STAPPA/ALAPCO

#108 10/28/86

BR #52 2.2 4.0

ANCHORAGE WATER & SEWER UTILITIES

2.5

3000 Arctic Boulevard
Anchorage, Alaska 99503
(907) 277-7622

Tony Knowles
Mayor

Owned by the Municipality of Anchorage

October 14, 1982

RECEIVED
OCT 27 1982
ENVIRONMENTAL CONSERVATION
REGION II

Alaska Department of Environmental Conservation
Air Quality Control
437 "E" Street, 2nd Floor
Anchorage, Alaska 99501

Attention: Mr. Carl Harmon

Subject: Pt. Woronzof Wastewater Treatment Facility Incinerator Stack Emissions Report - A.A.P.C.A. 0580, AQC-517 Permits

On the 20, 21, 22 of September, 1982, Chemical and Geological Laboratories of Alaska, Inc. performed particulate loading and sulfur dioxide tests on the Pt. Woronzof Wastewater Treatment Facility incinerator stack emissions. Results of their analyses are attached. Listed below is other information required by the Pt. Woronzof Air Quality Permits:

1. Highest six month average opacity reading from transmissometer:

   July 1982 - 22.5% for 1.6 minutes

2. Days operated:

1982	April	May	June	July	August	September
	28.1	23.6	24.4	27.9	27.1	25.1

3. Fuel Consumed (hundred cubic feet):

1982	April	May	June	July	August	September
	14,992 1.5	13,363 1.3	12,105 1.2	12,787 1.3	12,871 1.3	11,842 1.2

The next incinerator stack emission report will be submitted in April 1983. If you have any questions concerning this report, I can be reached at telephone number 338-3870.

R. E. Hutson
Manager
Treatment Division
AWWU

REH, JKW, /vw

The Treatment Section is charged with the responsibility for effective treatment of wastewater from residential, commercial, and industrial users of all area-wide sewerage systems within the municipal boundaries, prior to discharge to the waters of Cook Inlet. In carrying out this responsibility the Section operates treatment facilities serving the Anchorage, Eagle River and Girdwood communities, as well as over 20 sewage pumping and metering stations in the Anchorage area. The Section has also operated a solid waste incineration facility at the Point Woronzof treatment plant site since late 1971, first through a contractual agreement with the State of Alaska, Division of Aviation, for disposal of international air traffic garbage, and now for the disposal of classified documents and other materials from various governmental agencies and private organizations. This service will be discontinued in mid-1979.

The Point Woronzof treatment plant, located on a 46 acre tract on the northwestern corner of the Greater Anchorage area, operates 24 hours a day, 7 days a week, to provide primary treatment for the sewage from the community. The facility, which began operation in July 1972, has an optimum treatment capacity of 34 million gallons per day (MGD), and a hydraulic capacity of 75 MGD. It is designed to be readily expanded through duplication of certain units, and by further additions can provide for higher degrees of treatment, as may be required by regulatory authorities.

Raw wastewater enters the plant headworks through a 96 inch diameter tunnel, goes through a screening process, then is diverted to clarifiers where settleable and floatable solids are both separated from the water and pumped to other units for thickening, drying, incineration, and final disposal of the ash to the sanitary landfill. The water, or effluent, is chlorinated for reduction of harmful bacteria, routed through a long section of 84 inch diameter outfall pipe which also serves as a chlorine contact chamber, to a control structure, and then discharged a short distance out in the inlet, at a location where water currents provide some mixing and dispersion. The outfall pipe is designed to be extended if necessary.

As a means of assuring control of effluent quality and of the operational processes, the treatment plant laboratory carries out a great many examinations on samples of sewage and its components. The results of these tests document treatment efficiencies and the characteristics of the materials tested, and are necessary to the effective management of the facility. In addition, data resulting from the test procedures forms the basis for regular, required, monitoring reports to the Environmental Protection Agency and the Alaska Department of Environmental Conservation. The laboratory also provides analytical services from time to time to other agencies, such as U.S. Public Health, U.S.G.S., B.L.M., and the Corps. of Engineers, and to municipal government departments, including Solid Waste, Utility Engineering, and the School District.

The Point Woronzof treatment plant is presently treating a wastewater flow averaging nearly 24 million gallons per day (MGD). From that volume about 250 to 300 tons of wet sludge containing 10 to 12 tons of dry solids are removed each day for conditioning, incineration, and disposal. From 1½ to 2 tons of ash are produced each day from the incineration process, and that residue together with about 1¼ tons of grit separated daily from the raw wastewater is hauled to a landfill site for final disposal. Eleven to twelve hundred pounds of chlorine are required for disinfection of the plant effluent as it is being discharged to Cook Inlet each day.

The Eagle River facility, in service since 1971, is a small aerated lagoon treatment works, and is severely overloaded as a result of the rapid growth of that community. Construction of a larger plant, which will provide a higher degree of treatment, is scheduled to begin in late 1979 and be completed by the end of 1980. The plant will utilize biological treatment units, which include large air-driven rotating reactors, with primary and secondary solids separation, and aerobic digestion of the solids. Land disposal of the digested sludge will be practised at this facility. The disinfected effluent is discharged to Eagle River, a freshwater stream nearby.

