APPENDICES

APPENDIX A-1

FIELD DATA AND CALCULATION SHEETS FOR APRIL 30, 1998 SOURCE TEST

NICKEL
CALCULATION SHEET

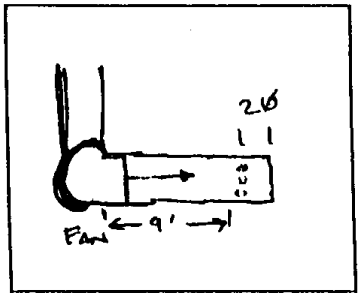
PLANT: Foss Plating
SOURCE: Exhaust
METHOD: CARB 433
DATE: 4/30/98
STANDARD TEMP (EPA = 68 DEG.) 68

RUN NUMBER	1	2	3
FIELD DATA INPUTS:			
BAROMETRIC PRESSURE (Pb)	29.75	29.75	29.75
RECTANGULAR STACK AREA (SQ FT)	1.78	1.78	1.78
PITOT CORRECTION (Cp)	0.84	0.84	0.84
SQRT DELTA P	1.040	1.050	1.050
STACK TEMP (DEG. F)	106.0	86.0	102.2
STATIC PRESSURE (Ps)	0.65	0.65	0.65
VOLUME SAMPLED (Vm)	77.597	78.401	79.197
METER TEMPERATURE (DEG. F)	81.0	94.0	89.0
METER GAMMA	1.006	1.006	1.006
DELTA H (INCHES WATER)	1.24	1.27	1.27
LIQUID COLLECTED (VLC)	42.2	40.0	40.9
% O2	20.90	20.90	20.90
%CO2	0.01	0.01	0.01
SAMPLING TIME (MINUTES)	126.0	126.0	126.0
NOZZLE DIAMETER (INCHES)	0.187	0.187	0.187
PROCESS DATA:			
AMPERE HOURS/HOUR	4499	4171	4021
LABORATORY DATA:			
NICKEL (ug)	26.000	53.000	52.000
FLOW RESULTS:			
VOLUME SAMPLED, DSCF	75.986	74.977	76.428
VOLUME SAMPLED, DSCM	2.152	2.123	2.164
MOISTURE IN SAMPLE (CF)	1.99	1.89	1.93
MOISTURE (%)	2.55	2.46	2.46
MOLECULAR WEIGHT (DRY)	28.84	28.84	28.84
MOLECULAR WEIGHT (WET)	28.56	28.57	28.57
STACK VELOCITY (FT/SEC)	60.91	60.38	61.27
ACTUAL CFM	6505	6449	6544
STANDARD CFM	6043	6211	6121
DRY STANDARD CFM	5889	6058	5970
NICKEL RESULTS:			
ISOKINETIC SAMPLING RATE (100% ±10%	95.6	91.7	94.8
NICKEL (mg/DSCM)	0.01208	0.02496	0.02403
NICKEL (mg/HR)	120.899	256.953	243.714
NICKEL (mg/AMP HOUR)	0.02688	0.06161	0.06062

PACIFIC ENVIRONMENTAL SERVICES, INC.

FIELD DATA

Plant FCS PLATING
Date Nickel Tanks Exhaust
Sampling Location 4/30/98
Sample Type CARB M-433
Run Number 1
Operator PT/JR/JB/DM
Ambient Temperature 75°F
Barometric Pressure 29.75"
Static Pressure +0.65
Filter Number(s) NA
Pretest Leak Rate 0 CFM @ 26 in. Hg
Read And Record All Data Every 7 Minutes



Schematic of
Traverse Point Layout
K=1.14

Probe Length and Type 3' SS Glass Lining
Pitot Tube I.D. No. S-3A
Nozzle I.D. No. And Diameter 0.1825
Assumed Moisture, % 2
Meter Box Number 6A
Meter Delta H@ 1.792
C Factor 1.14
Meter Gamma 1.006
Heater Box Setting NA
Reference Delta P —
Post test Leak Rate 0.005 CFM @ 10 in. Hg
Impinger Box No. 5B Blank Box No. 6B

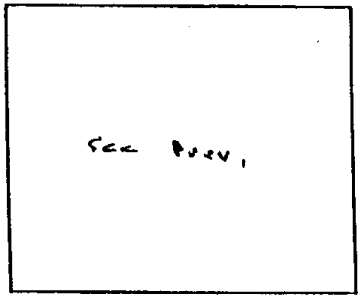
Traverse Point Number	Sampling Time θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
A-1	0	0926	411.603	0.95	1.0	1.0	103	71	70	3	NA	NA	49
2	7	0927	415.8	1.0	1.25	1.25	101	75	71	4			44
3	14	0934	420.10	1.1	1.25	1.25	104	80	72	4			48
4	21	0941	424.2	1.1	1.25	1.25	103	81	73	4			50
5	28	0948	428.5	1.1	1.25	1.25	103	82	74	4			51
6	35	0955	432.8	0.85	0.969	0.97	104	82	75	3			51
B-1	42	1003	436.7	1.1	1.25	1.25	107	81	76	4			53
2	49	1010	440.9	1.1	1.25	1.25	106	82	76	4			50
3	56	1017	445.3	1.1	1.25	1.25	104	84	77	4			51
4	63	1024	449.6	1.2	1.36	1.36	109	85	78	4			52
5	70	1031	454.1	1.2	1.36	1.36	110	87	78	4			52
6	77	1038	458.6	0.95	1.0	1.0	110	89	80	4			54
C-1	84	1046	462.6	1.1	1.25	1.25	110	88	81	4			55
2	91	1053	466.9	1.2	1.36	1.36	112	90	83	4			52
3	98	1100	471.3	1.2	1.36	1.36	105	90	84	4			52
4	105	1107	475.9	1.3	1.37	1.37	109	90	84	4			52
5	112	1114	480.4	1.2	1.36	1.36	107	90	84	4			52
6	119	1121	484.9	1.1	1.25	1.25	109	92	85	4			54
END	126	1128	489.2	—	—	—	—	—	—	—	↓	↓	—
								84	78				
			77.547	√ΔP = 1.04		1.24	106						

PACIFIC ENVIRONMENTAL SERVICES, INC.

FIELD DATA

Plant: Foss Plating
Date: 4/30/98
Sampling Location: Exhaust
Sample Type: CARB 433
Run Number: 2
Operator: PT/JR/DB/IB
Ambient Temperature: 80°F
Barometric Pressure: 29.75"
Static Pressure: +0.65
Filter Number(s): NA
Pretest Leak Rate: 15 Hg ~~CFM~~ @ 0.008 ~~in. Hg~~ CFM
Read And Record All Data Every: 7 Minutes

See Prev.



Schematic of Traverse Point Layout

Probe Length and Type: 3' SS Glass Lining
Pitot Tube I.D. No.: S-3A
Nozzle I.D. No. And Diameter: 0.1875
Assumed Moisture, %: 2
Meter Box Number: 6A
Meter Delta H@: 1.792
K Factor: 1.14
Meter Gamma: 1.006
Heater Box Setting: NA
Reference Delta P: —
Post test Leak Rate: 15 CFM @ 0.008 in. Hg
Impinger Box No.: 7B Blank Box No.: 6B

Traverse Point Number	Sampling Time θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	Orifice Pressure Differential (in. H20) ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
A-1	0	1200	489.603	0.90	1.0	1.0	104	89	88	4	NA	NA	55
2	7	1207	494.0	0.95	1.1	1.0	99	91	89	4			50
3	14	1214	498.0	1.1	1.25	1.25	92	93	89	4			49
4	21	1221	502.3	1.1	1.25	1.25	89	95	89	4			51
5	28	1228	506.6	1.1	1.25	1.25	85	96	90	4			49
6	35	1235	510.9	0.90	1.0	1.0	81	96	90	3.5			49
B-1	42	1243	514.8	0.98	1.1	1.1	80	96	91	4			51
2	49	1250	518.9	1.2	1.36	1.36	77	96	91	4			49
3	56	1257	523.4	1.2	1.36	1.36	83	98	92	4			49
4	63	1304	527.9	1.2	1.36	1.36	83	96	92	4			49
5	70	1311	532.3	1.2	1.36	1.36	82	98	92	4			49
6	77	1318	536.8	1.1	1.25	1.25	80	98	92	4			50
C-1	84	1326	541.2	1.1	1.25	1.25	86	97	93	4			52
2	91	1333	545.6	1.2	1.36	1.36	84	97	93	4			51
3	98	1340	550.0	1.2	1.36	1.36	87	98	93	4			51
4	105	1347	554.6	1.3	1.48	1.5	83	98	93	5			50
5	112	1354	559.3	1.3	1.48	1.5	84	98	93	5			51
6	119	1401	564.0	1.1	1.25	1.25	82	98	93	4			52
END	126	1408	568.004	—	—	—	—	—	—	—			—
								96	91				
			78.401	$\sqrt{\Delta P}$=1.05		1.27	86						

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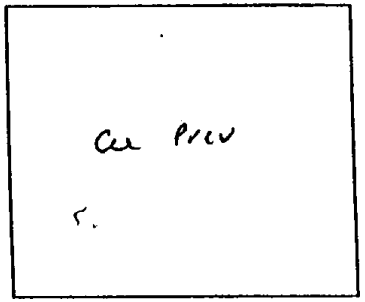
PACIFIC ENVIRONMENTAL SERVICES, INC.

FIELD DATA

Plant: Fossil Planing
Date: 4/30/98
Sampling Location: Exhaust
Sample Type: Carb 433
Run Number: 3
Operator: PT/JR/DB/JA
Ambient Temperature: 80°F
Barometric Pressure: 29.75
Static Pressure: +0.65
Filter Number(s): NA
Pretest Leak Rate ~~0.005~~ CFM @ 20 in. Hg
Read And Record All Data Every 7 Minutes



Schematic of
Traverse Point Layout

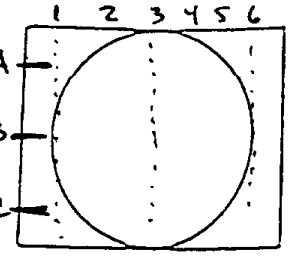
Probe Length and Type: 3' SS Glass Lined
Pitot Tube I.D. No.: S-3A
Nozzle I.D. No. And Diameter: 0.1875
Assumed Moisture, %: 2
Meter Box Number: 6A
Meter Delta H@ ~~1.00~~ 1.792
C Factor K= 1.14
Meter Gamma: 1.006
Heater Box Setting: NA
Reference Delta P: —
Post test Leak Rate +50 CFM @ 20 in. Hg
Impinger Box No. 8B Blank Box No. 6B

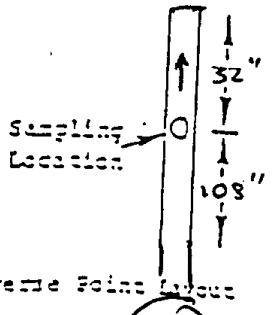
Traverse Point Number	Sampling Time θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
A-1	0	1420	568.807	0.90	1.0	1.0	84	644	93	3.0	NA	NA	60
2	7	1427	572.9	1.0	1.14	1.14	89	94	93	3.0			60
3	14	1434	577.0	1.1	1.25	1.25	96	95	92	3.0			60
4	21	1441	581.3	1.1	1.25	1.25	106	93	92	3.0			60
5	28	1448	585.7	1.1	1.25	1.25	107	93	91	3.0			60
6	35	1455	590.0	1.1	1.25	1.25	107	90	90	3.0			59
B-1	42	1503	594.2	1.1	1.25	1.25	108	90	90	3.0			58
2	49	1510	598.4	1.1	1.25	1.25	108	90	89	3.0			55
3	56	1517	603.0	1.2	1.36	1.36	109	89	87	3.0			54
4	63	1524	607.5	1.2	1.36	1.36	108	89	86	3.0			54
5	70	1531	612.0	1.2	1.36	1.36	111	90	86	3.0			55
6	77	1538	616.5	1.1	1.25	1.25	111	90	86	3.0			55
C-1	84	1546	620.9	1.1	1.25	1.25	110	89	85	3.0			55
2	91	1553	625.3	1.2	1.36	1.36	110	89	84	3.0			55
3	98	1600	629.9	1.2	1.36	1.36	112	89	84	3.0			55
4	105	1607	634.5	1.2	1.36	1.36	112	89	84	3.0			55
5	112	1614	639.1	1.2	1.36	1.36	113	89	84	3.0			55
6	119	1621	643.6	1.1	1.25	1.25	113	89	84	3.0			55
END	126	1635	648.004	—	—	—	—	—	—	—	↓	↓	—
								90.6	88				
			79.197	√ΔP = 1.05		1.27	106.2						

PACIFIC ENVIRONMENTAL SERVICES, INC.

PRELIMINARY VELOCITY TRAVERSE

Plant: FOSS PLATING
Date: 4/30/98
Location: EXHAUST
Stack I.D.: 14 x 14
Barometric Pressure, In. Hg:
Stack Gauge Pressure, In. H_2O: +0.65
Operators: JR / PT / JB
Pilot Tube I.D. Number: ST-3A
Temperature Readout I.D.: S-3A
Pilot Tube Leak Check: OK





Schematic of Traverse Point Layout

FAN

Run 1

Traverse Point Number	Velocity Head (Δp_s) In. H_2O	Stack Temp. (T_s), °F	Cyclonic Flow Check ° from Null
A-1	~~0.78~~ 1.0	97	0
2	1.0	98	5
3	1.1	98	5
4	1.1	99	5
5	1.0	99	0
C	0.87	98	3
B-1	1.2	95	8
2	1.2	95	5
3	1.3	97	3
4	1.2	99	5
5	1.2	99	2
6	1.1	99	2
C-1	0.92	92	2
2	1.2	92	5
3	1.4	95	5
4	1.3	96	3
5	1.2	98	2
6	~~0.9~~ 1.2	98	0
Average			

Traverse Point Number	Velocity Head (Δp_s) In. H_2O	Stack Temp. (T_s), °F	Cyclonic Flow Check ° from Null
Average			

TRAVERSE POINT LOCATIONS FOR RECTANGULAR DUCTS

PLANT Foss Plating

DATE 4-30-98

SAMPLING LOCATION Nickel Tanks Exhaust

INSIDE STACK DIMENSIONS 16" x 16"

INSIDE OF NEAR WALL TO OUTSIDE OF NIPPLE. (Distance B) Ø

EQUIVALENT STACK I.D. 16"

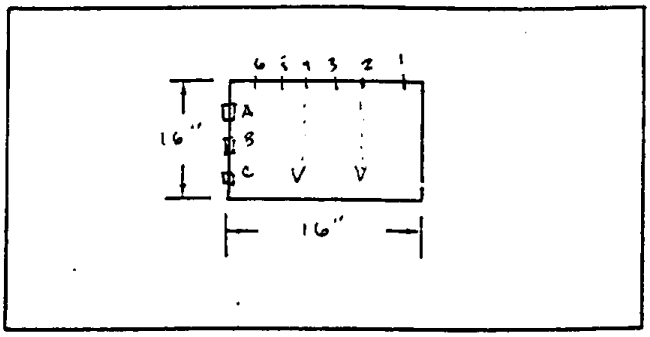
NEAREST UPSTREAM DISTURBANCE 108"

NEAREST DOWNSTREAM DISTURBANCE 32"

NUMBER OF TRAVERSE POINTS 18 ARRAY 3 x 16

CALCULATOR J RUBIO

ILLUSTRATE PORT LOCATIONS AND STACK DIMENSIONS



TRAVERSE POINT NUMBER	INSIDE OF NEAR WALL TO TRAVERSE POINT (Distance A)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF DISTANCES A+B)	PORT LOCATION	DISTANCE FROM EDGE OF STACK
1	~~1.33~~ 1.6	Ø	1.6	A	2.66
2	~~3.99~~ 4.8		4.8	B	~~7.98~~
3	~~6.66~~ 8.0		8.0	C	13.33
4	~~9.33~~ 11.2		11.2		
5	~~12.~~ 14.4		14.4		
6	16.0		16.0		

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Foss Plating

SOURCE: Tank Exhaust

DATE: 4/30/98

RUN #: 2 of 6

METHOD #: Carb 433

BOX #: 53

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	D.I. WATER	654.1	630.1	24.0
2	D.I. WATER	700.3	697.1	3.2
3	EMPTY	486.9	486.0	0.9
4	SILICA GEL	751.1	737.0	14.1

TOTAL GRAMS COLLECTED	42.2

INITALS: LB

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Foss Plating

SOURCE: Exhaust

DATE: 4/20/01

RUN #: 2 of 6

METHOD #: Carb 4??

