AIR EMISSIONS SOURCE TEST
CEMENT KILN - INITIAL TIRE BURN

ASH GROVE CEMENT COMPANY
SEATTLE, WASHINGTON

July 24 - August 6, 1996

Prepared for
Ash Grove Cement Company

By
Valid Results, Inc.
Seattle, WA

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Report STR96332

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Table 1

VALID RESULTS, INC.: Particulate Matter Emission Rate Calculation

INITIAL TIRE BURN - M5 Particulate Matter

Client:	Ash Grove Cement	Standard Temperature (T_{std}):	528	°Rankine
Operator:	TP, MR, DT	Standard Pressure (P_{std}):	29.92	nches mercury
Plant Location:	Seattle, WA	Pitot Tube Coefficient (C_p):	0.84	dimensionless
Source:	Cement Kiln	Meter Coefficient (Y_d):	0.9929	dimensionless
Control Equip:	Baghouse	Stack Diameter (D_s):	156.0	inches
		Stack Outlet Area (A_s):	132.733	square feet

	Symbol	Units	Run 1	Run 2	Run 3	<Averages>
Test Date			7/24/96	7/24/96	7/24/96	
Test Time		hours	12:45-20:13	20:42-23:50	00:35-03:04	
Kiln Feed Rate	K_{FR}	tons/hour	155.0	154.0	154.0	<154.3>
Clinker Production Rate	C_{PR}	tons/hour	94.2	93.6	93.6	<93.8>
Total Emission Rate	$ER_{(t)}$	lbs/hour	2.78	2.54	2.19	<2.50>
Total Concentration	$Er_{(t)}$	grains/dscf	0.00279	0.00233	0.00200	<0.00237>
Total Concentration	$er_{(t)}$	mg/dscm	6.38	5.33	4.58	<5.43>
Total sample weight gain	T_{mg}	milligrams	23.8	21.7	18.0	<21.2>
Front Half Emission Rate	$ER_{(F)}$	kg/megagram of clinker	0.01037	0.00753	0.00806	<0.00865>
Front Half Emission Rate	$ER_{(F)}$	lbs/ton of kiln feed	0.0139	0.0101	0.0108	<0.0116>
Front Half Emission Rate	$ER_{(f)}$	lbs/hour	2.16	1.56	1.67	<1.80>
Front Half Concentration	$Er_{(f)}$	grains/dscf	0.00217	0.00143	0.00153	<0.00171>
Front Half Concentration	$er_{(f)}$	mg/dscm	4.96	3.27	3.51	<3.91>
Front Half weight gain	FHmg	milligrams	18.5	13.3	13.8	<15.2>
Corrected Sample Volume	$V_{m(std)}$	dscf	131.730	143.656	138.741	<138.042>
Corrected Sample Volume		dscm	3.731	4.068	3.929	<3.909>
Stack Gas Flow Rate	$Q_{s(std)}$	dscf/min	116,294	127,073	127,549	<123,639>
Stack Gas Flow Rate	$Q_{s(Act)}$	acf/min	174,332	180,782	184,446	<179,853>
Stack Gas Moisture	B_{ws}	%/100	0.0962	0.1023	0.1076	<0.1050>
Stack Gas Velocity	V_s	feet/sec	21.89	22.70	23.16	<22.58>
Stack Pressure	P_s	inches Hg	30.11	29.95	29.93	<30.00>
Stack Temperature	T_s	°R	719.9	675.0	681.6	<692.2>
Stack Oxygen	$\%O_2$	%	9.20	9.53	9.65	<9.5>
Isokinetic Sample Rate	ISOK	%	102.3	102.1	98.2	<100.9>

Where:

kg/metric ton of clinker = (lbs/ton of kiln feed)*(1.645 ton of kiln feed/ton of clinker)/(2.205 lbs/kg)

lbs/ton of kiln feed = (lbs/hour)/(tons/hour of kiln feed rate)

lbs/hour = (grains/dscf)*(dscf/minute)*(60 minutes/hour)*(1 lb/ 7,000 grains)

grains/dscf = (0.001 grams/milligram)*(15.43 grains/gram)*(mg)/($V_{m(std)}$)

milligrams/dscm = (35.31 dscf/dscm)*(mg)/($V_{m(std)}$)

dscf/minute = 3600*(hour/60 minutes)*(1-B_{ws})*V_s*A_s*T_{std}*P_s/(T_s*P_{std})

acfm = V_s*A_s*(60 sec/minute)

Stack Gas Velocity (V_s) is calculated on each individual test run isokinetic calculation form.

Table 2

VALID RESULTS, INC.: EPA Method 23 Toxic Equivalency Factor Calculation (Blank Corrected)

INITIAL TIRE BURN - Method 23 - Polychlorinated Dioxins/Furans

Client:	Ash Grove Cement
Test Date:	8/5/96
Plant Location:	Seattle, WA
Source:	Cement Kiln
Recovery Date:	Baghouse
Analysis Date:	9/18/96

Compound	Run 1_{BC}	Run 2_{BC}	Run 3_{BC}	<Average>$_{BC}$	Toxic	I-TEF$_{BC}$
Sample volume (dscm)	6.897	6.143	6.147	<6.396>	Equivalency	Concentration
Concentration	ng/dscm	ng/dscm	ng/dscm	ng/dscm	Factor	ng/dscm
2,3,7,8-TCDD	< 0.00159	< 0.00212	< 0.00163	< 0.00178	1	**< 0.001780**
1,2,3,7,8-PeCDD	< 0.00435	< 0.00505	< 0.00472	< 0.00471	0.5	**< 0.002355**
1,2,3,4,7,8-HxCDD	< 0.00304	< 0.00374	< 0.00325	< 0.00334	0.1	**< 0.000334**
1,2,3,7,8,9-HxCDD	< 0.00290	< 0.00374	< 0.00325	< 0.00330	0.1	**< 0.000330**
1,2,3,4,6,7,8-HpCDD	< 0.00290	< 0.00260	< 0.00472	< 0.00341	0.01	**< 0.000034**
OCDD (total)	< 0.00478	< 0.00505	< 0.00862	< 0.00615	0.001	**< 0.000006**
2,3,7,8-TCDF	< 0.00139	< 0.00156	< 0.00107	< 0.00134	0.1	**< 0.000134**
2,3,4,7,8-PeCDF	< 0.00232	< 0.00260	< 0.00189	< 0.00227	0.5	**< 0.001135**
1,2,3,7,8-PeCDF	< 0.00261	< 0.00293	< 0.00195	< 0.00250	0.05	**< 0.000125**
1,2,3,4,7,8-HxCDF	< 0.00106	< 0.00119	< 0.00104	< 0.00110	0.1	**< 0.000110**
1,2,3,7,8,9-HxCDF	< 0.00203	< 0.00228	< 0.00195	< 0.00209	0.1	**< 0.000209**
1,2,3,6,7,8-HxCDF	< 0.00104	< 0.00117	< 0.00104	< 0.00108	0.1	**< 0.000108**
2,3,4,6,7,8-HxCDF	< 0.00145	< 0.00163	< 0.00145	< 0.00151	0.1	**< 0.000151**
1,2,3,4,6,7,8-HpCDF	< 0.00106	< 0.00119	< 0.00314	< 0.00180	0.01	**< 0.000018**
1,2,3,4,7,8,9-HpCDF	< 0.00075	< 0.00085	< 0.00405	< 0.00188	0.01	**< 0.000019**
OCDF (total)	< 0.00246	< 0.00277	< 0.00374	< 0.00299	0.001	**< 0.000003**

Average Blank Corrected Toxic Equivalent Concentration (TEC_{BC}) of 17 toxic dioxins and furans. **< 0.006851**

Average TEC_{BC} of 17 toxic dioxins and furans per megagram of clinker. **< 15.05**

The lab results for every compound were non-detected and reported as less than the detection limit.
The average kiln feed rate during the test was 160.2 short tons per hour.

$$\text{ng/megagram of clinker} = \frac{(\text{ng/dscm})*(\text{dscf/m})*(60\ \text{m/hr})*(1.645\ \text{tons of kiln feed/ton of clinker})}{((35.31\ \text{dscf/dscm})*(160.2\ \text{tons of kiln feed/hr})*(0.9072\ \text{metric tons/short ton}))}$$

Table 3

VALID RESULTS, INC.: EPA Method 23 Toxic Equivalency Factor Calculation (Non-Blank Corrected)

INITIAL TIRE BURN - Method 23 - Polychlorinated Dioxins/Furans

Client:	Ash Grove Cement
Test Date:	8/5/96
Plant Location:	Seattle, WA
Source:	Cement Kiln
Recovery Date:	Baghouse
Analysis Date:	9/18/96

Compound Sample volume (dscm) Concentration	Run 1 6.897 ng/dscm	Run 2 6.143 ng/dscm	Run 3 6.147 ng/dscm	<Average> <6.396> ng/dscm	Toxic Equivalency Factor	I-TEF Concentration ng/dscm
2,3,7,8-TCDD	< 0.00159	< 0.00212	< 0.00163	< 0.00178	1	**< 0.001780**
1,2,3,7,8-PeCDD	< 0.00435	< 0.00505	< 0.00472	< 0.00471	0.5	**< 0.002355**
1,2,3,4,7,8-HxCDD	< 0.00304	< 0.00374	< 0.00325	< 0.00334	0.1	**< 0.000334**
1,2,3,7,8,9-HxCDD	< 0.00290	< 0.00374	< 0.00325	< 0.00330	0.1	**< 0.000330**
1,2,3,4,6,7,8-HpCDD	< 0.00290	< 0.00260	< 0.00472	< 0.00341	0.01	**< 0.000034**
OCDD (total)	< 0.00870	< 0.00944	< 0.00862	< 0.00892	0.001	**< 0.000009**
2,3,7,8-TCDF	< 0.00232	< 0.00260	< 0.00107	< 0.00200	0.1	**< 0.000200**
2,3,4,7,8-PeCDF	< 0.00232	< 0.00260	< 0.00342	< 0.00278	0.5	**< 0.001390**
1,2,3,7,8-PeCDF	< 0.00261	< 0.00293	< 0.00374	< 0.00309	0.05	**< 0.000155**
1,2,3,4,7,8-HxCDF	< 0.00106	< 0.00119	< 0.00104	< 0.00110	0.1	**< 0.000110**
1,2,3,7,8,9-HxCDF	< 0.00203	< 0.00228	< 0.00195	< 0.00209	0.1	**< 0.000209**
1,2,3,6,7,8-HxCDF	< 0.00104	< 0.00117	< 0.00104	< 0.00108	0.1	**< 0.000108**
2,3,4,6,7,8-HxCDF	< 0.00145	< 0.00163	< 0.00145	< 0.00151	0.1	**< 0.000151**
1,2,3,4,6,7,8-HpCDF	< 0.00174	< 0.00195	< 0.00390	< 0.00253	0.01	**< 0.000025**
1,2,3,4,7,8,9-HpCDF	< 0.00075	< 0.00085	< 0.00504	< 0.00221	0.01	**< 0.000022**
OCDF (total)	< 0.00246	< 0.00277	< 0.00374	< 0.00299	0.001	**< 0.000003**

Average Non-Blank Corrected Toxic Equivalent Concentration (TEC_{NBC}) of 17 toxic dioxins and furans. **< 0.007215**

Average TEC_{NBC} of 17 toxic dioxins and furans per megagram of clinker. **< 15.85**

The lab results for every compound were non-detected and reported as less than the detection limit.
The average kiln feed rate during the test was 160.2 short tons per hour.

$$\text{ng/megagram of clinker} = \frac{(\text{ng/dscm})*(\text{dscf/m})*(60\ \text{m/hr})*(1.645\ \text{tons of kiln feed/ton of clinker})}{((35.31\ \text{dscf/dscm})*(160.2\ \text{tons of kiln feed/hr})*(0.9072\ \text{metric tons/short ton}))}$$

Table 4a

VALID RESULTS, INC.: EPA Method 23 Emission Rate Calculation

INITIAL TIRE BURN - Method 23 Semi-Volatile Organic Compounds

Client:	Ash Grove Cement	Standard Temperature (T_{std}):	528	°Rankine
Operator:	TP, MR	Standard Pressure (P_{std}):	29.92	inches mercury
Plant Location:	Seattle, WA	Pitot Tube Coefficient (C_p):	0.84	dimensionless
Source:	Cement Kiln	Meter Coefficient (Y_d):	0.9929	dimensionless
Control Equip:	Baghouse	Stack Diameter (D_s):	156.0	inches
		Stack Outlet Area (A_s):	132.733	square feet

	Symbol	Units	Run 1	Run 2	Run 3	<Averages>
Test Date			8/5/96	8/5/96	8/5/96	
Test Time			12:12-18:22	21:40-02:30	04:33-10:12	
Kiln Feed Rate	K_{FR}	tons/hr	160.3	163.0	168.0	<163.8>
Clinker Production Rate	C_{PR}	tons/hr	97.4	99.1	102.1	<99.5>
Total Reported Semi-VOST						
Semi-VOST Emission Rate		kg/megagram of clinker	0.00187	0.00219	0.00816	<0.00407>
Semi-VOST Emission Rate		lbs/ton of clinker	0.00375	0.00439	0.01632	<0.00815>
Semi-VOST Emission Rate		tons/year	1.597	1.908	7.298	<3.601>
Semi-VOST Emission Rate		lbs/hr	0.365	0.435	1.666	<0.822>
Weight of Reported Compounds		milligrams	5.39	4.58	17.4	<9.12>
Number of All Compounds		integer	108	108	108	108
Total Detected Semi-VOST						
Semi-VOST Emission Rate		kg/ megagram of clinker	0.00148	0.00165	0.00731	<0.00348>
Semi-VOST Emission Rate		lbs/ton of clinker	0.00296	0.00330	0.01462	<0.00696>
Semi-VOST Emission Rate		tons/year	1.259	1.435	6.544	<3.079>
Semi-VOST Emission Rate		lbs/hr	0.288	0.327	1.493	<0.703>
Weight of Detected Compounds		milligrams	4.24	3.44	15.6	<7.76>
Number of Detected Compounds		integer	23	23	17	21
Corrected Sample Volume	$V_{m(std)}$	dscf	230.285	144.440	162.323	<179.016>
Corrected Sample Volume		dscm	6.522	4.091	4.597	<5.070>
Stack Gas Flow Rate	$Q_{s(std)}$	dscf/min	118,088	104,153	117,015	<113,085>
Stack Gas Flow Rate	$Q_{s(Act)}$	acf/min	166,129	152,032	170,031	<162,731>
Stack Gas Moisture	B_{ws}	%/100	0.1021	0.1193	0.1134	<0.1164>
Stack Gas Velocity	V_s	feet/sec	20.86	19.09	21.35	<20.43>
Stack Pressure	P_s	inches Hg	30.20	30.04	29.84	<30.03>
Stack Temperature	T_s	°R	673.2	681.5	678.4	<677.7>
Stack Oxygen	$\%O_2$	%	9.15	9.09	9.17	<9.1>
Isokinetic Sample Rate	ISOK	%	101.2	96.8	96.9	<98.3>

Where:

Total reported and total detected Semi-VOST numbers are based upon blank corrected analytical values.

kg/metric ton of clinker = (lbs/ton of clinker) /((0.9072 metric tons/short ton)*(2.205 lbs/kg))

lbs/ton of clinker = ((lbs/hour)/(tons of kiln feed/hour))/(1.645 tons of kiln feed/ton of clinker)

lbs/hour = (grains/dscf)*(dscf/minute)*(60 minutes/hour)*(1 lb/ 7,000 grains)

grains/dscf = (0.001 grams/milligram)*(15.43 grains/gram)*(mg)/($V_{m(std)}$)

milligrams/dscm = (35.31 dscf/dscm)*(mg)/($V_{m(std)}$)

dscf/minute = 3600*(hour/60 minutes)*(1-B_{ws})*V_s*A_s*T_{std}*P_s/(T_s*P_{std})

acfm = V_s*A_s*(60 sec/minute)

Stack Gas Velocity (V_s) is calculated on each individual test run isokinetic calculation form.