The Girdwood-Alyeska ski resort and residential area placed an all-new sewer system and treatment plant in operation in the fall of 1978, to meet the growth requirements of this popular area. The sophisticated tertiary treatment process includes activated bio-filters, mixed-media filtration, and discharge of a very high quality effluent to an on-site leaching pond, where the water will percolate into the ground rather than be released directly to a receiving stream. The aerobically digested sludge produced in the Girdwood plant will be dewatered and trucked to Anchorage for final disposal.

MUNICIPALITY OF ANCHORAGE
Sewer Utility - Treatment Section

Pt. Woronzof Wastewater Treatment Plant

DESIGN DATA

TRIBUTARY POPULATION

Initial Design	221,000
Ultimate Design	442,000

SEWAGE QUANTITY, MGD

Average Flow	
Initial Design	34
Ultimate Design	75
Minimum Flow	
Initial Design	17
Ultimate Design	34
Maximum Flow	
Initial Design	75
Ultimate Design	150

DESIGN LOADINGS

Biochemical Oxygen Demand (1,000 lbs. per day)	
Initial Design	40.7
Ultimate Design	81.4
Suspended Solids (1,000 lbs. per day)	
Initial Design	21.5
Ultimate Design	43.0

INFLUENT SEWER

Diameter (inches)	96

COMMINUTER UNITS

Number	3
Channel Width (feet)	5
Channel Depth (feet)	11
Maximum Water Depth (feet)	7.33
Clear Opening (inches)	0.75

SEDIMENTATION TANKS

Number	
Initial Design	3
Ultimate Design	6
Diameter (feet)	120
Side Water Depth (feet)	10
Detention Time at Design Flow (hrs.)	1.80
Maximum Hydraulic Capacity per Tank (mgd)	37.5
Overflow Rate at Design Flow (gal. per day, per sq. ft.)	1,000

SLUDGE THICKENERS

Number	
Initial Design	1
Ultimate Design	2
Diameter (feet)	40
Solids Loading (lbs. per day, per sq. ft.)	20

CHLORINATORS

Number	2
Maximum Feed Rate (lbs. per day)	16,000
Minimum Feed Rate (lbs. per day)	500

FLOW METER

Minimum Flow (gpm)	3,400
Maximum Flow (gpm)	35,000

RAW SLUDGE PUMPS

Number	
Initial Design	3
Ultimate Design	6
Capacity per Unit (gpm)	200

THICKENED SLUDGE PUMPS

Number	
Initial Design	2
Ultimate Design	3
Capacity per Unit	
Minimum (gpm)	12
Maximum (gpm)	37

VACUUM FILTERS

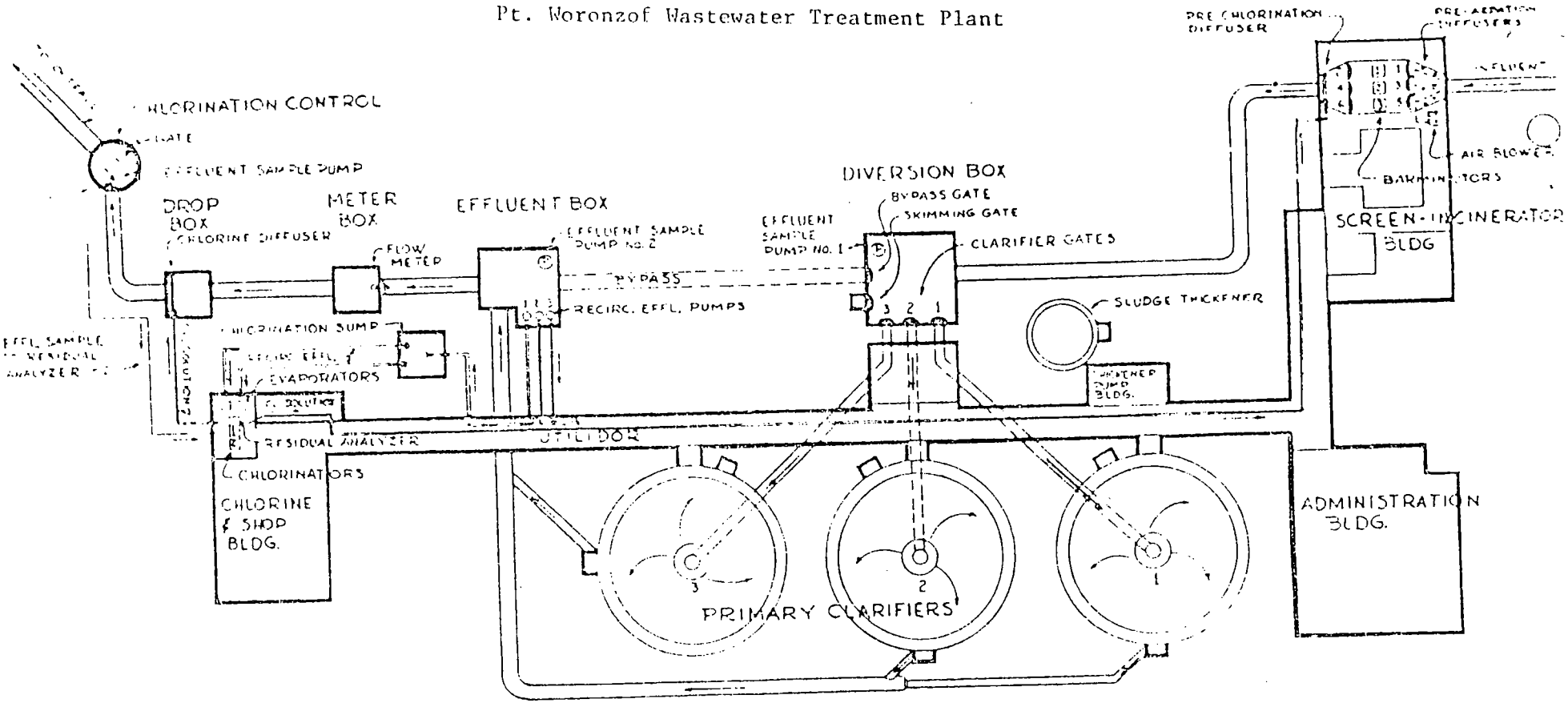
Number	
Initial Design	1
Ultimate Design	2
Solids Loading Rate (lbs. per hr, per sq. ft.)	8
Sludge Cake Moisture	% 70-75