BOX #: 78

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	D.I. WATER	645.6	620.8	22.8
2	D.I. WATER	689.2	685.7	3.5
3	EMPTY	504.3	504.2	0.1
4	SILICA GEL	788.6	775.0	13.6

TOTAL GRAMS COLLECTED	40.0

INITALS: JB

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Foss Plating

SOURCE: Exhaust

DATE: 4/29/98

RUN #: 3 of 6

METHOD #: Carb 433

BOX #: 8B

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	D.I. WATER	636.1	614.4	21.7
2	D.I. WATER	604.4	601.4	3.0
3	EMPTY	522.9	521.9	1.0
4	SILICA GEL	753.1	737.9	15.2

TOTAL GRAMS COLLECTED	40.9

INITALS: JB

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Loss Plating

SOURCE: Exhaust

DATE: 4/29/98

RUN #: Blank

METHOD #: Carb 433

BOX #: 68

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	D.I. WATER	629.8	630.0	-0.2
2	D.I. WATER	666.6	666.9	-0.3
3	EMPTY	539.5	539.8	-0.3
4	SILICA GEL	826.6	826.9	-0.3

TOTAL GRAMS COLLECTED	-1.1

INITALS: JB

NOMENCLATURE

		Units
Aliquot	mls of sample analyzed	mls
As	cross-sectional area of stack	ft^2
Bp	barometric pressure	"Hg
Bwo	moisture content of stack gas	%
Cp	Pitot tube coefficient	
Ds	stack diameter	inch
DSCF	dry standard cubic feet (through meter)	CF
DSCFM	dry standard cubic feet per minute (in flue gas)	CFM
L	length of rectangular duct	inch
mg	milligrams	grams
MWd	dry molecular weight of stack gas	lb/mole
MWw	wet molecular weight of stack gas	lb/mole
Ps	static pressure of stack gas	"H_2O
Pstd	standard pressure (29.92)	"Hg
SCFM	standard cubic feet per minute	CFM
Tm	dry gas meter temperature	°R
Ts	stack temperature	°R
Tstd	standard temperature (SCAQMD = 60°, EPA = 68°)	°R
Tstd °C	standard temp in °Celcius (SCAQMD = 15.56°, EPA = 20°)	
Vlc	volume of liquid collected	g
Vm	gas volume at meter condition	ft^3
Vmstd	gas volume at dry standard condition	ft^3
Vs	stack gas velocity	ft/sec
Vwstd	moisture volume at standard conditions	ft^3
W	width of rectangular duct	inch
Y	accuracy of dry gas meter (gamma)	
µg	micrograms	grams
ΔH	orifice differential pressure	"H_2O
$\sqrt{\Delta P}$	velocity pressure head (average of square roots)	"H_2O
%CO	carbon monoxide content of stack gas	%vol
%CO_2	carbon dioxide content of stack gas	%vol
%N_2	nitrogen content of stack gas	%vol
%O_2	oxygen content of stack gas	%vol

(1) STANDARD METER VOLUME, DRY

$$Vmstd = (Vm)(Y)\frac{(Tstd)}{(Tm)}\frac{(Bp + (\Delta H / 13.6))}{(Pstd)}$$

$$VMstd = (77.592)(1.006)\frac{(68 + 460)}{(81 + 460)}\frac{(29.75 + (1.24 / 13.6))}{(29.92)}$$

Vmstd = 75.986

(2) MOISTURE CONTENT OF EXHAUST GAS

$$Vwstd = \left(\frac{0.0000894\ ft^3}{gram}\right)(Tstd)(Vlc\ (grams))$$

$$Vwstd = (0.0000894)(68 + 460)(42.2)$$

Vwstd = 1.99

$$Bwo = 100\ (Vwstd) / (Vwstd + Vmstd)$$

$$Bwo = 100(1.99) / (1.99 + 75.986)$$

Bwo = 2.55

(3) DRY GAS MOLECULAR WEIGHT (MWd)

$MWd = (0.32 \times \%O_2) + (0.44 \times \%CO_2) + (0.28 \times (\%CO + \%N_2))$

$MWd = (0.32 \times 20.90) + (0.44 \times 0.01) + (0.28 \times (0 + 79.09))$

MWd = 28.84

(4) WET GAS MOLECULAR WEIGHT (MWw)

$MWw = (MWd)(1 - BWo / 100) + 18((BWo / 100))$

$MWw = (28.84)(1 - 2.55/100) + (18(2.55/100))$

MWw = 28.56

(5) VELOCITY (Vs)

$$Vs = 85.49 \times CP \times \sqrt{\Delta P} \times \sqrt{\frac{Ts + 460}{(Mw_w) \times (Bp + \frac{Ps}{13.6})}}$$

$$Vs = 85.49 \times (0.84) \times (1.040) \times \sqrt{\frac{(106 + 460)}{(28.52) \times (29.75 + \frac{0.65}{13.6})}}$$

Vs = 60.91

(6) AREA OF CIRCULAR STACK (As)

$$As = \frac{(Ds)^2 \times (3.1416)}{576}$$

N/A

$$As = \frac{(\quad)^2 \times (3.1416)}{576}$$

As = _____

(7) AREA OF A RECTANGULAR STACK (As)

As = (L) (W) / 144

As = (16) (16) / 144

As = 1.78

(8) ACTUAL CUBIC FEET PER MINUTE (ACFM)

ACFM = (Vs) (60) x (As)

ACFM = (60.91) x (60) x (1.78)

ACFM = 6505

(9) STANDARD CUBIC FEET PER MINUTE, WET (SCFM)

$$SCFM = (ACFM) \times \frac{Tstd}{Ts} \times \frac{(Bp) + (Ps / 13.6)}{29.92}$$

$$SCFM = (\ 6505\ ) \times \frac{(\ 68\ + 460)}{(\ 106 + 460)} \times \frac{(\ 29.75\ ) + (\ 0.65\ / 13.6)}{29.92}$$

SCFM = 6043

(10) DRY STANDARD CUBIC FEET PER MINUTE (DSCFM)

$$DSCFM = SCFM \times (1 - BWo / 100)$$

$$DSCFM = (\ 6043\ ) \times (1 - 7.55 / 100)$$

DSCFM = 5889

(11) ISOKINETIC (%)

$$\frac{100 \times (Ts + 460) \times [[(0.002669) \times (Vlc)] + [(Vm) \times (Y) / (Tm) \times [(Pbar) + (\Delta H) / (13.6)]]]}{60 \times \theta \times Vs \times (Ps / 13.6 + Pb)\ (Dn^2 \times 0.005454)}$$

$$\frac{100 \times (\ 106 + 460) \times [[(0.002669) \times (92.2)] + [(77.577) \times (1.006\ ) / (\ 81\ + 460))] \times [(29.75) + (\ 1.24 / 13.6]]}{(\ 60\ ) \times (\ \theta\ ) \times (\ 60.91\ ) \times (\ 0.65 / 13.6 + 29.75) \times (\ 0.187\ )^2 \times (0.005454)}$$

% ISOKINETIC = 95.6

(12) Nickel EMISSIONS

$$\text{mg Ni /DSCM} = \frac{\text{mg}}{\text{DSCF x 0.028317}}$$

$$\text{mg Ni /DSCM} = \frac{(\ 26\ )}{(\ 75.986\ )\ \text{x}\ (0.028317)} \div 1000$$

mg Ni / DSCM = 0.01208

$$\text{mg Ni /HR} = \frac{\mu g}{\text{DSCF}} \text{ x } \frac{1}{1000} \text{ x DSCFM EXHAUST x 60}$$

$$\text{mg Ni /HR} = \frac{(\ 26.0\ )}{(\ 75.986\ )} \text{ x } \frac{1}{1000} \text{ x } (5889\ ) \text{ x } (60)$$

mg Ni /HR = 120.899

$$\text{mg Ni /Ampere-hour} = \frac{\text{mg}}{\text{hr}} \text{ x } \frac{\text{hr}}{\text{Ampere hours}}$$

$$\text{mg Ni /Ampere-hour} = (120.899) \text{ x } \frac{(\ 1\text{-hr}\ )}{(\ 3900\ )}$$

mg Ni /Ampere-hour = 0.03100

APPENDIX A-2

FIELD DATA AND CALCULATION SHEETS FOR MAY 2, 1998 SOURCE TEST

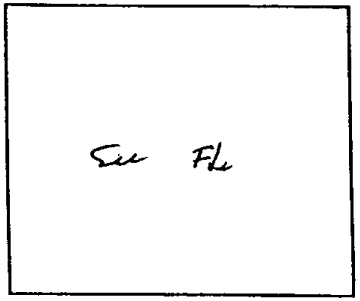
NICKEL
CALCULATION SHEET

PLANT: Foss Plating
SOURCE: Exhaust
METHOD: CARB 433
DATE: 5/2/98
STANDARD TEMP (EPA = 68 DEG.) 68

RUN NUMBER	4	5	6
FIELD DATA INPUTS:			
BAROMETRIC PRESSURE (Pb)	29.80	29.80	29.80
RECTANGULAR STACK AREA (SQ FT)	1.78	1.78	1.78
PITOT CORRECTION (Cp)	0.84	0.84	0.84
SQRT DELTA P	0.995	1.000	1.000
STACK TEMP (DEG. F)	109.0	111.0	110.0
STATIC PRESSURE (Ps)	0.60	0.60	0.60
VOLUME SAMPLED (Vm)	73.635	77.044	76.974
METER TEMPERATURE (DEG. F)	73.0	84.0	77.0
METER GAMMA	1.006	1.006	1.006
DELTA H (INCHES WATER)	1.14	1.14	1.14
LIQUID COLLECTED (VLC)	31.0	32.8	40.4
% O2	20.90	20.90	20.90
%CO2	0.01	0.01	0.01
SAMPLING TIME (MINUTES)	126.0	126.0	126.0
NOZZLE DIAMETER (INCHES)	0.188	0.188	0.188
PROCESS DATA:			
AMPERE HOURS/HOUR	4360	4477	4618
LABORATORY DATA:			
NICKEL (ug)	34.000	22.000	14.000
FLOW RESULTS:			
VOLUME SAMPLED, DSCF	73.293	75.136	76.046
VOLUME SAMPLED, DSCM	2.075	2.128	2.153
MOISTURE IN SAMPLE (CF)	1.46	1.55	1.91
MOISTURE (%)	1.96	2.02	2.45
MOLECULAR WEIGHT (DRY)	28.84	28.84	28.84
MOLECULAR WEIGHT (WET)	28.63	28.62	28.57
STACK VELOCITY (FT/SEC)	58.31	58.72	58.71
ACTUAL CFM	6228	6271	6270
STANDARD CFM	5764	5784	5794
DRY STANDARD CFM	5652	5667	5652
NICKEL RESULTS:			
ISOKINETIC SAMPLING RATE (100% ±10%	95.5	97.7	99.1
NICKEL (mg/DSCM)	0.01638	0.01034	0.00650
NICKEL (mg/HR)	157.304	99.562	62.431
NICKEL (mg/AMP HOUR)	0.03608	0.02224	0.01352

FIELD DATA

Plant: Foss Plating
Date: 5/2/98
Sampling Location: Exhaust
Sample Type: CARB 422
Run Number: 4
Operator: DD
Ambient Temperature: 67
Barometric Pressure: 29.80
Static Pressure: +0.65
Filter Number(s): NA
Pretest Leak Rate: 0 CFM @ 15 in. Hg
Read And Record All Data Every: 7 Minutes



Schematic of
Traverse Point Layout

Probe Length and Type: 4' Glass
Pitot Tube I.D. No.: S-7A
Nozzle I.D. No. And Diameter: 0.187"
Assumed Moisture, %: 2
Meter Box Number: 4A
Meter Delta H@: 1.79
K Factor: 1.14
Meter Gamma: 0.995
Heater Box Setting: NA
Reference Delta P: —
Post test Leak Rate: 0 CFM @ 20 in. Hg
Impinger Box No.: 2B Blank Box No.: 6B

Traverse Point Number	Sampling Time θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
1	0	0105	648.310	0.85	0.97	0.97	100	67	67	3	NA	NA	64
2	7	0112	652.6	0.90	1.02	1.02	103	68	67	3			62
3	14	0119	656.1	1.0	1.14	1.14	103	68	67	3			61
4	21	0126	660.1	1.0	1.14	1.15	105	70	68	3			61
5	28	0133	665.5	1.0	1.14	1.14	108	75	68	3			61
6	35	0140	670.4	1.0	1.14	1.14	108	75	69	3			61
	42	0147	675.1										
1	49	0158	675.1	0.96	1.09	1.1	107	72	68	3			61
2	56	0205	680.8	0.97	1.11	1.11	107	72	69	3			61
3	63	0212	687.1	1.0	1.14	1.14	107	72	69	3			61
4	70	0216	688.4	1.0	1.14	1.14	110	77	70	3			60
5	77	0223	693.1	1.0	1.14	1.14	110	78	72	3			62
6	84	0230											
	91												
1	91	0237	702.9	1.0	1.14	1.14	110	78	72	3			62
2	98	0244	706.0	1.0	1.14	1.14	110	78	72	3			61
3	105	0251	711.0	1.0	1.14	1.14	111	78	73	3			60
4	112	0258	716.7	1.0	1.14	1.14	111	78	73	3			61
5	119	0305	719.0	1.0	1.14	1.14	111	78	73	3			62
6	126	0312	722.013										
			73.675		ΔH²		109	76	70				

0.995

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PACIFIC ENVIRONMENTAL SERVICES, INC.

FIELD DATA

Plant: Foss Plating
Date: 5/2/98
Sampling Location: Exhaust
Sample Type: CAM 433
Run Number: 5
Operator: DB
Ambient Temperature: 65
Barometric Pressure: 29.80
Static Pressure: 0.45
Filter Number(s): NA
Pretest Leak Rate: 0 CFM @ 17 in. Hg
Read And Record All Data Every 7 Minutes

See File

Schematic of Traverse Point Layout

Probe Length and Type: 4' Glass
Pitot Tube I.D. No.: S-3A
Nozzle I.D. No. And Diameter: 0.185
Assumed Moisture, %: 2
Meter Box Number: 4A
Meter Delta H@: 1.75
℄ Factor: 1.14
Meter Gamma: 0.999
Heater Box Setting: NA
Reference Delta P: —
Post test Leak Rate: 0 CFM @ 10 in. Hg
Impinger Box No.: 5B Blank Box No.: 6B

Traverse Point Number	Sampling Time θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	Orifice Pressure Differential (in. H20) ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
	0	0330	722.159	1.0	1.14	1.14	109	77	73	6	NA	NA	63
	7	0337	728.1	1.0	1.14	1.14	103	77	73	6			63
	14	0344	734.5	1.0	1.14	1.14	109	78	74	6			63
	21	0351	736.1	1.0	1.14	1.14	110	79	74	6			63
	28	0358	740.2	1.0	1.14	1.14	112	80	74	6			62
	35	0405	744.0	1.0	1.14	1.14	112	80	74	6			62
	42	0412	749.1	1.0	1.14	1.14	112	80	74	6			62
	0	0413		1.0	1.14	1.14	112	80	73	6			62
	7	0420	751.0	1.0	1.14	1.14	112	80	74	6			62
	14	0427	756.5	1.0	1.14	1.14	112	80	74	6			62
	21	0434	762.3	1.0	1.14	1.14	112	80	74	6			62
	28	0441	768.4	1.0	1.14	1.14	112	80	74	6			61
	35	0448	774.1	1.0	1.14	1.14	112	80	74	6			61
	42	0455	780.1	1.0	1.14	1.14	112	80	73	6			61
	0	0456		0.96	1.14	1.14	111	81	75	6			61
	7	0503	783.1	0.97	1.14	1.14	111	81	75	6			61
	14	0510	787.2	1.0	1.14	1.14	112	81	75	6			61
	21	0517	789.5	1.0	1.14	1.14	112	81	75	6			62
	28	0524	793.1	1.0	1.14	1.14	112	81	75	6			62
	35	0531	795.5	1.0	1.14	1.14	112	81	75	6			62
	42	0538	799.30										
			77.044	1.0		1.14	111	80	73				

PACIFIC ENVIRONMENTAL SERVICES, INC.