Table 4b

VALID RESULTS, INC.: EPA Method 23 Emission Rate Calculation

INITIAL TIRE BURN - Method 23 Semi-Volatile Organic Compounds (1 of 2)

Client:	Ash Grove Cement			
Test Date:	8/5/96	Analysis Date:	9/10/96	
Plant Location:	Seattle, WA	Average Corrected Sample Volume	179.016	dscf
Source:	Cement Kiln	Corrected Sample Volume	5.070	dscm
Recovery Date:	8/13/96	Average Stack Gas Flow Rate:	113,085	dscf/m

Semi-Volatiles	Run 1 Net Reported (microgram)	Run 2 Net Reported (microgram)	Run 3 Net Reported (microgram)	Average Net Reported (microgram)	Average Compound Concentration (mcg/dscm)	Average Compound Concentration (lbs/dscf)	Average Compound Emission Rate (lbs/hour)	Average Compound Emission Rate (tons/year)
N-Nitrosodimethylamine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Aniline	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
bis(2-Chloroethyl)ether	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Phenol	< 11.3	11.3	< 22.5	< 15.0	< 2.96	< 1.85E-10	< 1.26E-03	< 5.52E-03
2-Chlorophenol	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
1,3-Dichlorobenzene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
1,4-Dichlorobenzene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
1,2-Dichlorobenzene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Benzyl alcohol	45.9	63.0	2169.0	< 759.3 >	149.76	9.35E-09	6.34E-02	2.78E-01
bis(2-chloroisopropyl)ether	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2-Methylphenol	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Hexachloroethane	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
N-Nitroso-di-n-propylamine	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
4-Methylphenol	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Nitrobenzene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Isophorone	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2-Nitrophenol	43.3	54.3	58.0	< 51.9 >	10.24	6.39E-10	4.34E-03	1.90E-02
2,4-Dimethylphenol	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
bis(2-Chloroethoxy)methane	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Benzoic acid	262.7	332.7	476.0	< 357.1 >	70.43	4.40E-09	2.99E-02	1.31E-01
2,4-Dichlorophenol	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
1,2,4-Trichlorobenzene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Naphthalene	290.9	180.9	187.6	< 219.8 >	43.35	2.71E-09	1.84E-02	8.06E-02
4-Chloroaniline	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Hexachlorobutadiene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
4-Chloro-3-methylphenol	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2-Methylnaphthalene	40.3	26.3	33.0	< 33.2 >	6.55	4.09E-10	2.78E-03	1.22E-02
Hexachlorocyclopentadiene	< 22.5	22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
2,4,6-Trichlorophenol	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2,4,5-Trichlorophenol	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2-Chloronaphthalene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2-Nitroaniline	< 22.5	22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
Acenaphthylene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Dimethylphthalate	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2,6-Dinitrotoluene	< 22.5	22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
Acenaphthene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
3-Nitroaniline	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2,4-Dinitrophenol	< 56.7	56.7	< 90.0	< 67.8	< 13.37	< 8.34E-10	< 5.66E-03	< 2.48E-02
Dibenzofuran	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
2,4-Dinitrotoluene	< 22.5	22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
4-Nitrophenol	< 22.5	22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
Azobenzene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Fluorene	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
4-Chlorophenyl-phenylether	< 11.3	11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
ethylbenzene	220			< 220.0 >	43.39	2.71E-09	1.84E-02	8.06E-02
m-Xylene	680	566	1726	< 990.7 >	195.40	1.22E-08	8.28E-02	3.63E-01
p-Xylene	13	8.3		< 10.7 >	2.11	1.32E-10	8.96E-04	3.92E-03
Styrene	280	496	9320	< 3365.3 >	663.77	4.14E-08	2.81E-01	1.23E+00
Hexane, 2,4-dimethyl-	80	80		< 80.0 >	15.78	9.85E-10	6.68E-03	2.93E-02
Benzaldehyde	451	277	317	< 348.3 >	68.70	4.29E-09	2.91E-02	1.27E-01
Benzonitrile	370	370	380	< 373.3 >	73.63	4.60E-09	3.12E-02	1.37E-01
Benzene, 1,3,5-trimethyl-	170	170	180	< 173.3 >	34.18	2.13E-09	1.45E-02	6.35E-02
Benzofuran	160	160	180	< 166.7 >	32.88	2.05E-09	1.39E-02	6.09E-02
Unknown, alkane	91	91		< 91.0 >	17.95	1.12E-09	7.60E-03	3.33E-02
Decane								
Benzene, 1,2,4-trimethyl-	130	130	140	< 133.3 >	26.29	1.64E-09	1.11E-02	4.86E-02
Acetophenone	99	99	100	< 99.3 >	19.59	1.22E-09	8.28E-03	3.63E-02
Unknown, alkane								
Tetradecane	11	5.7		< 8.4 >	1.66	1.04E-10	7.06E-04	3.09E-03
Pentadecane	7.6	4.4		< 6.0 >	1.18	7.36E-11	4.99E-04	2.19E-03
Hexadecane	7.3	3.8		< 5.6 >	1.10	6.86E-11	4.65E-04	2.04E-03
Unknown		5.9		< 5.9 >				
Heptane, 2,4-dimethyl-	6.4			< 6.4 >	1.26	7.86E-11	5.33E-04	2.33E-03
Unknown, alkane	6.8	4.2		< 5.5 >	1.08	6.74E-11	4.57E-04	2.00E-03
Unknown		4.0		< 4.0 >				
Sum of All Compounds	3997	3659.3	16117	8147.3	1605.7	1.00E-07	0.680	2.979
Sum of Detected Compounds	3466	3133	15267	7515.0	1480.3	9.24E-08	0.627	2.746

Table 4c

VALID RESULTS, INC.: EPA Method 23 Emission Rate Calculation

INITIAL TIRE BURN - Method 23 Semi-Volatile Organic Compounds (2 of 2)

Client:	Ash Grove Cement			
Test Date:	8/5/96	Analysis Date:	9/10/96	
Plant Location:	Seattle, WA	Average Corrected Sample Volume:	179.016	dscf
Source:	Cement Kiln	Corrected Sample Volume:	5.070	dscm
Recovery Date:	8/13/96	Average Stack Gas Flow Rate:	113,085	dscf/m

Semi-Volatiles	Run 1 Net Reported (microgram)	Run 2 Net Reported (microgram)	Run 3 Net Reported (microgram)	Average Net Reported (microgram)	Average Compound Concentration (micg/dscm)	Average Compound Concentration (lbs/dscf)	Average Compound Emission Rate (lbs/hour)	Average Compound Emission Rate (tons/year)
Diethylphthalate	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
4-Nitroaniline	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
4,6-Dinitro-2-methylphenol	< 56.7	< 56.7	< 90.0	< 67.8	< 13.37	< 8.34E-10	< 5.66E-03	< 2.48E-02
n-Nitrosodiphenylamine	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
4-Bromophenyl-phenylether	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
alpha-BHC	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Hexachlorobenzene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
beta-BHC	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Pentachlorophenol	< 56.7	< 56.7	< 90.0	< 67.8	< 13.37	< 8.34E-10	< 5.66E-03	< 2.48E-02
Lindane (gamma-BHC)	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Phenanthrene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Anthracene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
delta-BHC	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Carbazole	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Heptachlor	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Di-n-butylphthalate	< 13.1	< 11.5	< 17.5	< 14.0	< 2.76	< 1.72E-10	< 1.17E-03	< 5.12E-03
Aldrin	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Heptachlor Epoxide	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Fluoranthene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Benzidine	< 22.5	< 22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
Pyrene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Endosulfan I	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
p,p'-DDE	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Dieldrin	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Endrin	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Endosulfan II	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
p,p'-DDD	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Endrin Aldehyde	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Butylbenzylphthalate	< 11.3	< 11.3	117	< 46.5 >	9.17	5.72E-10	3.88E-03	1.70E-02
Endosulfan Sulfate	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
p,p'-DDT	< 22.5	< 22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
Endrin Ketone	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
3,3'-Dichlorobenzidine	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Benzo[a]anthracene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Chrysene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Methoxychlor	< 22.5	< 22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
bis(2-Ethylhexyl)phthalate	776.7	306.0	261.0	< 447.9 >	88.34	5.51E-09	3.74E-02	1.64E-01
Di-n-octylphthalate	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Benzo[b]fluoranthene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Benzo[k]fluoroanthene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Benzo[a]pyrene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Indeno[1,2,3-cd]pyrene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Dibenz[a,h]anthracene	< 22.5	< 22.5	< 36.0	< 27.0	< 5.33	< 3.33E-10	< 2.26E-03	< 9.90E-03
Benzo[g,h,i]perylene	< 11.3	< 11.3	< 18.0	< 13.5	< 2.66	< 1.66E-10	< 1.13E-03	< 4.95E-03
Sum of All Compounds	1389	916.4	1331.5	1211	238.8	1.49E-08	0.101	0.444
Sum of Detected Compounds	777	306.0	378.0	494	97.5	6.08E-09	0.041	0.181

VALID RESULTS, INC.: EPA Method 25A Total Organic Carbon (TOC) Emission Rate Calculation

Client: Ash Grove Cement
Date: 8/6/96
Operator: Seattle, WA
Plant Location: Cement Kiln
Source: Baghouse

Test Run Number	Barometric Pressure (P_{bar}) "Hg	Stack Gas Volumetric Flow Rate (dscf/m)	TOC Concentration (ppm) Propane	TOC Concentration (mg/dscm)	TOC Concentration (lbs/dscf)	TOC Emission Rate (lbs/hour)	TOC Emission Rate (tons/year)
1	29.85	105,233	33.99	62.07	3.87E-06	24.44	107.0
2	29.93	114,261	35.22	64.31	4.01E-06	27.49	120.4
3	29.88	112,965	33.75	61.63	3.84E-06	26.03	114.0
<Average>	<29.89>	<110,820>	<34.32>	<62.67>	<3.91E-06>	<25.99>	<113.8>

Stack Gas Volumetric Flow Rate (dscf/m) = calculated on Volumetric Flow Rate Calculation Sheet — *dry standard cubic feet per minute*

*TOC Concentration (ppm) = bias calibration corrected value*3 (reported as propane)* — *parts per million*

TOC Concentration (mg/dscm) = ((ppm)(44.00 g/g-mole)*(41,500)/(1,000,000))*
by 40CFR60, Subpart A, Section 60.45, Paragraph F(2) — *milligrams per dry standard cubic meter*

TOC Concentration (lbs/dscf) = ((mg/dscm)(0.01543 grains/mg)/((7,000 grains/lb)*(35.32 cubic feet/cubic meter)))* — *pounds per dry standard cubic foot*

TOC Emission Rate (lbs/hr) = ((lbs/dscf)(dscf/m)*60 min/hr))* — *pounds per hour*

TOC Emission Rate (tons/yr) = ((lbs/hr)(24 hr/day)*(365 day/yr)/(2,000 lb/ton))* — *tons per year*

Table 5

VALID RESULTS, INC.: EPA Method 26 Hydrochloric Acid Emission Rate Calculation

INITIAL TIRE BURN - M26 - HCl

Client:	Ash Grove Cement
Test Date:	8/6/96
Operator:	TP, MR
Plant Location:	Seattle, WA
Source:	Cement Kiln

Load Rating (tons of kiln feed/hour):	163.0	
Meter Number:	Apex LF-1	
Meter Coefficient (Y_d):	1.001	
Standard Pressure (P_{std}):	29.92	inches Mercury
Standard Temperature (T_{std}):	528	°Rankine

Run#:	Lab Result (mg / liter)	Liquid Sample Volume (liters)	Total Cl (mg)	Total HCl (mg)	Corrected Sample $V_{m(std)}$ (dscm)	HCl (mg/dscm)	HCl (ppm)	HCl (grains/dscf)	Flow Rate (dscf/m)	HCl (lbs/hr)	HCl (tons/yr)	HCL kg/megagrams of clinker
1	7.64	0.069	0.527	0.542	0.1873	2.89	3.57	0.00126	105,233	1.14	4.99	0.00575
2	< 0.5	0.078	< 0.039	< 0.040	0.1882	< 0.213	< 0.26	< 0.00009	114,261	< 0.09	< 0.39	< 0.00045
3	0.85	0.082	0.070	0.072	0.1869	0.39	0.48	0.00017	112,965	0.16	0.70	0.00081
<Average>	<3.0>	<0.076>	<0.212>	<0.218>	<0.1875>	<1.164>	<1.44>	<0.000507>	<110,820>	<0.46>	<2.03>	<0.00234>

Table 6

Where:

Lab Result: from laboratory analysis results sheet.
Liquid Sample Volume: volume of first three impingers and rinses.
Total Cl: = (Lab Result*Liquid Sample Volume).
Total HCl: = (Total Cl*(Molecular Weight HCl(M.W. HCl)/Molecular Weight Cl(M.W. Cl))).
Corrected Sample $V_{m(std)}$: from individual test run calculation sheet.
HCl mg/dscm: = (Total HCl / $V_{m(std)}$).
HCl ppm: = (((1.60864*Total HCl*(T_{std}+460)) / ((M.W. HCl)*$V_{m(std)}$*(35.32 cubic feet/cubic meter))).
1.60864: conversion factor.
HCl grains/dscf: = ((HCl mg/dscm)*(0.01543 grains/mg) / (35.32 cubic feet/cubic meter)).
Flow Rate: from individual test run calculation sheet.
HCl lbs/hr: = ((HCl grains/dscf)*(Flow Rate dscf/m)*(60 min/hr)/(7,000 grains/lb)).
HCl tons/yr: = ((HCl lbs/hr)*(24 hrs/day)*(365 days/yr)/(2,000 lbs/ton)).
HCl kg/megagram of clinker: = ((HCl lbs/hr)*(1.645 tons of kiln feed/ton of clinker)/(tons of kiln feed/hr)*(2.205 lbs/kg)*(0.9072 megagrams/ton)).
Molecular Weight of HCl (M.W. HCl): = 36.46.
Molecular Weight of Cl (M.W. Cl): = 35.45.