INCINERATORS

Number	
Initial Design	1
Ultimate Design	2
Capacity (tons dry solids per hr.)	0.5
Fuel Value (Btu per lb. combustible)	10,000

5-17-79

Pt. Woronzof Wastewater Treatment Plant



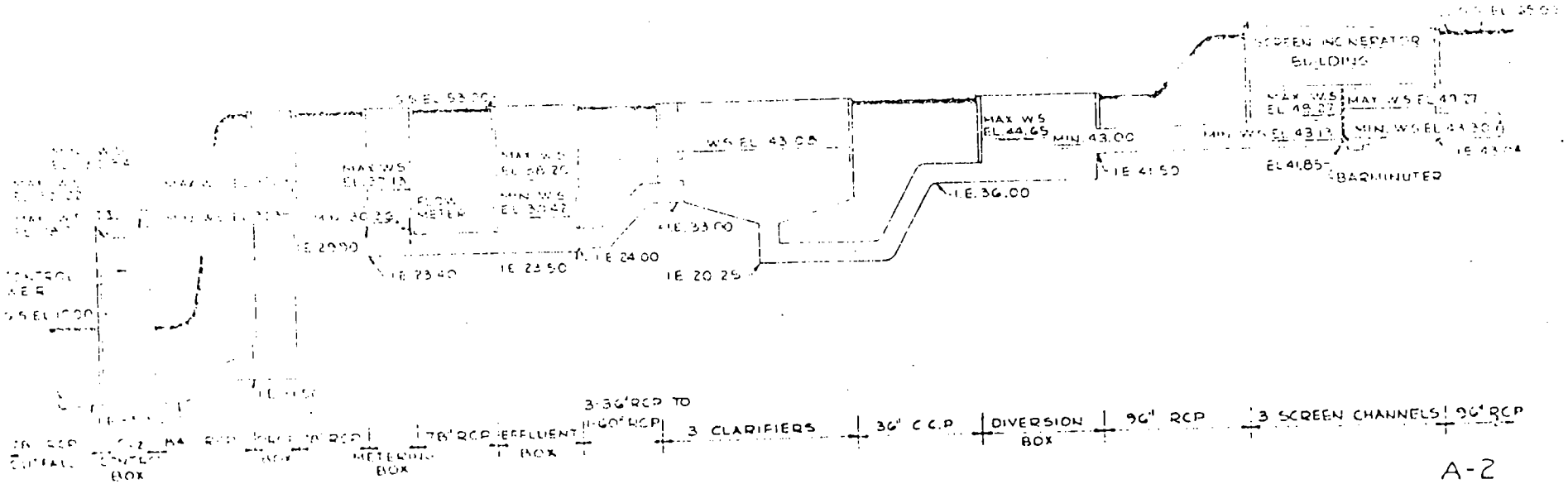
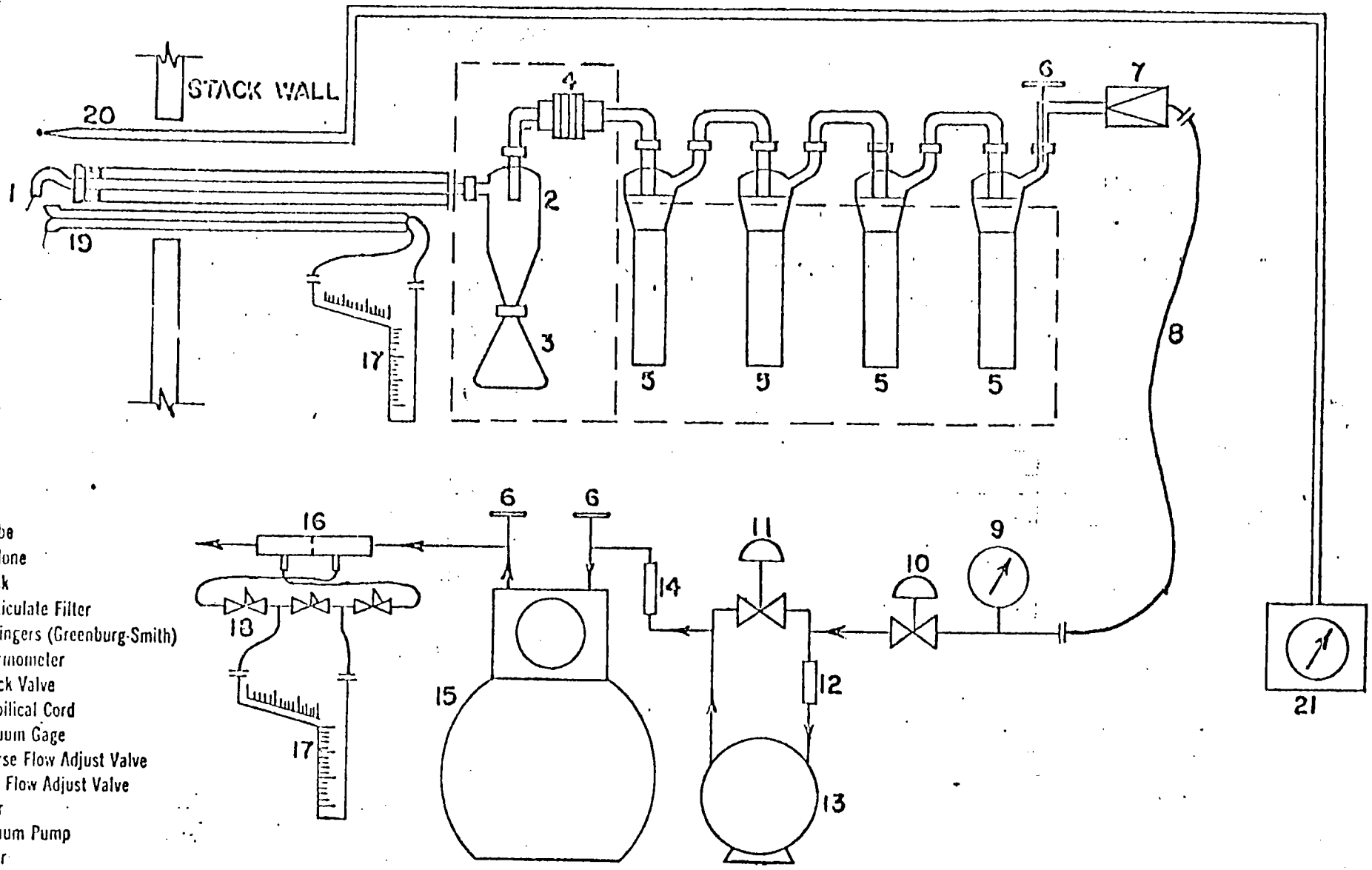