FIELD DATA

Plant: [illegible] Plating
Date: 5/4/91
Sampling Location: Exhaust
Sample Type: CARB 429
Run Number: 6
Operator: DD
Ambient Temperature: 63
Barometric Pressure: 25.80
Static Pressure: 6.45
Filter Number(s): NA
Pretest Leak Rate: 0 CFM @ 15 in. Hg
Read And Record All Data Every: 7 Minutes

Cu File

Schematic of
Traverse Point Layout

Probe Length and Type: 4' 6 (am
Pitot Tube I.D. No.: S-3A
Nozzle I.D. No. And Diameter: 0.181"
Assumed Moisture, %: 2
Meter Box Number: 6A
Meter Delta H@: 1.73
C Factor: 1.14
Meter Gamma: 0.991
Heater Box Setting: NA
Reference Delta P: —
Post test Leak Rate: 0 CFM @ 12 in. Hg
Impinger Box No.: 7B Blank Box No.: 6B

Traverse Point Number	Sampling Time θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
	0	0557	799.276	0.96	1.09	1.1	109	77	74	3	NA	NA	62
	7	0558	803.1	0.98	1.14	1.14	110	77	73	3			61
	14	0605	810.2	1.0	1.14	1.14	110	77	73	3			60
	21	0612	817.3	1.0	1.14	1.14	110	77	74	3			60
	28	0619	817.1	1.0	1.14	1.14	110	78	74	3			59
	35	0626	820.3	1.0	1.14	1.14	110	78	74	3			55
	42	0633	824.2	1.0	1.14	1.14	110	79	74	3			55
	0	0634	829.1	1.0	1.14	1.14	110	75	74	3			58
	7	0641	835.1	1.0	1.14	1.14	110	75	74	3			57
	14	0648	839.5	1.0	1.14	1.14	110	75	74	3			57
	21	0655	842.2	1.0	1.14	1.14	110	77	74	3			57
	28	0702	845.1	1.0	1.14	1.14	110	77	74	3			57
	35	0705	848.1										
	42	0716	850.1										
	0	0717		1.0	1.14	1.14	110	75	74	3			57
	7	0724	855.1	1.0	1.14	1.14	110	77	74	3			57
	14	0731	859.1	1.0	1.14	1.14	110	75	77	3			55
	21	0738	864.1	1.0	1.14	1.14	110	77	74	3			57
	28	0745	867.1	1.0	1.14	1.14	110	77	74	3			57
	35	0752	871.1	1.0	1.14	1.14	110	77	74	3			55
	42	0757	876.2										
			76,977	1.0	1.14		110	77	74				

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PACIFIC ENVIRONMENTAL SERVICES, INC.

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Ears Plating

SOURCE: Stack Exhaust

DATE: 5/2/95

RUN #: 4 of 6

METHOD #: Carb 433

BOX #: 28

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	D.I. WATER	605.9	590.1	15.8
2	D.I. WATER	594.4	592.3	2.1
3	EMPTY	485.8	484.8	1.0
4	SILICA GEL	853.2	821.1	12.1

TOTAL GRAMS COLLECTED	31.0

INITALS: LB

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Foss Plating

SOURCE: Stack Exhaust

DATE: 5/2/98

RUN #: 5 of 6

METHOD #: Carb 433

BOX #: SB

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	D.I. WATER	713.0	698.6	14.4
2	D.I. WATER	595.9	592.8	3.1
3	EMPTY	483.1	483.7	0
4	SILICA GEL	700.7	685.4	15.3

TOTAL GRAMS COLLECTED	32.8

INITALS: JB

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Fosc Plating

SOURCE: Stack Exhaust

DATE: 5/2/98

RUN #: 6 of 6

METHOD #: Carb 437

BOX #: 7B

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	D.I. WATER	711.5	690.4	21.1
2	D.I. WATER	630.5	627.2	3.3
3	EMPTY	502.9	502.6	0.3
4	SILICA GEL	779.2	763.5	15.7

TOTAL GRAMS COLLECTED	40.4

INITALS: JB

APPENDIX A-3
FIELD DATA AND CALCULATION SHEETS FOR MAY 29, 1998 SOURCE TEST

NICKEL
CALCULATION SHEET

PLANT: Foss Plating
SOURCE: Exhaust
METHOD: CARB 433
DATE: 5/29/98
STANDARD TEMP (EPA = 68 DEG.) 68

RUN NUMBER	1	2	3
FIELD DATA INPUTS:			
BAROMETRIC PRESSURE (Pb)	29.88	29.88	29.88
RECTANGULAR STACK AREA (SQ FT)	1.78	1.78	1.78
PITOT CORRECTION (Cp)	0.84	0.84	0.84
SQRT DELTA P	0.990	1.050	1.050
STACK TEMP (DEG. F)	100.0	98.0	97.0
STATIC PRESSURE (Ps)	0.70	0.70	0.70
VOLUME SAMPLED (Vm)	80.668	83.075	79.107
METER TEMPERATURE (DEG. F)	75.0	77.0	79.0
METER GAMMA	0.984	0.984	0.984
DELTA H (INCHES WATER)	1.27	1.29	1.29
LIQUID COLLECTED (VLC)	34.1	51.1	22.4
% O2	20.90	20.90	20.90
%CO2	0.01	0.01	0.01
SAMPLING TIME (MINUTES)	126.0	126.0	126.0
NOZZLE DIAMETER (INCHES)	0.187	0.187	0.187
PROCESS DATA:			
AMPERE HOURS/HOUR	0	0	0
LABORATORY DATA:			
NICKEL (ug)	72.000	7.400	14.000
FLOW RESULTS:			
VOLUME SAMPLED, DSCF	78.478	80.523	76.392
VOLUME SAMPLED, DSCM	2.222	2.280	2.163
MOISTURE IN SAMPLE (CF)	1.61	2.41	1.06
MOISTURE (%)	2.01	2.91	1.37
MOLECULAR WEIGHT (DRY)	28.84	28.84	28.84
MOLECULAR WEIGHT (WET)	28.62	28.52	28.69
STACK VELOCITY (FT/SEC)	57.48	60.96	60.73
ACTUAL CFM	6139	6511	6486
STANDARD CFM	5790	6163	6150
DRY STANDARD CFM	5674	5984	6066
NICKEL RESULTS:			
ISOKINETIC SAMPLING RATE (100% ±10%)	102.4	99.7	93.3
NICKEL (mg/DSCM)	0.03240	0.00325	0.00647
NICKEL (mg/HR)	312.339	32.993	66.705

FIELD DATA

Plant: Foss Plating Co.
Date: 5/29/98
Sampling Location: Exhaust
Sample Type: CAFB 437
Run Number: 1
Operator: DB/JB
Ambient Temperature: 70
Barometric Pressure: 29.88
Static Pressure: 0.70
Filter Number(s): —
Pretest Leak Rate: 0 CFM @ 20 in. Hg
Read And Record All Data Every 7 Minutes

Schematic of Traverse Point Layout

Probe Length and Type: 3" Glass
Pitot Tube I.D. No.:
Nozzle I.D. No. And Diameter: 0.1875
Assumed Moisture, %: 2
Meter Box Number: 3A
Meter Delta H@: 1.851
K Factor: 1.26
Meter Gamma: 0.984
Heater Box Setting: —
Reference Delta P: —
Post test Leak Rate: 0 CFM @ 5 in. Hg
Impinger Box No.: 3B Blank Box No.:

Traverse Point Number	Sampling Time θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	Orifice Pressure Differential (in. H20) ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
A1	0	0054	213.222	0.90	1.13	1.1	105	71	71	4	N/A	N/A	60
2	7	0101	217.6	0.95	1.20	1.2	101	72	71	4			60
3	14	0108	222.1	1.0	1.26	1.3	104	73	72	4			61
4	21	0115	227.4	1.0	1.26	1.3	103	75	72	4			61
5	28	0122	231.9	1.0	1.26	1.3	102	75	73	4			60
6	35	0119	236.4	1.0	1.26	1.3	101	75	73	4			60
	42	0136											
B1	0	0137	240.9	1.0	1.26	1.3	100	75	73	4			60
2	7	0144	245.4	1.0	1.26	1.3	99	76	74	4			60
3	14	0151	249.9	1.0	1.26	1.3	99	77	74	4			60
4	21	0158	254.5	1.0	1.26	1.3	99	77	73	4			62
5	28	0205	258.9	1.0	1.26	1.3	99	77	74	4			62
6	35	0212	263.3	1.0	1.26	1.3	98	77	74	4			63
	42	0219	267.9										
C1	0	0220	267.9	0.95	1.20	1.2	98	77	74	4			63
2	7	0227	271.4	0.97	1.22	1.2	98	78	75	4			63
3	14	0234	275.9	1.0	1.26	1.3	98	78	75	4			63
4	21	0241	280.1	1.0	1.26	1.3	98	78	75	4			60
5	28	0248	284.9	1.0	1.26	1.3	98	78	75	4			60
6	35	0255	289.4	1.0	1.26	1.3	98	78	75	4			60
	42	0302	293.900	1.0	1.26								
								76	74				

80.668 VDP 0.99 1.27 100 75

PACIFIC ENVIRONMENTAL SERVICES, INC.

FIELD DATA

Plant: Fort Platting
Date: 5/12/91
Sampling Location: Exhaust
Sample Type: CARB 475
Run Number: 2
Operator: DB / JB
Ambient Temperature: 68
Barometric Pressure: 29.88
Static Pressure: 0.7
Filter Number(s): —
Pretest Leak Rate: 0 CFM @ 16 in. Hg
Read And Record All Data Every 7 Minutes

Schematic of Traverse Point Layout

Probe Length and Type: 5' glass
Pitot Tube I.D. No.:
Nozzle I.D. No. And Diameter: 0.1871
Assumed Moisture, %: 2
Meter Box Number: 3A
Meter Delta H@: 1.851
C Factor: 1.26
Meter Gamma: 0.984
Heater Box Setting: —
Reference Delta P: —
Post test Leak Rate: 0 CFM @ 8 in. Hg
Impinger Box No.: 5B Blank Box No.:

Traverse Point Number	Sampling Time Θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	Orifice Pressure Differential (in. H20) ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
A1	0	0310	294.100	0.91	1.06	1.1	95	77	77	5	NA	NA	65
2	7	0317	297.5	0.96	1.21	1.2	96	78	73	5			64
3	14	0324	301.8	1.0	1.26	1.3	95	78	74	5			64
4	21	0331	306.3	1.0	1.26	1.3	95	78	74	5			64
5	28	0338	310.8	1.0	1.26	1.3	95	78	74	5			64
6	35	0345	315.3	1.0	1.26	1.3	95	78	75	5			64
	42	0352	319.2										
B1	0	0357	319.7	1.1	1.28	1.4	95	78	75	5			64
2	7	0400	326.5	1.1	1.28	1.4	95	78	75	5			63
3	14	0407	331.9	1.0	1.26	1.3	95	77	75	5			63
4	21	0414	336.4	1.0	1.20	1.3	95	75	75	5			63
5	28	0421	340.8	1.0	1.20	1.3	95	75	76	5			64
6	35	0428	345.3	1.0	1.26	1.3	95	75	76	5			63
	42	0435	349.8										
C1	0	0436	349.8	1.0	1.26	1.3	95	75	76	5			62
2	7	0443	355.0	1.0	1.26	1.3	95	75	76	5			62
3	14	0450	359.1	1.0	1.26	1.3	95	80	76	5			62
4	21	0457	363.9	1.0	1.26	1.3	95	80	76	5			62
5	28	0504	368.4	1.0	1.26	1.3	95	80	76	5			62
6	35	0511	372.7	1.0	1.26	1.3	95	80	76	5			62
	42	0518	377.125	1.0									
			83.025			1.29	98	79	75				

77

PACIFIC ENVIRONMENTAL SERVICES, INC.

FIELD DATA

Plant: Fon Plating
Date: 5/27/98
Sampling Location: Exhaust
Sample Type: CA-10 433
Run Number: 3
Operator: DB/JB
Ambient Temperature: 65
Barometric Pressure: 29.88
Static Pressure: +0.7
Filter Number(s): —
Pretest Leak Rate: 0 CFM @ 15 in. Hg
Read And Record All Data Every 7 Minutes

Schematic of Traverse Point Layout

Probe Length and Type: 3' Glass
Pitot Tube I.D. No.:
Nozzle I.D. No. And Diameter: 0.1825
Assumed Moisture, %: 2
Meter Box Number: 3A
Meter Delta H@: 1.851
C Factor: 1.26
Meter Gamma: 0.984
Heater Box Setting: —
Reference Delta P: —
Post test Leak Rate: 0 CFM @ 11 in. Hg
Impinger Box No.: 9A Blank Box No.:

Traverse Point Number	Sampling Time θ (minutes)	Clock Time (24 hr clock)	Gas Meter Reading Vm (cubic feet)	Velocity Head Ps (in. H20)	Orifice Pressure Differential (in. H20) ΔH Desired	Orifice Pressure Differential (in. H20) ΔH Actual	Stack Temp. Ts (F)	Dry Gas Meter Temp. Inlet Tm in (F)	Dry Gas Meter Temp. Outlet Tm out (F)	Pump Vacuum (in. Hg)	Heated Probe Temp. (F)	Filter Box Temp. (F)	Impinger Temp. (F)
	0	0525	378.573	0.95	1.20	1.20	98	80	75	6	NA	NA	62
	7	0532	382.5	0.99	1.25	1.25	98	80	76	6			62
	14	0539	386.9	1.0	1.26	1.3	97	80	76	6			63
	21	0546	391.2	1.1	1.38	1.40	97	81	76	6			63
	28	0553	395.7	1.0	1.26	1.3	97	81	76	6			63
	35	0600	400.1	1.0	1.26	1.3	97	81	76				63
	42	0607	404.6	1.0	1.26	1.3	97	81					
	0	0608	404.6	0.98	1.23	1.2	97	81	76	6			63
	7	0615	409.0	1.0	1.26	1.3	97	81	76	6			62
	14	0624	413.6	1.0	1.26	1.3	97	81	76	6			61
	21	0629	417.3	1.0	1.26	1.3	97	82	76	6			61
	28	0636	422.3	1.0	1.26	1.3	97	82	76	6			61
	35	0643	426.7	1.0	1.26	1.3	97	82	76	6			61
	42	0650	431.2	1.0	1.26	1.3							
	0	0650	431.2	1.0	1.26	1.3	97	82	77	6			62
	7	0657	435.6	1.0	1.26	1.3	97	82	77	6			62
	14	0704	440.1	1.0	1.26	1.3	97	83	77	6			62
	21	0711	444.5	1.0	1.26	1.3	97	83	77	6			63
	28	0718	448.7	1.0	1.26	1.3	97	83	77	6			63
	35	0725	453.3	1.0	1.26	1.3	97	83	77	6			63
	42	0732	457.680										
			79.107	Trips 1.0		1.29	97	81	76				
								79					

PACIFIC ENVIRONMENTAL SERVICES, INC.

