	Y	N	N	Y	Y	Y	Y	N	1990	STACK											Y	Y
FURNACE, KIRKSITE	KIRKSITE	7	1	N	2385B	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y									Y	Y	

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Substance Group: M-Metals, HI-HCl, PH-PAH, D-Dioxins, F-Formaldehyde, B-Benzene, VC-Vinyl Chloride, PB-PCB, HO-Halgenated Organics, HS-H2S, HC-Hex Chromium, O-Other
Other Comments: NR - Not required, Y - Yes, N - No, Blank - No, ? - Additional investigation required.

ATTACHMENT 2. LISTING OF TEST DOCUMENTATION INFORMATION AND SUBSTANCES QUANTIFIED IN THE FUEL AND AIR EMISSIONS.

Device	Material	Search Case	Number of Tests	Control Device Used	Report ID	Report Information										Report Year	Sample Location	Substance Group											
						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
FURNACE, LEAD	LEAD	7	1	N	2385A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y									Y	Y	
FURNACE, LEAD AND KIRKSITE POTS	LEAD/KIRKSITE	1	2	N	2322A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y									Y		Y
FURNACE, LIME RECALCING	SLUDGE	7	1	Y	2312A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y	Y	Y	Y	Y	Y	Y				Y	Y
FURNACE, MELTING POT	ALUMINUM	2	1	N	2053C	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	DUCT	Y	Y			Y	Y				Y		
FURNACE, MELTING POT	ALUMINUM	7	1	Y	2022A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y										Y	
FURNACE, MELTING POT	LEAD	1	3	Y	2016A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y									Y	Y	
FURNACE, MELTING POT	METAL	7	1	Y	2308A	Y	Y	Y	Y	N	Y	Y	N	N	N	1990	STACK	Y									Y	Y	
FURNACE, PYROBOR/CALCINER	POTASH	6	1	Y	2087A	N	Y	Y	Y	N	Y	Y	Y	Y	N	1989	STACK	Y				Y	Y						Y
FURNACE, RECOPERATOR	ALUMINUM	2	1	N	2025A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y									Y	Y	
FURNACE, REHEAT	STEEL	7	1	N	2136A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y											Y
FURNACE, REVERBERATORY	ALMINUM SCRAP	1	1	N	2113A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK	Y	Y									Y	
FURNACE, REVERBERATORY	ALUMINUM	2	1	Y	2053A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y				Y	Y				Y		
FURNACE, REVERBERATORY	ALUMINUM INGOTS AND SCRAP	1	1	N	2049A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y									Y	Y	
FURNACE, REVERBERATORY	UBC,INTERNAL SCRAP,INGOTS,MLC	2	1	N	2070A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1992	STACK	Y											
FURNACE, STEEL MELTING	METAL	3	1	Y	2311A	Y	Y	Y	Y	N	Y	N	N	Y	N	1993	STACK	Y											
GAS SEPARATOR	NATURAL GAS	5	1	N	2376A	Y	Y	Y	Y	Y	Y	N	Y	Y	N	1990	STACK	Y	Y			Y	Y				Y	Y	Y
GAS-STERILIZATION	ETHYLENE OXIDE	7	1	Y	2329A	Y	N	Y	N	Y	Y	N	N	N	N	1993	STACK												
GASIFIER	WET ALGANIC ACID PRODUCT	6	1	N	2520A	N	Y	Y	Y	N	Y	Y	N	Y	Y	1991	STACK		Y			Y							
GROUND WATER TREATMENT SYSTEM	WATER	7	1	Y	2412A	Y	Y	Y	Y	N	Y	N	N	N	N	1992	STACK										Y		
HEATER	CRUDE OIL	2	1	N	2513H	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK												Y
HEATER	GAS	6	1	N	2488A	N	Y	Y	Y	N	Y	Y	Y	Y	Y	1993	STACK			Y		Y	Y						Y
HEATER	NATURAL GAS	5	1	N	2405A	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	1992	STACK			Y		Y	Y						Y
HEATER	NATURAL/ REFINERY GAS	5	1	N	2481A	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1991	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
HEATER	NATURAL/ REFINERY GAS	5	1	N	2481A	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1991	STACK			Y		Y	Y						Y
HEATER	PIPELINE OIL	3	1	N	2541A	N	Y	Y	Y	Y	Y	Y	Y	N	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
HEATER	PIPELINE OIL	3	1	N	2541A	N	Y	Y	Y	Y	Y	Y	Y	N	Y	1990	STACK	Y		Y	Y	Y	Y						
HEATER	REFINERY GAS	5	1	Y	2117A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1992	STACK	Y		Y		Y					Y	Y	Y
HEATER	REFINERY GAS/OIL	1	1	N	2402A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK			Y		Y	Y						Y
HEATER, PETROLEUM	?	6	1	?	2124A	N	Y	N	Y	Y	N	N	Y	Y	N	1992	STACK	Y		Y		Y	Y					Y	Y
HEATER, PROCESS	REFINERY GAS	5	2	N	2599A	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
HEATER, PROCESS	REFINERY GAS	5	2	N	2599A	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK			Y		Y	Y						Y
HEATER, PROCESS	REFINERY GAS	5	1	N	2599C	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
HEATER, PROCESS	REFINERY GAS	5	1	N	2599C	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK			Y		Y	Y						
HEATER, PROCESS	REFINERY GAS	5	1	N	2599D	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
HEATER, PROCESS	REFINERY GAS	5	1	N	2599D	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK			Y		Y	Y						
HEATER, PROCESS & BOILER	REFINERY GAS	5	2	N	2599B	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
HEATER, PROCESS & BOILER	REFINERY GAS	5	2	N	2599B	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK			Y		Y	Y						
HYDRAULIC PRESS	RESIN	7	1	N	2105A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1991	STACK					Y							Y
IMPREGNATING TREATER	RESIN	3	2	Y	2034A	Y	Y	Y	Y	N	Y	Y	N	Y	Y	1989	DUCT												Y
IMPREGNATING TREATER	RESIN	3	1	Y	2035A	Y	Y	N	Y	N	N	Y	N	Y	Y	1989	STACK												Y
INCINERATOR	ANIMAL RESEARCH BEDDING	2	1	N	2422A	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	1993	STACK				Y							Y	
INCINERATOR	BIOMEDICAL WASTE	2	2	Y	2398A	Y	Y	Y	Y	N	N	Y	Y	Y	N	1991	STACK	Y	Y	Y		Y	Y	Y				Y	Y
INCINERATOR	BIOMEDICAL WASTE	2	1	N	2558A	Y	Y	Y	Y	N	N	Y	Y	Y	N	1992	STACK				Y								Y
INCINERATOR	BIOMEDICAL WASTE	3	1	?	2158A	N	N	Y	Y	N	N	Y	N	Y	N	1988	STACK		Y										Y
INCINERATOR	BIOMEDICAL WASTE	3	1	N	2442A	Y	Y	Y	N	Y	N	Y	N	Y	N	1989	STACK		Y		Y		Y	Y				Y	Y
INCINERATOR	COCAINE	7	1	N	2121A	Y	Y	Y	Y	Y	N	Y	Y	N	N	1992	STACK	Y	Y				Y	Y		Y			Y
INCINERATOR	NON-HAZARDOUS WASTE	7	1	Y	2573A	Y	N	Y	Y	N	Y	N	Y	N	N	1991	STACK		Y		Y								Y
INCINERATOR	PAPER/NATURAL GAS	3	1	N	2510A	Y	Y	Y	N	Y	Y	Y	Y	Y	N	1991	STACK	Y										Y	
INCINERATOR	PATHOLOGICAL WASTE	3	1	Y	2199A	N	N	Y	Y	N	N	Y	N	Y	N	1990	STACK		Y										Y
INCINERATOR	RESIN FACILITY BYPRODUCTS	7	1	N	2595A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1992	STACK					Y	Y				Y		
INCINERATOR	SEWER SLUDGE	3	1	?	2192A	N	N	Y	Y	N	N	Y	N	Y	N	1990	STACK	Y											

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						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
INCINERATOR	TRASH & REFUSE	7	1	N	2569A	Y	Y	Y	Y	Y	Y	Y	N	Y	N	1993	STACK	Y						Y				Y	Y
INCINERATOR	WASTE, HOSPITAL	2	1	N	2103A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	STACK	Y	Y	Y	Y							Y	Y
INCINERATOR	WASTE, HOSPITAL	3	1	?	2171A	Y	N	Y	N	N	N	Y	N	Y	N	1989	STACK		Y										Y
INCINERATOR	WASTE, MUNICIPAL	1	3	Y	2314A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y	Y	Y		Y	Y	Y				Y	Y
INCINERATOR	WASTE, MUNICIPAL	3	1	Y	2002A	Y	Y	N	N	Y	N	N	Y	Y	N	1988	STACK	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y
INCINERATOR	SEWER SLUDGE	7	1	Y	2098A	N	Y	Y	Y	N	Y	Y	Y	N	N	1991	STACK	Y			Y								Y
INCINERATOR, AFTERBURNER	?	7	1	Y	2047A	N	Y	Y	Y	N	Y	Y	N	N	N	1991	STACK	Y		Y	Y					Y	Y	Y	Y
INCINERATOR, AFTERBURNER	?	7	1	Y	2052A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK		Y			Y	Y	Y		Y			
INCINERATOR, AFTERBURNER	COATING PAINT	6	1	N	2141A	N	Y	Y	N	N	N	Y	N	Y	N	1990	STACK												Y
INCINERATOR, AFTERBURNER	COATING PAINT	6	1	?	2146A	N	Y	Y	Y	N	N	Y	N	Y	N	1985	STACK												Y
INCINERATOR, AFTERBURNER	COATING PROCESS EMISSIONS	7	1	?	2061A	Y	Y	Y	Y	N	Y	Y	N	N	N	1990	STACK												Y
INCINERATOR, AFTERBURNER	COFFEE BEENS	5	1	N	2543A	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1991	STACK												Y
INCINERATOR, AFTERBURNER	INK VAPORS	4	1	N	2485A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK			Y		Y	Y						Y
INCINERATOR, AFTERBURNER	INK/LIGHT OIL	7	1	Y	2057A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
INCINERATOR, AFTERBURNER	INK/LIGHT OIL	7	1	Y	2057A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK			Y		Y							
INCINERATOR, AFTERBURNER	PARTS COATING	7	1	N	2341A	Y	Y	Y	N	N	N	Y	N	N	N	1988	STACK												Y
INCINERATOR, AFTERBURNER	PC BOARDS	7	1	?	2163A	N	N	Y	Y	N	N	Y	Y	N	N	1988	STACK	Y										Y	Y
INCINERATOR, AFTERBURNER	PYROLYSIS OVEN EMISSIONS	7	2	?	2107A	Y	Y	Y	N	N	Y	N	Y	N	N	1990	STACK					Y	Y			Y			Y
INCINERATOR, AFTERBURNER	STRIPPING WASTE GAS	7	1	N	2108A	Y	N	N	Y	N	N	N	Y	N	N	1991	STACK						Y						Y
INCINERATOR, BLOWING STILL	ASPHALT	3	1	N	2193A	Y	N	Y	Y	N	N	Y	N	Y	Y	1992	STACK										Y		Y
INCINERATOR, CATALYTIC	RESIN OFF GASES	7	1	?	2155A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK					Y							Y
INCINERATOR, CREMATORY	BIO-WASTE	3	1	N	2152A	Y	Y	N	Y	N	N	Y	Y	Y	N	1992	STACK	Y	Y	Y	Y	Y				Y		Y	Y
INCINERATOR, OPEN BURN OF EXPLOSIVES	WASTE EXPLOSIVE	1	1	N	2542A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1993	STACK	Y	Y	Y	Y		Y	Y					Y
INCINERATOR, OPEN BURN PIT	WASTE FROM MANUF. SOCKET MOTOR	1	1	N	2423A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK	Y	Y	Y	Y	Y	Y	Y					Y
INTERNAL COMBUSTION ENGINE	DIESEL	1	1	?	2174A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
INTERNAL COMBUSTION ENGINE	DIESEL	1	1	?	2174A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y		Y		Y							Y
INTERNAL COMBUSTION ENGINE	DIESEL	1	1	N	2386A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y		Y		Y	Y					Y	Y
INTERNAL COMBUSTION ENGINE	DIESEL	1	1	N	2509A	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
INTERNAL COMBUSTION ENGINE	DIESEL	1	1	N	2509A	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	1991	STACK			Y		Y							Y
INTERNAL COMBUSTION ENGINE	DIESEL	1	1	N	2540A	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
INTERNAL COMBUSTION ENGINE	DIESEL	1	1	N	2540A	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	1991	STACK			Y		Y	Y						Y
INTERNAL COMBUSTION ENGINE	DIESEL	2	1	N	2101A	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1993	STACK	Y											
INTERNAL COMBUSTION ENGINE	DIESEL	2	2	N	2375C	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1990	STACK			Y		Y							Y
INTERNAL COMBUSTION ENGINE	DIESEL	2	1	N	2513C	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1990	STACK			Y		Y							
INTERNAL COMBUSTION ENGINE	DIESEL	2	1	N	2513K	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK												Y
INTERNAL COMBUSTION ENGINE	DIESEL	2	1	N	2530A	Y	Y	Y	Y	Y	Y	N	Y	Y	N	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
INTERNAL COMBUSTION ENGINE	DIESEL	2	1	N	2530A	Y	Y	Y	Y	Y	Y	N	Y	Y	N	1990	STACK			Y		Y							Y
INTERNAL COMBUSTION ENGINE	DIESEL	3	3	Y	2143A	Y	Y	Y	Y	N	Y	Y	N	Y	N	1991	STACK												Y
INTERNAL COMBUSTION ENGINE	DIESEL	3	2	N	2207A	Y	Y	Y	Y	N	Y	Y	N	Y	N	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
INTERNAL COMBUSTION ENGINE	DIESEL	3	2	N	2207A	Y	Y	Y	Y	N	Y	Y	N	Y	N	1990	STACK			Y	Y	Y							
INTERNAL COMBUSTION ENGINE	DIESEL	3	1	N	2436A	N	N	Y	Y	Y	Y	N	N	Y	N	1991	STACK			Y		Y							
INTERNAL COMBUSTION ENGINE	DIESEL	3	1	N	2472B	N	N	N	Y	N	N	N	Y	Y	N	1992	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
INTERNAL COMBUSTION ENGINE	DIESEL	3	2	N	2472C	N	N	N	Y	N	N	N	Y	Y	N	1992	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
INTERNAL COMBUSTION ENGINE	DIESEL	3	1	N	2589B	N	Y	Y	Y	N	N	N	Y	Y	Y	1990	STACK												Y
INTERNAL COMBUSTION ENGINE	DIESEL	7	6	N	2302A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK			Y		Y							Y
INTERNAL COMBUSTION ENGINE	DIESEL/SOYBENA OIL/NATURAL GAS	3	1	N	2562A	Y	Y	N	Y	N	N	N	N	Y	N	1994	STACK					Y							Y
INTERNAL COMBUSTION ENGINE	DIGESTER GAS	4	1	N	2331A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK			Y			Y	Y					Y
INTERNAL COMBUSTION ENGINE	DIGESTER GAS	6	1	N	2580A	Y	Y	Y	Y	N	Y	Y	N	Y	N	1992	STACK					Y	Y				Y		
INTERNAL COMBUSTION ENGINE	DIGESTER GAS	7	1	N	2590A	N	N	Y	Y	N	Y	Y	Y	N	N	1992	STACK					Y							
INTERNAL COMBUSTION ENGINE	FIELD GAS	5	1	N	2513D	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK												Y
INTERNAL COMBUSTION ENGINE	FUEL OIL NO.2/NATURAL GAS	2	1	?	2055A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		

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Substance Group: M-Metals, HI-HCl, PH-PAH, D-Dioxins, F-Formaldehyde, B-Benzene, VC-Vinyl Chloride, PB-PCB, HO-Halgenated Organics, HS-H2S, HC-Hex Chromium, O-Other
Other Comments: NR - Not required, Y - Yes, N - No, Blank - No, ? - Additional investigation required.

ATTACHMENT 2. LISTING OF TEST DOCUMENTATION INFORMATION AND SUBSTANCES QUANTIFIED IN THE FUEL AND AIR EMISSIONS.