FIG 2-1

A-2
PLANT FLOW



1) Probe
2) Cyclone
3) Flask
4) Particulate Filter
5) Impingers (Greenburg-Smith)
6) Thermometer
7) Check Valve
8) Umbilical Cord
9) Vacuum Gage
10) Course Flow Adjust Valve
11) Fine Flow Adjust Valve
12) Oiler
13) Vacuum Pump
14) Filter
15) Dry Gas Meter
16) Orifice Tube
17) Incline Manometer
18) Solenoid Valves
19) Pitot
20) Thermocouple
21) Pyrometer

FIGURE TWO

PROPERTY OF
RESEARCH APPLIANCE Co. ALLISON PARK, PA.

TOLERANCES DEC. ± FRACT. ±	TITLE STACK SAMPLING FLOW SYSTEM		
	DWG. NO. 1748	MATL	SCALE
NO. REQ'D	DRAWN BY R.G.	APPR. [illegible]	DATE 6-23-60
FINISH		JIG NO.	PART NO.

Stack Gas Composition = Wet

Run #1

	%	Mol Wt	Wt/mole
O_2	17.85	32.0	5.71
N_2	77.81	28.0	21.79
CO	0.18	28.0	0.05
CO_2	4.16	44.0	1.83
			29.38

Run #2

O_2	16.80	5.38
N_2	78.79	22.06
CO	0.11	0.03
CO_2	4.30	1.89
		29.36

Run #3

O_2	17.56	5.62
N_2	78.08	21.86
CO	0.14	0.04
CO_2	4.22	1.86
		29.38

Run #1

#584

Calculation

Volume of water collected = V_{WSTD}

$$V_{WSTD} = (0.0474)(23.727) = 1.12 \text{ ft}^3$$

Volume of gas metered @ STP = V_{WSTD}

$$V_{WSTD} = 80.81 \left(\frac{530}{554}\right)^{0.957}\left(\frac{29.92}{29.92}\right)^{1.00} = 77.34$$

Moisture content = Mc

$$B_{WO} = \frac{1.12}{77.34 + 1.12} = 0.014$$

Molecular wt of stack gas = Ms

$$29.39\,(1 - 0.014)^{.986} + 18\,(0.014)^{0.254} = 29.22$$

Xsec area of stack = A

$$\frac{\left(\frac{20}{2}\right)^2 \pi}{144} = 2.18$$

Volume of stack gas = V_S

$$V_S = (85.48)(0.80)(0.76)\sqrt{\frac{5.93}{(29.92)(29.22)}}^{.471} = 42.825 \text{ ft/sec}$$