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Foss Plating

SOURCE:

DATE: 05-28-98

RUN #: 1 of 3

METHOD #:

BOX #: 3B

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	0.1N HNO_3	770.0	758.3	11.7
2	0.1N HNO_3	655.3	652.9	2.4
3	EMPTY	527.6	526.2	1.4
4	SILICA GEL	864.7	846.1	18.6

TOTAL GRAMS COLLECTED	34.1

INITALS: JB

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Foss Plating

SOURCE:

DATE: 05-28-98

RUN #: 2 of 3

METHOD #: 433

BOX #: SB

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	0.1 N HNO_3	678.2	652.3	25.9
2	0.1 N HNO_3	700.1	696.2	3.9
3	EMPTY	521.1	519.4	1.7
4	SILICA GEL	829.2	809.6	19.6

TOTAL GRAMS COLLECTED	51.1

INITALS:

MOISTURE RECOVERY SHEET
PACIFIC ENVIRONMENTAL SERVICES, INC.

FACILITY: Foss Plating

SOURCE:

DATE: 05-28-98

RUN #: 3

METHOD #: Mod 434

BOX #: 9B

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	0.1N HNO_3	657.5	646.8	10.7
2	0.1N HNO_3	607.7	606.2	1.5
3	EMPTY	533.7	533.4	0.3
4	SILICA GEL	775.5	765.6	9.9

TOTAL GRAMS COLLECTED	22.4

INITALS: JB

APPENDIX B-1

LABORATORY DATA FOR APRIL 30 AND MAY 2, 1998 SOURCE TESTS

WEST COAST
ANALYTICAL
SERVICE, INC.
Analytical Chemists

May 12, 1998

PACIFIC ENVIRONMENTAL SERVICES
13100 Brooks Drive
Suite 100
Baldwin Park, CA 91706

Attn: Dennis Becvar

Job No: 38042 S

LABORATORY REPORT

Samples Received: Seven (7) Liquids
Date Received: 05/04/98
Purchase Order No: 102-98-0105B

The samples were analyzed as follows:

Analysis	Page
Nickel and Chromium by ICPMS	2

Charles Jacks, Ph.D.
Senior Staff Chemist

Greg R. Shaw, M.S.
Senior Chemist

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WEST COAST ANALYTICAL SERVICE, INC.

PACIFIC ENVIRONMENTAL SERVICES
Attn: Dennis Becvar

Job No: 38042
May 12, 1998

LABORATORY REPORT

Nickel and Chromium
Quantitative Analysis Report
Inductively Coupled Plasma-Mass Spectrometry

Sample ID	Nickel ug/l	Chromium ug/l	Volume (l)	Nickel ug	Chromium ug
Run 1	78	33	0.332	26	11
Run 2	130	20	0.408	53	8
Run 3	150	930	0.348	52	320
Run 4	66	6.7	0.522	34	3
Run 5	48	6.7	0.455	22	3
Run 6	51	3	0.281	14	0.8
Blank	0.9	ND	0.253	0.2	ND<0.2
Detection Limit:	0.1	1			

Date Analyzed: 5-7-98

Quality Control Summary

Sample: Run 3
Matrix: Impinger

Parts Per Billion (ug/l)

	Nickel	Chromium
Sample:	151	930
Duplicate:	156	940
Average:	153.5	935
Sample RPD:	3.3	1.1
Spike Conc:	100	100
MS Result:	241	1060
% Recovery	87.5	110

Date Analyzed: 5-7-98

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WCAS

Abbreviations Summary

General Reporting Abbreviations:

B Blank - Indicates that the compound was found in both the sample and the blank. The sample value is reported without blank subtraction. If the sample value is less than 10X the blank value times the sample dilution factor, the compound may be present as a laboratory contaminant.

D Indicates that the sample was diluted, and consequently the surrogates were too dilute to accurately measure.

DL Detection Limit - Is the minimum value which we believe can be detected in the sample with a high degree of confidence, taking into account dilution factors and interferences. The reported detection limits are equal to or greater than Method Detection Limits (MDL) to allow for day to day and instrument to instrument variations in sensitivity.

J Indicates that the value is an estimate.

ND Not Detected - Indicates that the compound was not found in the sample at or above the detection limit.

ppm
ppb Parts per million (billion) in liquids is usually equivalent to mg/l (ug/l), or in solids to mg/kg (ug/kg). In the gas phase it is equivalent to ul/l (ul/m^3).

TR Trace - Indicates that the compound was observed at a value less than our normal reported Detection Limit (DL), but we feel its presence may be important to you. These values are subject to large errors and low degrees of confidence.

kg	kilogram	mg	milligram	l	liter	m	meter
g	gram	ug	microgram	ul	microliter		

QC Abbreviations:

Control & Warning Limits QC Limits are determined from historical data. The test value must be within the Control Limits for the test to be considered valid. Based on historical data, the confidence intervals are 95% for warning limits and 99% for control limits.

% Error Percent Error - This is a measure of accuracy based on the analysis of a Laboratory Control Standard (LCS). An LCS is a reference sample of known value such as an NIST Standard Reference Material (SRM). The % Error is expressed in percent as the difference between the known value and the experimental value, divided by the known value. The LCS may simply be a solution based standard which confirms calibration (ICV or CCV - initial or continuing calibration verification), or it may be a reference sample taken through preparation and analysis.

CHAIN OF CUSTODY RECORD

COMPANY Pacific Environmental Sc
ADDRESS 13100 Brook Dr.
Baldwin Park CA 91706
PHONE NO 626 856 1440 FAX 626-814-0830
MAIL REPORT TO: Dawn Beaton

PROJECT MANAGER Dawn Beaton
PROJECT NAME Foss Plating
PROJECT NO. 3228.003
PURCHASE ORDER NO.

WEST COAST ANALYTICAL SERVICE, INC.
9840 Alburtis Avenue
Santa Fe Springs, CA 90670
(310) 948-2225 Fax (310) 948-5850

COMMENTS:
Run one matrix spike and duplicate

If sample is liquid & has sediment or particulate should we:
_____ test filtrate only?
_____ mix sample by shaking?
_____ test particulate only?

If sample is multi-phased, should we:
_____ test each phase separately?
_____ test only ONE phase? Which phase?
_____ mix all phases by shaking, if possible?

Sample I.D. #	Date Sampled	Time Sampled	Preservative	MATRIX: soil	water	air	other	# of containers	8015 Modified Gas Diesel	Total Petroleum Hydrocarbons 418.1	Halo. Volatiles 601/8010	Aromatic Volatiles 602/8020	Volatile Organics 624/8260	Semi-Volatile Org 625/8270	Chlor Pes/PCB 608/8080	Herbicides 615/8150	CAM (17) Metals	TCLP Metals	STLC Metals	Hex Chrome EPA 218.6	CARB 425/Total & Hex Chrome	CARB 436 Multi-metals	CARB 433	Nickel	Cr III			RUSH	Remarks
Run 1	4/30						X																X	X	X				
Run 2	4/30						X																X	X	X				
Run 3	4/30						X																X	X	X				
Run 4	5/2						X																X	X	X				
Run 5	5/2						X																X	X	X				
Run 6	5/2						X																X	X	X				
Blank							X																X	X	X				

Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time
	PES	5/4/98		WCAS	5/4/98 10:10am
Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time
Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time

NOTE: Samples are discarded 30 days after date of final report.

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WCAS Job No. No 38042

APPENDIX B-2

LABORATORY DATA FOR MAY 29, 1998 SOURCE TEST

WCAS
WEST COAST
ANALYTICAL
SERVICE, INC.
Analytical Chemists

June 10, 1998

PACIFIC ENVIRONMENTAL SERVICES
13100 Brooks Drive
Suite 100
Baldwin Park, CA 91706

Attn: Dennis Becvar

Job No: 38288 S

LABORATORY REPORT

Samples Received: Eight (8) Liquids
Date Received: 05/29/98
Purchase Order No: 102-98-0105B

The samples were analyzed as follows:

Analysis	Page
Chromium and Nickel by ICPMS	2 - 3

Charles Jacks, Ph.D.
Senior Staff Chemist

D.J. Northington, Ph.D.
President

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WEST COAST ANALYTICAL SERVICE, INC.

PACIFIC ENVIRONMENTAL SERVICES
Attn: Dennis Becvar

Job No: 38288
June 10, 1998

LABORATORY REPORT

Chromium and Nickel
Quantitative Analysis Report
Inductively Coupled Plasma-Mass Spectrometry

Sample ID	Chromium (ug/l)	Nickel (ug/l)	Impinger (l)	Chromium (ug)	Nickel (ug)
Blank Field	ND	2.1	0.06	ND<0.06	0.13
Foss Run 1	6.5	148	0.485	3.2	72
Foss Run 2	4.1	18	0.414	1.7	7.4
Foss Run 3	24	38	0.37	8.9	14
Detection Limit:	1	0.1			

Date Analyzed: 6-5-98

Quality Control Summary

Sample: Foss Run 2
Matrix: Impinger

Parts Per Billion (ug/l)

	Chromium	Nickel
Sample:	4.1	18.3
Duplicate:	3.9	17.9
Average:	4	18.1
Sample RPD:	5.0	2.2
Spike Conc:	100	100
MS Result:	102	110
% Recovery	98	91.9

Date Analyzed: 6-5-98

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WCAS

WEST COAST ANALYTICAL SERVICE, INC.

PACIFIC ENVIRONMENTAL SERVICES
Attn: Dennis Becvar

Job No: 38288
June 10, 1998

LABORATORY REPORT

Nickel
Quantitative Analysis Report
Inductively Coupled Plasma-Mass Spectrometry

Total micrograms per Filter

Sample ID	Nickel
IH Filter #1	5.5
IH Filter #2	1.5
IH Filter #3	4.5
IH Filter #4	3.3
Detection Limit:	0.01

Date Analyzed: 6-5-98

Quality Control Summary

Sample: Batch QC
Matrix: Filter

Total micrograms per Filter

	Nickel
Sample:	ND
Spike Conc:	10
MS Result:	9.6
% Recovery	96
MSD Result:	9.7
% Recovery	97
Spike RPD:	1.0

Date Analyzed: 6-5-98

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WCAS

Abbreviations Summary

General Reporting Abbreviations:

B Blank - Indicates that the compound was found in both the sample and the blank. The sample value is reported without blank subtraction. If the sample value is less than 10X the blank value times the sample dilution factor, the compound may be present as a laboratory contaminant.

D Indicates that the sample was diluted, and consequently the surrogates were too dilute to accurately measure.

DL Detection Limit - Is the minimum value which we believe can be detected in the sample with a high degree of confidence, taking into account dilution factors and interferences. The reported detection limits are equal to or greater than Method Detection Limits (MDL) to allow for day to day and instrument to instrument variations in sensitivity.

J Indicates that the value is an estimate.

ND Not Detected - Indicates that the compound was not found in the sample at or above the detection limit.

ppm
ppb Parts per million (billion) in liquids is usually equivalent to mg/l (ug/l), or in solids to mg/kg (ug/kg). In the gas phase it is equivalent to ul/l (ul/m^3).

TR Trace - Indicates that the compound was observed at a value less than our normal reported Detection Limit (DL), but we feel its presence may be important to you. These values are subject to large errors and low degrees of confidence.

kg	kilogram	mg	milligram	l	liter	m	meter
g	gram	ug	microgram	ul	microliter		

QC Abbreviations:

Control & Warning Limits QC Limits are determined from historical data. The test value must be within the Control Limits for the test to be considered valid. Based on historical data, the confidence intervals are 95% for warning limits and 99% for control limits.

% Error Percent Error - This is a measure of accuracy based on the analysis of a Laboratory Control Standard (LCS). An LCS is a reference sample of known value such as an NIST Standard Reference Material (SRM). The % Error is expressed in percent as the difference between the known value and the experimental value, divided by the known value. The LCS may simply be a solution based standard which confirms calibration (ICV or CCV - initial or continuing calibration verification), or it may be a reference sample taken through preparation and analysis.

CHAIN OF CUSTODY RECORD

COMPANY PES
ADDRESS 13100 Brooks DR.
Baldwin Park CA 91706
PHONE NO. 626 856 1160 FAX 626 814 0820
MAIL REPORT TO: Dennis Dean

PROJECT MANAGER D Beeson
PROJECT NAME Foss Plating
PROJECT NO.
PURCHASE ORDER NO.

WEST COAST ANALYTICAL SERVICE, INC.
9840 Alburtis Avenue
Santa Fe Springs, CA 90670
(310) 948-2225 Fax (310) 948-5850

COMMENTS:
Matrix + Duplicate → Run 2
Spike

If sample is liquid & has sediment or particulate should we:
_____ test filtrate only?
_____ mix sample by shaking?
_____ test particulate only?

If sample is multi-phased, should we:
_____ test each phase separately?
_____ test only ONE phase? Which phase?
_____ mix all phases by shaking, if possible?

Sample I.D. #	Date Sampled	Time Sampled	Preservative	MATRIX soil	MATRIX water	MATRIX air	MATRIX other	# of containers	8015 Modified Gas Diesel	Total Petroleum Hydrocarbons 418.1	Halo. Volatiles 601/8010	Aromatic Volatiles 602/8020	Volatile Organics 624/8260	Semi-Volatile Org 625/8270	Chlor Pest/PCB 608/8080	Herbicides 615/8150	CAM (17) Metals	TCLP Metals	STLC Metals	Hex Chrome EPA 218.6	CARB 425/Total & Hex Chrome	CARB 436 Multi-metals	CARB 433	EPA 306				RUSH	Remarks
✓ (Foss - Run 1)	5/29																						X	X					Analyze for
✓ (2)																							X	X					Cr T and
✓ (3)																							X	X					Nickel
✓ (Blank)																							X	X					
✓ (IH Filter #1)																							X						
✓ (#2)																							X						
✓ (#3)																							X						
✓ (#4)																							X						

Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time
[signature]	PES	5/29/98	[signature]	WCAS	5/29/98 3:00pm
Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time
Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time

NOTE: Samples are discarded 30 days after date of final report.

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WCAS Job No. 38288

APPENDIX B-3

LABORATORY DATA FOR WORKPLACE AIR MONITORING

WEST COAST
ANALYTICAL
SERVICE, INC.
Analytical Chemists

May 12, 1998

PACIFIC ENVIRONMENTAL SERVICES
13100 Brooks Drive
Suite 100
Baldwin Park, CA 91706

Attn: Dennis Becvar

Job No: 38041 S

LABORATORY REPORT

Samples Received: Nine (9) Filter Samples
Date Received: 05/04/98
Purchase Order No: 102-98-0105B
Project No: 3278.003

The samples were analyzed as follows:

Analysis	Page
Nickel by ICPMS	2

Charles Jacks, Ph.D.
Senior Staff Chemist

Greg R. Shaw, M.S.
Senior Chemist

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WEST COAST ANALYTICAL SERVICE, INC.

PACIFIC ENVIRONMENTAL SERVICES
Attn: Dennis Becvar

Job No: 38041
May 12, 1998

LABORATORY REPORT

Nickel
Quantitative Analysis Report
Inductively Coupled Plasma-Mass Spectrometry

Total micrograms per Filter

Sample ID	Nickel
AMB #1 4/30	4.9
AMB #2 4/30	0.02
AMB #3 4/30	3.4
AMB #4 4/30	4.1
AMB #1 5/2	4.3
AMB #2 5/2	5.6
AMB #3 5/2	3.4
AMB #4 5/2	7.1
Filter Blank	0.01
Detection Limit:	0.01

Date Analyzed: 5-7-98

Quality Control Summary

Sample: Batch QC
Matrix: Filter

Total micrograms per Filter

	Nickel
Sample:	0.03
Spike Conc:	10
MS Result:	9.4
% Recovery:	93.7
MSD Result:	9.4
% Recovery:	93.7
Spike RPD:	0.0

Date Analyzed: 5-7-98

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WCAS

Client: PACIFIC ENVIRONMENTAL SERVICES
Job Number: 38288

Nickel
Quantitative Analysis Report
Inductively Coupled Plasma-Mass Spectrometry

Total micrograms per Filter

Sample	Nickel
IH Filter #1	5.5
IH Filter #2	1.5
IH Filter #3	4.5
IH Filter #4	3.3
Detection Limit:	0.01
Date Analyzed: 6-5-98	

Quality Control Summary

Sample: Batch QC
Matrix: Filter

Total micrograms per Filter

	Nickel
Sample:	ND
Spike Conc:	10
MS Result:	9.6
% Recovery	96
MSD Result:	9.7
% Recovery	97
Spike RPD:	1.0
Date Analyzed: 6-5-98	

WEST COAST ANALYTICAL ID:310-948-5850 JUN 09'98 16:28 No.028 P.03

Abbreviations Summary

General Reporting Abbreviations:

B Blank - Indicates that the compound was found in both the sample and the blank. The sample value is reported without blank subtraction. If the sample value is less than 10X the blank value times the sample dilution factor, the compound may be present as a laboratory contaminant.