Device	Material	Search Case	Number of Tests	Control Device Used	Report ID	Report Information										Report Year	Sample Location	Substance Group											
						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
INTERNAL COMBUSTION ENGINE	FUEL OIL NO.2/NATURAL GAS	2	1	?	2055A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	STACK			Y		Y						Y	Y
INTERNAL COMBUSTION ENGINE	FUEL OIL NO.2/NATURAL GAS	7	3	N	2142A	Y	Y	Y	Y	N	N	Y	Y	N	N	1992	STACK	Y		Y		Y	Y					Y	Y
INTERNAL COMBUSTION ENGINE	GAS	5	1	N	2513G	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK												Y
INTERNAL COMBUSTION ENGINE	GAS	6	1	N	2441A	Y	Y	N	Y	Y	N	N	Y	Y	Y	1990	STACK					Y	Y						Y
INTERNAL COMBUSTION ENGINE	GAS	6	3	N	2458A	N	Y	N	Y	Y	Y	N	N	Y	Y	1990	STACK					Y	Y						Y
INTERNAL COMBUSTION ENGINE	GAS	6	24	N	2464A	Y	Y	N	Y	Y	Y	N	Y	Y	N	1993	STACK												Y
INTERNAL COMBUSTION ENGINE	GAS	7	1	N	2445A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y	Y	Y		Y	Y					Y	Y
INTERNAL COMBUSTION ENGINE	GAS	7	1	Y	2460A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1992	STACK					Y	Y						Y
INTERNAL COMBUSTION ENGINE	GAS	7	19	Y	2463A	Y	Y	N	Y	Y	Y	N	Y	N	N	1990	STACK												Y
INTERNAL COMBUSTION ENGINE	LANDFILL GAS	4	5	N	2404A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1989	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
INTERNAL COMBUSTION ENGINE	LANDFILL GAS	6	1	N	2042A	N	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK		Y	Y		Y							Y
INTERNAL COMBUSTION ENGINE	LANDFILL GAS	6	1	N	2043A	N	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK		Y	Y		Y							Y
INTERNAL COMBUSTION ENGINE	LANDFILL GAS	7	1	Y	2110A	Y	Y	N	Y	N	N	N	N	N	N	1988	STACK												Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	4	4	N	2460B	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	1992	STACK					Y							Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	4	1	N	2496A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK			Y		Y	Y						Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	4	1	N	2497A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK					Y	Y						Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	4	1	N	2498A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK						Y						Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	5	2	N	2021A	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1991	STACK					Y	Y						
INTERNAL COMBUSTION ENGINE	NATURAL GAS	5	2	N	2102A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK					Y							
INTERNAL COMBUSTION ENGINE	NATURAL GAS	5	1	N	2102C	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK					Y							
INTERNAL COMBUSTION ENGINE	NATURAL GAS	5	1	N	2355A	Y	Y	Y	Y	Y	Y	N	Y	Y	N	1993	STACK					Y							Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	5	1	Y	2591A	Y	Y	Y	Y	Y	Y	N	Y	Y	N	1991	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		
INTERNAL COMBUSTION ENGINE	NATURAL GAS	6	4	N	2352A	Y	Y	Y	Y	Y	Y	N	N	Y	N	1993	STACK										Y		Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	6	1	N	2400A	Y	Y	N	Y	Y	Y	N	Y	Y	N	1992	STACK			Y		Y	Y					Y	Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	6	1	N	2589A	N	Y	Y	Y	N	N	N	Y	Y	Y	1990	STACK					Y	Y						
INTERNAL COMBUSTION ENGINE	NATURAL GAS	7	1	Y	2351A	N	N	N	Y	N	Y	N	N	N	N	1989	STACK										Y		Y
INTERNAL COMBUSTION ENGINE	NATURAL GAS	7	1	Y	2594A	N	Y	Y	Y	Y	N	Y	Y	N	N	1990	STACK	Y	Y			Y	Y				Y	Y	
INTERNAL COMBUSTION ENGINE	NATURAL/FIELD GAS	6	14	N	2409A	N	Y	Y	Y	Y	Y	N	Y	N	Y	1990	STACK			Y		Y	Y						Y
ION IMPLANT/CHEMICAL ETCHING/TUBE CLEAN	CHEMICAL	7	3	Y	2557A	Y	Y	Y	Y	N	N	Y	N	N	N	1992	STACK		Y										Y
KILN, CALCINING COKE TO PETRO PRODUCTS	COKE	1	1	Y	2007A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1993	STACK	Y		Y	Y	Y	Y					Y	Y
KILN, CEMENT	COAL/COKE/RAW MATERIAL	2	1	Y	2429A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK	Y	Y	Y	Y	Y	Y					Y	
KILN, CEMENT	COAL/LIMESTONE	3	1	Y	2106A	Y	Y	N	Y	Y	N	N	N	Y	Y	1992	STACK	Y	Y	Y	Y	Y	Y					Y	Y
KILN, CEMENT	COAL/RAW MATERIAL	3	1	Y	2114A	N	Y	Y	Y	N	Y	Y	Y	Y	N	1991	STACK	Y	Y	Y	Y	Y	Y						Y
KILN, CEMENT	LIMESTONE, SILICA SAND, CLAY	1	1	Y	2205A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
KILN, CEMENT	LIMESTONE, SILICA SAND, CLAY	1	1	Y	2205A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK	Y	Y	Y	Y	Y	Y			Y		Y	Y
KILN, CEMENT	RAW MATERIAL	7	1	Y	2109A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK		Y	Y	Y	Y	Y			Y			Y
KILN, LIME	COKE	2	1	Y	2380A	Y	Y	Y	Y	N	Y	Y	Y	N	Y	1990	STACK	Y	Y	Y	Y	Y	Y					Y	Y
KILN, LIME	COKE	6	1	N	2374A	Y	Y	Y	Y	N	N	Y	N	Y	N	1990	STACK												Y
KILN, LIME	SOIL	6	1	?	2196A	N	N	Y	Y	N	N	Y	N	Y	N	1990	STACK	Y									Y		Y
KILN, PREHEATER	COAL/LIMESTONE	1	1	Y	2104A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y	Y	Y	Y	Y	Y					Y	Y
KILN, ROTARY	DIESEL	7	1	Y	2437A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK	Y		Y		Y							Y
KILN, ROTARY LIGHT WEIGHT AGGREGATE	AGGREGATE	6	1	Y	2185A	Y	N	Y	Y	N	Y	Y	Y	Y	N	1991	STACK						Y			Y			Y
KILN, USED TO REGENERATE CARBON	CARBON/NATURAL GAS	7	1	N	2203B	Y	Y	Y	Y	Y	N	Y	Y	N	N	1991	STACK	Y									Y	Y	Y
KILN,TEMPERING FOR MOLDED LINE	?	7	2	N	2572E	N	Y	Y	Y	Y	Y	Y	N	N	N	1992	STACK			Y		Y	Y						Y
KILN/RAW MILL SYS	COAL	7	1	Y	2583A	Y	Y	N	Y	Y	Y	N	N	N	N	1991	STACK	Y		Y	Y	Y	Y	Y					Y
LANDFILL GAS COLLECTION SYSTEM	LANDFILL GAS	7	1	N	2137A	Y	Y	Y	Y	Y	Y	Y	?	N	N	1990	STACK						Y				Y		Y
LEAD MELTING POTS,BATTERY PRODUCTION	METAL	7	4	Y	2559A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1993	STACK	Y			Y					Y	Y	Y	
LINTER SYSTEM & SEED CLEANER	?	7	2	N	2515A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK	Y										Y	Y
LLX	BORAX	6	1	Y	2093B	N	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK					Y	Y						Y
LOADOUT	GRAIN	2	1	N	2556E	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1989	DUST	Y											
LPCVD REACTOR	FILM COATING	7	1	Y	2381C	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK	Y											Y

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Other Comments: NR - Not required, Y - Yes, N - No, Blank - No, ? - Additional investigation required.

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Device	Material	Search Case	Number of Tests	Control Device Used	Report ID	Report Information										Report Year	Sample Location	Substance Group											
						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
MAINTENANCE/MIXING & PRODUCTION AREA	CHEMICAL	5	2	N	2399D	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1991	FUGITIVES		NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
MASH/LOAD OUT	GRAIN	2	1	N	2556D	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1989	DUST	Y											
MATERIAL MIXING LINE-MEZZANINE SCRUBBER	METALIC & NON-METALIC COMPOUND	5	1	Y	2399B	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1991	STACK											Y	
MATERIAL MIXING/PREPARATION	SCREEN COATING MATERIAL	5	1	N	2399A	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1991	STACK											Y	
MEA OFF GAS	?	7	1	?	2090A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y		Y	Y		Y						
MILL LOADOUT	FLOUR	2	1	N	2556G	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1989	DUST	Y											
MISC METALS, ALODINE PROCESSING TANK	METAL	7	1	N	2389A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1991	FUGITIVES		NR	NR	NR	NR	NR	NR	NR	NR	NR	Y	
MISC METALS, ANODIZING PROCESS TANK	METAL-STEEL PANELS	6	1	Y	2167A	Y	N	Y	Y	N	Y	Y	N	Y	N	1991	STACK											Y	
MISC METALS, AUTO SHREDDER	METAL	7	1	N	2495A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1994	STACK	Y						Y				Y	Y
MISC METALS, C-72 SALT BATH TANK	ALUMINUM	7	1	N	2526A	Y	Y	Y	N	Y	N	Y	Y	N	N	1992	STACK											Y	Y
MISC METALS, CADMIUM ION VAPOR	?	7	1	N	2385C	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK												Y
MISC METALS, CHEMICAL MILLING FACILITY	METAL	4	2	Y	2394A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK											Y	
MISC METALS, CHROMATE CONVER DIP TANK	METAL	7	1	N	2434A	Y	Y	Y	Y	Y	Y	Y	N	Y	N	1991	STACK											Y	Y
MISC METALS, CONFORMIC COATING	LEAD	7	1	N	2360C	Y	Y	Y	Y	N	Y	Y	N	N	N	1992	STACK						Y	Y					Y
MISC METALS, DELAQUERING	ALUMINUM	6	1	N	2324A	N	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK	Y	Y		Y	Y					Y	Y	
MISC METALS, DEPOSITION OPERATION	METAL	7	1	Y	2390A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y	Y								Y	Y	Y
MISC METALS, ELECTROWINNING	STEEL WOOL	7	1	N	2203C	Y	Y	Y	Y	Y	N	Y	Y	N	N	1991	STACK												Y
MISC METALS, FINISHING SHOP	METAL	7	1	Y	2522A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK											Y	Y
MISC METALS, GOLD STRIPPING TANK	CHEMICAL SOLUTION-CYANIDE	6	1	N	2454A	Y	Y	Y	Y	N	N	Y	N	Y	Y	1991	STACK												Y
MISC METALS, HELOBLADE ANODIZING	METAL	4	1	Y	2388B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK											Y	Y
MISC METALS, HF PICKLING TANK	METAL	4	1	N	2529A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK												Y
MISC METALS, HYDOTELMILL	BERYLLIUM	7	1	Y	2168A	Y	N	Y	Y	N	Y	Y	Y	N	N	1991	STACK												Y
MISC METALS, METAL CLEANING UNIT	METAL	5	1	?	2036A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK												Y
MISC METALS, MILLING & ANODIZING TANK	METALS	6	2	Y	2524A	Y	Y	Y	Y	Y	Y	Y	N	Y	N	1992	STACK											Y	
MISC METALS, PROCESSING	METAL	7	1	Y	2555B	N	N	Y	Y	N	Y	Y	Y	N	N	1991	STACK		Y										
MISC METALS, SHREDDING AND DELACQUERING	ALUMINUM	6	1	Y	2005A	Y	Y	Y	Y	N	Y	Y	N	Y	N	1992	DUCT	Y											
MISC METALS, SHREDDING AND DELAQUERING	ALUMINUM	5	1	Y	2072A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1992	STACK	Y			Y								
MISC METALS, SOLDERING	LEAD	7	1	N	2360B	Y	Y	Y	Y	N	Y	Y	N	N	N	1992	STACK	Y											
MISC METALS, SOLDERING	LEAD	7	1	N	2517E	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK												
MISC METALS, TREATMENT TANK	METAL	4	4	Y	2527A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1991	STACK											Y	Y
MONOHYDRATE CRYSTALLIZER	?	7	1	Y	2083A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y											Y
MONOHYDRATE CRYSTALLIZER	?	7	1	Y	2086A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y											Y
NATURALIZATION TANK	ACID	6	1	Y	2367A	Y	Y	Y	Y	N	Y	Y	N	Y	N	1987	STACK	Y										Y	Y
OVEN, CONNVECTION AIR	BREAD	6	1	?	2191A	N	N	Y	Y	N	N	Y	N	Y	N	1993	STACK												Y
OVEN, CONNVECTION AIR	BREAD	6	1	Y	2187A	Y	N	Y	Y	N	N	Y	N	Y	N	1993	STACK												Y
OVEN, CURING	GLASS	7	2	N	2417A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1993	STACK					Y							Y
OVEN, CURING	NATURAL GAS	6	1	?	2097A	N	Y	Y	Y	N	Y	Y	Y	Y	Y	1992	STACK					Y				Y			Y
OVEN, CURING	RUBBER & ELASTOMERS	7	1	Y	2017A	Y	Y	Y	Y	N	Y	Y	?	N	N	1991	STACK												Y
OVEN, DRYING	RUBBER	7	1	N	2020A	Y	Y	Y	N	Y	Y	Y	N	N	N	1991	STACK			Y									
OVEN, DRYING	RUBBER	7	1	Y	2020B	Y	Y	Y	N	Y	Y	Y	N	N	N	1991	STACK								Y				
OVEN, METAL CLEANING	GAS & GREASE ON METALS	4	1	N	2516A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK				Y								Y
OVEN, METAL CLEANING	METAL	5	1	?	2036B	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK												Y
OVEN, RADIANT TUBE	ELECT. MOTOR WIRES (BURN OFF)	4	1	N	2395A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK	Y		Y	Y	Y	Y	Y				Y	Y
OXIDE & KETTLE SANITARY STACK	?	7	6	?	2313A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK	Y									Y	Y	Y
OXIDIZER	METAL	7	1	N	2451A	Y	Y	Y	N	N	Y	Y	N	Y	N	1989	STACK												Y
PELLET COLLER & LOADOUT	GRAIN	2	1	N	2556B	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1989	DUST	Y											
PHOSPHAR BLOW OFF, FABRICATION	PHOSPHOR	5	1	N	2399C	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1991	STACK											Y	
PLATING AND ETCHING OPERATION	METAL	7	1	Y	2356A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1987	STACK	Y										Y	Y
PLATING OPERATION	METAL	6	2	Y	2456A	Y	Y	Y	N	N	Y	Y	N	Y	Y	1991	STACK	Y										Y	Y
PLATING OPERATION	METAL	7	1	?	2156A	N	N	Y	Y	N	N	Y	Y	N	N	1991	STACK		Y									Y	Y
PLATING OPERATION	METAL	7	5	Y	2330A	Y	Y	Y	Y	N	Y	Y	Y	N	N	1984	STACK	Y											Y

Report Information: DD-Device Description, MD-Method Decription, SD-Sample Data, LD-Lab Data, QD-QA/QC Data, CD-Calibration Data, LD-Location Data, BD-Blank Data, PR-Process Rate, EF-Emission Factor
Substance Group: M-Metals, HI-HCl, PH-PAH, D-Dioxins, F-Formaldehyde, B-Benzene, VC-Vinyl Chloride, PB-PCB, HO-Halgenated Organics, HS-H2S, HC-Hex Chromium, O-Other
Other Comments: NR - Not required, Y - Yes, N - No, Blank - No, ? - Additional investigation required.

ATTACHMENT 2. LISTING OF TEST DOCUMENTATION INFORMATION AND SUBSTANCES QUANTIFIED IN THE FUEL AND AIR EMISSIONS.