VALID RESULTS, INC.: EPA Method 26 Hydrofluoric Acid Emission Rate Calculation

INITIAL TIRE BURN - M26 - HF

STR96332

Client:	Ash Grove Cement
Test Date:	8/6/96
Operator:	TP, MR
Plant Location:	Seattle, WA
Source:	Cement Kiln

Load Rating (tons of kiln feed/hour):	163.0	
Meter Number:	Apex LF-1	
Meter Coefficient (Y_d):	1.001	
Standard Pressure (P_{std}):	29.92	inches Mercury
Standard Temperature (T_{std}):	528	°Rankine

Run #:	Lab Result (mg / liter)	Liquid Sample Volume (liter)	Total F (mg)	Total HF (mg)	Corrected Sample $V_{m(std)}$ (dscm)	HF (mg / dscm)	HF (ppm)	HF (grains/dscf)	Flow Rate (dscf/m)	HF (lbs/hr)	HF (tons/yr)	HF kg/megagrams of clinker
1	1.65	0.069	0.114	0.120	0.1873	0.641	1.52	0.000280	105,233	0.25	1.10	0.005550
2	0.53	0.078	0.041	0.043	0.1882	0.228	0.54	0.000100	114,261	0.10	0.44	0.002220
3	< 0.5	0.082	< 0.041	< 0.043	0.1869	< 0.230	< 0.54	< 0.000100	112,965	< 0.10	< 0.44	< 0.002220
<Average>	<0.9>	<0.076>		<0.069>	<0.1875>	<0.366>	<0.87>	<0.000160>	<110,820>	<0.15>	<0.66>	<0.003330>

Table 7

Where:

Lab Result: from laboratory analysis results sheet.
Liquid Sample Volume: volume of first three impingers and rinses.
Total F: = (Lab Result*Liquid Sample Volume).
Total HF: = (Total F*(Molecular Weight HF(M.W. HF)/Molecular Weight F(M.W. F))).
Corrected Sample $V_{m(std)}$: from individual test run calculation sheet.
HF mg/dscm: = (Total HF / $V_{m(std)}$).
HF ppm: = (((1.60864*Total HF*(Tstd+460)) /((M.W. HF)*Vm(std)*(35.32 cubic feet/cubic meter))).
1.60864: conversion factor.
HF grains/dscf: = ((mg/dscm)*(0.01543 grains/mg) /(35.32 cubic feet/cubic meter)).
Flow Rate: from individual test run calculation sheet.
HF lbs/hr: = ((grains/dscf)*(Flow Rate dscf/m)*(60 min/hr)/(7000 grains/lb)).
HF tons/yr: = ((HF lbs/hr)*(24 hrs/day)*(365 days/yr)/(2,000 lbs/ton)).
HF kg/megagram of clinker: = ((HF lbs/hr)*(1.645 tons of kiln feed/ton of clinker)/(tons of kiln feed/hr)*(2.205 lbs/kg)*(0.9072 megagrams/ton)).
Molecular Weight of HF (M.W. HF): = 20.01
Molecular Weight of F (M.W. F): = 19.00

10/3/96

AGCS2M000126
S4000569

VALID RESULTS, INC.: EPA Method 26 Ammonia Emission Rate Calculation

INITIAL TIRE BURN - M26 - NH_3

STR96332

Client:	Ash Grove Cement
Test Date:	8/6/96
Operator:	TP, MR
Plant Location:	Seattle, WA
Source:	Cement Kiln

Load Rating (tons of kiln feed/hour):	163.0	
Meter Number:	Apex LF-1	
Meter Coefficient (Y_d):	1.001	
Standard Pressure (P_{std}):	29.92	inches Mercury
Standard Temperature (T_{std}):	528	°Rankine

Run#:	Lab Result (mg / liter)	Liquid Sample Volume (liter)	Total NH_3 (mg)	Corrected Sample $V_{m(std)}$ (dscm)	NH_3 (mg/dscm)	NH_3 (ppm)	NH_3 (grains/dscf)	Flow Rate (dscf/m)	NH_3 (lbs/hr)	NH_3 (tons/yr)	NH_3 kg/megagrams of clinker
1	0.312	0.069	0.022	0.1873	0.117	0.31	0.000051	105,233	0.046	0.20	0.00023
2	0.260	0.078	0.020	0.1882	0.106	0.28	0.000046	114,261	0.045	0.20	0.00023
3	0.512	0.082	0.042	0.1869	0.225	0.59	0.000098	112,965	0.095	< 0.42	0.00048
<Average>	<0.4>	<0.076>	<0.028>	<0.1875>	<0.149>	<0.39>	<0.000065>	<110,820>	<0.062>	<0.27>	<0.00031>

Table 8

Where:

Lab Result: from laboratory analysis results sheet.
Liquid Sample Volume: volume of first three impingers and rinses.
Total NH_3: = (Lab Result*Liquid Sample Volume).
Corrected Sample $V_{m(std)}$: from individual test run calculation sheet.
NH_3 mg/dscm: = (Total NH_3 / $V_{m(std)}$).
NH_3 ppm: = (((1.60864*Total NH_3*(Tstd+460)) / ((M.W. NH_3)*$V_{m(std)}$*(35.32 cubic feet/cubic meter))).
1.60864: conversion factor.
NH_3 grains/dscf: = ((NH_3 mg/dscm)*(0.01543 grains/mg) / (35.32 cubic feet/cubic meter)).
Flow Rate: from individual test run calculation sheet.
HH_3 kg/megagram of clinker: = ((NH_3 lbs/hr)*(1.645 tons of kiln feed/ton of clinker)/(tons of kiln feed/hr)*(2.205 lbs/kg)*(0.9072 megagrams/ton)).
NH_3 tons/yr: = ((NH_3 lbs/hr)*(24 hrs/day)*(365 days/yr)/(2,000 lbs/ton)).
NH_3 lbs/hr: = ((NH_3 grains/dscf)*(Flow Rate dscf/m)*(60 min/hr)/(7,000 grains/lb)).
Molecular Weight of NH_3 (M.W. NH_3): = 17.033.

10/3/96

AGCS2M000127
S4000570

Table 9

VALID RESULTS, INC.: EPA Method 29 Average Air Emission Rate Calculation

INITIAL TIRE BURN - Method 29 Multiple Metals

Client:	Ash Grove Cement	
Test Date:	8/6/96	
Plant Location:	Seattle, WA	
Source:	Cement Kiln	
Recovery Date:	8/5/96	
Analysis Date:	9/9/96-9/16/96	
Average Corrected Sample Volume:	218.108	dscf
Average Corrected Sample Volume:	6.177	dscm
Average Stack Gas Flow Rate:	110,820	dscf/m
Average Tons of Kiln Feed per Hour:	163.8	tons of kiln feed per hour
Average Tons of Clinker per Hour:	99.6	tons of clinker produced per hour

Metals	<Avg.>$_{BC}$	(mg/dscm)	(lbs/hour)	(tons/year)	(lbs/ton of clinker)	(kg/metric ton of clinker)
Antimony*	<1.12>	0.000170	7.27E-05	3.18E-04	7.23E-07	3.61E-07
Arsenic	<3.46>	0.000567	2.33E-04	1.02E-03	2.32E-06	1.16E-06
Barium	<5.99>	0.000970	4.03E-04	1.77E-03	4.01E-06	2.00E-06
Beryllium	<0.74>	0.000120	4.98E-05	2.18E-04	4.95E-07	2.47E-07
Cadmium	<0.66>	0.000104	4.39E-05	1.92E-04	4.36E-07	2.18E-07
Chromium	<3.91>	0.000644	2.64E-04	1.15E-03	2.62E-06	1.31E-06
Cobalt	<0.51>	0.0000827	3.41E-05	1.49E-04	3.39E-07	1.69E-07
Copper	<13.2>	0.00216	8.90E-04	3.90E-03	8.85E-06	4.42E-06
Lead*	<3.24>	0.00051	2.15E-04	9.40E-04	2.14E-06	1.07E-06
Manganese	<11.7>	0.00192	7.91E-04	3.46E-03	7.86E-06	3.93E-06
Mercury*	<778.6>	0.1219	5.19E-02	2.27E-01	5.16E-04	2.58E-04
Nickel	<23.3>	0.00380	1.57E-03	6.86E-03	1.56E-05	7.80E-06
Phosphorous	<44.6>	0.00722	2.99E-03	1.31E-02	2.97E-05	1.48E-05
Selenium	<0.83>	0.000135	5.58E-05	2.45E-04	5.55E-07	2.77E-07
Silver	<3.70>	0.000600	2.48E-04	1.09E-03	2.47E-06	1.23E-06
Thallium	<0.90>	0.000150	6.10E-05	2.67E-04	6.06E-07	3.03E-07
Zinc	<31.2>	0.00514	2.10E-03	9.21E-03	2.09E-05	1.04E-05
Lithium	<37.0>	0.00600	2.48E-03	1.09E-02	2.47E-05	1.23E-05

Where:

* Reported antimony, lead and mercury concentration and emission rate values are based upon the results of test runs two and three.

kg/metric ton of clinker = (lbs/ton of clinker)/((0.9072 metric tons/short ton)*(2.205 lbs/kg))

lbs/ton of clinker = (lbs/hour)*(1.645 tons of kiln feed/ton of clinker)/(tons of kiln feed/hour)

lbs/hour = (0.001 grams/milligram)*(15.43 grains/gram)*(mg)*(dscf/minute)*(60 minutes/hour)*(1 lb/7,000 grains)/($V_{m(std)}$)

milligrams/dscm = (35.31 dscf/dscm)*(mg)/($V_{m(std)}$)

Table 10

VALID RESULTS, INC.: EPA Method TO-14* Emission Rate Summary

INITIAL TIRE BURN - Method TO-14* Volatile Organic Compounds

Client:	Ash Grove Cement	Recovery Date:	7/24/96	
Test Date:	7/24/96	Analysis Date:	7/27/96	
Plant Location:	Seattle, WA	Average Stack Gas Flow Rate:	123,639	dscf/m
Source:	Cement Kiln			

Total Detected Compounds Concentration and Emission Rate

Units	Page 1 of 4	Page 2 of 4	Page 3 of 4	Page 4 of 4	TO-14* Total	M25A Total
mg/dscm	1.59	0.55	6.29	0.13	**8.56**	62.67
lbs/hr	0.736	0.253	2.92	0.06	**3.97**	25.99
tons/year	3.22	1.11	12.78	0.26	**17.37**	113.8

Total Detected and Non-Detected Compounds Concentration and Emission Rate

Units	Page 1 of 4	Page 2 of 4	Page 3 of 4	Page 4 of 4	TO-14* Total	M25A Total
mg/dscm	2.38	1.21	7.87	3.77	**15.23**	62.67
lbs/hr	1.101	0.559	3.65	1.75	**7.06**	25.99
tons/year	4.82	2.45	15.99	7.66	**30.92**	113.8

Table 11

VALID RESULTS, INC.: EPA Method TO-14* Emission Rate Calculation

INITIAL TIRE BURN - Method TO-14* Volatile Organic Compounds (1 of 4)

Client:	Ash Grove Cement	Recovery Date:	7/24/96	
Test Date:	7/24/96	Analysis Date:	7/27/96	
Plant Location:	Seattle, WA	Avg. Stack Gas Flow Rate:	123,639	dscf/m
Source:	Cement Kiln			

Volatiles	Average Test Result (Tedlar Bag) (ppb/v)	Run 4 Tedlar Bag Blank (ppb/v)	Average Test Result (H_2O KO) (ppb/v)	Run 0 H_2O KO Blank (ppb/v)	Average Net Reported (ppb/v)	Compound Mol. Wt. (gm/gm-mole)	Average Compound Concentration (mg/dscm)	Average Compound Emission Rate (lbs/hour)	Average Compound Emission Rate (tons/year)
Bromobenzene	< 4.8	< 4.8	< 0.5	< 0.5	< 5.3	157.02	0.0345	0.0160	0.0701
Bromochloromethane	< 8.7	< 5.9	< 0.5	< 0.5	9.2	129.39	0.0494	0.0229	0.1003
Bromomethane*	240	< 7.9	< 0.2	< 0.5	232.3	94.94	0.9153	0.4238	1.8562
n-Butylbenzene	< 5.6	< 5.6	< 0.5	< 0.5	< 6.1	134.22	0.0340	0.0157	0.0688
sec-Butylbenzene	< 5.6	< 5.6	< 0.5	< 0.5	< 6.1	134.22	0.0340	0.0157	0.0688
tert-Butylbenzene	< 5.6	< 5.6	< 0.5	< 0.5	< 6.1	134.22	0.0340	0.0157	0.0688
Carbon tetrachloride	< 4.9	< 4.9	< 0.5	< 0.5	< 5.4	153.82	0.0345	0.0160	0.0701
Chlorobenzene*	6.0	< 6.7	< 0.5	< 0.5	6.5	112.56	0.0304	0.0141	0.0618
Chloroethane*	9.7	< 12	< 0.5	< 0.5	10.2	64.52	0.0273	0.0126	0.0552
Chloromethane*	313	< 15	< 0.2	< 0.5	298.2	50.49	0.6248	0.2893	1.2671
2-Chlorotoluene	< 6	< 6.0	< 0.5	< 0.5	< 6.5	126.59	0.0341	0.0158	0.0692
4-Chlorotoluene	< 6	< 6.0	< 0.5	< 0.5	< 6.5	126.59	0.0341	0.0158	0.0692
1,2-Dibromo-3-Chloropropane	< 3.2	< 3.2	< 0.5	< 0.5	< 3.7	236.33	0.0363	0.0168	0.0736
1,2-Dibromoethane	< 4	< 4.0	< 0.5	< 0.5	< 4.5	187.87	0.0351	0.0163	0.0714
Dibromomethane	< 2.6	< 4.4	< 0.5	< 0.5	< 3.1	173.85	0.0224	0.0104	0.0456
1,2-Dichlorobenzene	< 5.1	< 5.1	< 0.5	< 0.5	< 5.6	147.01	0.0342	0.0158	0.0692
1,3-Dichlorobenzene	< 5.1	< 5.1	< 0.5	< 0.5	< 5.6	147.01	0.0342	0.0158	0.0692
1,4-Dichlorobenzene	< 5.1	< 5.1	< 0.5	< 0.5	< 5.6	120.91	0.0281	0.0130	0.0569
Dichlorodifluoromethane	< 6.2	< 6.2	< 0.5	< 0.5	< 6.7	120.91	0.0336	0.0156	0.0683
1,1-Dichloroethane	< 7.7	< 7.7	< 0.5	< 0.5	< 8.2	98.96	0.0337	0.0156	0.0683
1,2-Dichloroethane	< 7.7	< 7.7	< 0.5	< 0.5	< 8.2	98.96	0.0337	0.0156	0.0683
1,1-Dichloroethene	< 7.7	< 7.7	< 0.5	< 0.5	< 8.2	96.94	0.0330	0.0153	0.0670
cis-1,2-Dichloroethene	< 7.8	< 7.8	< 0.5	< 0.5	< 8.3	96.94	0.0334	0.0155	0.0679
trans-1,2-Dichloroethene	< 7.8	< 7.8	< 0.5	< 0.5	< 8.3	96.94	0.0334	0.0155	0.0679
1,2-Dichloropropane	< 6.7	< 6.7	< 0.5	< 0.5	< 7.2	112.99	0.0338	0.0156	0.0683
1,3-Dichloropropane	< 6.7	< 6.7	< 0.5	< 0.5	< 7.2	112.99	0.0338	0.0156	0.0683
2,2-Dichloropropane	< 6.7	< 6.7	< 0.5	< 0.5	< 7.2	112.99	0.0338	0.0156	0.0683
Sum of All Compounds	706	178	13	14	696		2.379	1.101	4.824
Sum of Detected Compounds	562	29	0	0	539.7		1.59	0.736	3.22

* Detected compounds are presented in bold and followed by an asterisk.