D Indicates that the sample was diluted, and consequently the surrogates were too dilute to accurately measure.

DL Detection Limit - Is the minimum value which we believe can be detected in the sample with a high degree of confidence, taking into account dilution factors and interferences. The reported detection limits are equal to or greater than Method Detection Limits (MDL) to allow for day to day and instrument to instrument variations in sensitivity.

J Indicates that the value is an estimate.

ND Not Detected - Indicates that the compound was not found in the sample at or above the detection limit.

ppm Parts per million (billion) in liquids is usually equivalent
ppb to mg/l (ug/l), or in solids to mg/kg (ug/kg). In the gas phase it is equivalent to ul/l (ul/m^3).

TR Trace - Indicates that the compound was observed at a value less than our normal reported Detection Limit (DL), but we feel its presence may be important to you. These values are subject to large errors and low degrees of confidence.

kg	kilogram	mg	milligram	l	liter	m	meter
g	gram	ug	microgram	ul	microliter		

QC Abbreviations:

Control & Warning Limits — QC Limits are determined from historical data. The test value must be within the Control Limits for the test to be considered valid. Based on historical data, the confidence intervals are 95% for warning limits and 99% for control limits.

% Error — Percent Error - This is a measure of accuracy based on the analysis of a Laboratory Control Standard (LCS). An LCS is a reference sample of known value such as an NIST Standard Reference Material (SRM). The % Error is expressed in percent as the difference between the known value and the experimental value, divided by the known value. The LCS may simply be a solution based standard which confirms calibration (ICV or CCV - initial or continuing calibration verification), or it may be a reference sample taken through preparation and analysis.

CHAIN OF CU. ODY RECORD

COMPANY PES Inc.
ADDRESS 13100 Brooks Dr.
Baldwin Park, CA 91706
PHONE NO 626 856 1400 FAX 626 5
MAIL REPORT TO: Dennis Beeson

PROJECT MANAGER Dennis Beeson
PROJECT NAME Foss Plating
PROJECT NO. 3278.003
PURCHASE ORDER NO.

WEST COAST ANALYTICAL SERVICE, INC.
9840 Alburtis Avenue
Santa Fe Springs, CA 90670
(310) 948-2225 Fax (310) 948-5850

COMMENTS:

If sample is liquid & has sediment or particulate should we:
_____ test filtrate only?
_____ mix sample by shaking?
_____ test particulate only?

If sample is multi-phased, should we:
_____ test each phase separately?
_____ test only ONE phase? Which phase?
_____ mix all phases by shaking, if possible?

MCE Filter

Analyze per MOSH 7300

Sample I.D. #	Date Sampled	Time Sampled	Preservative	MATRIX soil	water	air	other	# of containers	8015 Modified Gas Diesel	Total Petroleum Hydrocarbons 418.1	Halo. Volatiles 601/8010	Aromatic Volatiles 602/8020	Volatile Organics 624/8260	Semi-Volatile Org 625/8270	Chlor Pest/PCB 608/8080	Herbicides 615/8150	CAM (17) Metals	TCLP Metals	STLC Metals	Hex Chrome EPA 218.6	CARB 425/Total & Hex Chrome	CARB 436 Multi-metals	Nickel					RUSH	Remarks
Amb #1	4/30							X															X						
" #2	4/30							X															X						
" #3	4/30							X															X						
" #4	4/30							X															X						
Amb #1	5/2							X															X						
" #2	5/2							X															X						
" #3	5/2							X															X						
" #4	5/2							X															X						
Blank								X															X						

0841

Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time
Dennis Beeson	PES	5/4/98	Jessica Rivera	WCAS	5/4/98 10:10
Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time
Relinquished by:	Company	Date/Time	Received by	Company	Date/Time

NOTE: Samples are discarded 30 days after date of final report

WCAS Job No. No 38041

APPENDIX C

COPY OF THE PERMIT TO OPERATE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, CA 91765

PERMIT TO OPERATE

Permit No. D57181
A/N 206424 Page 1

This initial permit shall be renewed ANNUALLY unless the equipment is moved, or changes ownership.
If the billing for annual renewal fee (Rule 301.f) is not received by the expiration date, contact the District.

Legal Owner or Operator: POSS PLATING CO INC. ID: 009502
8140 SECURA WAY
SANTA FE SPRINGS, CA 90670
ATTN: CAROL POSS

Equipment located at : 8140 SECURA WAY, SANTA FE SPRINGS, CA 90670-2198

Equipment Description:

NICKEL PLATING LINE CONSISTING OF:

1. NICKEL PLATING, TANK No. 24, 12'-0" L X6'-9" W X 5'-3" H, 2376000 BTU/HR GAS HEATED, WITH A 72 KVA RECTIFIER.
2. NICKEL PLATING, TANK No. 23, 12'-0" L X4'-0" W X 5'-3" H, 2376000 BTU/HR GAS HEATED, WITH A 72 KVA RECTIFIER.
3. NICKEL PLATING, TANK No. 1, 12'-0" L X4'-0" W X 5'-3" H, 2376000 BTU/HR GAS HEATED, WITH A 72 KVA RECTIFIER.
4. NICKEL PLATING, TANK No. 2, 12'-0" L X8'-0" W X 5'-3" H, 2376000 BTU/HR GAS HEATED, WITH A 72 KVA RECTIFIER.
5. DE-SMUTTER, TANK No. 6, 12'-0" L X3'-0" W X 5'-3" H, UNHEATED.
6. METAL SURFACE CLEANING, TANK No. 8, 12'-0" L X3'-5" W X 5'-3" H, 2376000 BTU/HR GAS HEATED, WITH A 18 KVA RECTIFIER.
7. DE-SMUTTER, TANK No. 10, 12'-0" L X3'-6" W X 5'-3" H, UNHEATED.
8. METAL SURFACE CLEANING, TANK No. 12, 12'-0" L X3'-6" W X 5'-3" H, 2376000 BTU/HR GAS HEATED.
9. METAL SURFACE CLEANING, TANK No. 14, 12'-0" L X3'-6" W X 5'-3" H, 2376000 BTU/HR GAS HEATED.
10. METAL SURFACE CLEANING, TANK No. 15, 12'-0" L X3'-6" W X 5'-3" H, 2376000 BTU/HR GAS HEATED.
11. METAL SURFACE CLEANING, TANK No. 18, 12'-0" L X3'-0" W X 5'-3" H, UNHEATED.
12. TRI-CHROME PLATING, TANK No. 22, 12'-0" L X4'-0" W X 5'-3" H, 2376000 BTU/HR GAS HEATED, WITH A 96 KVA RECTIFIER.
13. ASSOCIATED RINSE TANKS.

ORIGINAL

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, CA 91765

PERMIT TO OPERATE

Permit No. D57181
A/N 206424 Page

CONTINUATION OF PERMIT TO OPERATE

Conditions:

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.

3. THE FOLLOWING TANK(S) SHALL NOT BE HEATED:

   DE-SMUTTER TANK NO. 6.
   DE-SMUTTER TANK NO. 10.
   METAL SURFACE CLEANING TANK NO. 18.

NOTICE

IN ACCORDANCE WITH RULE 206, THIS PERMIT TO OPERATE OR COPY SHALL BE POSTED ON OR WITHIN 8 METERS OF THE EQUIPMENT.

THIS PERMIT DOES NOT AUTHORIZE THE EMISSION OF AIR CONTAMINANTS IN EXCESS OF THOSE ALLOWED BY DIVISION 26 OF THE HEALTH AND SAFETY CODE OF THE STATE OF CALIFORNIA OR THE RULES OF THE AIR QUALITY MANAGEMENT DISTRICT. THIS PERMIT CANNOT BE CONSIDERED AS PERMISSION TO VIOLATE EXISTING LAWS, ORDINANCES, REGULATIONS OR STATUTES OF OTHER GOVERNMENT AGENCIES.

EXECUTIVE OFFICER

Dorris M. Bailey

By Dorris M. Bailey
October 27, 1992

ORIGINAL

APPENDIX D

EQUIPMENT CALIBRATION DATA

DRY GAS METER AND ORIFICE CALIBRATION

Dry Gas Meter No.: 8804737 Meter Box No.: 6A Reference Dry Gas Meter No.: 25507 (Rockwell)

Barometric Pressure: 29.77 Calibration Date: 4/17/98 Calibration Performed By: J. Rubio

Orifice Manometer Setting H = "H2O	Initial Reference DGM Reading V = ft3	Final Reference DGM Reading V = ft3	Reference Gas Volume Vr = ft3	Initial DGM Reading V = ft3	Final DGM Reading V = ft3	Test DGM Volume Vd = ft3	Temperature				Run Time minutes	Flow Rate Q = cfm	Meter Gamma	Delta H @
							Reference DGM tr = F	DGM Inlet t = F	DGM Outlet t = F	DGM Average td				
0.5	295.775	307.037	11.262	365.678	376.970	11.292	71	75	71	73	28.0	0.40	1.000	1.741
1.0	307.316	318.041	10.725	377.240	387.978	10.738	72	80	74	77	19.0	0.56	1.006	1.761
2.0	318.863	329.065	10.202	388.808	399.014	10.206	73	86	77	82	13.0	0.77	1.011	1.814
4.0	329.475	340.453	10.978	399.435	410.418	10.983	74	88	80	84	10.0	1.08	1.008	1.853

Average	1.006	1.792

PACIFIC ENVIRONMENTAL SERVICES, INC.

DRY GAS METER AND ORIFICE CALIBRATION

Dry Gas Meter No.: 6846739 Meter Box No.: 3A Reference Dry Gas Meter No.: 25507 (Rockwell)

Barometric Pressure: 29.60 Calibration Date: 4/15/98 Calibration Performed By: J.Rubio

Orifice Manometer Setting H = "H2O	Initial Reference DGM Reading V = ft3	Final Reference DGM Reading V = ft3	Reference Gas Volume Vr = ft3	Initial DGM Reading V = ft3	Final DGM Reading V = ft3	Test DGM Volume Vd = ft3	Temperature				Run Time minutes	Flow Rate Q = cfm	Meter Gamma	Delta H @
							Reference DGM tr = F	DGM Inlet t = F	DGM Outlet t = F	DGM Average td				
0.5	251.776	262.166	10.390	369.841	380.265	10.424	68	71	66	69	26.0	0.40	0.996	1.769
1.0	262.662	272.751	10.089	380.766	390.952	10.186	70	84	73	79	18.0	0.55	1.004	1.778
2.0	273.310	283.679	10.369	391.500	401.942	10.442	71	91	77	84	13.0	0.78	1.012	1.745
4.0	284.997	295.231	10.234	402.247	413.527	11.280	72	96	80	88	10.0	1.00	0.925	2.112
										Average			0.984	1.851

PACIFIC ENVIRONMENTAL SERVICES, INC.

GLASS NOZZLE CALIBRATIONS

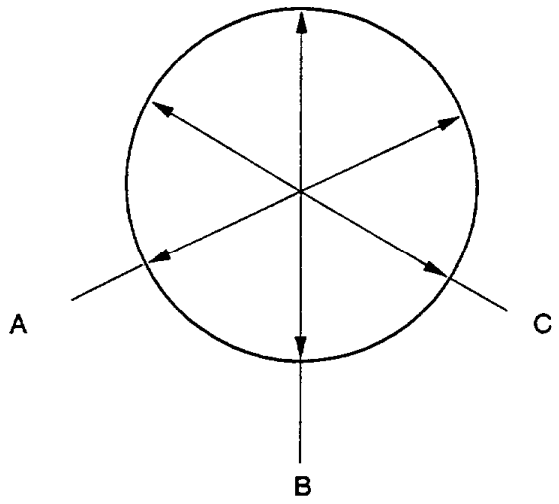
CALIBRATED BY: Joe Rubio
DATE: 12/18/97

NOZZLE ID	READING (INCHES)			AVG DIA.
	1	2	3	
A1	0.115	0.114	0.113	0.114
A2	0.193	0.192	0.193	0.193
A3	0.255	0.256	0.255	0.255
A4	0.312	0.313	0.314	0.313
A5	0.378	0.380	0.380	0.379
A6	0.433	0.432	0.433	0.433
A7	0.501	0.499	0.500	0.500
B1	0.114	0.114	0.114	0.114
B2	0.192	0.192	0.192	0.192
B3	0.253	0.253	0.254	0.253
B4	0.312	0.310	0.310	0.311
B5	0.382	0.382	0.382	0.382
B6	0.433	0.432	0.433	0.433
B7	0.499	0.498	0.498	0.498
X2	0.158	0.159	0.162	0.160
X3	0.187	0.187	0.186	0.187
X4	.210.	0.211	0.209	0.210
X5	0.239	0.241	0.239	0.240
X9	0.334	0.336	0.336	0.335
X16	0.250	0.251	0.252	0.251
M8	0.274	0.275	0.275	0.275
44PB	0.310	0.307	0.309	0.309

Calibrated by: J. Rubio

Nozzle Calibration

Plant: Foss Plating
Source: Exhaust
Method: CARB 433



A = 0.1880"
B = 0.1890"
C = 0.1840"

Average = 0.1870"

Pacific Environmental Services, Inc.

Pitot Tube Calibration Data Sheet

Calibrated by: R. RUSNAK

Date: 01-09-97

Pitot Tube I.D. S-31 (PITOT W/ WELDED TC)

Effective Length: 36" (37 1/4")

Pitot Tube Assembly Level ? ☑ Yes ☐ No

Pitot Tube Openings Damaged ? ☑ Yes ☐ No

If Yes, Explain big S impact opening out of round - filed smoothed = OK

α_1 = Ø °(<10°) α_2 = Ø °(<10°)

β_1 = Ø °(<10°) β_2 = Ø °(<10°)

γ = Ø ° θ = Ø ° A = 0.93⅝" °

Z = A sin γ = Ø cm (in.) 0.32 cm (<⅛ in.)

W = A sin θ = Ø cm (in.) 0.08 cm (<1/32 in.)

P_A = 0.467 cm (in.)

P_B = 0.467 cm (in.)

D_t = 0.375 cm (in.)

Comments: Stem worked, polished. — TC 102 need to be inserted for hot use.

PASSED

Calibration Required ? ☐ Yes ☑ No

RR

6929 E. Slauson Ave. Los Angeles, Ca. 90040
Phone: 213 722 8810 Fax: 213 888 1493
E-Mail: AtlasLabs@worldnet.att.net.

ATLAS TESTING LABORATORIES, INC

Facsimile Coversheet

To: DENNIS From LEN RADKE

Co.: PACIFIC ENVIRONMENTAL Date: 6/2/98

Re: CERTS Total pages: 3 (including cover page)

This message is intended only for the use of the person or entity to which it is addressed and may contain information that is privileged and confidential. If the reader of this message is not the intended recipient you are hereby notified that dissemination or distribution of this information to other than the intended recipient is strictly prohibited.
If you received this in error, please notify us immediately by phone call and return this message to me by u.s. postal service.
Thank you. Please deliver immediately to the proper recipient

Message:

If this transmission is unclear Please advise ATLAS TESTING LABORATORIES, INC.