Device	Material	Search Case	Number of Tests	Control Device Used	Report ID	Report Information										Report Year	Sample Location	Substance Group											
						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
PLATING OPERATION	METAL	7	1	N	2381A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK												Y
PLATING OPERATION	METAL	7	1	N	2428A	N	Y	Y	Y	Y	N	Y	Y	N	N	1990	STACK	Y										Y	Y
PLATING OPERATION	METAL	7	3	Y	2523A	Y	Y	Y	Y	N	N	Y	N	N	N	1990	STACK	Y	Y			Y							Y
PLATING OPERATION, CHROME	CHROMIC ACID	6	1	Y	2474A	Y	Y	Y	Y	N	Y	Y	N	Y	N	1991	STACK											Y	Y
PLATING OPERATION, CHROME	METAL	4	1	Y	2585A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1989	STACK											Y	Y
PLATING OPERATION, CHROME	METAL	5	1	Y	2332A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1992	STACK											Y	Y
PLATING OPERATION, CHROME	METAL	5	1	?	2420A	Y	Y	Y	Y	N	Y	N	Y	Y	Y	1990	STACK											Y	Y
PLATING OPERATION, CHROME	METAL	6	1	Y	2337A	Y	Y	Y	N	N	Y	Y	N	Y	N	1990	STACK											Y	Y
PLATING OPERATION, CHROME	METAL	6	1	Y	2430A	Y	Y	Y	Y	N	Y	Y	N	Y	Y	1990	STACK											Y	Y
PLATING OPERATION, CHROME	METAL	6	3	Y	2431A	Y	Y	Y	Y	N	Y	Y	N	Y	Y	1990	STACK												Y
PLATING OPERATION, CHROME	METAL	7	1	Y	2344A	N	N	Y	Y	N	N	Y	Y	N	N	1988	STACK											Y	
PLATING OPERATION, CHROME TANK	CHROMIC ACID	4	2	Y	2388A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK											Y	Y
PLATING OPERATION, CHROME TANK	CHROMIC ACID	5	2	Y	2062A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1989	STACK											Y	Y
PLATING OPERATION, CHROME TANK	CHROMIC ACID	5	1	Y	2357A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1993	STACK											Y	Y
PLATING OPERATION, CHROME TANK	CHROMIC ACID	5	3	Y	2418A	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1991	STACK											Y	Y
PLATING OPERATION, CHROME TANK	CHROMIC ACID	6	2	Y	2067A	Y	Y	N	Y	N	N	Y	Y	Y	N	1990	STACK											Y	Y
PLATING OPERATION, CHROME TANK	METAL	4	1	N	2015A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK											Y	
PLATING OPERATION, CHROME TANK	METAL	4	1	Y	2024A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK											Y	
PLATING OPERATION, CHROME TANK	METAL	5	1	Y	2013A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1993	STACK											Y	
PLATING OPERATION, CHROME TANK	METAL	5	1	N	2112A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1991	STACK											Y	Y
PLATING OPERATION, CHROME TANK	METAL	6	1	Y	2132A	Y	Y	Y	Y	Y	N	Y	N	Y	Y	1992	STACK											Y	Y
PLATING OPERATION, CHROME TANK	METAL	6	1	Y	2133A	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	1992	STACK											Y	Y
PLATING OPERATION, CHROME TANK	METAL	6	1	Y	2186A	Y	Y	Y	Y	Y	Y	Y	N	Y	N	1991	STACK											Y	Y
PLATING OPERATION, CHROME TANK	METAL	6	1	Y	2349A	Y	N	Y	Y	N	N	Y	N	Y	N	1988	STACK											Y	Y
PLATING OPERATION, CHROME TANK	METAL	7	2	?	2019A	Y	Y	Y	Y	N	Y	Y	N	N	N	1992	STACK											Y	
PLATING OPERATION, CHROME TANK	METAL	7	1	Y	2056A	N	Y	Y	N	N	Y	Y	N	N	N	1988	STACK											Y	Y
PLATING OPERATION, CHROME TANK	METAL	7	1	?	2063A	N	Y	Y	Y	N	Y	Y	N	N	N	1988	STACK											Y	
PLATING OPERATION, CHROME TANK	METAL	7	1	Y	2181A	N	N	Y	Y	Y	N	Y	N	Y	N	1992	STACK											Y	
PLATING OPERATION, CHROME TANK	METAL	7	1	Y	2189A	N	N	Y	Y	N	N	Y	N	N	N	1989	STACK											Y	
PLATING OPERATION, CHROME TANK	METAL	7	1	Y	2190A	N	Y	N	Y	Y	N	Y	N	Y	N	1992	STACK											Y	
POLYSTYRENE MANUFACTURING	RESIN	6	8	Y	2076A	N	N	Y	Y	Y	N	Y	Y	Y	Y	1992	STACK						Y						Y
POTASH DRYER	POTASH	6	1	Y	2082A	N	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y				Y	Y						Y
PRESS & UNLOADER VENT	FIBERBOARD	2	2	N	2575B	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y		Y		Y	Y						Y
PRETREATMENT OF ALUMINUM PARTS	ALLUMINUM	7	1	N	2315A	Y	Y	Y	Y	Y	Y	Y	N	N	N	1992	STACK											Y	
PRINTING PRESS	INK AND COATINGS	6	1	Y	2038A	Y	Y	Y	Y	N	Y	Y	N	Y	Y	1988	STACK												Y
PROCESS HEATER	REFINERY GAS	4	1	N	2598A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1992	STACK	Y		Y		Y	Y						
PUMP	BORIC ACID	6	1	Y	2177B	Y	N	Y	Y	N	Y	Y	Y	Y	N	1990	FUEL	Y	NR	NR	NR	NR	NR	NR	NR	NR	NR		
PUMP	BORIC ACID	6	1	Y	2177B	Y	N	Y	Y	N	Y	Y	Y	Y	N	1990	STACK			Y		Y							
PYROBAR MILLING AND SCREENING	?	7	1	Y	2088A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y											
REACTOR 2 SCRUBBER	?	7	1	Y	2037C	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK		Y										
RECEIVING	FLOUR	2	1	N	2556F	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1989	DUST	Y											
RECEIVING	GRAIN	2	1	N	2556A	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1989	DUST	Y											
RECEIVING	GRAIN	2	1	N	2556C	Y	Y	Y	Y	Y	N	Y	Y	N	Y	1989	DUST	Y											
RESIN MIX TANK	RESIN	6	1	Y	2059A	Y	Y	Y	N	N	Y	Y	N	Y	N	1989	STACK												Y
ROCKET ENGINES	?	6	12	N	2361A	Y	Y	Y	N	N	N	Y	Y	Y	N	1992	STACK	Y		Y		Y	Y						Y
SAND DRYING FACILITY	DIESEL	3	1	Y	2353A	Y	Y	Y	Y	Y	Y	Y	N	Y	N	1991	STACK			Y		Y							
SECONDARY CRUSHER	LIMESTONE ROCK	6	1	Y	2096A	N	Y	N	N	N	N	N	N	Y	N	1990	STACK	Y										Y	Y
SECONDARY PROCESS TANKS	METAL SOLUTION	7	2	N	2381B	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1990	STACK												Y
SHREDDER	PC BOARDS	7	1	?	2163B	N	N	Y	Y	N	N	Y	Y	N	N	1988	STACK	Y										Y	Y
SLUDGE DRYER	?	7	1	?	2058A	B	Y	Y	N	N	Y	Y	N	N	N	1990	STACK	Y										Y	
SO2 ROASTER	?	7	1	N	2568A	N	Y	Y	Y	Y	Y	Y	Y	N	N	1991	STACK	Y		Y		Y	Y					Y	

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Other Comments: NR - Not required, Y - Yes, N - No, Blank - No, ? - Additional investigation required.

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Device	Material	Search Case	Number of Tests	Control Device Used	Report ID	Report Information										Report Year	Sample Location	Substance Group											
						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
SOLVENT TANKS	?	7	2	N	2443A	N	Y	Y	Y	Y	Y	Y	N	N	N	1990	STACK						Y						Y
SPENT CARBON REGERATOR	?	7	1	?	2081A	N	Y	Y	Y	N	Y	Y	Y	N	N	1990	STACK	Y				Y							
SPRAY DRYER	ZINC SULFATE MONOHYDRATE	6	1	Y	2198A	N	N	Y	Y	N	Y	Y	N	Y	N	1992	STACK	Y											Y
STEAM GENERATOR	CRUDE OIL	2	1	Y	2375B	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1990	STACK	Y		Y									Y
STEAM GENERATOR	CRUDE OIL	2	1	Y	2513A	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y						Y
STEAM GENERATOR	CRUDE OIL	2	1	N	2513E	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK												Y
STEAM GENERATOR	CRUDE OIL	2	1	N	2513F	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK												Y
STEAM GENERATOR	CRUDE OIL	2	1	N	2513L	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK												Y
STEAM GENERATOR	CRUDE OIL	3	1	N	2536A	N	N	Y	Y	Y	N	Y	Y	Y	N	1990	STACK	Y	Y	Y		Y	Y						Y
STEAM GENERATOR	GAS	6	2	N	2415A	Y	Y	Y	Y	Y	Y	Y	N	N	Y	1993	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		
STEAM GENERATOR	GAS	6	2	N	2415A	Y	Y	Y	Y	Y	Y	Y	N	N	Y	1993	STACK												Y
STEAM GENERATOR	NATURAL GAS	5	1	N	2375A	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1990	STACK					Y	Y						Y
STEAM GENERATOR	NATURAL GAS	6	4	N	2407A	Y	Y	N	N	Y	Y	N	N	N	Y	1992	STACK					Y	Y					Y	Y
STEAM GENERATOR	NATURAL GAS	6	1	N	2459A	Y	Y	N	Y	Y	Y	N	N	N	Y	1990	STACK					Y	Y						Y
STEAM GENERATOR	NATURAL GAS/1:1 81:3 TEORING	5	1	N	2513B	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1990	STACK												Y
STEAM GENERATOR	NATURAL/CVR GAS	5	1	N	2405B	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	1992	STACK			Y		Y	Y				Y		Y
STEAM GENERATOR	NATURAL/CVR GAS	5	1	N	2444A	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1991	STACK			Y			Y						Y
STERILIZER	ETHYLENE OXIDE	7	1	?	2188A	N	Y	Y	Y	Y	N	Y	N	N	N	1991	STACK												Y
SULFUR RECOVERY UNIT	?	5	1	N	2599M	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK					Y	Y				Y		Y
SUPO DRYER	POTASH	6	1	Y	2085A	N	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK	Y				Y	Y						Y
THERMAL OXIDIZER	GAS	6	1	N	2502A	N	N	Y	Y	N	Y	Y	Y	Y	N	1992	STACK	Y		Y		Y	Y					Y	Y
THERMAL OXIDIZER	GAS	7	1	Y	2503A	Y	Y	Y	Y	N	Y	Y	N	N	N	1992	STACK			Y		Y							Y
THERMAL OXIDIZER	VAPOR GASOLINA	4	1	N	2446A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	0	STACK						Y						Y
THERMAL OXIDIZER, VAPOR EXTRACTION SYS	SOIL	7	1	Y	2471A	Y	Y	Y	Y	N	Y	N	N	N	N	1993	STACK						Y						Y
TURBINE	?	6	1	N	2383A	N	Y	Y	Y	N	N	Y	Y	Y	N	1991	STACK	Y		Y		Y	Y						
TURBINE	?	7	1	?	2040A	Y	Y	Y	Y	Y	N	Y	Y	N	N	1990	STACK					Y							Y
TURBINE	DIESEL	1	1	N	2525B	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1990	STACK			Y									
TURBINE	DISTILLATE NO.2	1	1	N	2028B	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK			Y		Y	Y						Y
TURBINE	DISTILLATE NO 2	1	1	N	2478A	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	1990	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
TURBINE	DISTILLATE NO 2	1	1	N	2478A	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	1990	STACK	Y	Y	Y	Y	Y	Y					Y	Y
TURBINE	DISTILLATE NO 2	1	1	N	2553A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1989	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		
TURBINE	DISTILLATE NO 2	1	1	N	2553A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1989	STACK			Y		Y							
TURBINE	DISTILLATE NO.2	2	1	N	2554A	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	1990	STACK			Y		Y							
TURBINE	FIELD GAS	4	1	N	2403A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK			Y		Y	Y						
TURBINE	GAS	4	1	Y	2511A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK			Y		Y	Y						
TURBINE	GAS	6	1	N	2416A	N	Y	Y	Y	Y	Y	Y	N	Y	Y	1993	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		
TURBINE	GAS	6	1	N	2416A	N	Y	Y	Y	Y	Y	Y	N	Y	Y	1993	STACK												Y
TURBINE	GAS	6	1	N	2461A	Y	N	N	Y	Y	Y	N	Y	Y	N	1992	STACK												Y
TURBINE	GAS	6	4	N	2472A	N	N	N	Y	N	N	N	Y	Y	N	1992	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
TURBINE	GAS	6	1	N	2519A	Y	Y	Y	Y	N	Y	Y	N	Y	Y	1991	STACK												Y
TURBINE	GAS	7	1	Y	2048A	N	N	N	Y	N	N	N	N	N	N	1991	STACK					Y	Y						Y
TURBINE	LANDFILL GAS	5	1	N	2586A	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK					Y	Y	Y					Y
TURBINE	NATURAL GAS	4	1	N	2028A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1991	STACK					Y	Y						Y
TURBINE	NATURAL GAS	4	1	N	2486A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
TURBINE	NATURAL GAS	4	1	N	2486A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1990	STACK			Y		Y	Y					Y	
TURBINE	NATURAL GAS	4	1	N	2507A	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	1992	STACK					Y	Y						
TURBINE	NATURAL GAS	4	1	N	2593A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1993	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
TURBINE	NATURAL GAS	4	1	N	2593A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1993	STACK			Y		Y	Y						
TURBINE	NATURAL GAS	5	1	?	2102B	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK					Y							
TURBINE	NATURAL GAS	5	1	N	2102D	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1990	STACK					Y							
TURBINE	NATURAL GAS	5	1	N	2405C	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	1992	STACK			Y		Y	Y						Y

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						DD	MD	SD	LD	QD	CD	LD	BD	PR	EF			M	HI	PH	D	F	B	VC	PB	HO	HS	HC	O
TURBINE	NATURAL GAS	5	1	Y	2444B	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1991	STACK			Y			Y						Y
TURBINE	NATURAL GAS	5	1	N	2480A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1992	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
TURBINE	NATURAL GAS	5	1	N	2480A	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1992	STACK			Y		Y	Y						
TURBINE	NATURAL GAS	5	1	N	2554B	Y	Y	Y	Y	N	Y	Y	Y	Y	N	1990	STACK			Y		Y							
TURBINE	NATURAL GAS	6	1	?	2009A	N	Y	Y	Y	N	N	N	Y	Y	Y	1991	STACK					Y	Y						
TURBINE	NATURAL GAS	6	1	?	2130A	N	Y	N	Y	Y	Y	Y	Y	Y	Y	1990	STACK					Y	Y						Y
TURBINE	NATURAL GAS	6	2	Y	2477A	Y	Y	Y	Y	Y	N	Y	N	Y	Y	1991	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
TURBINE	NATURAL GAS	6	2	Y	2477A	Y	Y	Y	Y	Y	N	Y	N	Y	Y	1991	STACK												Y
TURBINE	NATURAL GAS	7	1	Y	2032A	Y	Y	Y	Y	Y	Y	Y	Y	N	N	1989	STACK					Y							Y
TURBINE	NATURAL GAS	7	1	Y	2033A	N	Y	N	Y	Y	N	N	Y	Y	N	1989	STACK												Y
TURBINE	NATURAL GAS	7	1	N	2142B	Y	Y	Y	Y	N	N	Y	Y	N	N	1992	STACK	Y		Y		Y	Y					Y	Y
TURBINE	REFINERY GAS	5	1	N	2599I	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y					Y	
TURBINE	REFINERY GAS	5	1	N	2599J	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y					Y	
TURBINE	REFINERY GAS	5	1	N	2599K	Y	Y	Y	Y	N	N	Y	Y	Y	Y	1990	STACK	Y		Y		Y	Y					Y	
WASTE WATER	H2O	7	1	N	2466C	Y	Y	N	Y	Y	Y	N	Y	N	N	1990	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		Y
WATER TREATMENT FACILITY	SEWER WATER	2	6	?	2101C	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1993	FUEL		NR	NR	NR	NR	NR	NR	NR	NR	NR		
WATER TREATMENT FACILITY	SEWER WATER	2	6	?	2101C	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	1993	STACK						Y			Y			

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ATTACHMENT 3
METHOD VALIDATION FORMS AND CALCULATION SPREADSHEETS

Description of Forms

Each method validation procedure includes a description of the method, quality assurance/control checks, blank correction procedure if applicable, and other comments. The method description is used to check the procedures followed in the source test report. The quality assurance/control checks are provided in a table. This table includes a series of questions. If the answer to a question is yes, then the user circles the code which includes the character "a". For example, if a swirl check was not conducted for Method 12, the code sc1a would be circled. If the test report does not provide enough information to answer the question, then the user circles the code which includes the character "b". For example, if the test report did not indicate the variation in probe diameter for Method 12, the code nz2b is circled. For some checks, more than one "a" code is provided. In these instances, each code refers to a different run. For example, if the Method 12 leak check was greater than 0.02 cfm for the second run, the second lc3a code is circled. It should be noted that all questions are phrased to indicate failures of key method criteria. Therefore, any mark on the table indicates either the information in the report was missing or a key parameter was not satisfied. If the table contains no marks, the test was conducted within guidelines of the method. All of the circled codes are transferred to a database. In addition to verifying key method parameters, calculation checks are conducted for each isokinetic method using the spreadsheets provided in this attachment. One calculation check is conducted per report per method per substance. For example, if a report presented results from methods 428 and 436, two calculation checks are conducted.