Volumetric flow Rate = Q

$$(42.825)(2.18)(3600) = 3.3609 \times 10^5 \text{ ft}^3/\text{hr}$$

Volumetric flow rate @ STP = Q_{sw}

$$(3.3609)\left(\frac{530}{593}\right)\left(\frac{29.92}{29.92}\right) = 3.0046 \times 10^5$$

(.894, 1.00)

Volumetric flow rate (Dry basis) @ STP = Q_{SD}

$$\left(\frac{77.34}{77.34+1.12}\right)\left(3.0046 \times 10^5\right) = 2.9617 \times 10^5$$

(78.46)

Nozzle area = AN

$$AN = \left(\frac{\left(\frac{.250}{2}\right)^2 \pi}{144}\right) = 0.00034 \text{ ft}^2$$

Concentration of particulates/scf = Cs

$$C_S = \frac{0.0329\ (15.43)}{77.34} = 0.0066$$

Concentration of particulates, gr/scf @ stack gas cond = Cau

$$C_{au} = \frac{0.0329\ (15.43)}{77.34+1.12} = 0.0065$$

(78.46)

Particulate, lbs/hr = Cax

$$\frac{(0.0065)\ (3.0046 \times 10^5)}{7000} = 0.279$$

Cs @ 12% CO_2 = $(0.0066)\left(\frac{12.00}{4.16}\right) = 0.0190$

Cax @ 12% $(0.0065)\left(\frac{12.00}{4.16}\right) = 0.0E$ (2.88)

Isokinetic = I

$$I = \frac{77.34+1.12}{(102.8?)\ (.0030?)\ \left(\frac{29.92}{29.92}\right)\left(\frac{530}{593}\right)(0.00034)} \times 100 = 100.3\%$$

(78.34; 1.00; .894; 78.34/78.10)

Plant Sewage Treatment Plant | Sample Box Number | Ambient Temp 55°F

Location Ft. Wilson Surf | Meter Box No. | Barometric Pressure 29.90

Run No. 1 | Meter Δ H@ 1.79 | Assumed Moisture % 1.8

Date 9/20/82 | C Factor 1.05 | Nozzle Diameter, in. .249"

Traverse Point	Sampling Time, min	Static Pressure (P_s) in. Hg	Stack Temp (T_s) F	Velocity Head (ΔP_s)	Pressure Diff. across Or. Meter (H) in H_2O	Gas Sample Vol (Vm) ft³	Temperature of Dry Gas Meter		Sample Box Temp, F
	5min/point 1440-1520					694.02	Inlet 78 (Tm in) F	Outlet 82 (Tm out)	57°
1	5 min	.35	105	0.55 (0.74)	2.0		90	80	
2	5 min	.39	128	0.63 (0.79)	2.40	697.00	102	82	46°
3	5 min	.30	135	0.68 (0.82)	2.50	702.20	110	83	54
4	5 min	.30	140	0.70 (0.84)	2.55	706.52	112	84	58
5	5 min	.32	141	0.69 (0.83)	2.50	710.95	114	86	62
	5 min	.33	131	0.72 (0.85)	2.55	715.24	113	86	65
7	5 min	.38	121	0.70 (0.84)	2.55	719.70	112	86	66
8	5 min	.39	109	0.64 (0.80)	2.40	724.10	112	86	67
9	5 min	.34	105	0.50 (0.71)	1.80	728.45	112	86	65
10	5 min	.23	108	0.12 (0.35)	0.45	732.20	114	86	64
Avg.		~~0.097~~ .31	~~122.3~~ 122			734.65	110	86	62

Plant [illegible]

Location [illegible]

Run No. 1

Date 9-20

Sample Box Number ____

Meter Box No. ____

Meter $\Delta H_@$ 1.79

C Factor 1.05

Ambient Temp 55

Barometric Pressure 29.90

Assumed moisture % 1.8

Nozzle Diameter, in. 0.2498

Traverse Point	Sampling Time, min	Static Pressure (P_s) in. Hg	Stack Temp (T_S) F	Velocity Head (ΔP_s)	Pressure Diff. across Or. Meter (H) in H_2O	Gas Sample Vol (Vm) ft³	Gas Sample Temperature of Dry Gas Meter Inlet (Tm in) F	Gas Sample Temperature of Dry Gas Meter Outlet (Tm out)	Sample Box Temp, F
11	1650 · 1730 5 min	0.10	119	0.40 (.63)	1.50	734.65	86	82	58
12	5 min	0.17	140	0.45 (0.67)	1.75	738.10	97	82	59
13	5 min	0.24	170	0.53 (.73)	1.90	741.70	100	82	105
14	5 min	0.28	207	0.55 (0.74)	2.0	745.50	103	82	69
15	5 min	0.31	195	0.60 (0.77)	2.20	749.35	104	82	71
16	5 min	0.39	148	0.70 (0.84)	2.60	553.45	105	82	71
17	5 min	0.41	121	0.75 [illegible] (0.86)	2.75	558.00	108	82	70
18	5 min	0.43	117	0.74 (0.86)	2.70	762.35	106	82	70
19	5 min	0.38	117	0.67 (0.82)	2.40	766.55	106	82	69
[illegible]	5 min	0.16	105	0.4 (0.64)	1.40	771.00	106	82	68
			2662 / 20 =			774.83	104	82	67
			133°F	15.1 / 20 (0.76)		(20.81)	4319 / 46 = (94°F)		