ATLAS TESTING LABORATORIES, INC.
6929 EAST SLAUSON AVENUE
LOS ANGELES, CA 90040
(213) 722-8810 FAX (213) 888-1493

Pacific Environmental
13100 Brooks Drive #100
Baldwin Park, CA 91706
EQUIPMENT LOCATED AT:
FOSS PLATING
8140 SEQUOIA WAY
SANTA FE SPRINGS, CA 90670

CERT DATE: 05 · 13 · 98
RECERT DATE: 08 · 13 · 98
ATL #: 81448?
PAGE: 2 OF 2

CERTIFICATION

This is to certify Ampere-Hour Meters at the above plant were checked on the above date with recorded data provided below. This certification was accomplished by comparison to the following meter, which was certified as indicated, and is traceable to NIST.

FLUKE DMM	S/N 68630277	DATE CERTIFIED: 11 · 04 · 98
CERTIFIED BY: Wilmington Instruments		NIST # 257047

METERS SURVEYED		
TANK, POWER SOURCE, OR METER DESCRIPTION	THEORETICAL DIFFERENCE	ACTUAL DIFFERENCE
Amphour #1		
Start @ 11950 Amphour		
5 min. @ 2,448 Amps	204	210
End @ 12160 Amphour		
Amphour #2		
Start @ 7356 Amphour		
10 min @ 1476 Amps	246	270
End @ 7626 Amphour		

In accordance with ISO 10012-1, ANSI Z540-1

FOR INFORMATION ONLY

ATLAS TESTING LABORATORIES, INC.

ATLAS TESTING LABORATORIES, INC. SUBMITS THIS REPORT AS THE CONFIDENTIAL PROPERTY OF OUR CLIENT. REPRODUCTION RIGHTS ARE RESERVED PENDING OUR WRITTEN APPROVAL (AND THEN MAY ONLY BE REPRODUCED IN FULL) AS A PROTECTION OF OUR CLIENT AND OURSELVES.

OUTSIDE CALIBRATION FORMS (21)

ATLAS TESTING LABORATORIES, INC.
6929 EAST SLAUSON AVENUE
LOS ANGELES, CA 90040
(213) 722-8810 FAX (213) 888-1493

Pacific Environmental
13100 Brooks Drive #100
Baldwin Park, CA 91706
EQUIPMENT LOCATED AT:
FOSS PLATING
8140 SECURA WAY
SANTA FE SPRINGS, CA 9267

CERT DATE: 05·13·98
RECERT DATE: 08·13·98
ATL #: 814487
PAGE: 1 OF 2

CERTIFICATION

This is to certify that the following ammeters and voltmeters at the above plant were certified on the above date to be within manufacturer's specifications of ± 2% of full scale by comparison with the Atlas Testing Laboratories meters shown below. The Atlas Test Lab meters were in turn certified as indicated by Accurate Calibration.

CALIBRATION INSTRUMENTS		CERT DATE	NIST #
Simpson Voltmeter	S/N A2244		
Simpson Voltmeter	S/N 3218		
Extech Clamp-On DMM	S/N WA26804	11·10·97	257047
Fluke DMM	S/N 68630277	11·04·97	257047

METERS SURVEYED (✓) = APPROVED

TANK OR POWER SOURCE	AMMETER	VOLTMETER
Rec #1	NO	✓
Rec #2	✓	✓

In accordance with ISO 10012-1, ANSI Z540-1

ATL 2
ATLAS TESTING LABORATORIES, INC.

ATLAS TESTING LABORATORIES, INC. SUBMITS THIS REPORT AS THE CONFIDENTIAL PROPERTY OF OUR CLIENT. REPRODUCTION RIGHTS ARE RESERVED PENDING OUR WRITTEN APPROVAL (AND THEN MAY ONLY BE REPRODUCED IN FULL) AS A PROTECTION OF OUR CLIENT AND OURSELVES.

ATLAS TESTING LABORATORIES, INC.
6929 EAST SLAUSON AVENUE
LOS ANGELES, CA 90040
(213) 722-8810 FAX (213) 888-1493

Pacific Environmental
13100 Brooks Drive #100
Baldwin Park, CA 91706
EQUIPMENT LOCATION AT:
FOSS PLATING
8140 SECURA WAY
SANTA FE SPRINGS, CA 90670

CERT DATE: 05·13·98
RECERT DATE: 08·13·98
ATL #: 814487
PAGE: 1 OF 2

CERTIFICATION

This is to certify that the following ammeters and voltmeters at the above plant were certified on the above date to be within manufacturer's specifications of ± 2% of full scale by comparison with the Atlas Testing Laboratories meters shown below. The Atlas Test Lab meters were in turn certified as indicated by Accurate Calibration.

CALIBRATION INSTRUMENTS		CERT DATE	NIST #
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Simpson Voltmeter	S/N 3218		
Extech Clamp-On DMM	S/N WA26804	11·10·97	257047
Fiuke DMM	S/N 68630277	11·04·97	257047

METERS SURVEYED (✓) = APPROVED

TANK OR POWER SOURCE	AMMETER	VOLTMETER
Rec #1	NO	✓
Rec #2	✓	✓

In accordance with ISO 10012-1, ANSI Z540-1

ATL 2
ATLAS TESTING LABORATORIES, INC.

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ATLAS TESTING LABORATORIES, INC.
6929 EAST SLAUSON AVENUE
LOS ANGELES, CA 90040
(213) 722-8810 FAX (213) 888-1493

Pacific Environmental
13100 Brooks Drive #100
Baldwin Park, CA 91706

EQUIPMENT LOCATED AT:
FOSS PLATING
8140 SECURA WAY
SANTA FE SPRINGS, CA 90670

CERT DATE: 05 · 13 · 98
RECERT DATE: 08 · 13 · 98
ATL #: 814487
PAGE: 2 OF 2

CERTIFICATION

This is to certify Ampere-Hour Meters at the above plant were checked on the above date with recorded data provided below. This certification was accomplished by comparison to the following meter, which was certified as indicated, and is traceable to NIST.

FLUKE DMM	S/N 68630277	DATE CERTIFIED: 11 · 04 · 98
CERTIFIED BY: Wilmington Instruments		NIST # 257047

METERS SURVEYED

TANK, POWER SOURCE, OR METER DESCRIPTION	THEORETICAL DIFFERENCE	ACTUAL DIFFERENCE
Amphour #1		
Start @ 11950 Amphour		
5 min. @ 2,448 Amps	204	210
End @ 12160 Amphour		
Amphour #2		
Start @ 7356 Amphour		
10 min @ 1476 Amps	246	270
End @ 7626 Amphour		

In accordance with ISO 10012-1, ANSI Z540-1

FOR INFORMATION ONLY

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APPENDIX E-1

PROCESS DATA FOR
APRIL 30, 1998 SOURCE TEST

NICKEL PLATING PROCESS DATA

Company Name: Foss Plating

Date: 4/30/98

Test ID #:

Time	9:20		9:35		9:50	
Tank #	Bright	S. Bright	Bright	S. Bright	Bright	S. Bright
Totalizer	003914	003684	004499	004015	005127	004414
Amp Meter (amps)	1900	800	2200	1600	2100	1800
Volt Meter (volt)	8.0	6.6	8.0	7.0	8.0	7.0
Tank Temp. (degrees F)	140	140	140	140	140	140
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)	8	8	8	8	8	8
Time	10:05		10:20		10:35	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	005864	004932	006600	005508	007084	005893
Amp Meter (amps)	2100	1800	2000	2000	2400	2000
Volt Meter (volt)	8.0	7.0	8.0	7.0	8.0	7.0
Tank Temp. (degrees F)	140	135	140	135	140	135
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)	8	8	8	8	8	8
Time	10:50		11:05		11:20	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	007989	006440	008575	006843	009911	007285
Amp Meter (amps)	2500	1800	2400	1800	2300	2100
Volt Meter (volt)	8.0	7.0	8.0	7.0	8.0	7.0
Tank Temp. (degrees F)	140	133	140	135	140	135
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)						

NICKEL PLATING PROCESS DATA

Company Name: Foss Plating

Date: 4/30/98

Test ID #:

Time	11:55		12:05		12:25	
Tank #	Bright	S. Bright	Bright	S Bright	Bright	S. Bright
Totalizer	010769	008574	011213	009061	011887	009610
Amp Meter (amps)	1900	2300 –	2000	2300	2200	1800
Volt Meter (volt)	7.0	7.0	7.0	7.0	7.0	7.0
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)	8	8	8	8	8	8
Time	12:40		12:55		13:10	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	012509	010055	013103	0104	013800	010964
Amp Meter (amps)	1300	1800	1100	1800	2000	1400
Volt Meter (volt)	7.0	7.0	7.1	7.0	7.0	7.0
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)	8	8	8	8	8	8
Time	13:25		13:40		13:55	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	014329	011378	014843	011857	015324	012360
Amp Meter (amps)	2000	1800	800	2100	1100	2100
Volt Meter (volt)	7.1	7.0	7.0	7.0	7.0	7.1
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)	8	8	8	8	8	8

NICKEL PLATING PROCESS DATA

Company Name: Foss Plating

Date: 4/30/98

Test ID #:

Time	14:20		14:35		14:50	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	016489	013299	016948	013696	017587	014139
Amp Meter (amps)	1800	1900	2200	1900	2200	2100
Volt Meter (volt)	7.0	7.1	7.0	7.0	7.0	7.0
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)	8	8	8	8	8	8
Time	15:05		15:20		15:35	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	018206	014656	018851	015107	019403	015629
Amp Meter (amps)	2200	2000	1000	1800	1800	1800
Volt Meter (volt)	7.0	7.0	7.0	7.0	7.0	7.0
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)	8	8	8	8	8	8
Time	15:50		16:05		16:20	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	019969	016072	020562	016510	020989	016840
Amp Meter (amps)	1100	1900	1800	1900	1900	1700
Volt Meter (volt)	7.1	7.0	6.1	7.0	6.1	7.0
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	on	on	on	on	on	on
Air Pressure (psig)	8	8	8	8	8	8

APPENDIX E-2

PROCESS DATA FOR
MAY 2, 1998 SOURCE TEST

NICKEL PLATING PROCESS DATA

Company Name: Foss Plating

Test ID #:

Date: 5/2/98

Page 4 of 6

Time	1:05		1:20		1:35	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	000277	000461	000863	000871	001499	001328
Amp Meter (amps)	2000	2000	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.6	10.1	9.6	10.2	9.6
Tank Temp. (degrees F)	130	130	130	130	130	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	oFF	oFF	oFF	oFF	oFF	oFF
Air Pressure (psig)	0	0	0	0	0	0
Time	1:50		2:05		2:20	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	002159	001804	002786	002266	003417	002794
Amp Meter (amps)	2000	1800	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.6	10.2	9.6	10.2	9.6
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	oFF	oFF	oFF	oFF	oFF	oFF
Air Pressure (psig)	0	0	0	0	0	0
Time	2:35		2:50		3:05	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	003996	003226	004608	003669	005287	004171
Amp Meter (amps)	2000	1800	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.6	10.2	9.6	10.2	9.6
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	oFF	oFF	oFF	oFF	oFF	oFF
Air Pressure (psig)	0	0	0	0	0	0

NICKEL PLATING PROCESS DATA

Company Name: Foss Plating

Date: 5/2/99

Test ID #:

Time	3:25		3:40		3:55	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	006117	004778	006759	005252	007422	005740
Amp Meter (amps)	2000	1800	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.6	10.2	9.6	10.2	9.6
Tank Temp. (degrees F)	140	130	140	130	140	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	oFF	oFF	oFF	oFF	off	oFf
Air Pressure (psig)	0	0	0	0	0	0
Time	4:10		4:25		4:40	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	008077	006229	008709	006703	009354	007183
Amp Meter (amps)	2000	1800	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.6	10.2	9.6	10.2	9.6
Tank Temp. (degrees F)	145	130	145	130	145	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	oFF	oFF	oFF	oFF	oFF	oFF
Air Pressure (psig)	0	0	0	0	0	0
Time	4:55		5:10		5:25	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	009972	007670	010560l	008136	011239	008610
Amp Meter (amps)	2000	1800	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.6	10.2	9.6	10.2	9.6
Tank Temp. (degrees F)	145	130	145	120	145	120
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	oFF	oFF	oFF	oFF	oFF	oFF
Air Pressure (psig)	0	0	0	0	0	0

NICKEL PLATING PROCESS DATA

Company Name: Forr Plating

Date: 5/2/98

Test ID #:

Page 6 of 6

Time	5:40		5:55		6:10	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	011899	009100	012547	009579	013244	010094
Amp Meter (amps)	2000	1800	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.6	10.2	9.6	10.2	9.6
Tank Temp. (degrees F)	145	130	145	130	145	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	off	off	off	off	off	off
Air Pressure (psig)	0	0	0	0	0	0
Time	6:25		6:40		6:55	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	013874	010560	014545	011049	015203	011535
Amp Meter (amps)	2000	1800	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.6	10.2	9.6	10.2	9.6
Tank Temp. (degrees F)	145	130	145	130	145	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	off	off	off	off	off	off
Air Pressure (psig)	0	0	0	0	0	0
Time	7:10		7:25		7:40	
Tank #	Bright	S Bright	Bright	S Bright	Bright	S Bright
Totalizer	015885	012034	016549	012524	017216	013014
Amp Meter (amps)	2000	1800	2000	1800	2000	1800
Volt Meter (volt)	10.2	9.8	10.2	9.8	10.2	9.8
Tank Temp. (degrees F)	145	130	145	130	145	130
Nickel Solution (oz/gal)						
Surface Tension (dynes/cm)						
Plating Rate						
Air Agitation (on or off)	off	off	off	off	off	off
Air Pressure (psig)	0	0	0	0	0	0

PACIFIC ENVIRONMENTAL SERVICES, INC.
CARB Method 433
Tank Data Report

Facility: Foss Plating
Source: Bright and Semi Bright Tank
Method: CARB 433
Test Date: 4/30/98-5/2/98

Run 1			
Time	**Description**	**Quantity**	**Tank**
9:20	Towel Boxes were in	8	Bright
	Roll Bars were in	2	Bright
9:23	Towel Boxes were in	4	Semi Bright
	Tubs were in	2	Semi Bright
9:30	Bars were in	6	Semi Bright
	Roll Bars were in	2	Semi Bright
9:38	Towel Boxes were out	8	Bright
	Roll Bars were out	2	Bright
9:40	Manifolds were in	16	Bright
	Tubs were out	2	Semi Bright
	Towel Boxes were out	4	Semi Bright
9:45	Hollow Tubes were in	22	Bright
	Pointed Hangers were in	8	Bright
10:10	Bars were out	6	Semi Bright
	Roll Bars were out	2	Semi Bright
10:30	Manifolds were out	16	Bright
	Hollow Tubes were out	4	Bright
	Pointed Hangers were out	8	Bright
10:40	Towel Boxes were in	6	Semi Bright
	Bumpers were in	2	Semi Bright
	Unions were in	4	Semi Bright
10:45	Stubbies were in	24	Bright
11:05	Stubbies were out	24	Bright
11:15	Towel Boxes were out	6	Semi Bright
	Bumpers were out	2	Semi Bright
	Unions were out	4	Semi Bright

PACIFIC ENVIRONMENTAL SERVICES, INC.
CARB Method 433
Tank Data Report

Run 2			
Time	**Description**	**Quantity**	**Tank**
12:00	ZV were in	16	Bright
	Bars were in	6	Bright
12:20	Bars were in	22	Bright
	Stand Bases were in	6	Bright
12:26	Roll Bars were in	6	Semi Bright
	Rails were in	4	Semi Bright
12:30	ZV were out	16	Bright
	Bars were out	6	Bright
12:35	Towel Boxes were in	8	Semi Bright
	Easi Rod were in	10	Semi Bright
	Rails were in	40	Bright
	Roll Bars were in	6	Bright
12:38	Roll Bars were out	6	Semi Bright
	Rails were out	4	Semi Bright
12:45	Bars were out	22	Bright
	Stand Bases were out	6	Bright
	Towel Boxes were out	8	Semi Bright
	Easi Rod were out	10	Semi Bright
13:05	Rails were out	40	Bright
	Roll Bars were out	6	Bright
13:15	Bumpers were in	12	Semi Bright
	Plates were in	4	Semi Bright
	Prongs were in	36	Bright
	Plates were in	4	Bright
13:28	Prongs were out	36	Bright
	Plates were out	4	Bright
	Bars were in	10	Bright
	Rails were in	4	Bright
13:38	Bumpers were out	12	Semi Bright
	Plates were out	4	Semi Bright
	Bars were out	10	Bright
	Rails were out	4	Bright