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 11 - June, 1983
Substance: Hydrogen Sulfide

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of hydrogen sulfide content of fuel gas streams at petroleum refineries. Hydrogen sulfide (H2S) is collected from a source in a series of midget impingers and absorbed in pH 3.0 cadmium sulfate (CdSO4) solution to form cadmium sulfide (CdS). The latter compound is then measured iodometrically.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.
Other Comments

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Device ID:

SAMPLING EQUIPMENT				
** Field Dry Gas Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
SAMPLING PROCEDURES				
**Sample Time*				
NR 1.) Runs < 10 minutes	sd1a	sd1a	sd1a	R
**Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Indication of leaks?	ic2a		lc2b	M
**Reagent Blank*				
1.) Not conducted daily?	fb1a		fb1b	M
**Impinger Solution*				
1.) Hydrogen peroxide (H2O2) not used?	im1a		im1b	M
2.) Cadmium sulfate (CdS) not used?	im2a		im2b	M
ANALYSIS				
**Method*				
1.) 0.01N Sodium thiosulfate solution not used for titration?	mt1a		mt1b	M
2.) Iodine solution not used?	mt2a		mt2b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 12 - March, 1986
Substance: Inorganic Lead

Report ID Number: ____________
Reviewer: ____________
Review Date: ____________

Method Description and Applicability

This method is applicable to the determination of inorganic lead emissions from stationary sources. Particulate and gaseous Pb emissions are withdrawn isokinetically and collected on a filter and/or in dilute nitric acid. The samples are then digested and analyzed by atomic absorption spectrometry using an air acetylene flame.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s. In addition to completing the checklist please answer the following questions:

1.) What digestion method was used? ____________
2.) Enter the digestion date(s). ____________
3.) Number of Impingers: 0.1 HNO3 (2) __ Empty (1)__ Silica Gel (1) __

Blank Procedure

Please be sure that the blank data was applied and considered correctly. For this particular method, the absorbance reading from the sample needs to be corrected for the absorbance readings from the filter and nitric blanks. There is no criteria for the blank levels, they just need to be performed and corrected for in the sample values.

Other Comments

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Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				M
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* *Field Reagent Blank*				
1.) Not conducted for two filters and 0.1N HNO3?	rb1a		rb1b	M
2.) Not used to correct samples?	rb2a		rb2b	M
ANALYSIS				
* *Method*				
1.) Atomic absorption spectrometry (AAS) not used?	mt1a		mt1b	M
2.) Not conducted in triplicate?	mt2a		mt2b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

CALCULATION CHECK FOR CARB METHOD 12

Device ID:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER RECTANGULAR STACK, LENGTH WIDTH	ds L W	inches inches inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	dscf	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	scf	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28[100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF LEAD IS SAMPLE TRAIN	Mpb	mg	
CALCULATED DATA-OVERALL			
CONCENTRATION OF LEAD MCpb = (35.31*Mpb)/Vmstd	MCpb	mg/dscm	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 15 - June, 1983
Substance: Hydrogen Sulfide

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the measurement of hydrogen sulfide, carbonyl sulfide, and carbon disulfide from tail gas control units of sulfur recovery plants. A gas sample is extracted from the emission source and diluted with clean dry air. An aliquot of the sample is then analyzed by gas chromatographic separation and flame photometric detection (GC/FPD).

Quality Assurance/Quality Control Checks

Due to the difficulty in performing on-site GC testing, CARB has often allowed contractors to collect sample in Tedlar Bags and submit the bags to the laboratory for analysis. If this was done on the source test, prior approval from CARB must be obtained. Along with approval, CARB adds additional quality assurance checks and samples to ensure accurate measurements. Determine if samples were collected with a bag sample or if on-site GC analysis was performed. If the sample was collected using a bag, please answer the following questions.

1) Was this modification discussed in the text? YES NO
2) Did the discussion include prior approval and additional requirements by CARB?YES NO
3) Were the additional requirements completed and did they pass criteria? YES NO

If the bag collection technique was used, some of the parameters listed in Table 1 might not be applicable. **The Table 1 applies strictly to the method, which specifies on-site GC analysis.** Please complete the detailed checklist provided in the attached Table . Please complete the detailed checklist provided in attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Other Comments

Device ID:

This table applies only to on-site GC analysis.

SAMPLING PROCEDURES			
** Leak Check*			
1.) Not conducted?	lc1a	lc1b	M
2.) Indication of leaks?	lc2a	lc2b	M
**Sample line loss*			
1.) Not conducted for post-test?	sl1a	sl1b	M
2.) Sample not corrrected for <20% loss?	sl2a	sl2b	M
3.) Sample corrected for >20% loss?	sl3a	sl3b	M
ANALYSIS			
** Method*			
1.) GC/FPD not used?	mt1a	mt1b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 101A - March, 1986
Substance: Mercury

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of mercury emissions from stationary sources. Particulate and gaseous mercury emissions are withdrawn isokinetically from the source and collected in acidic potassium permanganate (KMnO4) solution. The Hg collected (in the mercuric form) is reduced to elemental Hg which is then aerated from the solution into an optical cell and measured by atomic absorption spectrometry.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "a"s. In addition to completing the checklist please answer the following questions:

1.) What digestion method was used? ______________________________
2.) Enter the digestion date(s). ______________________________
3.) Number of Impingers: 50 ml 4% KMnO4 (1) __ 100 ml 4% KMnO4 (1)__
Empty (1 optional) __Silica Gel (1) __

Blank Procedure

Please be sure that the blank data was applied and considered correctly. For this particular method, the average peak height (or peak area) of the blank should have been subtracted from the average peak height of the aliquot standards.

Other Comments

Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				M
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* *Field Reagent Blank*				
1.) Not conducted once per test?	rb1a		rb1b	M
2.) Not used to correct sample?	rb2a		rb2b	M
* *Temperature*				
1.) Filter temperature not between 106 and 134 degrees?	tm1a		tm1b	M
* *Flow Rate*				
1.) Flow rate not reported?	fr1a			M
2.) Flow rate > 28 liter per minute (1 cfm)?	fr2a	fr2a	fr2a	R
ANALYSIS				
* *Method*				
1.) Atomic absorption spectrometry (AAS) not used?	mt1a		mt1b	M
2.) Combined analysis used ?	mt2a		mt2b	M

M-Method a-True
R-Run b-Not reported
S-Substance

CALCULATION CHECK FOR CARB METHOD 101A

Device ID:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER	ds	inches	
RECTANGULAR STACK, LENGTH	L	inches	
WIDTH	W	inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	0
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28{100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF MERCURY IN SAMPLE TRAIN	Mhg	mg	
CALCULATED DATA-OVERALL			
CONCENTRATION OF MERCURY MChg = (35.31*Mhg)/Vmstd	MChg	mg/dscm	#DIV/0!
ARSENIC MASS EMISSION RATE Ehg = ((Qsd*Mhg)/Vmstd)*1.32e-4	Ehg	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 104 - March, 1986
Substance: Beryllium

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of beryllium emissions from stationary sources. Beryllium emissions are withdrawn isokinetically and the collected sample is digested in and acid solution and analyzed by atomic absorption spectrometry.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "a"s. In addition to completing the checklist please answer the following questions:

1.) What digestion method was used? ______________________________
2.) Enter the digestion date(s). ______________________________
3.) Number of Impingers: H2O (2) __ Empty (1)__ Silica Gel (1) __

Blank Procedure

Please be sure that the blank data was applied and considered correctly. For this particular method, the total amount of beryllium detected in the sample is corrected for the total amount of beryllium detected in the acetone and water blanks. There is no criteria for the blank levels, they just need to be performed and corrected for the sample values.

Other Comments

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Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				M
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* ***Field Reagent Blank***				
1.) Not conducted for acetone?	rb1a		rb1b	M
2.) Not used to correct sample ?	rb2a		rb2b	M
* *Flow Rate*				
1.) Flow rate not reported?	fr1a			M
2.) Flow rate < 0.5 or > 1 cfm?	fr2a	fr2a	fr2a	R
ANALYSIS				
* *Method*				
1.) Atomic absorption spectrometry (AAS) not used?	mt1a		mt1b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

CALCULATION CHECK FOR CARB METHOD 104

Device ID:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER	ds	inches	
RECTANGULAR STACK, LENGTH	L	inches	
WIDTH	W	inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	0
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28{100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF BERYLLIUM IN SAMPLE TRAIN	Mass	mg	
TOTAL MASS OF BERYLLIUM IN ACETONE REAGENT BLAN	Mbeac	mg	
TOTAL MASS OF BERYLLIUM IN WATER REAGENT BLANK	Mbeh2o	mg	
CALCULATED DATA-OVERALL			
CORRECTED TOTAL AMOUNT OF BERYLLIUM Mbe = Mass - Mbeac - Mbeh2o	Mbe	mg	0.000
CONCENTRATION OF BERYLLIUM MCbe = (35.31*Mbe)/Vmstd	MCbe	mg/dscm	#DIV/0!
ARSENIC MASS EMISSION RATE Ebe = ((Qsd*Mbe)/Vmstd)*1.32e-4	Ebe	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 106 - June, 1983
Substance: Vinyl Chloride

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the measurement of vinyl chloride in stack gases. An integrated bag sample of stack gas is subjected to chromatographic analysis, using a flame ionization detector.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table . If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Other Comments

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Device ID:

ANALYSIS			
* *Method*			
1.) GC/FID not used?	mt1a	mt1b	M
**Analysis Date*			
1.) Not within 72 hours from collection, all samples?	ad1a	ad1b	M
* *3-Point Calibration Curve*			
1.) Not conducted daily or before and after test?	pc1a	pc1b	M
2.) Percent difference not reported?	pc2a		M
3.) Percent difference > 5%?	pc3a	pc3b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 410A/B - March, 1986
Substance: Benzene

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is designed to provide sampling and analysis techniques for measurement of benzene emissions from stationary sources. CARB Method 410A is used for low concentrations (1.0 to 1000 ppb) and CARB Method 410B is used for high concentrations (60 ppb to 1 %). A Tedlar bag is used to collect a sample and the sample is subjected to gas chromatographic with a photo ionization detector for low concentrations and a flame ionization detector for high concentrations.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table . If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Other Comments

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Device ID:

SAMPLING EQUIPMENT			
* *Tedlar Bag Contamination Checks*			
1.) Not conducted for all bags?	tb1a	tb1b	M
SAMPLE COLLECTION			
* *Leak Check*			
1.) Not conducted before and after each test?	lc1a	lc1b	M
ANALYSIS			
* *Method*			
1.) FID not used for high concentrations (60ppb to .01) used?	mt1a	mt1b	M
2.) PID not used for low concentratons (1.0 to 1000 ppb)?	mt2a	mt2b	M
**Analysis Date*			
1.) Not within 96 hours from collection, each sample?	ad1a	ad1b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 421 - January, 1987
Substance: Hydrochloric Acid

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of hydrochloric acid emissions from stationary sources. Particulate and gaseous chloride emissions are withdrawn isokinetically from the source through a impinger-filter train where the gaseous chloride is absorbed and ionized in a basic buffer solution. Hydrochloric acid is assumed to be the principle compounds detected when testing combustion sources. ARB Method 421 calls for isokinetic sampling, absorption of HCL in impingers filled with ion chormatographic eluent solution, and analysis of samples by ion chormatography using that same eluent solution.

Quality Assurance/Quality Control Checks

Before completing the detailed QA checklist, please answer the following questions:

1) Is stack temperature above 250F? Yes No (answer Q #2)
2) If No, Is the sampling isokinetic? Yes No
3) If No, **STOP** evaluating this method.
4) Number of Impingers: $NaHCO_3/Na_2CO_3$ (2)__ Empty (1)__Silica Gel (1)__

Please complete the detailed checklist provided in the attached Table . If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Blank Procedure -

Please be sure that the blank data is considered correctly. For this particular method, the peak resulting from the reagent blank **should have been subtracted** off of the sample peaks on the chromatograph.

Other Comments

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Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				M
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* ***Field Reagent Blank***				
1.) Not conducted once per test?	fb1a		fb1b	M
2.) Not used to correct sample peaks on the chromatograph?	fb2a		fb2b	M
* *Impinger Solution*				
1.) Biocarbonate (NaHCO3) not used ?	im1a		im1b	M
2.) Sodium carbonate (Na2CO3) not used ?	im2a		im2b	M
3.) Water not used ?	im3a		im3b	M
ANALYSIS				
* *Method*				
1.) Ion chromatography not used?	mt1a		mt1b	M
* ***Lab Spike***				
1) Not conducted 10% of all samples?	ls1a		ls1b	M
* ***Duplicate***				
1.) Not conducted for each sample?	du1a		du1b	M
2.) Percent difference not reported?	du2a			M
3.) Percent difference > 5%?				
NR Hydrogen Chloride (HCl)	du3a	du3a	du3a	S

M-Method a-True
R-Run b-Not reported
S-Substance

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 421 - December, 1991
Substance: Hydrogen Chloride

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of gaseous chloride emissions from stationary sources. Gaseous chloride is absorbed and ionized in a basic buffer solution and volatile chloride aerosol mist are also detected. Hydrochloric acid is assumed to be the principle compounds detected when testing combustion sources. ARB Method 421 calls for isokinetic sampling, absorption of HCL in impingers filled with ion chormatographic eluent solution, and analysis of samples by ion chormatography using that same eluent solution.

Quality Assurance/Quality Control Checks

Before completing the detailed QA checklist, please answer the following questions:

1) Is stack temperature above 250F? Yes No (answer Q #2)
2) If No, Is the sampling isokinetic? Yes No
3) If No, **STOP** evaluating this method.
4) Number of Impingers: NaHCO3/Na2CO3 (2)__ Empty (1)__Silica Gel (1)__

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Blank Procedure

Please be sure that the blank data is considered correctly. For this particular method, the sample value is not corrected with any of the blank values, although there is a blank level criteria. Make sure the measured blank levels satisfy the method criteria.

Other Comments

Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				M
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Sample Runs*				
1.) Runs<3?	sr1a		sr1b	M
* *Sample Time*				
1.) Not conducted per run?	sd1a		sd1a	M
NR 2.) Runs <60 minutes?	sd2a	sd2a	sd2a	R
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a		lc2b	M
3.) Pre-test >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* ***Field Blank***				
1.) Not conducted once per test?	fb1a		fb1b	M
2.) Used to correct sample peaks on the chromatograph?	fb2a		fb2b	M
3.) Contamination >20% of any run ?				
NR HCl	fb3a	fb3a	fb3a	S
* *Impinger Solution*				
1.) Biocarbonate (NaHCO3) not used ?	im1a		im1b	M
2.) Sodium carbonate (Na2CO3) not used ?	im2a		im2b	M
3.) Water not used ?	im3a		im3b	M
ANALYSIS				
* *Method*				
1.) Ion chromatography not used?	mt1a		mt1b	M
* ***Lab Spike***				
1.) Not conducted prior, daily, and after every 40 samples?	ls1a		ls1b	M
2.) Percent recovery not reported?	ls2a			M
3.) Percent recovery <95% or > 105%				
Hydrogen Chloride (HCl)	ls3a	ls3a	ls3a	S
* ***Duplicate***				
1.) Not conducted for 10% of all samples?	du1a		du1b	M
2.) Percent difference not reported?	du2a			M
3.) Percent difference > 5% STD?				
Hydrogen Chloride (HCl)	du3a	du3a	du3a	R

M-Method	a-True
R-Run	b-not reported
S-Substance	

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 422-January, 1987
Substance: Volatile Halogenated Organic Compounds

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is designed to provide sampling and analysis techniques for measurement of halogenated organics in emissions from stationary sources. A Tedlar bag is used to collect a sample and the sample is subjected to gas chromatographic analysis for quantitation.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a
"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Other Comments

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____

Device ID:

SAMPLING EQUIPMENT			
** Tedlar Bag Contamination Checks*			
1.) Not conducted for all bags?	tb1a	tb1b	M
2.) Levels not reported ?	tb2a	tb2b	M
SAMPLE Collection			
** Leak Check*			
1.) Not conducted before and after each test?	lc1a	lc1b	M
2.) Leaks > 5% of sample rate ?	lc2a	lc2b	M
ANALYSIS			
** Method*			
1.) GC not used ?	mt1a	mt1b	M
**Analysis Date*			
1.) Not within 24 hours from collection, each sample?	ad1a	ad1b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 422 - December, 1991
Substance: Volatile Halogenated Organic Compounds

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is designed to provide sampling and analysis techniques for measurement of volatile organic compounds in emissions from stationary sources. This method cannot be used to determine compounds that (1) are polymetric (high molecular weight) (2) can polymerize before analysis, or (3) have very low vapor pressures at stack or instrument conditions. A Tedlar bag is used to collect a sample and the sample is subjected to gas chromatographic analysis for quantitation.

Quality Assurance/Quality Control Checks

Some preliminary determinations and options are available to the source tester based on the stack conditions. The following questions indicate those options.

1) Was the sample diluted to avoid condensation? Yes No
2) Were impingers used? Yes No
3) Was an on-site GC used for 1,3-Butadiene? Yes No

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "a"s.