LIQUID WATER AND PARTICULATE COLLECTED

Plant Ft. Wadsworth - Sewage Treatment Plant
Date 9/20/82
Run No. 1

VOLUME OF LIQUID WATER COLLECTED

	Final		Initial		Gain	
Impinger No. 1	232	ml	250	ml	-8.0	ml
Impinger No. 2	158	ml	150	ml	8.0	ml
Impinger No. 3	1	ml	0	ml	1.0	ml
Impinger No. 4 (**) Silica Gel	208,261	gm	185,534	gm	22,727	ml
Cyclone		ml	0	ml		ml

(**) 1 gram = 1 milliliter

Total volume collected 23,727 ml

WEIGHT OF PARTICULATE COLLECTED

	Final		Tare		Gain	
Filter No. 7	[illegible]	gm	[illegible]	gm	[illegible]	gm
Cyclone	0.0[illegible]	gm	X X X X X X		[illegible]	gm
Probe	[illegible]4	gm	X X X X X X		[illegible]	gm

(1 gram = 1000 milligrams)

Total weight collected [illegible] g

Run #2

#584

Calculation

Volume of water collected = V_{wstd}

$V_{wstd} = (0.0474)(22.671) = 1.07\ ft^3$

Volume of gas metered @ STP = V_{mstd}

$V_{mstd} = 78.805 \left(\frac{530}{548}\right)\left(\frac{29.84}{29.92}\right) = 75.97$

Moisture content = M_c

$B_{wo} = \frac{1.07}{75.97 + 1.07} = \frac{1.07}{77.04} = 0.014$

Molecular wt of stack gas = M_s

$29.36(1 - 0.014) + 18(0.014) = 29.20$

Xsec area of stack = A

$\frac{\left(\frac{20}{2}\right)^2 \pi}{144} = 2.18$

Volume of stack gas = V_s

$V_s = (85.48)(0.80)(0.75)\sqrt{\frac{597}{(29.84)(29.20)}}^{.685} = 42.466\ ft/sec$

Volumetric flow Rate = Q

$(42.466)(2.18)(3600) = 3.3328 \times 10^5\ ft^3/hr$

LIQUID WATER AND PARTICULATE COLLECTED

Plant _____
Date _____
Run No. 2

VOLUME OF LIQUID WATER COLLECTED

	Final		Initial		Gain	
Impinger No. 1	234	ml	250	ml	-10.0	ml
Impinger No. 2	160	ml	150	ml	+10.0	ml
Impinger No. 3	0	ml	0	ml	0.0	ml
Impinger No. 4 (**) Silica Gel	207.0	gm	221.0	gm	-14.0	ml
Cyclone	-	ml	0	ml		ml

(**) 1 gram = 1 milliliter

Total volume collected 32.0 ml

WEIGHT OF PARTICULATE COLLECTED

	Final		Tare		Gain	
Filter No. 23	0.2365	gm	0.2179	gm	0.0186	g
Cyclone	0.0041	gm	X X X X X X		0.0041	g
Probe	0.0036	gm	X X X X X X		0.0036	g

(1 gram = 1000 milligrams)

Total weight collected 0.0263

Volumetric flow rate @ STP = Q_{sw}

$$(3.3328 \times 10^5)\left(\frac{530}{597}\right)\left(\frac{29.84}{29.92}\right) = 2.9506 \times 10^5$$

(888) (.997)

Volumetric flow rate (Dry basis) @ STP = Q_{sD}

$$\left(\frac{75.97}{\sout{75.97+1.07}\ 77.04}\right)(2.9506 \times 10^5) = 2.9096 \times 10^5$$

Nozzle Area = AN

$$AN = \left(\frac{\left(\frac{.250}{2}\right)^2 \pi}{144}\right) = 0.00034\ ft^2$$

Concentration of particulates/scf = Cs

$$C_s = \frac{0.0255\ (15.43)}{75.97} = 0.0052$$

Concentration of particulates, gr/scf @ stack gas cond = Cau

$$C_{au} = \frac{0.0255\ (15.43)}{\sout{75.97}+1.07\ \ 77.04} = 0.0051$$

Particulate, lbs/hr = Cax

$$\frac{(0.0051)(2.9506 \times 10^5)}{7000} = 0.214$$

$$C_s @ 12\%\ CO_2 = (0.0052)\left(\frac{12.00}{4.30}\right) = 0.0145$$

(2.79)

Isokinetic = I

$$C_{ax} @ 12\%\ (0.0051)\left(\frac{12.00}{4.30}\right) = 0.014[illegible]$$

$$I = \frac{\sout{75.97+1.07}\ 77.04}{(42.066)(1030)(29.84)([illegible])(0.00034)}$$

(.997) (888)

$$\frac{77.04}{76.7[illegible]} \times 100 = 100.4\%$$

Plant			Sample Box Number			Ambient Temp	58		
Location	Worcester		Meter Box No.			Barometric Pressure	29.82		
Run No.	#2		Meter $\Delta H_@$	1.79		Assumed moisture %	2.4		
Date	9-21-82		C Factor	1.0		Nozzle Diameter, in.	.2498		