Compound Concentration (mg/dscm) = ((ppm)*(MW g/g-mole)*(41,500)/(1,000,000))
by 40CFR60, Subpart A, Section 60.45, Paragraph F(2)

Compound Concentration (lbs/hr) = ((mg/dscm)*(0.01543 grains/mg)*(dscf/m)*(60 min/hr)/((7,000 grains/lb)*(35.32 cubic feet/cubic meter)))

Compound Emission Rate (tons/yr) = ((lbs/hr)*(24 hr/day)*(365 day/yr)/(2,000 lb/ton))

Table 12

VALID RESULTS, INC.: EPA Method TO-14* Emission Rate Calculation

INITIAL TIRE BURN - Method TO-14* Volatile Organic Compounds (2 of 4)

Client:	Ash Grove Cement	Recovery Date:	7/24/96	
Test Date:	7/24/96	Analysis Date:	7/27/96	
Plant Location:	Seattle, WA	Avg. Stack Gas Flow Rate:	123,639	dscf/m
Source:	Cement Kiln			

Volatiles	Average Test Result (Tedlar Bag) (ppb/v)	Run 4 Tedlar Bag Blank (ppb/v)	Average Test Result (H_2O KO) (ppb/v)	Run 0 H_2O KO Blank (ppb/v)	Average Net Reported (ppb/v)	Compound Mol. Wt. (gm/gm-mole)	Average Compound Concentration (mg/dscm)	Average Compound Emission Rate (lbs/hour)	Average Compound Emission Rate (tons/year)
1,1-Dichloropropene	< 6.8	< 6.8	< 0.5	< 0.5	< 7.3	110.97	0.0336	0.0156	0.0683
cis-1,3-Dichloropropene	< 6.8	< 6.8	< 0.5	< 0.5	< 7.3	110.97	0.0336	0.0156	0.0683
trans-1,3-Dichloropropene	< 6.8	< 6.8	< 0.5	< 0.5	< 7.3	110.97	0.0336	0.0156	0.0683
Hexachlorobutadiene	< 2.9	< 2.9	< 0.5	< 0.5	< 3.4	260.76	0.0368	0.0170	0.0745
Isopropylbenzene	< 6.3	< 6.3	< 0.5	< 0.5	< 6.8	120.20	0.0339	0.0157	0.0688
4-Isopropyltoluene	< 5.6	< 5.6	< 0.5	< 0.5	< 6.1	134.22	0.0340	0.0157	0.0688
Methylene chloride*	**113**	**73**	**5.4**	< 3.2	**111.1**	**84.93**	**0.3916**	**0.1813**	**0.7941**
Naphthalene	< 4.4	< 5.9	0.7	< 0.9	< 5.1	128.19	0.0271	0.0125	0.0548
n-Propylbenzene	2.8	< 6.3	< 0.5	< 0.5	< 3.3	120.20	0.0165	0.0076	0.0333
Styrene	< 7.2	< 7.2	< 0.5	< 0.5	< 7.7	104.16	0.0333	0.0154	0.0675
1,1,1,2-Tetrachloroethane	< 4.5	< 4.5	< 0.5	< 0.5	< 5.0	167.85	0.0348	0.0161	0.0705
1,1,2,2-Tetrachloroethane	< 4.5	< 4.5	< 0.5	< 0.5	< 5.0	167.85	0.0348	0.0161	0.0705
Tetrachloroethene	< 4.6	< 4.6	< 0.5	< 0.5	< 5.1	165.83	0.0351	0.0163	0.0714
1,2,3-Trichlorobenzene	< 4.2	< 4.2	< 0.5	< 0.5	< 4.7	181.45	0.0354	0.0164	0.0718
1,2,4-Trichlorobenzene	< 4.2	< 4.2	< 0.5	< 0.5	< 4.7	181.45	0.0354	0.0164	0.0718
1,1,1-Trichloroethane	< 5.7	< 5.7	< 0.5	< 0.5	< 6.2	133.41	0.0343	0.0159	0.0696
1,1,2-Trichloroethane	< 5.7	< 5.7	< 0.5	< 0.5	< 6.2	133.41	0.0343	0.0159	0.0696
1-Pentene*	**7.0**				**7.0**	**149.04**	**0.0433**	**0.0200**	**0.0876**
Unknown*	**4.7**				**4.7**		**0.0000**	**0.0000**	**0.0000**
1-Hexene*	**16.7**				**16.7**	**84.16**	**0.0583**	**0.0270**	**0.1183**
Propanal, 2-methyl-*	**7.7**				**7.7**	**190.29**	**0.0608**	**0.0281**	**0.1231**
Thiophene*	**17.7**				**17.7**	**84.14**	**0.0618**	**0.0286**	**0.1253**
Nitric Acid, 1-methylethyl ester*	**5.3**				**5.3**	**149.10**	**0.0328**	**0.0152**	**0.0666**
Octane*	**1.3**				**1.3**	**114.23**	**0.0062**	**0.0029**	**0.0127**
Nonane*	**2.6**				**2.6**	**128.26**	**0.0138**	**0.0064**	**0.0280**
Decane*	**2.1**				**2.1**	**142.29**	**0.0124**	**0.0057**	**0.0250**
Sum of All Compounds	261	161	14	12	267		1.208	0.559	2.449
Sum of Detected Compounds	144	73	0	0	141.8		0.55	0.253	1.11

* Detected compounds are presented in bold and followed by an asterisk.

Compound Concentration (mg/dscm) = ((ppm)*(MW g/g-mole)*(41,500)/(1,000,000))
by 40CFR60, Subpart A, Section 60.45, Paragraph F(2)

Compound Concentration (lbs/hr) = ((mg/dscm)*(0.01543 grains/mg)*(dscf/m)*(60 min/hr)/((7,000 grains/lb)*(35.32 cubic feet/cubic meter)))

Compound Emission Rate (tons/yr) = ((lbs/hr)*(24 hr/day)*(365 day/yr)/(2,000 lb/ton))

Table 13

VALID RESULTS, INC.: EPA Method TO-14* Emission Rate Calculation

INITIAL TIRE BURN - Method TO-14* Volatile Organic Compounds (3 of 4)

Client:	Ash Grove Cement	Recovery Date:	7/24/96
Test Date:	7/24/96	Analysis Date:	7/27/96
Plant Location:	Seattle, WA	Avg. Stack Gas Flow Rate:	123,639
Source:	Cement Kiln		

Volatiles	Average Test Result (Tedlar Bag) ($ppb_{f,v}$)	Run 4 Tedlar Bag Blank ($ppb_{f,v}$)	Average Test Result (H_2O KO) ($ppb_{f,v}$)	Run 0 H_2O KO Correction ($ppb_{f,v}$)	Average Net Reported ($ppb_{f,v}$)	Compound Mol. Wt. (gm/gm-mole)	Average Compound Concentration (mg/dscm)	Average Compound Emission Rate (lbs/hour)	Average Compound Emission Rate (tons/year)
Trichloroethene	< 5.8	< 5.8	< 0.5	< 0.5	< 6.3	131.29	3.43E-02	1.59E-02	6.96E-02
Trichlorofluoromethane	< 5.5	< 5.5	< 0.5	< 0.5	< 6.0	137.37	3.42E-02	1.58E-02	6.92E-02
1,2,3-Trichloropropane	< 5.1	< 5.1	< 0.5	< 0.5	< 5.6	147.43	3.43E-02	1.59E-02	6.96E-02
1,2,4-Trimethylbenzene*	**11.3**	< 6.3	< 0.4	< 0.5	**11.7**	**120.20**	**5.84E-02**	**2.70E-02**	**1.18E-01**
1,3,5-Trimethylbenzene	< 3.6	< 6.3	< 0.5	< 0.5	< 4.1	120.20	2.05E-02	9.49E-03	4.16E-02
Vinyl chloride*	**12**	< 12	< 0.5	< 0.5	**12.5**	**62.50**	**3.24E-02**	**1.50E-02**	**6.57E-02**
Benzene*	**410**	< 9.6	**1.5**	< 0.5	**401.9**	**78.12**	**1.30E+00**	**6.02E-01**	**2.64E+00**
Toluene*	**114.7**	< 8.2	**0.8**	**0.2**	**107.3**	**92.15**	**4.10E-01**	**1.90E-01**	**8.32E-01**
Ethylbenzene*	**10.1**	< 7.1	< 0.5	< 0.5	**10.6**	**106.17**	**4.67E-02**	**2.16E-02**	**9.46E-02**
p/m-Xylene*	**26**	< 7.1	**0.8**	< 0.5	**24.2**	**106.17**	**1.07E-01**	**4.95E-02**	**2.17E-01**
o-Xylene*	**9.8**	< 7.1	< 0.5	< 0.5	**10.3**	**106.17**	**4.54E-02**	**2.10E-02**	**9.20E-02**
Chloroform	1.8	52	< 0.5	< 0.5	< 2.3	119.38	1.14E-02	5.28E-03	2.31E-02
Bromodichloromethane	< 4.6	< 4.6	< 0.5	< 0.5	< 5.1	163.83	3.47E-02	1.61E-02	7.05E-02
Dibromochloromethane	< 3.6	< 3.6	< 0.5	< 0.5	< 4.1	208.29	3.54E-02	1.64E-02	7.18E-02
Bromoform	< 3	< 3.0	< 0.5	< 0.5	< 3.5	252.75	3.67E-02	1.70E-02	7.45E-02
Acetone*	**740**	< 260	**1238**	**944**	**1780**	**58.08**	**4.29E+00**	**1.99E+00**	**8.72E+00**
2-Butanone	< 210	< 210	< 10.2	< 1000	< 220	72.12	6.58E-01	3.05E-01	1.34E+00
2-Hexanone	< 7.5	< 7.5	< 0.5	< 0.5	< 8.0	100.16	3.33E-02	1.54E-02	6.75E-02
4-Methyl-2-Pentanone	< 7.5	< 7.5	< 0.5	< 0.5	< 8.0	100.16	3.33E-02	1.54E-02	6.75E-02
Carbon Disulfide	< 9.9	< 9.9	< 0.5	< 0.5	< 10.4	76.14	3.29E-02	1.52E-02	6.66E-02
2-Chloroethylvinylether	< 7.1	< 7.1	< 0.5	< 0.5	< 7.6	106.55	3.36E-02	1.56E-02	6.83E-02
Acrylonitrile	< 213	< 280	< 5.0	< 10.0	< 218	53.06	4.80E-01	2.22E-01	9.72E-01
Allyl Chloride	< 9.9	< 9.9	< 0.5	< 0.5	< 10.4	76.53	3.30E-02	1.53E-02	6.70E-02
Benzyl Chloride	< 5.9	< 5.9	< 0.5	< 0.5	< 6.4	126.59	3.36E-02	1.56E-02	6.83E-02
Sum of All Compounds	1838	941	1265	1964	2884		7.87	3.65	15.99
Sum of Detected Compounds	1335.7	369	1241.1	944	2358.5		6.29	2.92	12.78

* Detected compounds are presented in bold and followed by an asterisk.