PACIFIC ENVIRONMENTAL SERVICES, INC.
CARB Method 433
Tank Data Report

Run 3			
Time	**Description**	**Quantity**	**Tank**
14:42	Towel Paper were in	8	Bright
	Manifolds were in	6	Semi Bright
	Bumpers were in	6	Semi Bright
	Stand Bases were in	6	Bright
14:50	Manifolds were out	6	Semi Bright
	Bumpers were out	6	Semi Bright
14:54	Bars were in	108	Semi Bright
	Stand Bases were out	6	Bright
	Towel Paper were out	8	Bright
15:00	Plates were in	6	Bright
	Bars were in	6	Bright
15:12	Bars were out	108	Semi Bright
	Stand Bases were in	7	Semi Bright
	Bars were in	8	Semi Bright
15:20	Towel Paper were in	8	Bright
	Stand Bases were in	20	Bright
	Plates were out	6	Bright
	Bars were out	6	Bright
15:45	Stand Bases were out	7	Semi Bright
	Bars were out	8	Semi Bright
16:03	Towel Papers were out	8	Bright
	Stand Bases were out	20	Bright
	Chairs were in	4	Bright
16:20	Chairs were out	4	Bright

APPENDIX F

LABORATORY DATA
FOR THE SEMI-BRIGHT NICKEL PLATING SOLUTION

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER ATOTECH USA INC

WAL NO. 8050117

DATE RECEIVED 05/06/98

ATTENTION IRIS BUCHANAN

DATE OF REPORT 05/07/98

SAMPLE IDENTIFICATION: MARK 90 SEMI-BRIGHT NICKEL PLATING SOLUTION

Sample # 1057 sampled 5-2

TANK NO. Run #1 GALLONS SAMPLED 05/06/98

ANALYSIS	STANDARD	RESULTS
	RAW DATA	
NICKEL	10.5 ml	8.25 oz/gal
NICKEL SULFATE		30.7 oz/gal
NICKEL CHLORIDE	7.1 ml	5.64 oz/gal
BORIC ACID	14.2 ml	5.87 oz/gal
pH	3.43	3.43
SURFACE TENSION	34.2 dyne/cm	34.2 dyne/cm
M-90I	0.53	4.52 gal/ 1000 gal

FORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER ATOTECH USA INC

WAL NO. B050118

DATE RECEIVED 05/06/98

ATTENTION IRIS BUCHANAN

DATE OF REPORT 05/07/98

SAMPLE IDENTIFICATION: MARK 90 SEMI-BRIGHT NICKEL PLATING SOLUTION

Sample # 1058 Sampled 5-2

TANK NO. Run #2 GALLONS SAMPLED 05/06/98

ANALYSIS	STANDARD	RESULTS
	RAW DATA	
NICKEL	10.3 ml	8.07 oz/gal
NICKEL SULFATE		29.8 oz/gal
NICKEL CHLORIDE	7.2 ml	5.72 oz/gal
BORIC ACID	14.0 ml	5.80 oz/gal
pH	3.45	3.45
SURFACE TENSION	34.5 dyne/cm	34.5 dyne/cm
M-901	0.51	4.43 gal/ 1000 gal

FORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 (909) 627-3628 · FAX (909) 627-0491

CUSTOMER ATOTECH USA INC

WAL NO. 8050119

DATE RECEIVED 05/06/98

ATTENTION IRIS BUCHANAN

DATE OF REPORT 05/07/98

SAMPLE IDENTIFICATION: MARK 90 SEMI-BRIGHT NICKEL PLATING SOLUTION

Sample # 1059 Sampled 5-2

TANK NO. Run #3 GALLONS SAMPLED 05/06/98

ANALYSIS	STANDARD	RESULTS
	RAW DATA	
NICKEL	10.7 ml	8.44 oz/gal
NICKEL SULFATE		31.4 oz/gal
NICKEL CHLORIDE	7.3 ml	5.78 oz/gal
BORIC ACID	14.4 ml	5.98 oz/gal
pH	3.58	3.58
SURFACE TENSION	35.4 dyne/cm	35.4 dyne/cm
M-901	0.52	4.46 gal/ 1000 gal

FORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3828 · FAX (909) 627-0491

CUSTOMER ATOTECH USA INC

WAL NO. 8050114

DATE RECEIVED 05/06/98

ATTENTION IRIS BUCHANAN

DATE OF REPORT 05/07/98

SAMPLE IDENTIFICATION: MARK 90 SEMI-BRIGHT NICKEL PLATING SOLUTION

Sample # 1054 Sampled 4-30

TANK NO. Run #1 GALLONS SAMPLED 05/06/98

ANALYSIS	STANDARD	RESULTS
	RAW DATA	
NICKEL	10.4 ml	8.19 oz/gal
NICKEL SULFATE		30.6 oz/gal
NICKEL CHLORIDE	6.9 ml	5.48 oz/gal
BORIC ACID	14.1 ml	5.83 oz/gal
pH	3.65	3.65
SURFACE TENSION	34.9 dyne/cm	34.9 dyne/cm
M-901	0.52	4.44 gal/ 1000 gal

FORM 1002 CONT

TOTAL P.07

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER ATOTECH USA INC

WAL NO. 8050115

DATE RECEIVED 05/06/98

ATTENTION IRIS BUCHANAN

DATE OF REPORT 05/07/98

SAMPLE IDENTIFICATION: MARK 90 SEMI-BRIGHT NICKEL PLATING SOLUTION

Sample # 1055 sampled 4-30

TANK NO. Run #2 GALLONS SAMPLED 05/06/98

ANALYSIS	STANDARD	RESULTS
	RAW DATA	
NICKEL	10.5 ml	8.26 oz/gal
NICKEL SULFATE		30.7 oz/gal
NICKEL CHLORIDE	7.1 ml	5.65 oz/gal
BORIC ACID	14.4 ml	5.95 oz/gal
pH	3.56	3.56
SURFACE TENSION	35.9 dyne/cm	35.9 dyne/cm
M-901	0.52	4.45 gal/ 1000 gal

FORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0401

CUSTOMER ATOTECH USA INC

WAL NO. 8050116

DATE RECEIVED 05/06/98

ATTENTION IRIS BUCHANAN

DATE OF REPORT 05/08/98

SAMPLE IDENTIFICATION: MARK 90 SEMI-BRIGHT NICKEL PLATING SOLUTION

Sample # 1056 sampled 4-30

TANK NO. Run #3 GALLONS SAMPLED 05/06/98

ANALYSIS	STANDARD	RESULTS
	RAW DATA	
NICKEL	10.3 ml	8.09 oz/gal
NICKEL SULFATE		30.0 oz/gal
NICKEL CHLORIDE	7.1 ml	5.64 oz/gal
BORIC ACID	14.5 ml	5.99 oz/gal
pH	3.66	3.66
SURFACE TENSION	34.6 dyne/cm	34.6 dyne/cm
M-901	0.52	4.48 gal/ 1000 gal

FORM 1002 CONT

fax: 626-814-0864

PACIFIC ENVIRONMENTAL SERVICES, INC.

DATE 5/6/98 PAGE 1 OF 1

CHAIN-OF-CUSTODY RECORD

Atotech - Semi Bright

PROJECT NAME: Foss Plating
COMPANY NAME: PES
REFERENCE: Dennis Beeson 626-856-1400
ADDRESS: 13100 Brooks DR. Baldwin Park, CA 91706
SAMPLERS (SIGNATURE)

SAMPLE	DATE	TIME	LOCATION	Nickel metal	Nickel Chloride	Nickel Sulfate	Boric Acid	Surfactant	pH					NUMBER OF CONTAINERS	COMMENTS/ CONTAINER TYPE
Run 1	4/30		Foss Plating	✓	✓	✓	✓	✓	✓						SBN - Run 1
" 2	4/30		"	✓	✓	✓	✓	✓	✓						SBN - Run 2
" 3	4/30		"	✓	✓	✓	✓	✓	✓						SBN - Run 3
" 4	5/2		"	✓	✓	✓	✓	✓	✓						SBN - Run 1
" 5	5/2		"	✓	✓	✓	✓	✓	✓						" " 2
" 6	5/2		"	✓	✓	✓	✓	✓	✓						" " 3

1 RELINQUISHED BY	DATE 5/5/98	3 RELINQUISHED BY	DATE 5/6	5 RELINQUISHED BY	DATE	TOTAL NUMBER OF CONTAINERS	
SIGNATURE	TIME	SIGNATURE	TIME 8:66	SIGNATURE	TIME	SAMPLE CONDITIONS	
PRINTED NAME		PRINTED NAME		PRINTED NAME		RECEIVED ON ICE	YES / NO
COMPANY		COMPANY		COMPANY		SEALED	YES / NO
2 RECEIVED BY	DATE 5/6	4 RECEIVED BY	DATE	6 RECEIVED BY	DATE	SPECIAL SHIPMENT / HANDLING OR STORAGE REQUIREMENTS:	
SIGNATURE	TIME 3:09 PM	SIGNATURE	TIME	SIGNATURE	TIME		
PRINTED NAME		PRINTED NAME Iris Buchanan		PRINTED NAME			
COMPANY		COMPANY Atotech, USA		COMPANY			

Telephone: (818) 856-1400 13100 Brooks Drive Baldwin Park, California 91706 Fax: (818) 814-0820

05/08/1998 15:59 6253054043 ATOTECH USA MONROVIA PAGE 01

APPENDIX G

LABORATORY DATA
FOR THE BRIGHT NICKEL PLATING SOLUTION

Brent America, Inc.
16961 Knott Avenue
La Mirada, California 90638-6015

Brent International Group

Brent

SERVICE THROUGH SOLUTIONS

NICKEL PLATING SOLUTION

TANK NO.: SAMPLE # 1
TANK VOLUME: RACK # 1 BRIGHT
PROCESS: _____
SAMPLE DATE: APRIL 30, 1998

CUSTOMER SERVICE ANALYSIS

BATH COMPOSITION	ANALYSIS	OPTIMUM CONCENTRATION	RECOMMENDED ADDITIONS
Nickel Metal oz/gal	11.83		
Nickel Sulfate oz/gal	40.85		
Nickel Chloride oz/gal	10.98		
Boric Acid oz/gal	8.15		
pH	4.02		
ADDITIVES			

REMARKS & SPECIAL INSTRUCTIONS

Brent America, Inc.
16961 Knott Avenue
La Mirada, California 90638-6015

Brent International Group

SERVICE THROUGH SOLUTIONS

NICKEL PLATING SOLUTION

TANK NO.: SAMPLE # 2
TANK VOLUME: RUN - 2 BRIGHT
PROCESS: _____
SAMPLE DATE: APRIL 30, 1998

CUSTOMER SERVICE ANALYSIS

BATH COMPOSITION	ANALYSIS	OPTIMUM CONCENTRATION	RECOMMENDED ADDITIONS
Nickel Metal oz/gal	11.83		
Nickel Sulfate oz/gal	41.03		
Nickel Chloride oz/gal	10.82		
Boric Acid oz/gal	8.19		
pH	4.00		
ADDITIVES			

REMARKS & SPECIAL INSTRUCTIONS

Brent America, Inc.
16961 Knott Avenue
La Mirada, California 90638-6015

Brent International Group

SERVICE THROUGH SOLUTIONS

NICKEL PLATING SOLUTION

TANK NO.: SAMPLE #3
TANK VOLUME: RUN-3 BRIGHT
PROCESS: _____
SAMPLE DATE: APRIL 30, 1998

CUSTOMER SERVICE ANALYSIS

BATH COMPOSITION	ANALYSIS	OPTIMUM CONCENTRATION	RECOMMENDED ADDITIONS
Nickel Metal oz/gal	12.23		
Nickel Sulfate oz/gal	42.82		
Nickel Chloride oz/gal	10.82		
Boric Acid oz/gal	8.03		
pH	4.03		
ADDITIVES			

REMARKS & SPECIAL INSTRUCTIONS

Brent America, Inc.
16961 Knott Avenue
La Mirada, California 90638-6015

SERVICE THROUGH SOLUTIONS

NICKEL PLATING SOLUTION

TANK NO.: SAMPLE # 4
TANK VOLUME: RUN - 4 BRIGHT
PROCESS: _____
SAMPLE DATE: MAY 2, 1998

CUSTOMER SERVICE ANALYSIS

BATH COMPOSITION	ANALYSIS	OPTIMUM CONCENTRATION	RECOMMENDED ADDITIONS
Nickel Metal oz/gal	11.91		
Nickel Sulfate oz/gal	41.25		
Nickel Chloride oz/gal	10.50		
Boric Acid oz/gal	8.07		
pH	4.17		
ADDITIVES			

REMARKS & SPECIAL INSTRUCTIONS

Brent America, Inc.
16961 Knott Avenue
La Mirada, California 90638-6015

Brent International Group

Brent

SERVICE THROUGH SOLUTIONS

NICKEL PLATING SOLUTION

TANK NO.: SAMPLE # 5
TANK VOLUME: RUN-5 BRIGHT
PROCESS: _____
SAMPLE DATE: May 2, 1998

CUSTOMER SERVICE ANALYSIS

BATH COMPOSITION	ANALYSIS	OPTIMUM CONCENTRATION	RECOMMENDED ADDITIONS
Nickel Metal oz/gal	12.57		
Nickel Sulfate oz/gal	44.03		
Nickel Chloride oz/gal	10.98		
Boric Acid oz/gal	8.28		
pH	4.20		
ADDITIVES			

REMARKS & SPECIAL INSTRUCTIONS

Brent America, Inc.
16961 Knott Avenue
La Mirada, California 90638-6015

Brent International Group

Brent

SERVICE THROUGH SOLUTIONS

NICKEL PLATING SOLUTION

TANK NO.: SAMPLE # 6
TANK VOLUME: RUN-6 BRIGHT
PROCESS: _____
SAMPLE DATE: 8 Aug 2, 1998

CUSTOMER SERVICE ANALYSIS

BATH COMPOSITION	ANALYSIS	OPTIMUM CONCENTRATION	RECOMMENDED ADDITIONS
Nickel Metal oz/gal	12.62		
Nickel Sulfate oz/gal	44.57		
Nickel Chloride oz/gal	10.82		
Boric Acid oz/gal	8.32		
pH	4.28		
ADDITIVES			

REMARKS & SPECIAL INSTRUCTIONS

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER PACIFIC ENVIRONMENTAL SRVCSINC

WAL NO. 8060640

DATE RECEIVED 06/26/98

ATTENTION DENNIS BECVAR

DATE OF REPORT 06/29/98

SAMPLE IDENTIFICATION: BRIGHT NICKEL

TANK NO. 1 GALLONS SAMPLED 06/25/98

ANALYSIS	STANDARD	RESULTS
SURFACE TENSION		31.3 dyne/cm

FORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER PACIFIC ENVIRONMENTAL SRVCSINC

WAL NO. 8060641

DATE RECEIVED 06/26/98

ATTENTION DENNIS SERVAR

DATE OF REPORT 06/29/98

SAMPLE IDENTIFICATION: BRIGHT NICKEL

Rinse
TANK NO. 2 GALLONS SAMPLED 06/26/98

ANALYSIS	STANDARD	RESULTS
SURFACE TENSION		31.2 dyne/cm

ORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER PACIFIC ENVIRONMENTAL SRVCSINC

WAL NO. 8060642

DATE RECEIVED 06/26/98

ATTENTION DENNIS BEIVAR

DATE OF REPORT 07/08/98

SAMPLE IDENTIFICATION: BRIGHT NICKEL

Rinse

~~TANK~~ NO. 3 GALLONS SAMPLED 06/26/98

ANALYSIS	STANDARD	RESULTS
SURFACE TENSION		31.1 dyne/cm

ORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER PACIFIC ENVIRONMENTAL SRVCSINC

WAL NO. 8060643

DATE RECEIVED 06/26/98

ATTENTION DENNIS BECVAR

DATE OF REPORT 06/29/98

SAMPLE IDENTIFICATION: BRIGHT NICKEL

TANK NO. 4 GALLONS SAMPLED 06/26/98

ANALYSIS	STANDARD	RESULTS
SURFACE TENSION		32.0 dyne/cm

FORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER PACIFIC ENVIRONMENTAL SRVCSINC

WAL NO. 8060644

DATE RECEIVED 06/26/98

ATTENTION DENNIS BECVAR

DATE OF REPORT 06/29/98

SAMPLE IDENTIFICATION: BRIGHT NICKEL

TANK NO. 5 GALLONS SAMPLED 06/26/98

ANALYSIS	STANDARD	RESULTS
SURFACE TENSION		31.3 dyne/cm

FORM 1002 CONT

WESTERN ANALYTICAL LABORATORIES, INC.