Other Comments

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Device ID: 422DEC91.XLS

SAMPLING EQUIPMENT							
** Tedlar Bag Contamination Checks*							
			1.) Not conducted for all bags?	tb1a		tb1b	M
			2.) Levels not reported ?	tb2a		tb2b	M
SAMPLE COLLECTION							
** Field Blank*							
			1.) Not conducted once per test?	fb1a		fb1b	M
			2.) Used to correct sample?	fb2a		fb2b	M
			3.) Blank > 20% of the stack samples?				
	NA	NR	Dichloromethane	fb3a	fb3a	fb3a	S
	NA	NR	Chloroform	fb3a	fb3a	fb3a	S
	NA	NR	1,1,1-trichloroethane	fb3a	fb3a	fb3a	S
	NA	NR	Carbon tetrachloride	fb3a	fb3a	fb3a	S
	NA	NR	1,2-dichloroethane	fb3a	fb3a	fb3a	S
	NA	NR	Trichloroethene	fb3a	fb3a	fb3a	S
	NA	NR	1,2-dibromoethane	fb3a	fb3a	fb3a	S
	NA	NR	Tetrachloroethene	fb3a	fb3a	fb3a	S
	NA	NR	1,3-butadiene	fb3a	fb3a	fb3a	S
** Leak Check*							
			1.) Not conducted before and after each test?	lc1a		lc1b	M
			2.) Leaks > 5% of sample rate ?	lc2a		lc2b	M
** Field Spike*							
			1.) Not collected once per source?	fs1a		fs1b	M
ANALYSIS							
** Method*							
			1.) GC not used ?	mt1a		mt1b	M
**Analysis Date*							
			1) Not within 72 hours from collection, each sample?	ad1a		ad1b	M
** Duplicates*							
			1.) Not conducted once per sample?	du1a		du1b	M
			2.) Values not reported?	du2a			M
			3.) Values > 3 X RSD ?				
		NA	Dichloromethane	du3a		du3b	S
		NA	Chloroform	du3a		du3b	S
		NA	1,1,1-trichloroethane	du3a		du3b	S
		NA	Carbon tetrachloride	du3a		du3b	S
		NA	1,2-dichloroethane	du3a		du3b	S
		NA	Trichloroethene	du3a		du3b	S
		NA	1,2-dibromoethane	du3a		du3b	S
		NA	Tetrachloroethene	du3a		du3b	S
		NA	1,3-butadiene	du3a		du3b	S

M-Method	a-True
R-Run	b-Not reported
S-Substance	

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 423 - January, 1987
Substance: Inorganic Arsenic

Report ID Number: ______________
Reviewer: ______________
Review Date: ______________

Method Description and Applicability

This method is applicable to the determination of inorganic arsenic emissions from stationary sources. Particulate and gaseous arsenic emissions are withdrawn isokinetically and collected on a filter and in water. The samples are then analyzed by atomic absorption spectrometry.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "a"s. In addition to completing the checklist please answer the following questions:

1.) What digestion method was used? ______________________

2.) Enter the digestion date(s). ______________________

3.) Number of Impingers: H2O (2) __ Empty (1)__ Silica Gel (1) __

Blank Procedure

Please be sure that the blank data was applied and considered correctly. For this particular method, the total amount of arsenic detected in the sample is corrected for the total amount of arsenic detected in the filter, NaOH, and water blanks. There is no criteria for the blank levels, they just need to be performed and corrected for the sample values.

Other Comments

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Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				M
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* *Field Reagent Blank*				
1.) Not conducted for two filters and 0.1N NaOH?	rb1a		rb1b	M
2.) Not used to correct sample ?	rb2a		rb2b	M
* *Temperature*				
1.) Filter temperature not between 107 and 135 degrees?	tm1a		tm1b	M
* *Flow Rate*				
1.) Flow rate not reported?	fr1a			M
2.) Flow rate > 28 liter per minute (1 cfm)?	fr2a	fr2a	fr2a	R
ANALYSIS				
* Method				
1.) Atomic absorption spectrometry (AAS) not used?	mt1a		mt1b	M
2.) Combined analysis used ?	mt2a		mt2b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

CALCULATION CHECK FOR CARB METHOD 423

Device ID:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER	ds	inches	
RECTANGULAR STACK, LENGTH	L	inches	
WIDTH	W	inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28{100-(Co2,m)-(Cco2,m)}	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF ARSENIC IN SAMPLE TRAIN	Mass	mg	
TOTAL MASS OF ARSENIC IN FILTER REAGENT BLANKS	Masf	mg	
TOTAL MASS OF ARSENIC IN 0.1N NaOH REAGENT BLANK	Masoh	mg	
TOTAL MASS OF ARSENIC IN WATER REAGENT BLANK	Mash2o	mg	
CALCULATED DATA-OVERALL			
CORRECTED TOTAL AMOUNT OF ARSENIC Mas = Mass - Masf - Masoh - Mash2o	Mas	mg	0.000
CONCENTRATION OF ARSENIC MCas = (35.31*Mas)/Vmstd	MCas	mg/dscm	#DIV/0!
ARSENIC MASS EMISSION RATE Eas = ((Qsd*Mas)/Vmstd)*1.32e-4	Eas	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 424 - January, 1987
Substance: Inorganic Cadmium

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of inorganic cadmium emissions from stationary sources. Particulate and gaseous cadmium emissions are withdrawn isokinetically and collected on a filter and in a solution of nitric acid. The samples are then analyzed by atomic absorption spectrometry (direct aspiration method).

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "a"s. In addition to completing the checklist please answer the following questions:

1.) What digestion method was used? ____________________________
2.) Enter the digestion date(s). ____________________________
3.) Number of Impingers: 0.1N HNO_3 (2) __ Empty (1)__ Silica Gel (1) __

Blank Procedure

Please be sure that the blank data was applied and considered correctly. For this particular method, the absorbance reading from the sample needs to be corrected for the absorbance readings of the filter and nitric blanks. There is no criteria for the blank levels, they just need to be performed and corrected for the sample values.

Other Comments

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424JAN87.XLS

Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				M
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* *Field Reagent Blank*				
1.) Not conducted for two filters and 0.1N HNO3?	rb1a		rb1b	M
2.) Not used to correct sample ?	rb2a		rb2b	M
ANALYSIS				
* *Method*				
1.) Atomic absorption spectrometry (AAS) not used?	mt1a		mt1b	M
2.) Not conducted in triplicate ?	mt2a		mt2b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

CALCULATION CHECK FOR CARB METHOD 424

Device ID:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER	ds	inches	
RECTANGULAR STACK, LENGTH	L	inches	
WIDTH	W	inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	0
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28{100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF CADMIUM IN SAMPLE TRAIN	Mcd	mg	
CALCULATED DATA-OVERALL			
CONCENTRATION OF CADMIUM MCcd = (35.31*Mcd)/Vmstd	MCcd	mg/dscm	#DIV/0!
CADMIUM MASS EMISSION RATE Ecd = ((Qsd*Mcd)/Vmstd)*1.32e-4	Ecd	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 425 - January, 1987
Substance: Total and Hexavalent Chromium

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of total chromium and hexavalent chromium emissions from stationary sources. Particulate emissions are withdrawn isokinetically and collected on a filter and in DI water. The components of the collected sample are then split and analyzed. Analysis for hexavalent chromium is performed by a diphenylcarbazide colorimetric method after alkaline extraction. Total chromium is analyzed by a graphite furnace technique after acid digestion and dissolution.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "a"s.

Other Comments

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____

____

____

425JAN87.XLS

Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* *Reagent Blank*				
1.) Not conducted once per sample batch?	rb1a		rb1b	M
2.) Used to correct sample?	rb2a		rb2b	M
ANALYSIS (Hexavalent Chromium)				
* *Matrix Spike*				
1.) Not conducted per test?	ms1a		ms1b	M
2.) Percent recovery not reported?	ms2a			M
3.) Was percent recovery > 10%?				
Hexavalent Chromium	ms3a	ms3a	ms3a	S
ANALYSIS (Total Chromium)				
* *Duplicates*				
1.) Not conducted for every 10 samples?	du1a		du1b	M
* *Matrix Spike*				
1.) Not conducted daily?	ms4a		ms4b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

CALCULATION CHECK FOR CARB METHOD 425-Jan 87

Device ID:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER	ds	inches	
RECTANGULAR STACK, LENGTH	L	inches	
WIDTH	W	inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28[100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp [sqrt[(dP*Ts) /(Ps*Mw)]]	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL HEXAVELENT CHROMIUM IN PROBE	Mpcr6	ug	
TOTAL HEXAVELENT CHROMIUM IN FILTER	Mfcr6	ug	
TOTAL HEXAVELENT CHROMIUM IN IMPINGERS	Micr6	ug	
TOTAL CHROMIUM IN PROBE	Mpcr	ug	
TOTAL CHROMIUM IN FILTER	Mfcr	ug	
TOTAL CHROMIUM IN IMPINGERS	Micr	ug	
CALCULATED DATA-OVERALL			
TOTAL HEXAVALENT CHROMIUM Mcr6 = Mpcr6 + Mfcr6 + Micr6	Mcr6	ug	0.000
TOTAL CHROMIUM Mcr = Mpcr + Mfcr + Micr	Mcr	ug	0.000
CONCENTRATION OF HEXAVELENT CHROMIUM Ccr6 = (35.31*Mcr6)/Vmstd	Ccr6	ug/dscm	#DIV/0!
CONCENTRATION OF TOTAL CHROMIUM Ccr = (35.31*Mcr)/Vmstd	Ccr	ug/dscm	#DIV/0!
HEXAVALENT CHROMIUM MASS EMISSION RATE Ecr6 = ((Qsd*Mcr6)/Vmstd)*1.32e-7	Ecr6	lb/hr	#DIV/0!
TOTAL CHROMIUM MASS EMISSION RATE Ecr = ((Qsd*Mcr)/Vmstd)*1.32e-7	Ecr	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 425 - September, 1990
Substance: Total and Hexavalent Chromium

Report ID Number: ____________________
Reviewer: ____________________
Review Date: ____________________

Method Description and Applicability

This method is applicable to the determination of total chromium and hexavalent chromium emissions from stationary sources. Particulate emissions are withdrawn isokinetically and collected in an alkaline medium. The components of the collected sample are then split and analyzed. Analysis for hexavalent chromium is performed by a diphenylcarbazide colorimetric method after alkaline extraction. Total chromium is analyzed by a graphite furnace technique after acid digestion and dissolution.

Quality Assurance/Quality Control Checks

Before preceding with the validation checklist, the method allows alternative procedures and analysis to be performed. The following questions will indicate which alternatives the contractor chose in order to perform the source test (circle correct answers).

1) Was total chromium quantified with this method? Yes No (if no, disregard all questions involving total chrome)
2) How was the hexavalent chromium analyzed? Colorimetric Ion Chromatography
3) How was the total chromium analyzed? Graphite Furnace Flame AAS
4) Were impinger catches analyzed combined or separate? Combined Separate
5) Which impinger catch was used to extract filter? Imp #1 Imp #2

Please complete the detailed checklist provided in the attached Tabl. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Blank Procedure

Please be sure that the blank data was applied and considered correctly. The absorbance reading from the reagent blank should be subtracted from the absorbance reading obtained from the field sample.

Other Comments

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Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* *Probe Proof*				
1.) Not conducted per prob?	pp1a		pp1b	M
2.) Value not reported ?	pp2a			M
3.) Total chrome > DL ?	pp3a	pp3a	pp3a	S
* *Reagent Blank*				
1.) Not conducted one per sample batch?	rb1a		rb1b	M
2.) Not used to correct sample?	rb2a		rb2b	M
ANALYSIS (Hexavalent Chromium)				
* *Matrix Spi[illegible]*				
1.) Not conducted per test?	ms1a		ms1b	M
2.) Percent recovery not reported?	ms2a			M
3.) Percent recovery > 10%?				
Hexavalent Chromium	ms3a	ms3a	ms3a	S
ANALYSIS (Total Chromium)				
* *Duplicates*				
1.) Not conducted for every 10 samples?	du1a		du1b	M
* *Spikes*				
1.) Not conducted daily?	ms4a		ms4b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

CALCULATION CHECK FOR CARB METHOD 425-Sep 90

Device ID:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER RECTANGULAR STACK, LENGTH WIDTH	ds L W	inches inches inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28{100-(Co2,m)-(Cco2,m)}	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF HEXAVELENT CHROMIUM IN SAMPLE TRAIN	Mcr6	ug	
TOTAL MASS OF TOTAL CHROMIUM IN SAMPLE TRAIN	Mcr	ug	
CALCULATED DATA-OVERALL			
CONCENTRATION OF HEXAVELENT CHROMIUM Ccr6 = (35.31*Mcr6)/Vmstd	Ccr6	ug/dscm	#DIV/0!
CONCENTRATION OF TOTAL CHROMIUM Ccr = (35.31*Mcr)/Vmstd	Ccr	ug/dscm	#DIV/0!
HEXAVALENT CHROMIUM MASS EMISSION RATE Ecr6 = ((Qsd*Mcr6)/Vmstd)*1.32e-7	Ecr6	lb/hr	#DIV/0!
TOTAL CHROMIUM MASS EMISSION RATE Ecr = ((Qsd*Mcr)/Vmstd)*1.32e-7	Ecr	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 428-March, 1988
Substance: PCDD/PCDF

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of Polychlorinated Dibenzo-p-dioxin (PCDD) and Polychlorinated Dibenzofuran (PCDF) emissions from stationary sources. Particulate and gaseous phase PCDD, and PCDF are withdrawn isokinetically from the stack and collected on a filter, XAD-2 resin, or in impingers. The contents of the sample train are then extracted. Internal standards are added and the extracts are separated by high resolution gas chromatography (HRGS) and quantified by low resolution mass spectrometry (LRMS) or high resolution mass spectrometry (HRMS). Only total amounts of the analytes can be determined, partitioning of the analytes cannot be determined.

Quality Assurance/Quality Control Checks

Before completing the detailed QA checklist, please answer the following questions:

1) Sampling run IDs ---------------- (428) Laboratory sample IDs ---------------- (428)
---------------- (429) ---------------- (429)

2) Was the sample run ID the same for the Method 428 and 429 tests? Yes No

3) Was the Laboratory sample ID the same for Method 428 and 429 samples? Yes No

If the answer to either 2 or 3 is "Yes", check the source test report for further confirmation that Method 428 and 429 were modified for analysis of single sample.

4) Was a single sampling train used for both methods? Yes No

5) If the answer to #4 is "Yes"; **STOP**, do not evaluate these method.