Compound Concentration (mg/dscm) = ((ppm)*(MW g/g-mole)*(41,500)/(1,000,000))
by 40CFR60, Subpart A, Section 60.45, Paragraph F(2)

Compound Concentration (lbs/hr) = ((mg/dscm)*(0.01543 grains/mg)*(dscf/m)*(60 min/hr)/((7,000 grains/lb)*(35.32 cubic feet/cubic meter)))

Compound Emission Rate (tons/yr) = ((lbs/hr)*(24 hr/day)*(365 day/yr)/(2,000 lb/ton))

Table 14

VALID RESULTS, INC.: EPA Method TO-14* Emission Rate Calculation

INITIAL TIRE BURN - Method TO-14* Volatile Organic Compounds (4 of 4)

Client:	Ash Grove Cement	Recovery Date:	7/24/96
Test Date:	7/24/96	Analysis Date:	7/27/96
Plant Location:	Seattle, WA	Avg. Stack Gas Flow Rate:	123,639
Source:	Cement Kiln		

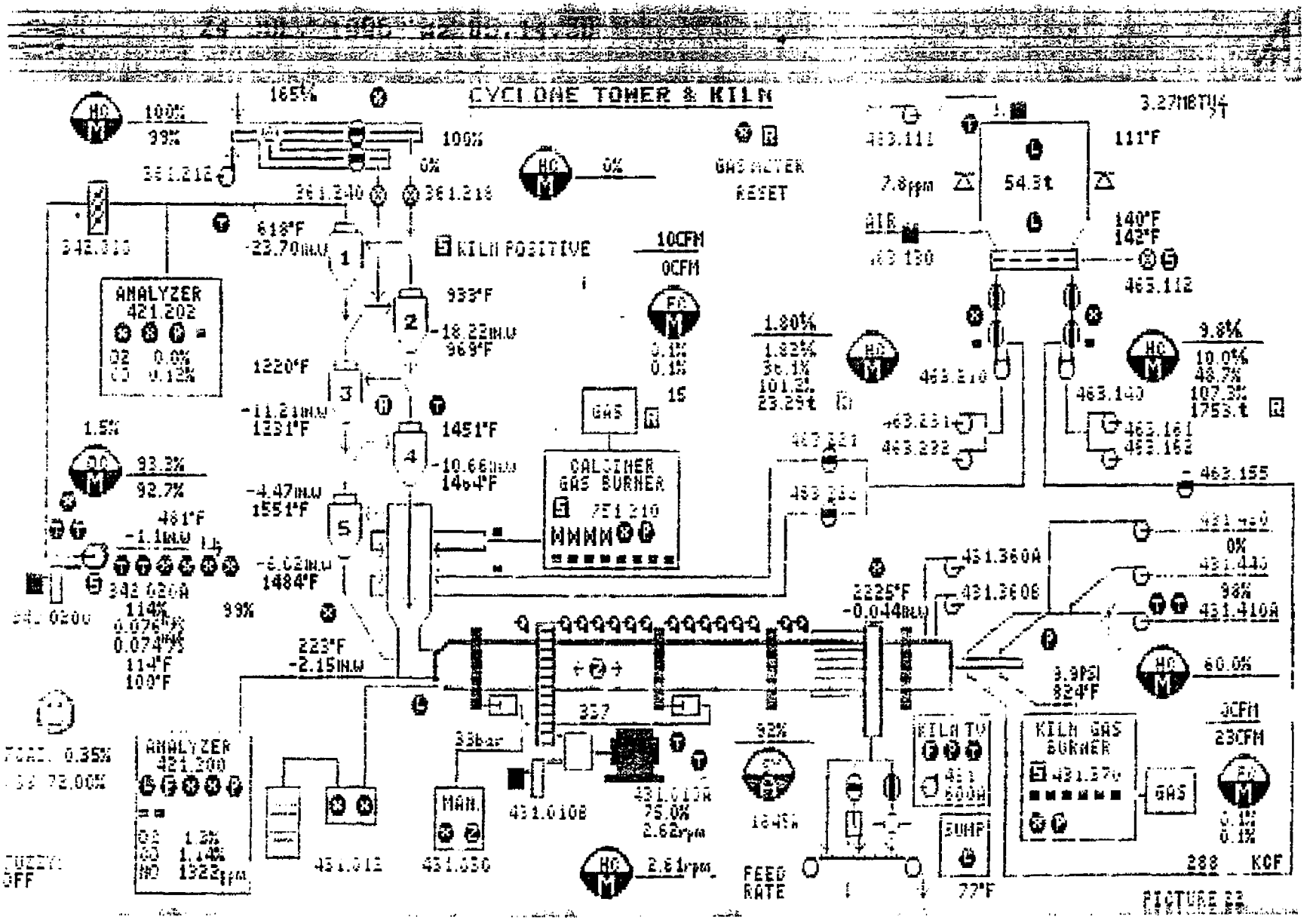
Volatiles	Average Test Result (Tedlar Bag) ($ppb_{(v)}$)	Run 4 Tedlar Bag Blank ($ppb_{(v)}$)	Average Test Result (H_2O KO) ($ppb_{(v)}$)	Run 0 H_2O KO Correction ($ppb_{(v)}$)	Average Net Reported ($ppb_{(v)}$)	Compound Mol. Wt. (gm/gm-mole)	Average Compound Concentration (mg/dscm)	Average Compound Emission Rate (lbs/hour)	Average Compound Emission Rate (tons/year)
1-Chlorobutane	< 8.2	< 8.2	< 0.5	< 0.5	< 8.7	92.57	3.34E-02	1.55E-02	6.79E-02
Cyclohexane	< 8.9	< 8.9	< 0.5	< 0.5	< 9.4	84.16	3.28E-02	1.52E-02	6.66E-02
trans-1,4-Dichloro-2-Butene	< 6.1	< 6.1	< 0.5	< 0.5	< 6.6	125.00	3.42E-02	1.58E-02	6.92E-02
Diethyl Ether	< 10	< 10	< 0.5	< 0.5	< 10.5	162.23	7.07E-02	3.27E-02	1.43E-01
Ethyl Methacrylate	< 130	< 130	< 10.2	< 10.0	< 140	114.15	6.63E-01	3.07E-01	1.34E+00
Freon 113	< 4	13	< 0.5	< 0.5	< 4.5	187.38	3.50E-02	1.62E-02	7.10E-02
4-Ethyltoluene*	9.2	< 6.2	< 0.5	< 0.5	9.7	120.20	4.84E-02	2.24E-02	9.81E-02
Heptane*	8.5	< 7.4	< 0.5	< 0.5	9.0	100.21	3.74E-02	1.73E-02	7.58E-02
Hexane*	10.9	< 8.6	< 0.5	< 0.5	11.4	86.18	4.08E-02	1.89E-02	8.28E-02
Hexachloroethane	< 3.2	< 3.2	< 0.5	< 0.5	< 3.7	236.74	3.64E-02	1.69E-02	7.40E-02
Iodomethane	< 4.4	< 5.3	< 0.5	< 0.5	< 4.9	141.94	2.89E-02	1.34E-02	5.87E-02
Methacrylonitrile	< 220	< 220	< 10.2	< 10.0	< 230	67.09	6.40E-01	2.96E-01	1.30E+00
Methyl Acrylate	< 170	< 170	< 10.2	< 10.0	< 180	86.09	6.43E-01	2.98E-01	1.31E+00
Methyl-t-Butyl Ether	< 8.5	< 8.5	< 0.5	< 0.5	< 9.0	88.15	3.29E-02	1.52E-02	6.66E-02
Methyl methacrylate	< 150	< 150	< 10.2	< 10.0	< 160	100.13	6.65E-01	3.08E-01	1.35E+00
Nitrobenzene	N/A	N/A	N/A	N/A	N/A	123.11	N/A	N/A	N/A
2-Nitropropane	N/A	N/A	N/A	N/A	N/A	89.09	N/A	N/A	N/A
Pentachloroethane	< 3.8	< 3.8	< 0.5	< 0.5	< 4.3	202.30	3.61E-02	1.67E-02	7.31E-02
Tetrahydrofuran	< 210	< 210	< 10.2	< 10.0	< 220	72.12	6.58E-01	3.05E-01	1.34E+00
Vinyl Acetate	< 8.6	< 8.6	< 0.5	< 0.5	< 9.1	86.09	3.25E-02	1.50E-02	6.57E-02
Benzaldehyde*			0.1		0.1	106.13	4.40E-04	2.04E-04	8.94E-04
Benzonitrile*			0.3		0.3	117.15	1.46E-03	6.76E-04	2.96E-03
Cyclohexanol,**			0.3		0.3	153.25	1.91E-03	8.84E-04	3.87E-03
Sum of All Compounds	974	978	58	57	1032		3.77	1.75	7.66
Sum of Detected Compounds	28.6	22	0.7		30.8		0.13	0.06	0.26

* Detected compounds are presented in bold and followed by an asterisk.
** Cyclohexanol, 5-methyl-2-(1-methylethyl)-*

Compound Concentration (mg/dscm) = ((ppm)*(MW g/g-mole)*(41,500)/(1,000,000))
by 40CFR60, Subpart A, Section 60.45, Paragraph F(2)

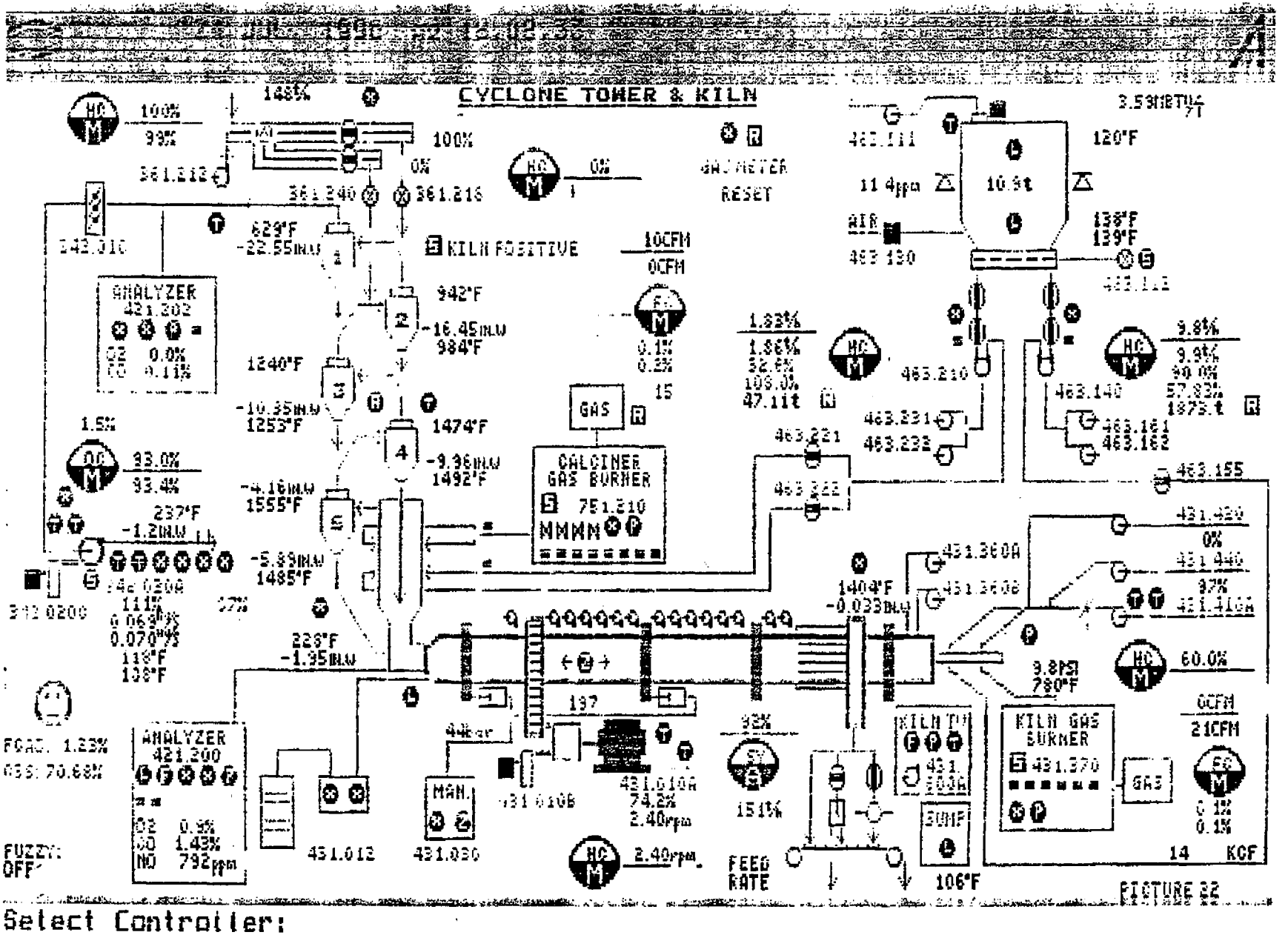
Compound Concentration (lbs/hr) = ((mg/dscm)*(0.01543 grains/mg)*(dscf/m)*(60 min/hr)/((7,000 grains/lb)*(35.32 cubic feet/cubic meter)))

Compound Emission Rate (tons/yr) = ((lbs/hr)*(24 hr/day)*(365 day/yr)/(2,000 lb/ton))



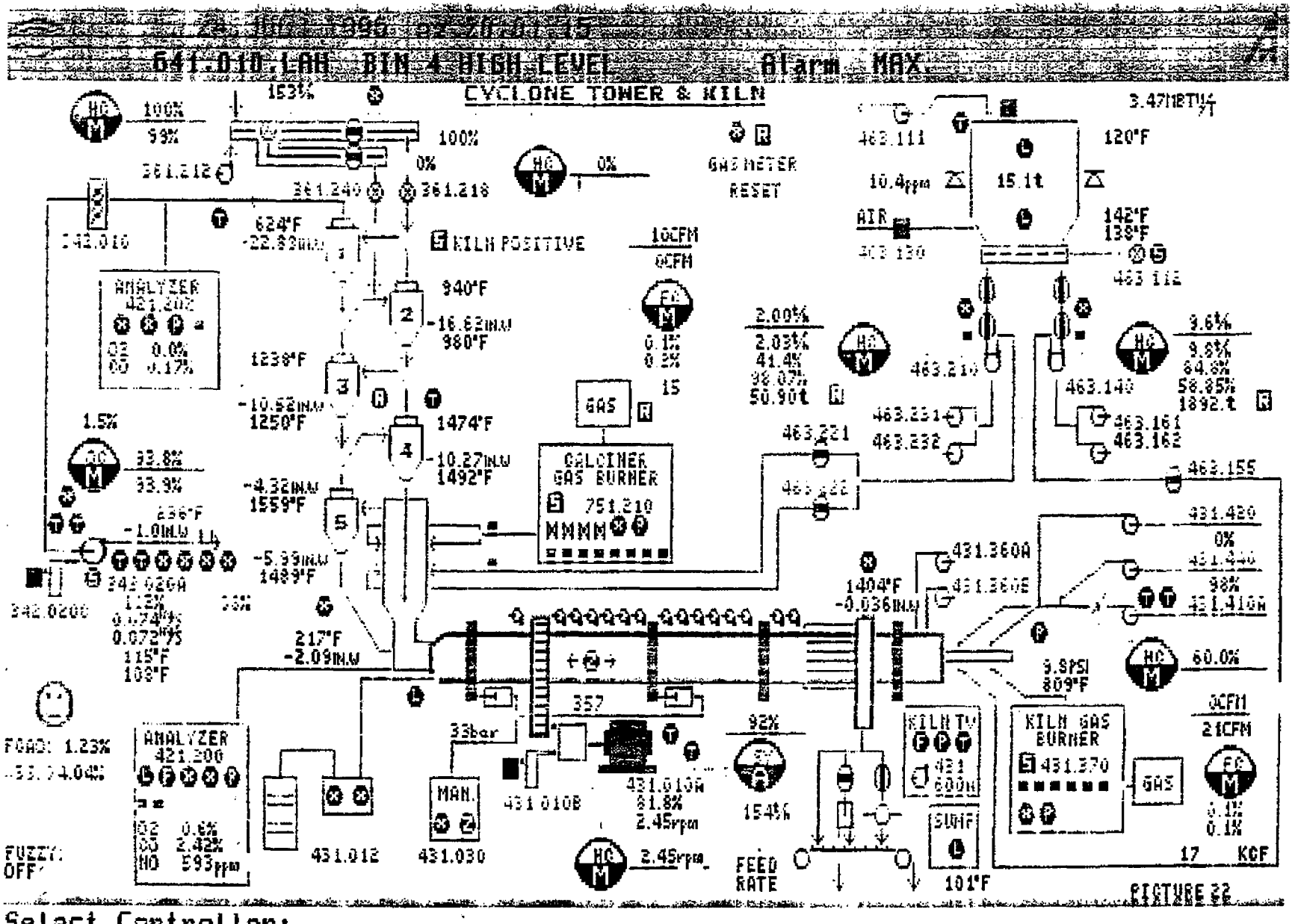
Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