13744 MONTE VISTA AVENUE · CHINO, CALIFORNIA 91710 · (909) 627-3628 · FAX (909) 627-0491

CUSTOMER PACIFIC ENVIRONMENTAL SRVCSINC

WAL NO 3060645

DATE RECEIVED 06/26/98

ATTENTION DENNIS BECVAR

DATE OF REPORT 06/29/98

SAMPLE IDENTIFICATION: BRIGHT NICKEL

TANK NO 6 GALLONS SAMPLED 06/26/98

ANALYSIS	STANDARD	RESULTS
SURFACE TENSION		33.5 dyne/cm

FORM 1002 CONT

Appendix G

Model Source Test Protocol

MODEL SOURCE TEST PROTOCOL
FOR NICKEL EMISSION MEASUREMENTS

Prepared For

Prepared On

Prepared By

Telephone:

SOURCE TEST PROTOCOL
FOR NICKEL EMISSION MEASUREMENTS

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SECTION 4 RESULTS .....

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MODEL SOURCE TEST PROTOCOL
FOR NICKEL EMISSION MEASUREMENTS

GENERAL INFORMATION

Facility:

Contact:

Telephone:
Fax:

Source Test Coordinators:

Telephone:
Fax:

Telephone:
Fax:

Source Testing Contractor:

Contact:

Telephone:
Fax:

Schedule:

MODEL SOURCE TEST PROTOCOL
FOR NICKEL EMISSION MEASUREMENTS

1.0 INTRODUCTION

Describe the location of the test and the purpose of the emissions testing program.

2.0 EQUIPMENT AND PROCESS DESCRIPTION

The following is a summary of the tanks and the rectifiers in use at the subject nickel plating facility:

Tank No.	Operating Amperage	Dimensions (LxWxH)	Tank Contents	Emission Control?	Lip Exhaust?	Fume Hood?	Air Agitation?

A diagram showing the tanks and ventilation system is shown as Figure 1. A plan view of the plating area and roof vents is included as Figure 2. These plating tanks will utilize a forced draft ventilation system during the test which includes a X,XXX cfm fan. Plastic sheeting will be placed around the plating tanks to assure all plating emissions are captured by the ventilation system, and to assure that the contribution of background nickel is minimized. These plating tanks are [not] vented to an emissions control device. A diagram of the emission control device is included as Figure 3. This testing program will be conducted over a XX day period.

Figure 1

Sampling Location and Discharge Fan

Figure 2

Plan View of System

Figure 3

Diagram of Emission Control Device

3.0 TESTING METHODOLOGY

The location of the sampling ports for the stack is shown in Figure 1. The required number of traverse points for each will be xx points on each of two diameters, 90° apart. The locations of traverse points will be based on EPA Method 1. The sampling will be conducted in triplicate during periods of high production.

A smoke test will be conducted prior to the emissions testing program to verify adequate ventilation over the tanks has been achieved with the forced draft ventilation system.

Nickel will be measured using a modified CARB Method 433 sampling procedure. A diagram showing the configuration of the sampling train is shown in Figure 4. The samples will be extracted at ambient temperature with a sampling train configured with: a glass nozzle; Teflon union, a 60-inch glass-lined probe; a xx-foot Teflon tube from the probe to the first impinger, two Greenburg-Smith impingers; each containing 100 milliliters of 0.1 Normal solution of nitric acid; an empty impinger; an impinger filled with approximately 200 grams silica gel; a xx-foot umbilical line; a vacuum pump; a dry gas meter; and a calibrated orifice connected to an inclined oil manometer. A filter operated at ambient temperature will be located between the third and fourth impingers.

The weight of the impinger solution and the weight of the silica gel will be recorded before and after each test run in order to obtain the moisture content of the exhaust gases. All sample weights will be recorded on sample recovery sheets during charging and sample recovery. Leak checks will be performed immediately before and after each test.

Sampling will be conducted isokinetically two hours per test run (5 minutes per point) per sample (test run) generating a sample size of about 100 cubic feet through the sampling train. Field data will be recorded on data sheets shown in Appendix A.

Volumetric flow rates for the outlet will be calculated from the measured velocity head and the cross-sectional area of the stack. As each traverse point is sampled, the velocity head of the flue gas will be measured with an S-type Pitot tube connected to an inclined oil manometer, and the

temperature of the flue gas will be measured with a chromel-alumel (type K) thermocouple connected to a digital readout (EPA Method 2).

After each test run, the contents of the impingers will be recovered and placed in a 1,000 milliliter polyethylene container. The remainder of the sampling train components will be rinsed from the nozzle through the third impinger with the charging solution and the rinse added to the sample. The filter will be placed in the same sample container and analyzed along with the solution. During sample collection the impingers and solution will be immersed in an ice bath (chilled to 68 degrees Fahrenheit or less during the tests) and refrigerated prior to the analyses.

The laboratory analyses for nickel will be conducted by XX in XX, California. The mass of Nickel collected in each train will be determined by inductively coupled plasma/mass spectrometry. The detection level of the analytical procedure for nickel is expected to be 1 microgram/liter. An example of a chain of custody form to be used for tracking samples during this project is shown in Appendix B and will be maintained for each sample throughout the sample recovery and analytical process.

The following calculations are required by Method 433 before conducting a test. Best available measured values or estimated values and their ranges are used for each formula entry. These calculations are used to predict incompatibilities among the expected ranges for formula entries.

Eq. 1	Sample Concentration x Flow x Time = Mass Sampled
Eq. 2	Mass Analyzed / Liquid Volume = Reported Concentration

Where:

Sample Concentration =	expected concentration of total nickel compounds in the sampled gas.
Flow =	sample flow rate.
Mass Sampled =	mass collected per sampling run.
Mass Analyzed =	same as mass sampled, or, if appropriate, the aggregate mass of more than one run.
Liquid Volume =	volume of liquid which dissolves the nickel analyte at the time of analytical detection.
Reported Concentration =	concentration reported from the analysis; the range minimum is the detection limit

Typical values expected for the listed parameters are as follows:

Sample Concentration =	0.005 to 0.025 mg/m^3
Flow =	1.5 to 2.5 m^3
Mass Sampled =	7.5 to 62.5 ug
Mass Analyzed =	7.5 to 62.5 ug
Liquid Volume =	300 to 600 ml
Reported Concentration =	12.5 to 200 ug/l

The level of detection for the analytical procedure used is expected to be 1 ug/l or less, which is below the lowest calculated concentration.

4.0 RESULTS

Calculations will be made from field data sheets to determine sample volume, molecular weight, velocities, flow rate, and isokinetic variation for the test. These calculations are shown on the emission test calculation sheets located in Appendix A. An example of a data summary for the source emissions is shown in Table 1. An example table showing the production data that will be collected during the testing is shown in Table 2. Process rate data in units of amp-hours will be recorded during each emission sampling test run.

Figure 4

Diagram of Modified CARB Method 433 Sampling Train

5.0 QUALITY ASSURANCE/QUALITY CONTROL

Reliability and accuracy of the test data is assured by using the following work practices:

5.1 Use of Standard Test Procedures

A procedure must be thoroughly studied under various conditions in order to be designated as a state or federal Reference Method. Results of many executions of the procedure are compared to demonstrate accuracy and repeatability before adoption of the procedure as a source testing method EPA Methods 1 and 2 will be utilized to determine the sampling point locations and flow rate. CARB Method 433 will be used to determine the emission rates of nickel.

5.2 Use of Trained Test Personnel

Because of the complexity of typical source testing methods, the testers are trained and experienced with the test procedures in order to assure reliable results for this testing program.

5.3 Knowledge of Source's Operation

The source testing team well have sufficient knowledge of the process to be tested in order to properly document the process parameters during the tests. Without documentation of the process parameters used, results are much less meaningful.

Table 1

Example Data Summary for Nickel Emissions

Run Number	1	2	3	Average
Sample Collection Date				
Sample Time				
Load (amp-hrs/hr)				
Sample Number				
Stack Temperature (deg F)				
Outlet Velocity (ft/sec)				
Static Pressure, in. H_2O				
Outlet Flow Rate (ACFM)				
Outlet Flow Rate (DSCFM)				
Moisture (% v/v)				
Sample Volume (DSCF)				
Sampling Time (min)				
Isokinetic Rate (%)				
Nickel				
Concentration (mg/m^3)				
Emission Rate (mg/hr)				
Emission Factor (mg/amp-hr)				

Table 2

Example Data Summary of Process Data

Run No.	**1**	**2**	**3**	**Average**
Sample Collection Date				
Time period for collecting process amperage data				
Tank No. Volts Amperage Temperature Nickel solution				
Tank No. Volts Amperage Temperature Nickel solution				
Air agitation (on or off)				

TABLE 3

CALIBRATION PROCEDURES AND CRITERIA FOR CARB METHOD 433 SAMPLING EQUIPMENT

Parameter	Calibration Technique	Reference Standard	Acceptance Limit	Frequency
CARB Method 433 Measurements				
1. Probe nozzle	Measure Diameter to nearest 0.001"	Micrometer	Average of three measurements; difference between high and low <0.1 mm	Prior to test
2. Gas Meter Volume	Compare to Reference Meter	Dry Gas Meter Transfer Standard	Record calibration factor ± 5% of pretest calibration factor	Prior to test
3. Gas Meter Temperature	Compare to Mercury-in-glass	ASTM Thermometer	± 5 deg F	Posttest
4. Stack Temperature Sensor	Heated block monitored with potentiometric thermocouple system	NIST Traceable potentiometric thermocouple system	± 1.5% of minimum absolute stack temperature	Prior to test
5. Final Impinger Temperature Sensor	Compare to Mercury-in-glass	ASTM thermometer	± 5 deg F	Prior to test and Posttest
6. Aneroid Barometer	Compare to Mercury Barometer	Mercury column barometer	± 2.5 mm	Prior to test and Posttest
7. S-Type Pitot Tube		Micrometer and Angle finder	No change from pretest conditions	Prior to test and Posttest

5.4 Equipment Maintenance and Calibration

Use of properly maintained and calibrated test equipment is essential for minimizing systematic errors in results. All sampling devices to be used for this project will be constructed, maintained, and calibrated as suggested in EPA documents APTD-0576, and APTD-0581 (These are commonly accepted construction and maintenance manuals for source testing equipment). The dry gas meters will be calibrated with a transfer gas meter with NIST traceability. These calibrations will be included in the Appendices to the final source test report along with those for the nozzles, thermocouples, digital potentiometers, and Pitot tubes. Calibration procedures and acceptance criteria for ARB Method 433 are summarized in Table 3.

5.5 Thorough Recordkeeping

All data relating to the operation of the sampling train will be immediately recorded to ensure that it is not lost or misinterpreted. Field data sheets similar to those shown in Appendix B will be utilized. Any unusual occurrences in the process operations, unusual test instrument readings, or any other items that could affect the test results will be noted.

5.6 Proper Sample Handling Procedures

Inaccurate source test results can be caused by delays in retrieving samples, contamination of the samples, insufficient sample identification, tampering, and mishandling of samples. The chances of these errors are greatly increased when too many people are permitted to handle the samples. For this reason, a chain of custody procedure will be used. The samples will be recovered at the site and kept in secure areas until delivery to the analytical laboratory. The nickel samples will be kept refrigerated until analysis. A sample submittal/chain of custody form will be completed and submitted with the nickel samples to document that each sample analyzed was taken under the conditions reported.

5.7 Use of Thoroughly Cleaned Glassware

All glassware and probe lines will be cleaned prior to the tests with hot tap water and then with 40% nitric acid solution. The trains will then be cleaned with 0.1 normal sodium hydroxide solution, laboratory grade distilled water, air dried, and sealed until the tests.

5.8 Use of Standardized Data Reduction Techniques

Data reduction will be accomplished by the use of step by step calculation sheets. The calculations will be systematic and easy to follow. All calculations for the source test will be included in the final source test report.

5.9 Analytical Quality Assurance Procedures

Filter and reagent samples from an unused but charged nickel sampling train carried to the field will be submitted to the laboratory and analyzed with the other samples to detect any possible contamination of sampling media or problems with lab analyses. No corrections will be made to the measured concentrations of the collected samples, but the blank train results will be reported on the calculation sheets. In addition, one sample in the group submitted will be spiked and re-analyzed to check for matrix effects, and duplicate analysis will be performed on one sample in the group. Acceptance criteria for the analytical QA procedures are summarized in Table 4.

TABLE 4

QUALITY ASSURANCE OBJECTIVES FOR PRECISION AND ACCURACY

Data Quality Parameter	Method of Determination	Frequency	Precision	Accuracy
CARB Method 433 Nickel	Duplicate analysis	1 per test series	< 10% RPD	
	Spike	1 per test series		75 to 125 % recovery
	Field blanks	1 per test series	NA	NA
	Initial Calibration reference standard. Certified standard independent of working calibration standards.	Prior to sample analysis	NA	10%
	Check - standard midpoint standard verification	After every 10 samples and at end of analytical run	NA	10%

MODEL TEST PROTOCOL APPENDIX A

EXAMPLE FIELD DATA AND CALCULATION SHEETS

MODEL TEST PROTOCOL APPENDIX B

EXAMPLE CHAIN OF CUSTODY FORM

CHAIN OF CUSTODY RECORD

COMPANY _____
ADDRESS _____
_____
PHONE NO. _____ FAX _____
MAIL REPORT TO: _____

PROJECT MANAGER _____
PROJECT NAME _____
PROJECT NO. _____
PURCHASE ORDER NO. _____

COMMENTS:

If sample is liquid & has sediment or particulate should we:
_____ test filtrate only?
_____ mix sample by shaking?
_____ test particulate only?

If sample is multi-phased, should we:
_____ test each phase separately?
_____ test only ONE phase? Which phase?
_____ mix all phases by shaking, if possible?

Sample I.D. #	Date Sampled	Time Sampled	Preservative	MATRIX: soil	water	air	other	# of containers	8015 Modified Gas Diesel	Total Petroleum Hydrocarbons 418.1	Halo. Volatiles 601/8010	Aromatic Volatiles 602/8020	Volatile Organics 624/8260	Semi-Volatile Org 625/8270	Chlor Pes/PCB 608/8080	Herbicides 615/8150	CAM (17) Metals	TCLP Metals	STLC Metals	Hex Chrome EPA 218.6	CARB 425/Total & Hex Chrome	CARB 436 Multi-metals					RUSH	Remarks

Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time
Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time
Relinquished by:	Company	Date/Time	Received by:	Company	Date/Time

NOTE: Samples are discarded 30 days after date of final report.

White Copy - WCAS • Yellow - Report • Pink - Client

MODEL TEST PROTOCOL APPENDIX C

COPY OF THE PERMIT TO OPERATE