Please complete the detailed checklist provided in the attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Other Comments

Device ID:

		SAMPLE LOCATION				
		** Swirl Check*				
		1.) Not conducted?	sc1a		sc1b	M
		2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
		** Stack Size*				
		1.) Enter stack diameter (inches).				
		2.) Stack diameter < 12 inch ? or	st2a		st2b	M
		3.) Area <113 inch squared?	st3a		st3b	M
		** Number of Sample Points*				
		1.) Enter total number of points.				M
		2.) Method 1 not used?	ns2a		ns2b	M
		SAMPLING EQUIPMENT				
		** Nozzle Size Check*				
		1.) Not conducted prior to test?	nz1a		nz1b	M
		2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
		** Field Gas Dry Meter*				
		1.) Not checked pre- and post-test?	gm1a		gm1b	M
		2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
		** Pitot Tube*				
		1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
		SAMPLING PROCEDURES				
		** Leak Check*				
		1.) Not conducted?	lc1a		lc1b	M
		2.) Values not reported?	lc2a			M
		3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
		4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
		** Sample Runs*				
		1) Runs<3?	sr1a		sr1b	M
		** Sample Time*				
	NR	1.) Runs < 3 hours?	sd1a	sd1a	sd1a	R
		** Isokinetic Variation*				
		1.) Sample not taken isokinetically?	is1a		is1b	M
		2.) Isokinetic variation not reported?	is2a			M
		3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
		** Field Blank*				
		1.) Not conducted once per test?	fb1a		fb1b	M
		2.) Used to correct sample?	fb2a		fb2b	M
		**Surrogate Standards*				
		1.) Not conducted once per test?	ss1a		ss1b	M
		2.) Spiked <1 run?	ss2a		ss2b	M
		3.) Percent recovery <60 or >140%?				
NA	NR	37Cl-2,3,7,8-TCDD	ss3a	ss3a	ss3a	R
NA	NR	13C-1,2,3,4,6,7,8-HpCDF	ss4a	ss4a	ss4a	R

M-Method a-True

R-Run b-Not reported

S-Substance

		ANALYSIS				
		**Laboratory Control Spike*				
		1.) Not conducted every 20 samples or per site?	lq1a		lq1b	M
		2.) Percent accuracy <60 or >140%?				
	NA	**PCDDs**				
	NA	2,3,7,8-TCDD	lq2a		lq2b	S
	NA	Total TCDD	lq2a		lq2b	S
	NA	1,2,3,7,8-PeCDD	lq2a		lq2b	S
	NA	Total PeCDD	lq2a		lq2b	S
	NA	1,2,3,4,7,8-HxCDD	lq2a		lq2b	S
	NA	1,2,3,6,7,8-HxCDD	lq2a		lq2b	S
	NA	1,2,3,7,8,9-HxCDD	lq2a		lq2b	S
	NA	Total HxCDD	lq2a		lq2b	S
	NA	1,2,3,4,6,7,8-HpCDD	lq2a		lq2b	S
	NA	Total HpCDD	lq2a		lq2b	S
	NA	Total OCDD	lq2a		lq2b	S
		PCBs				
	NA	Monochlorobiphenyls	lq2a		lq2b	S
	NA	Dichlorobiphenyls	lq2a		lq2b	S
	NA	Trichlorobiphenyls	lq2a		lq2b	S
	NA	Tetrachlorobiphenyls	lq2a		lq2b	S
	NA	Pentachlorobiphenyls	lq2a		lq2b	S
	NA	Hexachlorobiphenyls	lq2a		lq2b	S
	NA	Heptachlorobiphenyls	lq2a		lq2b	S
	NA	Octachlorobiphenyls	lq2a		lq2b	S
	NA	Nonachlorobiphenyls	lq2a		lq2b	S
		Decachlorobiphenyl	lq2a		lq2b	S
		PCDFs				
	NA	2,3,7,8-TCDF	lq2a		lq2b	S
	NA	Total TCDF	lq2a		lq2b	S
	NA	1,2,3,7,8-PeCDF	lq2a		lq2b	S
	NA	2,3,4,7,8-PeCDF	lq2a		lq2b	S
	NA	Total PeCDF	lq2a		lq2b	S
	NA	1,2,3,4,7,8-HxCDF	lq2a		lq2b	S
	NA	1,2,3,6,7,8-HxCDF	lq2a		lq2b	S
	NA	1,2,3,7,8,9-HxCDF	lq2a		lq2b	S
	NA	2,3,4,6,7,8-HxCDF	lq2a		lq2b	S
	NA	Total HxCDF	lq2a		lq2b	S
	NA	1,2,3,4,6,7,8-HpCDF	lq2a		lq2b	S
	NA	1,2,3,4,7,8,9-HpCDF	lq2a		lq2b	S
	NA	Total HpCDF	lq2a		lq2b	S
	NA	Total OCDF	lq2a		lq2b	S
		**Internal Standards*				
		1.) Not conducted once per sample?	qs1a		qs1b	M
		2.) Percent recovery <60 or >120%?				
NA	NR	13C-2,3,7,8-TCDD	qs2a	qs2a	qs2a	S
NA	NR	13C-1,2,3,7,8-PeCDD	qs2a	qs2a	qs2a	S
NA	NR	13C-1,2,3,6,7,8-HxCDD	qs2a	qs2a	qs2a	S
NA	NR	13C-1,2,3,4,6,7,8-HpCDD	qs2a	qs2a	qs2a	S
NA	NR	13C-OCDD	qs2a	qs2a	qs2a	S
NA	NR	13C-2,3,7,8-TCDF	qs2a	qs2a	qs2a	S

CALCULATION CHECK FOR CARB METHOD 428-March 88

Device ID:
Substance:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER	ds	inches	
RECTANGULAR STACK, LENGTH	L	inches	
WIDTH	W	inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28[100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF ONE ANALYTE IN SAMPLE TRAIN	Ma	ng	
CALCULATED DATA-OVERALL			
CONCENTRATION OF ANALYTE Mc = (35.31*Ma)/Vmstd	Mc	ng/dscm	#DIV/0!
ANALYTE MASS EMISSION RATE Em = ((Qsd*Ma)/Vmstd)*1.32e-10	Em	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 428 - September, 1990
Substance: PCDD/PCDF and PCB's

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of Polychlorinated Dibenzo-p-dioxin (PCDD), Polychlorinated Dibenzofuran (PCDF) and Polychlorinated Biphenyl (PCB) emissions from stationary sources. Particulate and gaseous phase PCDD, PCDF, and PCB are withdrawn isokinetically from the stack and collected on a filter, XAD-2 resin, and in impingers. The contents of the sample train are then extracted and split, if both PCDD/PCDF and PCB are of interest. Internal standards are added and the extracts are separated by high resolution gas chromatography (HRGS) and quantified by low resolution mass spectrometry (LRMS). High resolution mass spectrometry (HRMS) is sometimes used to quantify PCDD/PCDF. Only total amounts of the analytes can be determined, partitioning of the analytes cannot be determined.

Quality Assurance/Quality Control Checks

Before completing the detailed QA checklist, please answer the following questions:

1) Sampling run IDs ---------------- (428) Laboratory sample IDs ---------------- (428)
---------------- (429) ---------------- (429)

2) Was the sample run ID the same for the Method 428 and 429 tests? Yes No

3) was the Laboratory sample ID the same for Method 428 and 429 samples? Yes No

If the answer to either 2 or 3 is "Yes", check the source test report for further confirmation that Method 428 and 429 were modified for analysis of single sample.

4) Was a single sampling train used for both method? Yes No

5) If the answer to #4 is "Yes"; **STOP**, do not evaluate these method.

Please complete the detailed checklist provided in the attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Other Comments

Device ID:

		SAMPLE LOCATION				
		* *Swirl Check*				
		1.) Not conducted?	sc1a		sc1b	M
		2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
		* *Stack Size*				
		1.) Enter stack diameter (inches).				M
		2.) Stack diameter < 12 inch ? or	st2a		st2b	M
		3.) Area <113 inch squared?	st3a		st3b	M
		* *Number of Sample Points*				
		1.) Enter total number of points.				M
		2.) Method 1 not used?	ns2a		ns2b	M
		SAMPLING EQUIPMENT				
		* *Nozzle Size Check*				
		1.) Not conducted prior to test?	nz1a		nz1b	M
		2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
		* *Field Gas Dry Meter*				
		1.) Not checked pre- and post-test?	gm1a		gm1b	M
		2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
		* *Pitot Tube*				
		1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
		SAMPLING PROCEDURES				
		* *Leak Check*				
		1.) Not conducted?	lc1a		lc1b	M
		2.) Values not reported?	lc2a			M
		3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
		4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
		* *Sample Runs*				
		1) Runs<3?	sr1a		sr1b	M
		* *Sample Time*				
		1.) Runs < 3 hours	sd1a	sd1a	sd1a	R
		* *Isokinetic*				
		1.) Sample not taken isokinetically?	is1a		is1b	M
		2.) Isokinetic variation not reported?	is2a			M
		3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
		* *Field Blank*				
		1.) Not conducted once per test?	fb1a		fb1b	M
		2.) Used to correct sample?	fb2a		fb2b	M
		**Surrogate Standard*				
		1.) Not conducted once per run?	ss1a	ss1a	ss1a	R
		2.) Not reported?	ss2a			M
		3a.) Percent recovery <60 or >140% (for LRMS)?				
NA	NR	37Cl-2,3,7,8-TCDD	ss3a	ss3a	ss3a	S
NA	NR	13C-1,2,3,7,8,9-HxCDD	ss3a	ss3a	ss3a	S
NA	NR	13C-1,2,3,4,6,7,8-HpCDF	ss3a	ss3a	ss3a	S
		3b.) Percent recovery <60 or >140% (for HRMS)?				
NA	NR	37Cl-2,3,7,8-TCDD	ss4a	ss4a	ss4a	S
NA	NR	13C-2,3,4,7,8-PeCDF	ss4a	ss4a	ss4a	S
NA	NR	13C-1,2,3,7,8,9-HxCDD	ss4a	ss4a	ss4a	S
NA	NR	13C-1,2,3,4,7,8-HxCDF	ss4a	ss4a	ss4a	S
NA	NR	13C-1,2,3,4,6,7,8-HpCDF	ss4a	ss4a	ss4a	S

M-Method
R-Run
S-Substance

a-True
b-Not reported

		ANALYSIS				
		**Laboratory Control Spike*				
		1.) Not conducted every 20 samples or per site?	lg1a		lg1b	M
		2.) Was percent accuracy <60 or >140%?				
		PCDDs				
NA		2,3,7,8-TCDD	lg2a		lg2b	S
NA		Total TCDD	lg2a		lg2b	S
NA		1,2,3,7,8-PeCDD	lg2a		lg2b	S
NA		Total PeCDD	lg2a		lg2b	S
NA		1,2,3,4,7,8-HxCDD	lg2a		lg2b	S
NA		1,2,3,6,7,8-HxCDD	lg2a		lg2b	S
NA		1,2,3,7,8,9-HxCDD	lg2a		lg2b	S
NA		Total HxCDD	lg2a		lg2b	S
NA		1,2,3,4,6,7,8-HpCDD	lg2a		lg2b	S
NA		Total HpCDD	lg2a		lg2b	S
NA		Total OCDD	lg2a		lg2b	S
		PCBs				
NA		Monochlorobiphenyls	lg2a		lg2b	S
NA		Dichlorobiphenyls	lg2a		lg2b	S
NA		Trichlorobiphenyls	lg2a		lg2b	S
NA		Tetrachlorobiphenyls	lg2a		lg2b	S
NA		Pentachlorobiphenyls	lg2a		lg2b	S
NA		Hexachlorobiphenyls	lg2a		lg2b	S
NA		Heptachlorobiphenyls	lg2a		lg2b	S
NA		Octachlorobiphenyls	lg2a		lg2b	S
NA		Nonachlorobiphenyls	lg2a		lg2b	S
NA		Decachlorobiphenyl	lg2a		lg2b	S
		PCDFs				
NA		2,3,7,8-TCDF	lg2a		lg2b	S
NA		Total TCDF	lg2a		lg2b	S
NA		1,2,3,7,8-PeCDF	lg2a		lg2b	S
NA		2,3,4,7,8-PeCDF	lg2a		lg2b	S
NA		Total PeCDF	lg2a		lg2b	S
NA		1,2,3,4,7,8-HxCDF	lg2a		lg2b	S
NA		1,2,3,6,7,8-HxCDF	lg2a		lg2b	S
NA		1,2,3,7,8,9-HxCDF	lg2a		lg2b	S
NA		2,3,4,6,7,8-HxCDF	lg2a		lg2b	S
NA		Total HxCDF	lg2a		lg2b	S
NA		1,2,3,4,6,7,8-HpCDF	lg2a		lg2b	S
NA		1,2,3,4,7,8,9-HpCDF	lg2a		lg2b	S
NA		Total HpCDF	lg2a		lg2b	S
NA		Total OCDF	lg2a		lg2b	S
		**Internal Standards (LRMS)*				
NA		1.) Not conducted once per sample?	qs1a		qs1b	M
NA		2.) Values not reported?	qs2a			M
		3.) Was percent accuracy <40 or >120%?				
NA	NR	13C-2,3,7,8-TCDD	qs4a	qs4a	qs4a	S
NA	NR	13C-1,2,3,7,8-PeCDD	qs4a	qs4a	qs4a	S
NA	NR	13C-1,2,3,6,7,8-HxCDD	qs4a	qs4a	qs4a	S
NA	NR	13C-1,2,3,4,6,7,8-HpCDD	qs4a	qs4a	qs4a	S
NA	NR	13C-OCDD	qs4a	qs4a	qs4a	S
NA	NR	13C-2,3,7,8-TCDF	qs4a	qs4a	qs4a	S
		**Internal Standards (HRMS)*				
NA		1.) Not conducted once per sample?	qs1a		qs1b	M
NA		2.) Values not reported?	qs2a			M
		3.) Was percent accuracy <40 or >120%?				
NA	NR	13C-2,3,7,8-TCDD	qs3a	qs3a	qs3a	S
NA	NR	13C-1,2,3,7,8-PeCDD	qs3a	qs3a	qs3a	S
NA	NR	13C-1,2,3,6,7,8-HxCDD	qs3a	qs3a	qs3a	S
NA	NR	13C-1,2,3,4,6,7,8-HpCDD	qs3a	qs3a	qs3a	S
NA	NR	13C-OCDD	qs3a	qs3a	qs3a	S
NA	NR	13C-2,3,7,8-TCDF	qs3a	qs3a	qs3a	S
NA	NR	13C-1,2,3,7,8-PeCDF	qs3a	qs3a	qs3a	S
NA	NR	13C-1,2,3,6,7,8-HxCDF	qs3a	qs3a	qs3a	S
NA	NR	13C-1,2,3,4,7,8,9-HpCDF	qs3a	qs3a	qs3a	S

CALCULATION CHECK FOR CARB METHOD 428-Sep 90

Device ID:
Substance:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER RECTANGULAR STACK, LENGTH WIDTH	ds L W	inches inches inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	0
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28[100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF ONE ANALYTE IN SAMPLE TRAIN	Ma	ng	
CALCULATED DATA-OVERALL			
CONCENTRATION OF ANALYTE Mc = (35.31*Ma)/Vmstd	Mc	ng/dscm	#DIV/0!
ANALYTE MASS EMISSION RATE Em = ((Qsd*Ma)/Vmstd)*1.32e-10	Em	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 429 - September, 1989
Substance: PAH

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of Polycyclic Aromatic Hydrocarbons (PAH) emissions from stationary sources. Particulate and gaseous phase PAH are withdrawn isokinetically from the stack and collected on a filter, XAD-2 resin, and in impingers. The contents of the sample train are then extracted. Internal standards are added and the extracts are separated by high resolution gas chromatography (HRGS) and quantified by low resolution mass spectrometry (LRMS) or high resolution mass spectrometry (HRMS). Only total amounts of the analytes can be determined, partitioning of the analytes cannot be determined.

Quality Assurance/Quality Control Checks

Before completing the detailed QA checklist, please answer the following questions:

1) Sampling run IDs ----------------- (428) Laboratory sample IDs ----------------- (428)
----------------- (429) ----------------- (429)
2) Was the sample run ID the same for the Method 428 and 429 tests? Yes No
3) was the Laboratory sample ID the same for Method 428 and 429 samples? Yes No
If the answer to either 2 or 3 is "Yes", check the source test report for further confirmation that Method 428 and 429 were modified for analysis of single sample.
4) Was a single sampling train used for both method? Yes No
5) If the answer to #4 is "Yes"; **STOP**, do not evaluate these method.
6) Was a Teflon coated glass fiber or Teflon membrane filter used? Yes No
7) If the answer to #6 is "No"; **STOP**, do not evaluate these method.