Select Controller:

KILN SP KILN TR TR DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA

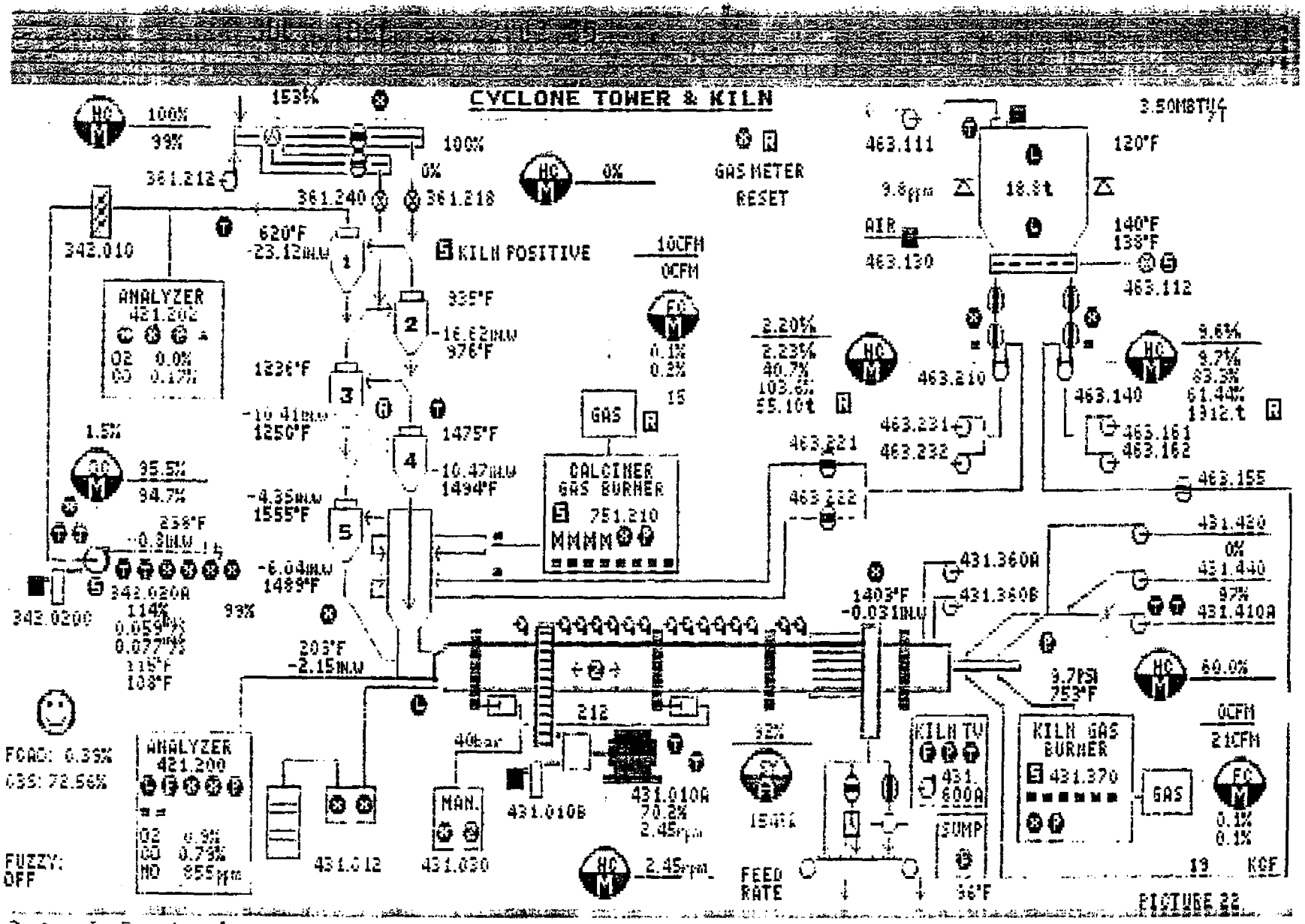
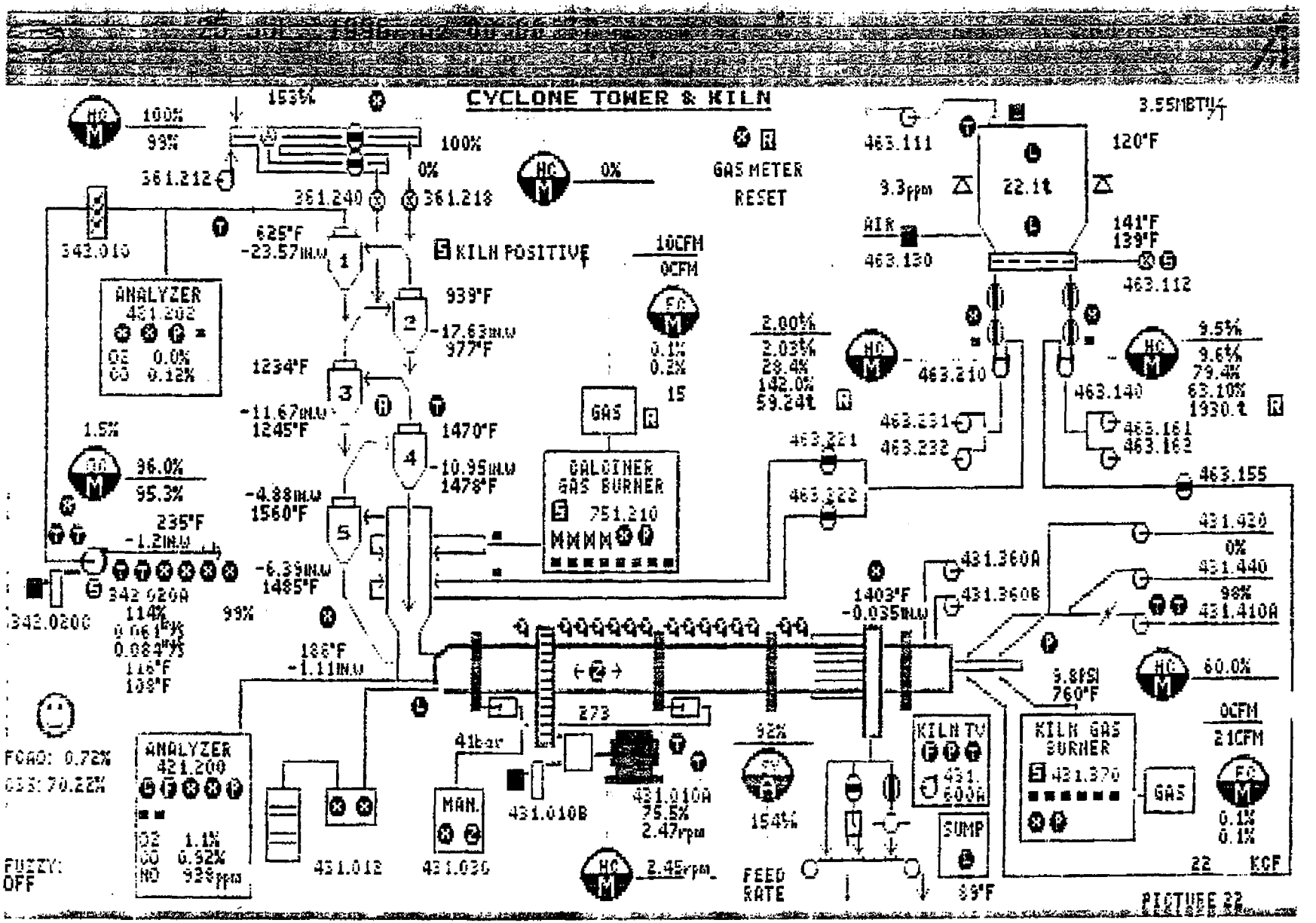