Traverse Point	Sampling Time, min	Static Pressure (P_s) in. Hg	Stack Temp (T_s) F	Velocity Head (ΔP_s)	Pressure Diff. across Or. Meter (H) in H_2O	Gas Sample Vol (Vm) ft^3	Gas Sample of Dry Gas	Temperature Meter	Sample Box Temp, F
	Start 1457						Inlet 62 (Tm in) F	Outlet 62 (Tm out)	
1	5min	0.15	109	0.29 (0.54)	1.10	850.425			46
2	5min	0.25	155	0.42 (0.78)	1.55	853.90	64	76	46
3	5min	0.32	144	0.58 (0.76)	2.10	857.00	86	65	80
4	5min	0.34	152	0.64 (0.80)	2.30	860.90	94	68	55
5	5min	0.34	153	0.65 (0.81)	2.30	865.10	100	70	60
6	5min	0.39	132	0.64 (0.82)	2.45	869.30	104	74	63
7	5min	0.35	124	0.68 (0.82)	2.60	873.60	106	76	66
8	5min	0.33	110	0.64 (0.82)	2.50	877.90	108	78	67
9	5min	0.33	105	0.64 (0.80)	2.30	882.20	109	80	68
10	5min	0.20	102	0.57 (0.75)	2.10	886.45	110	82	68
						890.67	104	83	

Plant: Spent Treatment Plant
Location: Pfc Woronzay
Run No.: 2
Date: 9-21-82

Sample Box Number: ______
Meter Box No.: ______
Meter Δ $H_@$: 1.79
C Factor: 1.0

Ambient Temp: 58
Barometric Pressure: 29.82
Assumed moisture %: 2.4
Nozzle Diameter, in.: .2498

Traverse Point	Sampling Time, min	Static Pressure (P_s) in. Hg	Stack Temp (T_s) F	Velocity Head (Δ P_s)	Pressure Diff. across Or. Meter (H) in H_2O	Gas Sample Vol (Vm) ft³	Gas Sample Temperature of Dry Gas Meter Inlet (Tm in) F	Gas Sample Temperature of Dry Gas Meter Outlet (Tm out)	Sample Box Temp, F
	[illegible]					890.67			
11	5 min	0.12	121	0.38 (0.62)	1.45	890.67	80	78	64
12	5 min	0.18	142	0.44 (0.66)	1.60	894.00	90	78	55
13	5 min	0.26	175	0.52 ~~0.4~~ (0.72)	1.90	897.30	95	78	62
14	5 min	0.30	210	0.55 (0.74)	2.00	901.00	100	78	66
15	5 min	0.32	201	0.58 (0.76)	2.10	904.85	102	79	69
16	5 min	0.40	150	0.65 (0.81)	2.35	906.75	104	80	66
17	5 min	0.42	126	0.70 (0.84)	2.50	913.00	106	80	64
18	5 min	0.45	119	0.70 (0.84)	2.50	917.30	108	80	64
19	5 min	0.42	118	0.60 (0.77)	2.20	921.60	110	82	64
20	5 min	0.17	107	0.42 (0.65)	1.55	925.70	108	83	62
	Stop 11 45		2735 [illegible]	11.98 [illegible]		78.805 / 979.73	105	[illegible]	[illegible]

Run #3

(5-84)

Calculation

Volume of water collected = V_{WSTD}

$V_{WSTD} = (0.0474)(24.300) = 1.15\ ft^3$

Volume of gas metered @ STP = V_{WSTD}

$V_{WSTD} = 77.745 \left(\frac{530}{553}\right)\left(\frac{29.99}{29.92}\right) = 74.63$

Moisture content = Mc

$B_{WO} = \frac{1.15}{74.63 + 1.15} = \frac{1.15}{75.78} = 0.015$

Molecular wt of stack gas = M_S

$29.38(1 - 0.015) + 18(0.015) = 29.21$

Xsec area of stack = A

$\frac{\left(\frac{2}{2}\right)^2 \pi}{144} = 2.18$

Volume of stack gas = V_S

$V_S = (85.48)(0.80)(0.75)\sqrt{\frac{582}{(29.99)(29.21)}\cdot .664} = 41.748\ ft/sec$

Volumetric flow Rate = Q

$(41.748)(2.18)(3600) = 3.2764 \times 10^5\ ft^3/hr$

Volumetric flow rate @ STP = Q_{sw}

$$(3.2764 \times 10^5)\left(\frac{530}{582}\right)\left(\frac{29.99}{29.92}\right) = 2.9908 \times 10^5$$

(.911, 1.002)

Volumetric flow rate (dry basis) @ STP = Q_{sd}

$$\left(\frac{74.63}{75.78}\right)(2.9908 \times 10^5) = 2.9454 \times 10^5$$

Nozzle area = A_N

$$A_N = \frac{\left(\frac{.2}{12}\right)^2 \pi}{144} = .00034 \text{ ft}^2$$

Concentration of particulate/scf = C_s

$$C_s = \frac{0.0326\ (15.43)}{74.63} = 0.0067$$

Concentration of particulate, gr/scf @ stack gas cond = C_{sn}

$$C_{sn} = \frac{0.0326\ (15.43)}{75.78} = 0.0066$$

Particulate, lbs/hr = C_{sx}

$$\frac{(0.0066)\ (2.9908 \times 10^5)}{7000} = 0.282$$

$$S @ 12\%\ CO_2 = (0.0067)\left(\frac{12}{4.22}\right)^{2.84} = 0.0190$$

$$C_{sx} @ 12\% \quad (0.0066)\left(\frac{12}{4.22}\right)^{2.84} = 0.018$$

Isokinetic = I

$$I = \frac{\frac{75.78}{74.63} \quad 1.002 \quad .911}{(41.748)(6000)\ \frac{29.100}{29.92}\ \frac{530}{582}\ 0.00034} \times 100 = 97.5$$