Please complete the detailed checklist provided in the attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Other Comments

____

____

____

____

Device ID:

SAMPLE LOCATION						
		* *Swirl Check*				
		1.) Not conducted?	sc1a		sc1b	M
		2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
		* *Stack Size*				
		1.) Enter stack diameter (inches).				M
		2.) Stack diameter < 12 inch ? or	st2a		st2b	M
		3.) Area <113 inch squared?	st3a		st3b	M
		* *Number of Sample Points*				
		1.) Enter total number of points.				M
		2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT						
		* *Nozzle Size Check*				
		1.) Not conducted prior to test?	nz1a		nz1b	M
		2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
		* *Field Gas Dry Meter*				
		1.) Not checked pre- and post-test?	gm1a		gm1b	M
		2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
		* *Pitot Tube*				
		1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES						
		* *Leak Check*				
		1.) Not conducted?	lc1a		lc1b	M
		2.) Values not reported?	lc2a			M
		3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
		4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
		* *Sample Runs*				
		1) Runs < 3?	sr1a		sr1b	M
		* *Isokinetic Variation*				
		1.) Sample not taken isokinetically?	is1a		is1b	M
		2.) Isokinetic variation not reported?	is2a			M
		3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
		* *Field Blank*				
		1.) Not conducted once per test?	fb1a		fb1b	M
		2.) Used to correct sample?	fb2a		fb2b	M
		* *Surrogate Standards*				
		1.) Not conducted once per run?	ss1a		ss1b	M
		2.) Values not reported?	ss2a			M
		3.) Percent recovery <50 or >150% ?				
NA	NR	d10-methylnaphthalene	ss3a	ss3a	ss3a	R

M-Method a-True
R-Run b-Not reported
S-Substance

ANALYSIS						
		* *Analysis Date*				
		1.) Not within 40 days of extraction?	ad1a		ad1b	M
		* *Extraction Date*				
		1.) Not within 7 days of collection	ed1a		ed1b	M
		**Laboratory Control*				
		1.) Not conducted every 20 samples?	lq1a		lq1b	M
		2.) Percent accuracy <50 or >150%?				
	NA	acenaphthene	lq2a		lq2b	S
	NA	acenaphtheylene	lq2a		lq2b	S
	NA	anthracene	lq2a		lq2b	S
	NA	benz[a]anthracene	lq2a		lq2b	S
	NA	benzo[b]fluoranthene	lq2a		lq2b	S
	NA	benzo[a]pyrene	lq2a		lq2b	S
	NA	benzo[g,h,i]pyrene	lq2a		lq2b	S
	NA	chrysene	lq2a		lq2b	S
	NA	dibenz[a,h]anthracene	lq2a		lq2b	S
	NA	fluoranthene	lq2a		lq2b	S
	NA	fluorene	lq2a		lq2b	S
	NA	indeno[1,2,3-c,d]pyrene	lq2a		lq2b	S
	NA	naphthalene	lq2a		lq2b	S
	NA	phenantherene	lq2a		lq2b	S
	NA	pyrene	lq2a		lq2b	S
	NA	benzo[k]fluoranthene	lq2a		lq2b	S
	NA	benzo[b+k]fluoranthene	lq2a		lq2b	S
		**Internal Standards*				
		1.) Not conducted once per sample?	qs1a		qs1b	M
		2.) Values not reported?	qs2a			M
		3.) Percent accuracy <50 or >150%?				
NA	NR	d8-acenaphtheylene	qs3a	qs3a	qs3a	S
NA	NR	d8-naphthalene	qs3a	qs3a	qs3a	S
NA	NR	d10-acenaphthene	qs3a	qs3a	qs3a	S
NA	NR	d10-anthracene	qs3a	qs3a	qs3a	S
NA	NR	d10-fluoranthene	qs3a	qs3a	qs3a	S
NA	NR	d10-fluorene	qs3a	qs3a	qs3a	S
NA	NR	d10-phenantherene	qs3a	qs3a	qs3a	S
NA	NR	d10-pyrene	qs3a	qs3a	qs3a	S
NA	NR	d12-benz[a]anthracene	qs3a	qs3a	qs3a	S
NA	NR	d12-benzo[a]pyrene	qs3a	qs3a	qs3a	S
NA	NR	d12-benzo[b]fluoranthene	qs3a	qs3a	qs3a	S
NA	NR	d12-benzo[g,h,i]pyrene	qs3a	qs3a	qs3a	S
NA	NR	d12-benzo[k]fluoranthene	qs3a	qs3a	qs3a	S
NA	NR	d12-chrysene	qs3a	qs3a	qs3a	S

CALCULATION CHECK FOR CARB METHOD 429

Device ID:
Substance:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER	ds	inches	
RECTANGULAR STACK, LENGTH	L	inches	
WIDTH	W	inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	0
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28{100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF ONE ANALYTE IN SAMPLE TRAIN	Ma	ng	
CALCULATED DATA-OVERALL			
CONCENTRATION OF ANALYTE Mc = (35.31*Ma)/Vmstd	Mc	ng/dscm	#DIV/0!
ANALYTE MASS EMISSION RATE Em = ((Qsd*Ma)/Vmstd)*1.32e-10	Em	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 430-September, 1989
Substance: Formaldehyde

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of formaldehyde emissions from stationary sources. Gaseous emissions are drawn through a Teflon sample line and two impingers in series, each impinger containing an aqueous acidic solution of 2,4-dinitrophenyl-hydrazine (DNPH). An aldehyde reacts with DNPH by nucleophilic addition on the carbonyl followed by 1,2-elimination of water and the formation of a 2,4-dinitrophenylhydrazone. The sample is then extracted and analyzed using reverse phase HPLC with an ultraviolet absorption detector.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Other Comments

____
____
____
____

Device ID:

	SAMPLING EQUIPMENT				
	** Field Gas Dry Meter*				
	1.) Not checked pre- and post-test?	gm1a		gm1b	M
	2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
	SAMPLING PROCEDURES				
	** Flow Rate*				
	1.) Not conducted per run?	fr1a		fr1b	M
	2.) Values not reported?	fr2a			M
	3.) Runs > 1.0 L / min?	fr3a	fr3a	fr3a	R
	4.) Pre-test and post-test not within 15% per run?	fr4a	fr4a	fr4a	R
	** Leak Checks*				
	1.) Not conducted per test?	lc1a		lc1b	M
	2.) Indication of flow?	lc2a		lc2b	M
	** Sample Runs*				
NR	1.) Runs < 3?	sr1a	sr1a	sr1a	R
	** Field Blank*				
	1.) Not conducted once per test?	fb1a		fb1b	M
	2.) Not conducted on 2 impingers?	fb2a		fb2b	M
	3.) Used to correct sample?	fb3a		fb3b	M
	**Field Spike*				
NR	1.) Not conducted once per run?	fs1a	fs1a	fs1a	R
	ANALYSIS				
	** Extraction Date*				
	1.) Not within 7 days of collection, each sample?	ed1a		ed1b	M
	** Analysis Date*				
	1.) Not within 30 days of extraction, each sample?	ad1a		ad1b	M
	**Sampling Method*				
	1.) Reverse phase HPLC not used?	mt1a		mt1b	M
	** Matrix Spike*				
	1.) Not conducted per test?	ms1a		ms1b	M
	2.) Not reported?	ms2a			M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

CALCULATION CHECK FOR CARB 430-Sept 89

DATA ENTRY	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
AVERAGE METER TEMPERATURE	Fm	degree F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
AVG. DELTA H	dH	in. H20	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
SAMPLE WEIGHTS (1ST IMPINGER)			
Formaldehyde	Swt,1	µg	
SAMPLE WEIGHTS (2ND IMPINGER)			
Formaldehyde	Swt,2	µg	

CALCULATED DATA	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	0.00
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.00
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	dscm	0.000

SAMPLE CONCENTRATIONS Cc,1 = (Swt,1 + Swt,2) / Vmstd

RUN NUMBER	-	-	0.00
Formaldehyde	Cc,1	ng/dscm	#DIV/0!

SAMPLE CONCENTRATIONS Cc,2 = Cc,1 * 24.05/30

RUN NUMBER	-	-	0.00
Formaldehyde	Cc,2	ppbv	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 430 - December, 1991
Substance: Formaldehyde and Acetaldehyde

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of formaldehyde and acetaldehyde emissions from stationary sources. Gaseous emissions are drawn through a Teflon sample line and two impingers in series , each impinger containing an aqueous acidic solution of 2,4-dinitrophenylhydrazine (DNPH). The sample line is rinsed with another aliquot of the same solution. An aldehyde reacts with DNPH by nucleophilic addition on the carbonyl followed by 1,2-elimination of water and the formation of a 2,4-dinitrophenylhydrazone. The sample is then extracted and analyzed using reverse phase HPLC with an ultraviolet absorption detector.

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Blank Procedure

The average of the three field blanks should be used to calculate the sample/blank ratios. **If the ratios are greater than five, the field blank is subtracted off of the field samples. If the ratios are equal to or less than five, the reporting limit should be reported. The reporting limit is equal to the average field blank times 5.**

Other Comments

____
____
____
____

Device ID:

		SAMPLING EQUIPMENT				
		* *Calibration Check*				
		1.) Not conducted for each rotometer?	cc1a		cc1b	M
		2.) Calibration sheet not included?	cc2a		cc2b	M
		SAMPLING PROCEDURES				
		* *Sample flow*				
		1.) Not conducted per run?	fr1a		fr1b	M
		2.) Values not reported?	fr2a			M
		3.) Runs > 1.0 L / min?	fr3a	fr3a	fr3a	R
		4.) Pre-test and post-test not within 15% per run?	fr4a	fr4a	fr4a	R
		* *Leak Checks*				
		1.) Not conducted per test?	lc1a		lc1b	M
		2.) Indication of flow?	lc2a		lc2b	M
		* *Sample Runs*				
		1.) Runs < 3?	sr1a		sr1b	M
		* *Sampling Date*				
		1.) Not within 2 days of reagent blank contaminatin check?	sd1a		sd1b	M
		* *Field Blank*				
		1.) Not conducted three per test?	fb1a		fb1b	M
		2a.) Reporting limit not given?(Sample / Field Blank <5)				
NA	NR	formaldehyde	fb2a	fb2a	fb2a	S
NA	NR	acetaldehyde	fb2a	fb2a	fb2a	S
NA	NR	acrolein	fb2a	fb2a	fb2a	S
		2b.) Sample not corrected?(Sample / Field Blank >5)				
NA	NR	formaldehyde	fb3a	fb3a	fb3a	S
NA	NR	acetaldehyde	fb3a	fb3a	fb3a	S
NA	NR	acrolein	fb3a	fb3a	fb3a	S
		ANALYSIS				
		* *Extraction Date*				
		1.) Not within 7 days of collection, each sample?	ed1a		ed1b	M
		* *Analysis Date*				
		1.) Not within 30 days of extraction, each sample?	ad1a		ad1b	M
		**Sampling Method*				
		1.) Reverse phase HPLC not used?	mt1a		mt1b	M
		* *Impinger Analysis*				
		1.) Not analyzed seperately?	im1a		im1b	M
		* *Matrix Spike*				
		1.) Not conducted per test?	ms1a		ms1b	M
		2.) Not reported ?	ms2a		ms2b	M

M-Method	a-True
R-Run	b-Not reported
S-Substance	

CALCULATION CHECK FOR CARB 430-December, 1991

Device ID:

DATA ENTRY	SYMBOL	UNITS		DATA		DATA		DATA			
RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
AVERAGE METER TEMPERATURE	Fm	degree F								#DIV/0!	#DIV/0!
BAROMETRIC PRESSURE	Pbar	in. Hg								#DIV/0!	#DIV/0!
AVG. DELTA H	dH	in. H20								#DIV/0!	#DIV/0!
GAS SAMPLE VOLUME	Vm	cubic ft.								#DIV/0!	#DIV/0!
METER CALIBRATION FACTOR	Y	-								#DIV/0!	#DIV/0!
TOTAL SAMPLING TIME	min	minutes								#DIV/0!	#DIV/0!
SAMPLE 1ST IMPINGER VOLUME	Siwt,1	ml								#DIV/0!	#DIV/0!
SAMPLE 2ND IMPINGER VOLUME	Siwt,2	ml								#DIV/0!	#DIV/0!
BLANK 1ST IMPINGER VOLUME	Biwt,1	ml								#DIV/0!	#DIV/0!
BLANK 2ND IMPINGER VOLUME	Biwt,2	ml								#DIV/0!	#DIV/0!
SAMPLE WEIGHTS (1ST IMPINGER)											
Formaldehyde	Swt,1	µg								#DIV/0!	#DIV/0!
SAMPLE WEIGHTS (2ND IMPINGER)											
Formaldehyde	Swt,2	µg								#DIV/0!	#DIV/0!
BLANK WEIGHTS (1ST IMPINGER)											
Formaldehyde	Bwt,1	µg								#DIV/0!	#DIV/0!
BLANK WEIGHTS (2ND IMPINGER)											
Formaldehyde	Bwt,2	µg								#DIV/0!	#DIV/0!

CALCULATED DATA	SYMBOL	UNITS		DATA		DATA		DATA			
RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R		460.00		460.00		460.00		460.00	0.00
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	dscm		0.000		0.000		0.000		0.000	#DIV/0!

SAMPLE IMPINGER CONCENTRATION (ng/ml), S or Bic= 1000*(S or Bwt,1+S or Bwt,2)/(S or Biwt,1+S or Biwt,2)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Sic	ng/ml		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!	#DIV/0!
BLANK											
Formaldehyde	Bic	ng/ml		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!	#DIV/0!

BLANK TO SAMPLE RATIO, Br=Sic/Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
RATIO											
Formaldehyde	Br		###	#DIV/0!	###	#DIV/0!	###	#DIV/0!		#DIV/0!	#DIV/0!

CORRECTED SAMPLE CONCENTRATION (ng/ml) Br>5 Cic=Sic-Average(Bic); Br<5 Cic=5*Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cic	ng/ml	### ###	#DIV/0!	### ###	#DIV/0!	### ###	#DIV/0!	### ###	#DIV/0!	#DIV/0!

CORRECTED SAMPLE CONCENTRATION 1 (mg/dscm), Cc,1=Cic*(Swt,1+Swt,2)/VmStd/1e06

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,1	mg/dscm	### ###	#DIV/0!	### ###	#DIV/0!	### ###	#DIV/0!	### ###	#DIV/0!	#DIV/0!

CORRECTED SAMPLE CONCENTRATION 2 (ppbv), Cc,2=1000*24.05/Mw

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,2	ppbv	### ###	#DIV/0!	### ###	#DIV/0!	### ###	#DIV/0!	### ###	#DIV/0!	#DIV/0!

ND - Sample value below detection limit

< - Some sample values below detection limit

C - Blank Corrected

RL - Reporting Limit

NA - Not Available

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 433 - September, 1989
Substance: Nickel

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of nickel emissions from stationary sources. Particulate and gaseous nickel emissions are withdrawn isokinetically and collected on a filter and in a solution of nitric acid. The samples are then analyzed by atomic absorption spectrometry using the direct aspiration flame method (flame AA).

Quality Assurance/Quality Control Checks

Please complete the detailed checklist provided in the attached Table. If the statements are true, please circle "a"s or the corresponding run numbers; and if they are not reported, circle "a"s. In addition to completing the checklist please answer the following questions:

1.) What digestion method was used? ______________________________
2.) Enter the digestion date(s). ______________________________
3.) Number of Impingers: 0.1N HNO_3 (2) __ Empty (1)__ Silica Gel (1) __

Blank Procedure

Please be sure that the blank data was applied and considered correctly. For this particular method, the absorbance reading from the sample needs to be corrected for the absorbance readings of the filter and nitric blanks. There is no criteria for the blank levels, they just need to be performed and corrected for the sample values.

Other Comments

____

____

433SEPT89.XLS

Device ID:

SAMPLE LOCATION				
** Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
** Stack Size*				
1.) Enter stack diameter (inches).				M
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
** Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
** Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
** Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
** Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
** Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
** Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
** Field Reagent Blank*				
1.) Not conducted for two filters and 0.1N HNO3?	rb1a		rb1b	M
2.) Not used to correct sample ?	rb2a		rb2b	M
ANALYSIS				
** Method*				
1.) Atomic absorption spectrometry (AAS) not used?	mt1a		mt1b	M
2.) Not conducted in triplicate ?	mt2a		mt2b	M

M-Method

R-Run

S-Substance

a-True

b-Not reported

CALCULATION CHECK FOR CARB METHOD 433

Device ID:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER RECTANGULAR STACK, LENGTH WIDTH	ds L W	inches inches inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	0
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28{100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF NICKEL IN SAMPLE TRAIN	Mni	mg	
CALCULATED DATA-OVERALL			
CONCENTRATION OF NICKEL MCni = (35.31*Mni)/Vmstd	MCni	mg/dscm	#DIV/0!
NICKEL MASS EMISSION RATE Eni = ((Qsd*Mni)/Vmstd)*1.32e-4	Eni	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: MMT - Pre 436
Substance: Trace Metals

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of trace metal emissions from stationary sources. Particulate and gaseous metal emissions are withdrawn isokinetically and collected on a filter and in a nitric acid solution and a potassium permanganate solution. The samples are then analyzed in separate front and back half portions by either ICAP, GVAAS, AAS and Hg is analyzed by CVAAS.

Quality Assurance/Quality Control Checks

Before completing the detailed QA checklist, please answer the following questions.

1) Was ARB approval granted for use of this method (This method was to be used prior to February 1991)? Yes No

2) Equipment check - Non-metallic prob, nozzle, prob brush, and non-wood prob brush.
Yes No

3) If the answer to #2 is "No" **STOP** evaluating.

4) Number of impingers with Mercury:
$5\%HNO_3/10\%H_2O_2$ (2)___ $4\%KMnO_4/10\%H_2SO_2$ (1 or 2 depending on Hg levels)___
Silica Gel (1)___ Empty(0 if moisture <150ml ; otherwise 1) ___
Number of impingers without Mercury:
$5\%HNO_3/10\%H_2O_2$ (2)___ Silica Gel (1)___
Empty (0 if moisture <150ml ; otherwise 1) ___

5) If answer to #4 is different than the default **STOP** evaluating this method (see manager).