FIGURE 22

Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA

HARD

TIRES TR

CALCINER MBTUS/HR

		PCT OF TOTAL	PCT TIRE FUEL REPLACEMENT
COAL	42.7		
GAS	0.000		
TIRES	39.03	24.32%	11.62%
TOTAL	81.7		

# of Tires	Tons
987	9.68

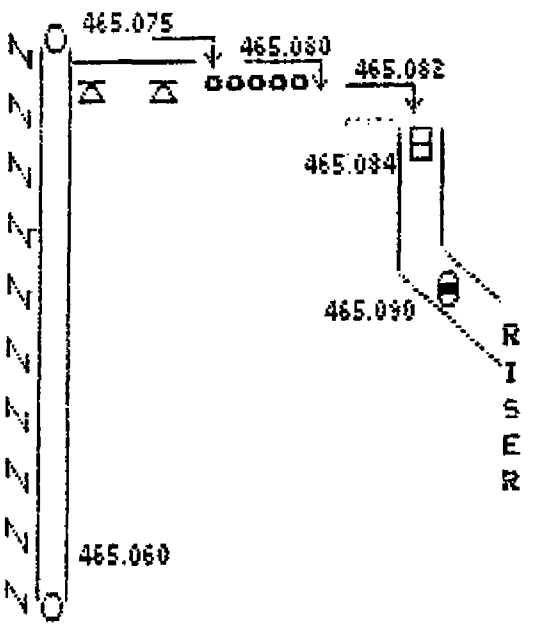
KILN MBTUS/HR

COAL	228.0
GAS	4.2
TOTAL	232.2

Tire System Select On

TIRERATE

SP	1.20	TPH
TIRE RATE	2612.	lbs/hr



	Top Twr	Feed End	Stack Average
O2	0.0%	0.9%	
CO	0.11%	1.43%	673ppm

EMG STOP

PICTURE

Select Controller:
TIRERAT

HARD COPY

TIRES TO US

CALCINER MBTUS/HR

		PCT OF TOTAL	PCT TIRE FUEL REPLACEMENT
COAL	46.5		
GAS	0.000		
TIRES	30.12	23.45%	9.22%
TOTAL	76.6		

# of Tires	Tons
1208	11.94

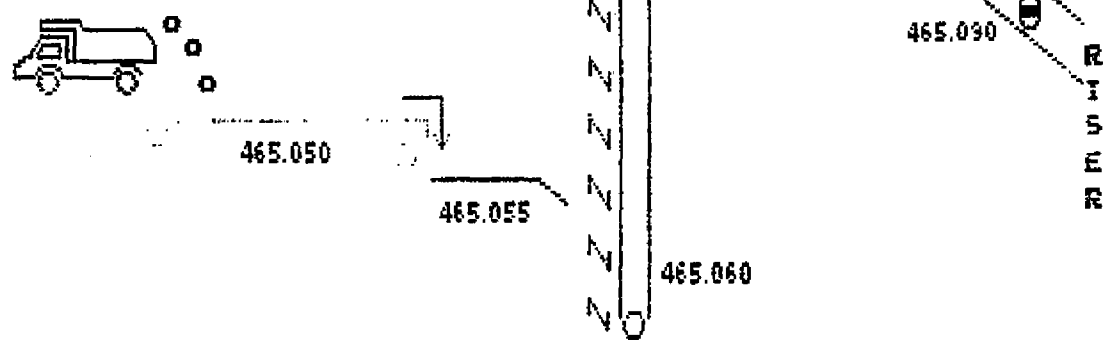
KILN MBTUS/HR

COAL	223.8
GAS	4.2
TOTAL	228.0

Tire System Select On

TIRERATE

SP	1.20	TPH
TIRE RATE	2092.	lbs/hr



	Top Twr	Feed End	Stack Average
O2	0.0%	0.6%	
CO	0.17%	2.36%	835ppm

EMG STOP

PICTURE

Select Controller:
TIRERAT

STR96332

230

AGCS2M0000140
10/3/96
S4000583

CALCINER MBTUS/HR

		PCT OF TOTAL	PCT TIRE FUEL REPLACEMENT
COAL	51.1		
GAS	0.000		
TIRES	36.56	26.02%	10.85%
TOTAL	87.7		

# of Tires	Tons
1400	14.19

KILN MBTUS/HR

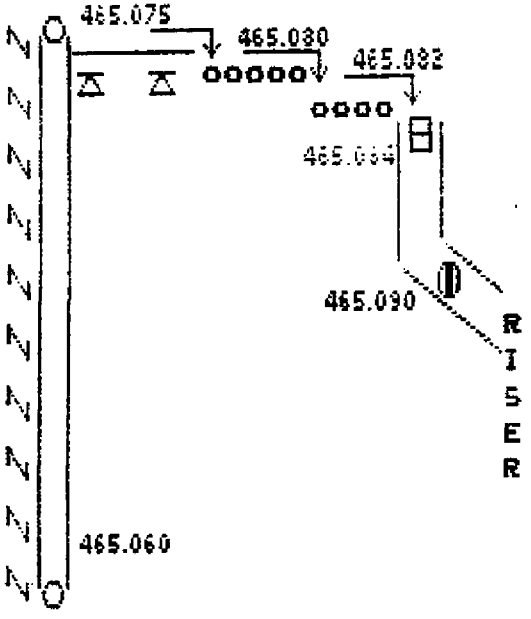
COAL	222.7
GAS	4.3
TOTAL	227.0

Tire System Select On

EMG STOP

TIRERATE

SP	1.20	TPH
TIRE RATE	2583.	lbs/hr



	Top Tnr	Feed End	Stack Average
O2	0.0%	1.0%	
CO	0.16%	0.74%	1515ppm

FIGURE

Select Controller:
TIRERAT

HARD COPY

TIRES R US

CALCINER MBTUS/HR

		PCT OF TOTAL	PCT TIRE FUEL REPLACEMENT
COAL	46.6		
GAS	0.000		
TIRES	37.07	25.31%	11.21%
TOTAL	83.7		

# of Tires	Tons
1634	16.48

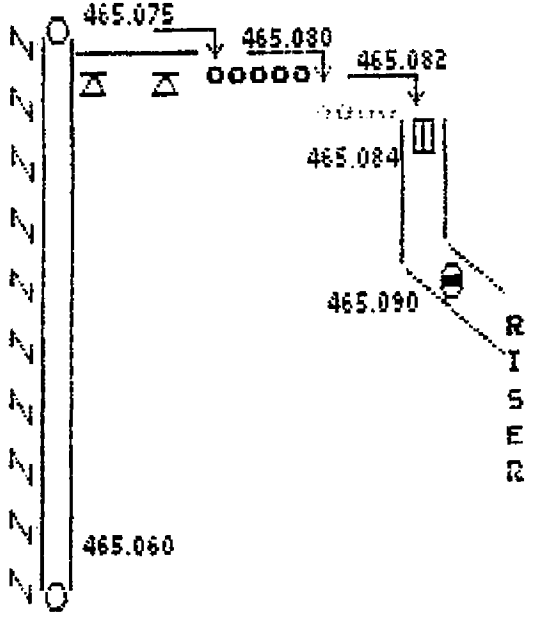
KILN MBTUS/HR

COAL	220.7
GAS	4.4
TOTAL	225.1

Tire System Select On

TIRERATE

SP	1.20	TPH
TIRE RATE	2575.	lbs/hr



	Top THr	Feed End	Stack Average
O2	0.0%	1.1%	
CO	0.14%	0.98%	995ppm

EMG STOP

PICTURE

Select Controller:
TIRERAT

CALCINER MBTUS/HR

		PCT OF TOTAL	PCT TIRE FUEL REPLACEMENT
COAL	23.4		
GAS	0.000		
TIRES	32.34	18.19%	10.56%
TOTAL	55.7		

# of Tires	Tons
1425	13.93

KILN MBTUS/HR

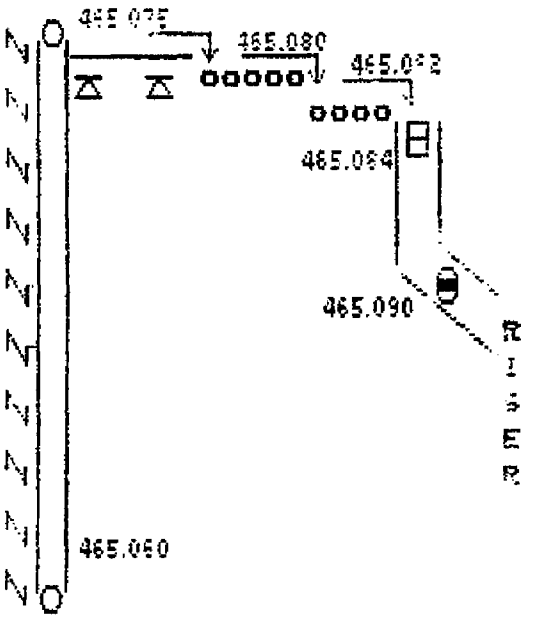
COAL	244.0
GAS	4.8
TOTAL	248.8

Tire System Select On

TIRERATE

SP 1.20 TPH

TIRE RATE 2312. lbs/hr



	Top Thr	Feed End	Stack Average
O2	3.5%	0.3%	
CO	0.08%	3.31%	597ppm

EMG STOP

PICTURE 24

Select Controller:

TIRERAT

STR96332

TIRES 'R US

CALCINER MBTUS/HR

		PCT OF TOTAL	PCT TIRE FUEL REPLACEMENT
COAL	23.4		
GAS	0.000		
TIRES	38.72	19.57%	12.20%
TOTAL	62.1		

# of Tires	Tons
1669	16.17

KILN MBTUS/HR

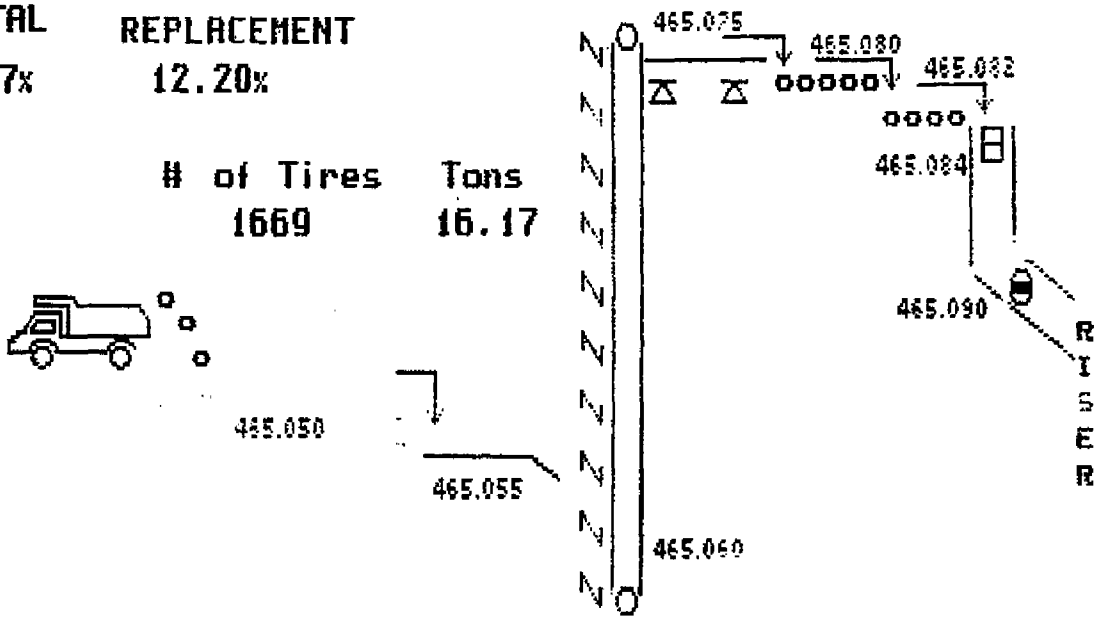
COAL	248.7
GAS	4.9
TOTAL	253.7

Tire System Select On

EMG STOP

TIRERATE

SF	1.20	TPH
TIRE RATE	2488.	lb=/hr

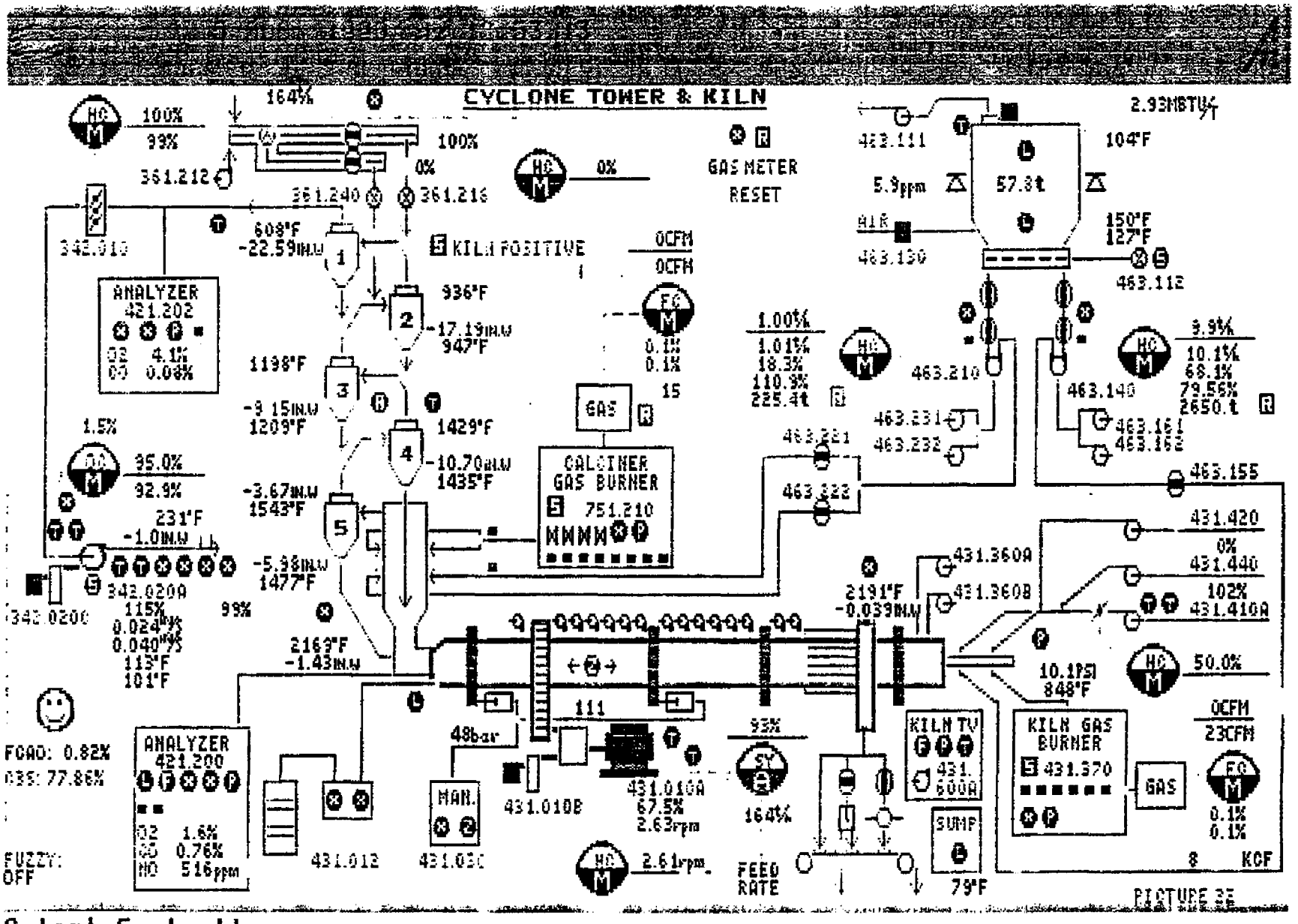


	Top THr	Feed End	Stack Average
O2	3.2%	0.1%	
CO	0.14%	2.87%	1141 ppm

PICTURE 24

Select Controller:
TIRERAT

AGCS2M000144 S4000587



Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA

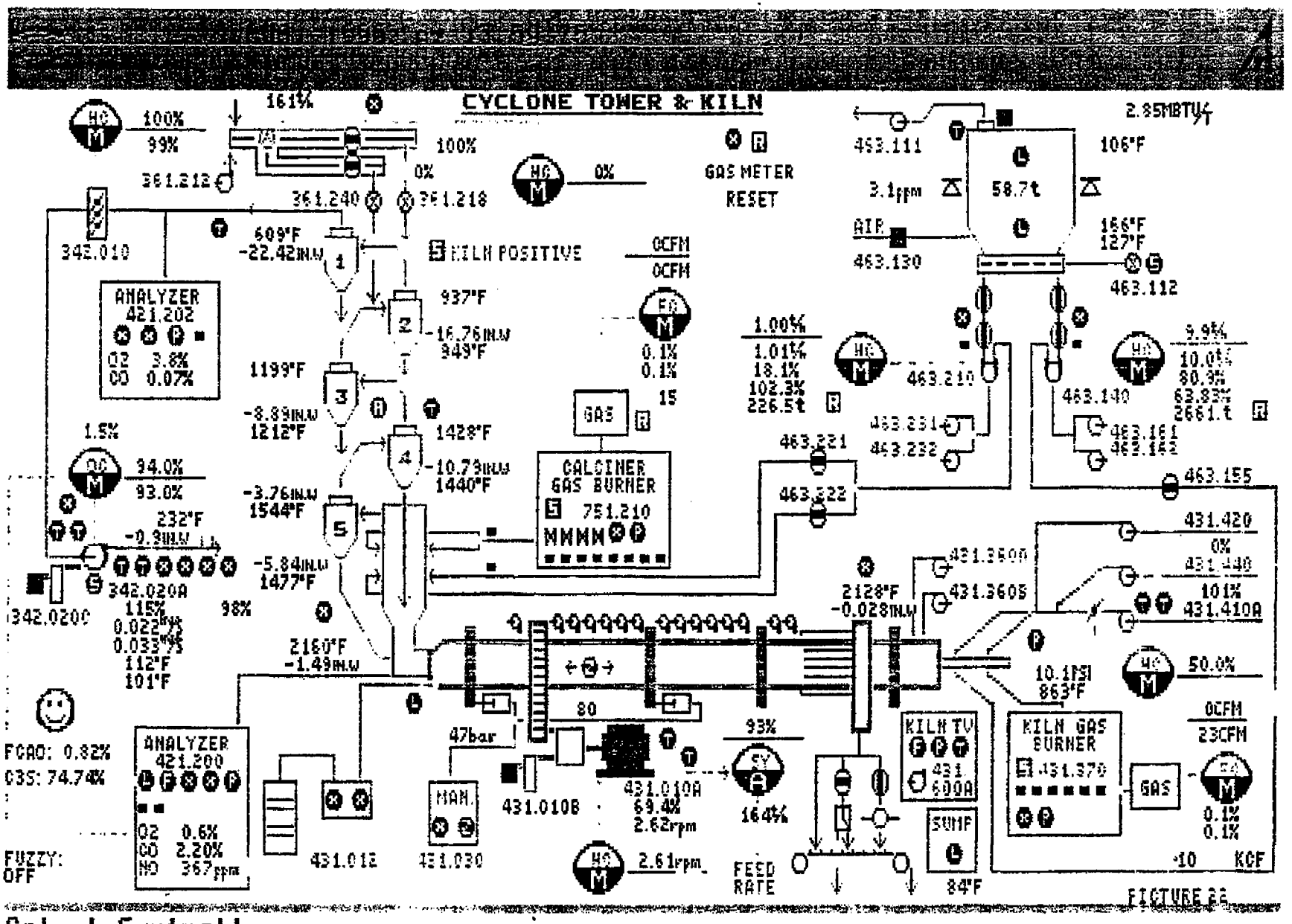
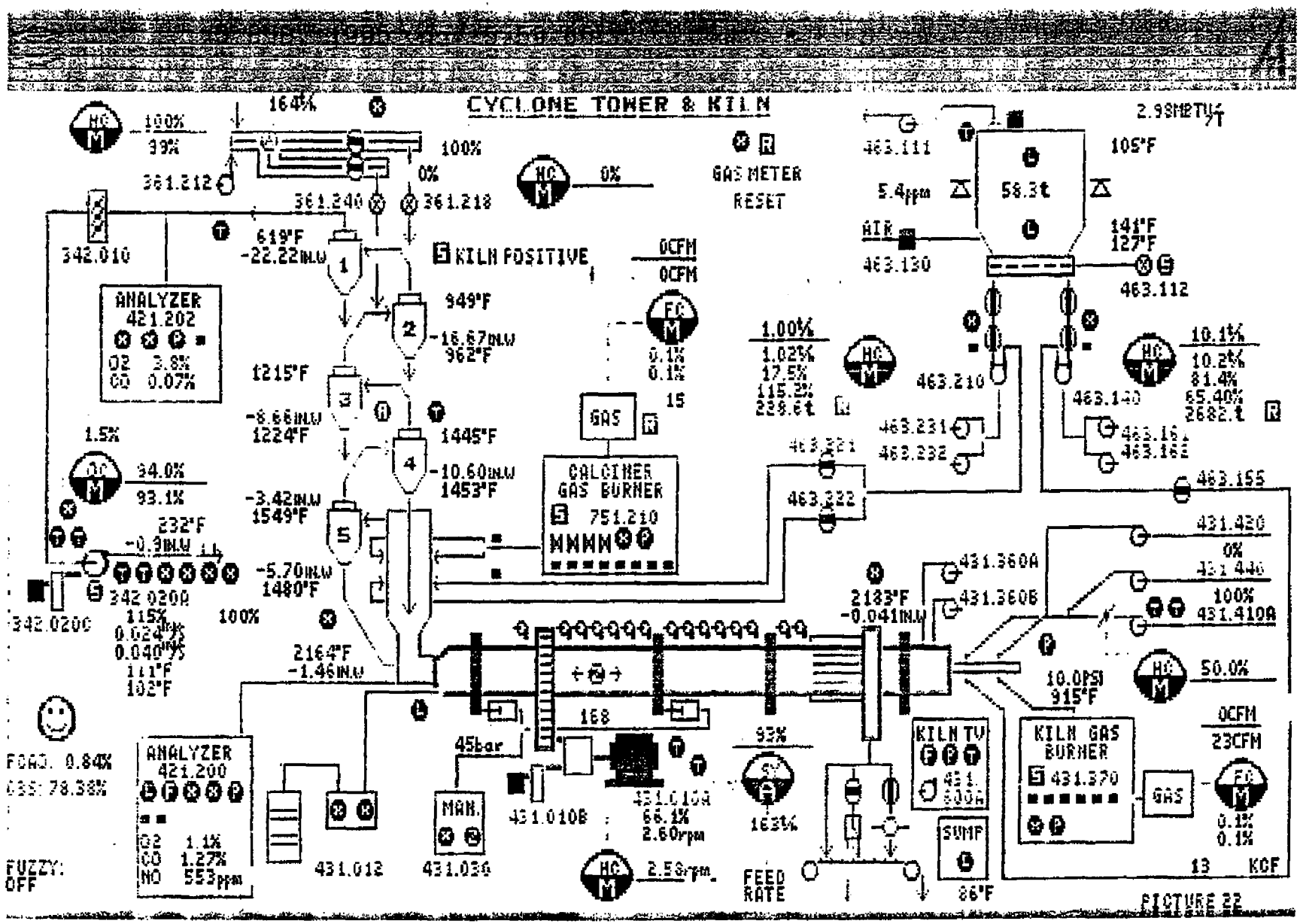