Plant			Sample Box Number				Ambient Temp	49.0	
Location	Woronsky		Meter Box No.				Barometric Pressure	29.97	
Run No.	3		Meter $\Delta H_@$	1.79			Assumed moisture %		
Date	9-22-82		C Factor	1.00			Nozzle Diameter, in.	.2498	

Traverse Point	Sampling Time, min	Static Pressure (P_s) in. Hg	Stack Temp (T_s) F	Velocity Head (ΔP_s)	Pressure Diff. across or. Meter (H) in H_2O	Gas Sample Vol (Vm) ft³	Gas Sample Temperature of Dry Gas Meter: Inlet (Tm in) F	Gas Sample Temperature of Dry Gas Meter: Outlet (Tm out)	Sample Box Temp, F
	1225					930.775	64	64	56
11	5 min	0.10	149	0.39 (0.62)	1.45	930.775	64	64	56
12	5 min	0.15	171	0.45 (0.67)	1.60	934.00	75	65	44
13	5 min	0.20	176	0.50 (0.71)	1.80	937.90	88	68	49
14	5 min	0.24	185	0.55 (0.74)	1.95	941.30	94	70	53
15	5 min	0.27	188	0.59 (0.77)	2.20	944.90	98	71	55
[illegible]	5 min	0.35	94	0.65 (0.81)	2.80	948.70	102	78	56
17	5 min	0.42	89	0.70 (0.84)	2.50	953.00	108	80	58
[illegible]	5 min	0.43	85	0.67 (0.82)	2.40	957.40	110	84	58
[illegible]	5 min	0.40	80	0.61 (0.78)	2.20	961.55	114	86	58
[illegible]	5 min	0.25	78	0.50 (0.71)	1.40	965.70	114	88	58
			(122)	14.95 / 20		34.525 / 969.30	110	4475 / 89.48	(93)

[illegible]		Sample Box Number				Ambient Temp 60			
[illegible] Monitor		Meter Box No.				Barometric Pressure 29.97			
Run No. 3		Meter $\Delta H_@$ 1.79				Assumed Moisture %			
Date 9-22		C Factor 1.0				Nozzle Diameter, in. .2498			
Traverse Point	Sampling Time, min	Static Pressure (P_s) in. Hg	Stack Temp (T_s) F	Velocity Head (ΔP_s)	Pressure Diff. across Or. Meter (H) in H_2O	Gas Sample Vol (Vm) ft	Gas Sample of Dry Gas Inlet/04 (Tm in) F	Temperature Meter Outlet 88 (Tm out)	Sample Box Temp, F
						969.30			
1	5 min	0.10 ~~0.15~~	87	0.45 (0.67)	1.65	969.30	106	~~88~~	60
2	5 min	0.15	92	0.55 (0.74) ~~0.45~~	2.06	973.00	182	88	58
3	5 min	0.25	97	0.60 (0.77)	2.20	976.75	110	90	53
4	5 min	0.35 ~~0.25~~	98	0.65 (0.81)	2.30	980.80	112	90	56
5	5 min	0.35	98	0.65 (0.81)	2.30	985.60	114	91	56
6	5 min	0.38	133	0.70 (0.84)	2.50	989.20	114	92	56
7	5 min	0.36	135	0.68 (0.82)	2.45	993.50	116	93	56
8	5 min	0.30	140	0.65 (0.81)	2.30	997.80	116	94	56
9	5 min	0.25	130	0.50 (0.71)	1.80	1002.0	116	94	56
10	5 min	0.15	130	0.25 (0.50)	0.90	1005.80 (77.145) 1008.52	112	92	57
	Stop 1420						106	91	57

LIQUID WATER AND PARTICULATE COLLECTED

Plant Paint Wrong
Date 4-22-82
Run No. 3

VOLUME OF LIQUID WATER COLLECTED

	Final		Initial		Gain	
Impinger No. 1	255	ml	250	ml	5.0	ml
Impinger No. 2	153	ml	150	ml	3.0	ml
Impinger No. 3	[illegible]	ml	0	ml	2	ml
Impinger No. 4 (**) Silica Gel	223.392	gm	207.092	gm	16.300	ml
Cyclone	0	ml	0	ml	[illegible]	ml

(**) 1 gram = 1 milliliter

Total volume collected 24.300 ml

WEIGHT OF PARTICULATE COLLECTED

	Final		Tare		Gain	
Filter No. 24	0.2455	gm	0.2209	gm	0.0246	g
Cyclone	[illegible]	gm	X X X X X X		[illegible]	g
Probe	[illegible]	gm	X X X X X X		[illegible]	g

(1 gram = 1000 milligrams)

Total weight collected [illegible] g