6) Combined or separate (front and back half) analysis? Combined Separate

7) If the answer to #6 is "Combined" **STOP** evaluating this method (see manager).
8.) What digestion method was used? ______________________________
9.) Enter the digestion date(s). ____________________________________

Please complete the detailed checklist provided in the attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Blank Procedure

Please be sure that the blank data was applied and considered correctly. The blank data should be handled as follows:

If the measured blank value for the front half is in the range of 0.0 to A [where A equals the value determined by multiplying 1.4 ug per square inch (1.4 ug/in2) times the actual area in square inches (in2) of the filter used in the emission sample], the measured blank value can be used to correct the front half field sample results. If the measured blank level is greater than A, the greater of these two value should be used:

I. A ug, or
II. The lesser of (1) the measured front half blank value or (2) 5 percent of the front half sample value

If the measured blank value for the back half is in the range of 0.0 to 1 ug, the measured back half blank value can be used to correct the back half field sample results. If the measured back half blank value exceeds 1 ug, the greater of the two following values may be used:

I. 1 ug, or
II. 5 percent of the measured back half field sample

Other Comments

____
____
____
____

Device ID:

SAMPLE LOCATION				
* *Swirl Check*				
1.) Not conducted?	sc1a		sc1b	M
2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
* *Stack Size*				
1.) Enter stack diameter (inches).				
2.) Stack diameter < 12 inch ? or	st2a		st2b	M
3.) Area <113 inch squared?	st3a		st3b	M
* *Number of Sample Points*				
1.) Enter total number of points.				M
2.) Method 1 not used?	ns2a		ns2b	M
SAMPLING EQUIPMENT				
* *Nozzle Size Check*				
1.) Not conducted prior to test?	nz1a		nz1b	M
2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
* *Field Gas Dry Meter*				
1.) Not checked pre- and post-test?	gm1a		gm1b	M
2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
* *Pitot Tube*				
1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
SAMPLING PROCEDURES				
* *Leak Check*				
1.) Not conducted?	lc1a		lc1b	M
2.) Values not reported?	lc2a			M
3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
* *Isokinetic Variation*				
1.) Sample not taken isokinetically?	is1a		is1b	M
2.) Isokinetic variation not reported?	is2a			M
3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
* ***Field Reagent Blanks***				
1.) Not conducted once per test?	rb1a		rb1b	M
2.) Not used to correct samples?	rb2a		rb2b	M

M-Method a-True
R-Run b-Not reported
S-Substance

ANALYSIS ICAP (all metals ,except mercury)						
* ***Duplicate***						
NA		1.) Not conducted once per test?	du1a		du1b	M
NA		2.) Percent difference not reported?	du2a			M
		3.) Was percent difference > 5%?				
NA	NR	Antimony (Sb)	du3a	du3a	du3a	S
NA	NR	Arsenic (As)	du3a	du3a	du3a	S
NA	NR	Barium (Ba)	du3a	du3a	du3a	S
NA	NR	Beryllium (Be)	du3a	du3a	du3a	S
NA	NR	Cadmium (Cd)	du3a	du3a	du3a	S
NA	NR	Chromium (Cr)	du3a	du3a	du3a	S
NA	NR	Copper (Cu)	du3a	du3a	du3a	S
NA	NR	Lead (Pb)	du3a	du3a	du3a	S
NA	NR	Manganese (Mn)	du3a	du3a	du3a	S
NA	NR	Nickel (Ni)	du3a	du3a	du3a	S
NA	NR	Phosphorus (P)	du3a	du3a	du3a	S
NA	NR	Selenium (Se)	du3a	du3a	du3a	S
NA	NR	Silver (Ag)	du3a	du3a	du3a	S
NA	NR	Thallium (Tl)	du3a	du3a	du3a	S
NA	NR	Zinc (Zn)	du3a	du3a	du3a	S
ANALYSIS GFAAS (listed metals)						
* ***Duplicate***						
NA		1.) Not conducted per run?	du4a		du4b	M
NA		2.) Runs not reported?	du5a	du5a	du5a	R
* ***Matrix Spike***						
NA		1.) Spike include Front- and Back-Half?	ms1a		ms1b	M
NA		2.) Percent recovery not reported?	ms3a			
		3.) Was percent recovery <75 or >125%?				
NA	NR	Antimony (Sb)	ms4a	ms4a	ms4a	S
NA	NR	Arsenic (As)	ms4a	ms4a	ms4a	S
NA	NR	Cadmium (Cd)	ms4a	ms4a	ms4a	S
NA	NR	Lead (Pb)	ms4a	ms4a	ms4a	S
NA	NR	Selenium (Se)	ms4a	ms4a	ms4a	S
NA	NR	Thallium (Tl)	ms4a	ms4a	ms4a	S
ANALYSIS CVAAS (mercury)						
* ***Duplicate***						
NA		1.) Not conducted per run?	du6a		du6b	M
NA		2.) Runs not reported?	du7a	du7a	du7a	R
* ***Matrix Spike***						
NA		1.) Not conducted on one nitric impinger?	ms5a		ms5b	M
NA		2.) Percent recovery not reported?	ms6a			M
		3.) Was percent recovery <75 or >125%?				
NA	NR	1.) Mercury (Hg)	ms7a	ms7a	ms7a	S

CALCULATION CHECK FOR METHOD MMT - Pre 436

Device ID:

Substance:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER RECTANGULAR STACK, LENGTH WIDTH	ds L W	inches inches inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28{100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF ONE TRACE METAL IN FRONT HALF OF SAMPLE TRAIN	Mfh	mg	
TOTAL MASS OF TRACE METAL IN FRONT HALF REAGENT BLANK	Mfhb	mg	
TOTAL MASS OF TRACE METAL IN BACK HALF OF SAMPLE TRAIN	Mbh	mg	
TOTAL MASS OF TRACE METAL IN BACK HALF REAGENT BLANK	Mbhb	mg	
CALCULATED DATA-OVERALL			
CORRECTED TOTAL AMOUNT OF TRACE METAL Mmt = (Mfh - Mfhb) + (Mbh - Mbhb)	Mmt	mg	0.000
CONCENTRATION OF TRACE METAL Mmc = (35.31*Mmt)/Vmstd	Mmc	mg/dscm	#DIV/0!
TRACE METAL MASS EMISSION RATE Emt = ((Qsd*Mmt)/Vmstd)*1.32e-4	Emt	lb/hr	#DIV/0!

SOURCE TEST METHOD DETAILED VALIDATION CHECKLIST

Test Method: CARB 436-March, 1991 or March 1992
Substance: Trace Metals

Report ID Number: ________________
Reviewer: ________________
Review Date: ________________

Method Description and Applicability

This method is applicable to the determination of trace metal emissions from stationary sources. Particulate and gaseous arsenic emissions are withdrawn isokinetically and collected on a filter and in a nitric acid solution and a potassium permanganate solution. The samples are then analyzed in separate front and back half portions by either ICAP, GVAAS, AAS and Hg is analyzed by CVAAS.

Quality Assurance/Quality Control Checks

Before completing the detailed QA checklist, please answer the following questions.

1) Was ARB approval granted for use of this method? Yes No
2) If the answer to question 1 is "No" check with manager.
3) Indicate the specific version of CARB 436 used. March 1991 or March 1992
4) Have results of parallel source test or audit provided? Yes No
5) Equipment check - Non-metallic prob, nozzle, prob brush, and non-wood prob brush.
   Yes No
6) If the answer to #5 is "No" **STOP** evaluating.
7) Number of impingers with Mercury:
   5%HNO_3/10%H_2O_2 (2)___ 4%$KMnO_4$/10%H_2SO_2 (2)___ Silica Gel (1)___
   Empty(1 if moisture <100ml 92 version or <150ml 91 version ; otherwise 2) ___
   Number of impingers without Mercury:
   5%HNO_3/10%H_2O_2 (2)___ Silica Gel (1)___
   Empty(0 if moisture <100ml 92 version or <150ml 91 version ; otherwise 1) ___

8) If answer to #7 is different than the default **STOP** evaluating this method (see manager).

9) For all metals except mercury was combined or separate (front and back half) analysis conducted? Combined Separate

10) If the answer to #9 is "Separate" and prior approval from ARB not obtained **STOP** evaluating this method (see manager).

11.) What digestion method was used? ______________________

12.) Enter the digestion date(s). ______________________

Please complete the detailed checklist provided in the attached Table. If the statements are true, circle "a"s or the corresponding run numbers; and if they are not reported, circle "b"s.

Blank Procedure

Please be sure that the blank data was applied and considered correctly. The blank data should be handled as follows:

The field reagent blanks should be used to correct field sample data. If the amount of metal detected in the field reagent blank is greater than 20% of the field sample. The field sample needs to be flagged as such. The field blank is not used to correct the field data, instead a field sample/field blank ratio needs to be calculated for all of the samples. If the ratio is less than 5, the field data needs to be flagged as such.

Other Comments

____

____

____

____

Device ID:

		SAMPLE LOCATION				
		* *Swirl Check*				
		1.) Not conducted?	sc1a		sc1b	M
		2.) Average absolute value of angles > 10%?	sc2a		sc2b	M
		* *Stack Size*				
		1.) Enter stack diameter (inches).				
		2.) Stack diameter < 12 inch ? or	st2a		st2b	M
		3.) Area <113 inch squared?	st3a		st3b	M
		* *Number of Sample Points*				
		1.) Enter total number of points.				
		2.) Method 1 not used?	ns2a		ns2b	M
		SAMPLING EQUIPMENT				
		* *Nozzle Size Check*				
		1.) Not conducted prior to test?	nz1a		nz1b	M
		2.) Variation in diameter > 0.004 inch?	nz2a		nz2b	M
		* *Field Gas Dry Meter*				
		1.) Not checked pre- and post-test?	gm1a		gm1b	M
		2.) Pre- and post-test Y not within (+/-) 5%?	gm2a		gm2b	M
		* *Pitot Tube*				
		1.) Semi-annual calibration sheet not included?	pt1a		pt1b	M
		SAMPLING PROCEDURES				
		* *Leak Check*				
		1.) Not conducted?	lc1a		lc1b	M
		2.) Values not reported?	lc2a			M
		3.) Pretest >0.02 cfm or 4% of average?	lc3a	lc3a	lc3a	R
		4.) Post-test >0.02 cfm or 4% of average?	lc4a	lc4a	lc4a	R
		Sample runs				
		1) Runs<3?	sr1a		sr1b	M
		* *Isokinetic*				
		1.) Sample not taken isokinetically?	is1a		is1b	M
		2.) Isokinetic variation not reported?	is2a			M
		3.) Isokinetic <90 or >110%?	is3a	is3a	is3a	R
		[illegible]				
		1.) Not conducted once per test?	fb1a		fb1b	M
		2.) Used to correct samples?	fb2a		fb2b	M
		3) Sample/field blank<5?				
NA	NR	Antimony	fb3a	fb3a	fb3a	S
NA	NR	Arsenic	fb3a	fb3a	fb3a	S
NA	NR	Barium	fb3a	fb3a	fb3a	S
NA	NR	Beryllium	fb3a	fb3a	fb3a	S
NA	NR	Cadmium	fb3a	fb3a	fb3a	S
NA	NR	Chromium	fb3a	fb3a	fb3a	S
NA	NR	Copper	fb3a	fb3a	fb3a	S
NA	NR	Lead	fb3a	fb3a	fb3a	S
NA	NR	Manganese	fb3a	fb3a	fb3a	S
NA	NR	Nickel	fb3a	fb3a	fb3a	S
NA	NR	Phosphorus	fb3a	fb3a	fb3a	S
NA	NR	Selenium	fb3a	fb3a	fb3a	S
NA	NR	Silver	fb3a	fb3a	fb3a	S
NA	NR	Titanium	fb3a	fb3a	fb3a	S
NA	NR	Zinc				
		[illegible]	rb1a		rb1b	M
		1.) Not conducted once per test?	rb2a		rb2b	M
		2.) Not used to correct samples?				

		ANALYSIS ICAP (all metals ,except mercury)				
		**Analysis Date*				
NA		1.) Not within 2 months, for all samples?	ad1a		ad1b	M
		* *Duplicate*				
NA		1.) Not conducted once per test?	du1a		du1b	M
NA		2.) Percent difference not reported?	du2a			M
		3.) Was percent difference > 10%?				
NA	NR	Antimony (Sb)	du3a	du3a	du3a	S
NA	NR	Arsenic (As)	du3a	du3a	du3a	S
NA	NR	Barium (Ba)	du3a	du3a	du3a	S
NA	NR	Beryllium (Be)	du3a	du3a	du3a	S
NA	NR	Cadmium (Cd)	du3a	du3a	du3a	S
NA	NR	Chromium (Cr)	du3a	du3a	du3a	S
NA	NR	Copper (Cu)	du3a	du3a	du3a	S
NA	NR	Lead (Pb)	du3a	du3a	du3a	S
NA	NR	Manganese (Mn)	du3a	du3a	du3a	S
NA	NR	Nickel (Ni)	du3a	du3a	du3a	S
NA	NR	Phosphorus (P)	du3a	du3a	du3a	S
NA	NR	Selenium (Se)	du3a	du3a	du3a	S
NA	NR	Silver (Ag)	du3a	du3a	du3a	S
NA	NR	Thallium (Tl)	du3a	du3a	du3a	S
NA	NR	Zinc (Zn)	du3a	du3a	du3a	S
		ANALYSIS GFAAS (listed metals)				
		Analysis Date				
NA		1.) Not within 2 months, for all samples?	ad2a		ad2b	M
		Duplicate				
NA		1.) Not conducted per run?	du4a		du4b	M
NA		2.) Runs not reported?	du5a	du5a	du5a	R
		Matrix Spike				
NA		1.) Not conducted on combined?	ms1a		ms1b	M
NA		2.) Percent recovery not reported?	ms2a			M
		3.) Was percent recovery <75 or >125%?				
NA	NR	Antimony (Sb)	ms3a	ms3a	ms3a	S
NA	NR	Arsenic (As)	ms3a	ms3a	ms3a	S
NA	NR	Cadmium (Cd)	ms3a	ms3a	ms3a	S
NA	NR	Lead (Pb)	ms3a	ms3a	ms3a	S
NA	NR	Selenium (Se)	ms3a	ms3a	ms3a	S
NA	NR	Thallium (Tl)	ms3a	ms3a	ms3a	S
		ANALYSIS CVAAS (mercury)				
		[illegible]				
NA		1.) Not within 28 days, for all samples?	ad3a		ad3b	M
		[illegible]				
NA		1) Not conducted per run?	du6a		du6b	M
NA		2.) Runs not reported?	du7a	du7a	du7a	R
		[illegible]				
NA		1.) Not conducted on one nitric impinger?	ms4a		ms4b	M
NA		2.) Percent recovery not reported?	ms5a			M
		3.) Percent recovery <75 or >125%?				
NA	NR	1.)Mercury (Hg)	ms6a	ms6a	ms6a	S

M-Method
R-Run
S-Substance

a-True
b-Not reported

CALCULATION CHECK FOR CARB METHOD 436-MARCH 91 and 92

Device ID:
Substance:

DATA ENTRY-SAMPLING	SYMBOL	UNITS	DATA
RUN NUMBER	-	-	
ROUND STACK, DIAMETER	ds	inches	
RECTANGULAR STACK, LENGTH	L	inches	
WIDTH	W	inches	
NOZZLE DIAMETER	dn	inches	
AVERAGE STACK TEMPERATURE	Fs	degrees F	
AVERAGE METER TEMPERATURE	Fm	degrees F	
BAROMETRIC PRESSURE	Pbar	in. Hg	
STACK STATIC PRESSURE	Pg	in. H20	
AVG. DELTA H	dH	in. H20	
AVG. RMS VELOCITY HEAD	dP	in. H20	
PITOT COEFFICIENT	Cp	-	
GAS SAMPLE VOLUME	Vm	cubic ft.	
METER CALIBRATION FACTOR	Y	-	
TOTAL SAMPLING TIME	min	minutes	
STACK GAS OXYGEN CONTENT	Co2,m	%	
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	
CALCULATED DATA-SAMPLING			
RUN NUMBER	-	-	
NOZZLE AREA, An = 3.14(dn)**2/4	An	sq. in.	0.000
STACK AREA, As = 3.14*(ds)**2/576 (ROUND) = L * W/144 (RECTANGULAR)	As	sq. feet	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	460.0
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	460.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64*Y*(Vm/Tm)*(Pbar + dH/13.6)	VmStd	cubic ft.	0.0
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	0.0
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	#DIV/0!
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28[100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	28.00
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	#DIV/0!
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	0.00
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	#DIV/0!
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	#DIV/0!
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	#DIV/0!
ISOKINETIC RATE, I = 13.61*Ts*VmStd/[Ps*vs*An*min*(1-Bws)]	I	%	#DIV/0!
DATA ENTRY-ANALYTICAL			
TOTAL MASS OF ONE TRACE METAL IN SAMPLE TRAIN	Mf	mg	
TOTAL MASS OF TRACE METAL IN FIELD REAGENT BLANK	Mb	mg	
CALCULATED DATA-OVERALL			
CORRECTED TOTAL AMOUNT OF TRACE METAL Mmt = (Mf - Mb)	Mmt	mg	0.000
CONCENTRATION OF TRACE METAL Mmc = (35.31*Mmt)/Vmstd	Mmc	mg/dscm	#DIV/0!
TRACE METAL MASS EMISSION RATE Emt = ((Qsd*Mmt)/Vmstd)*1.32e-4	Emt	lb/hr	#DIV/0!