FIGURE 26

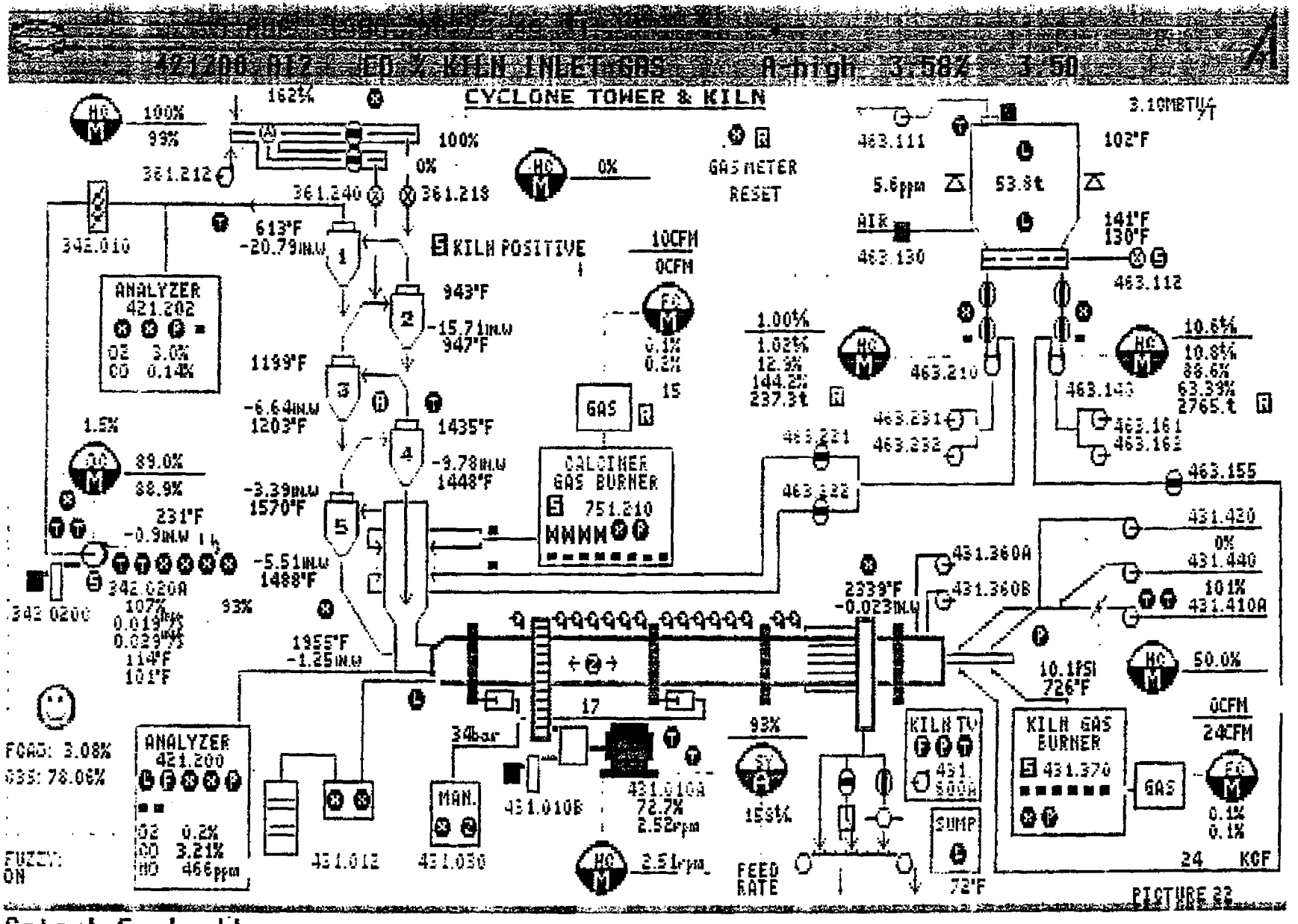
Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



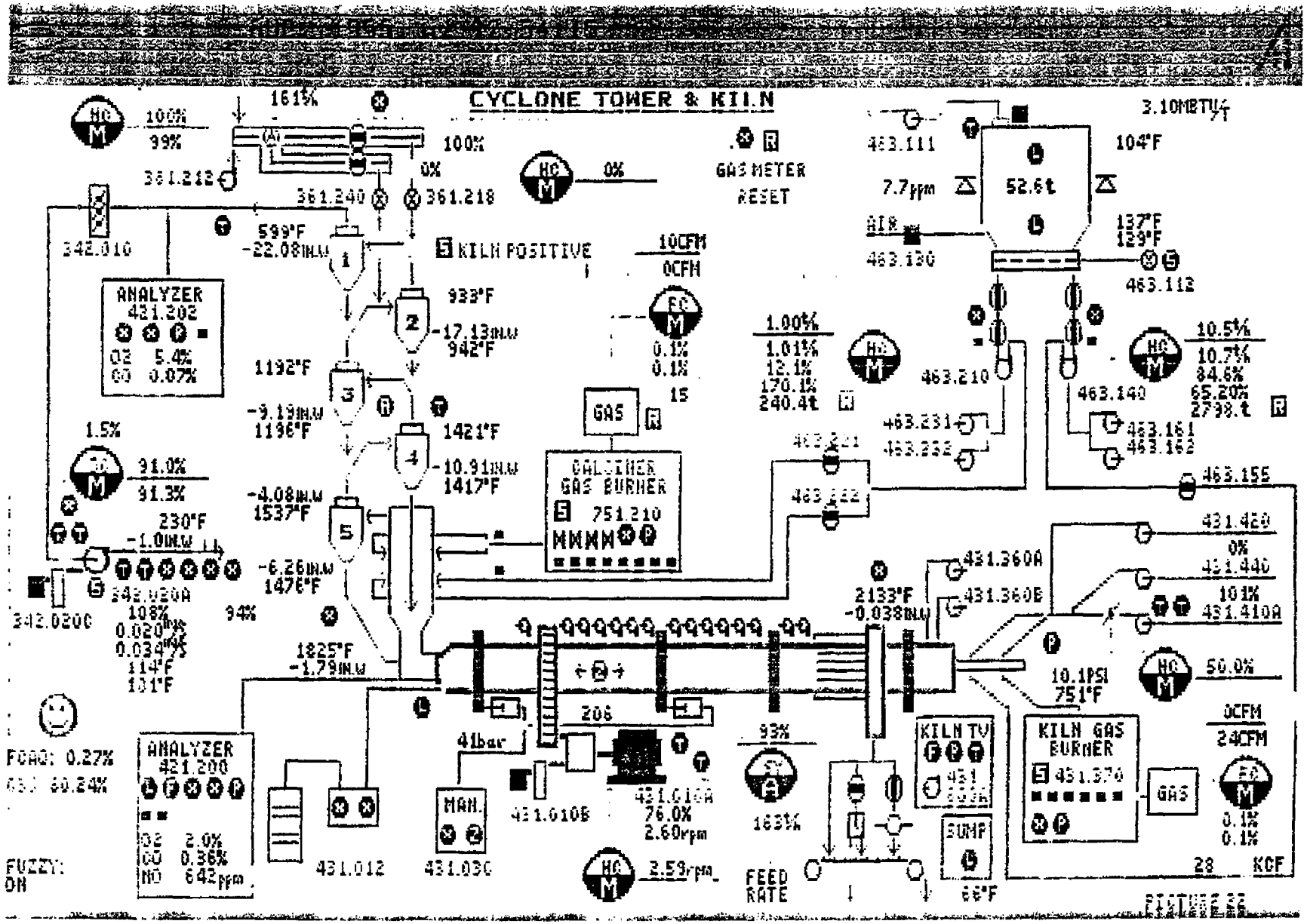
Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



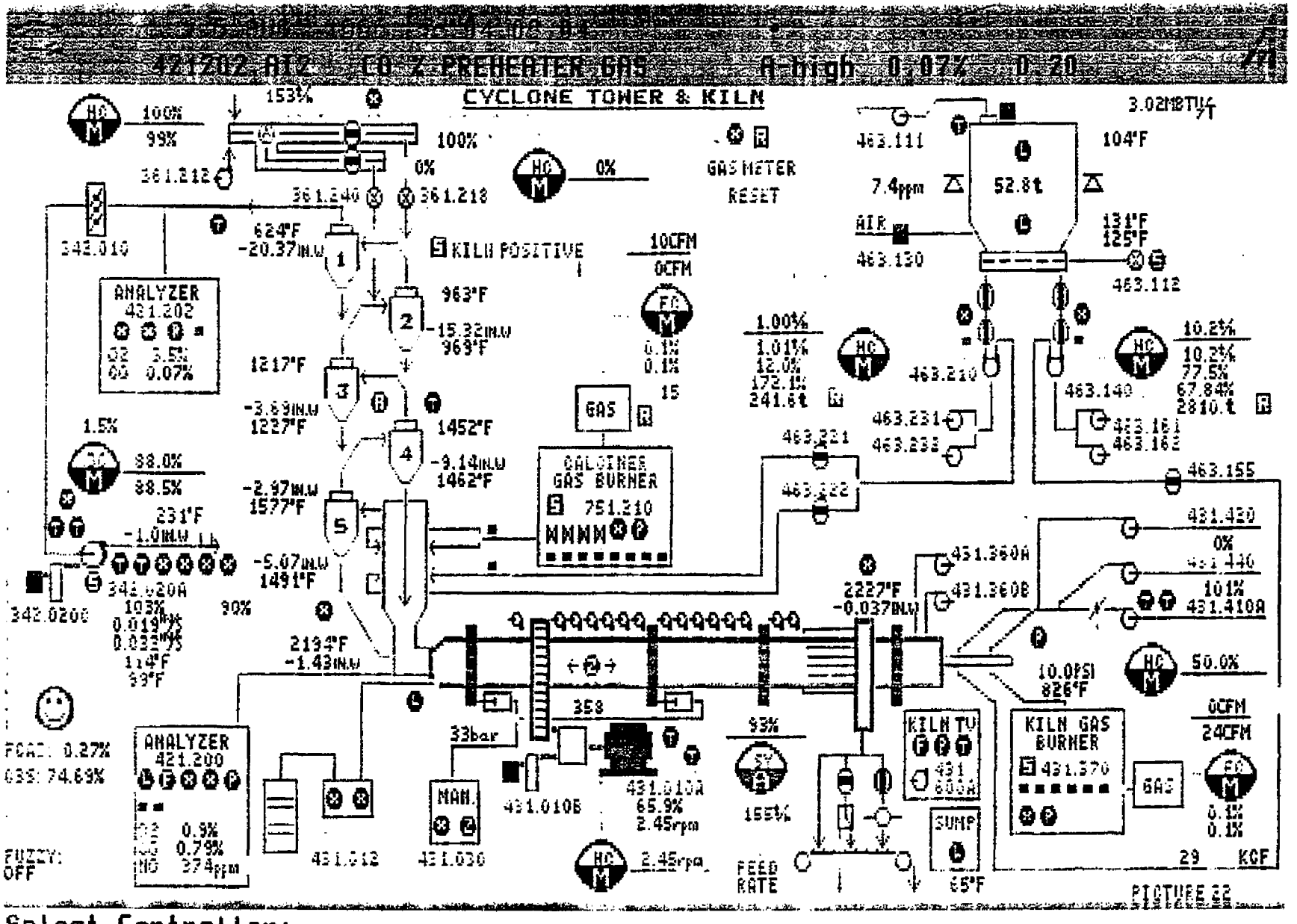
Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



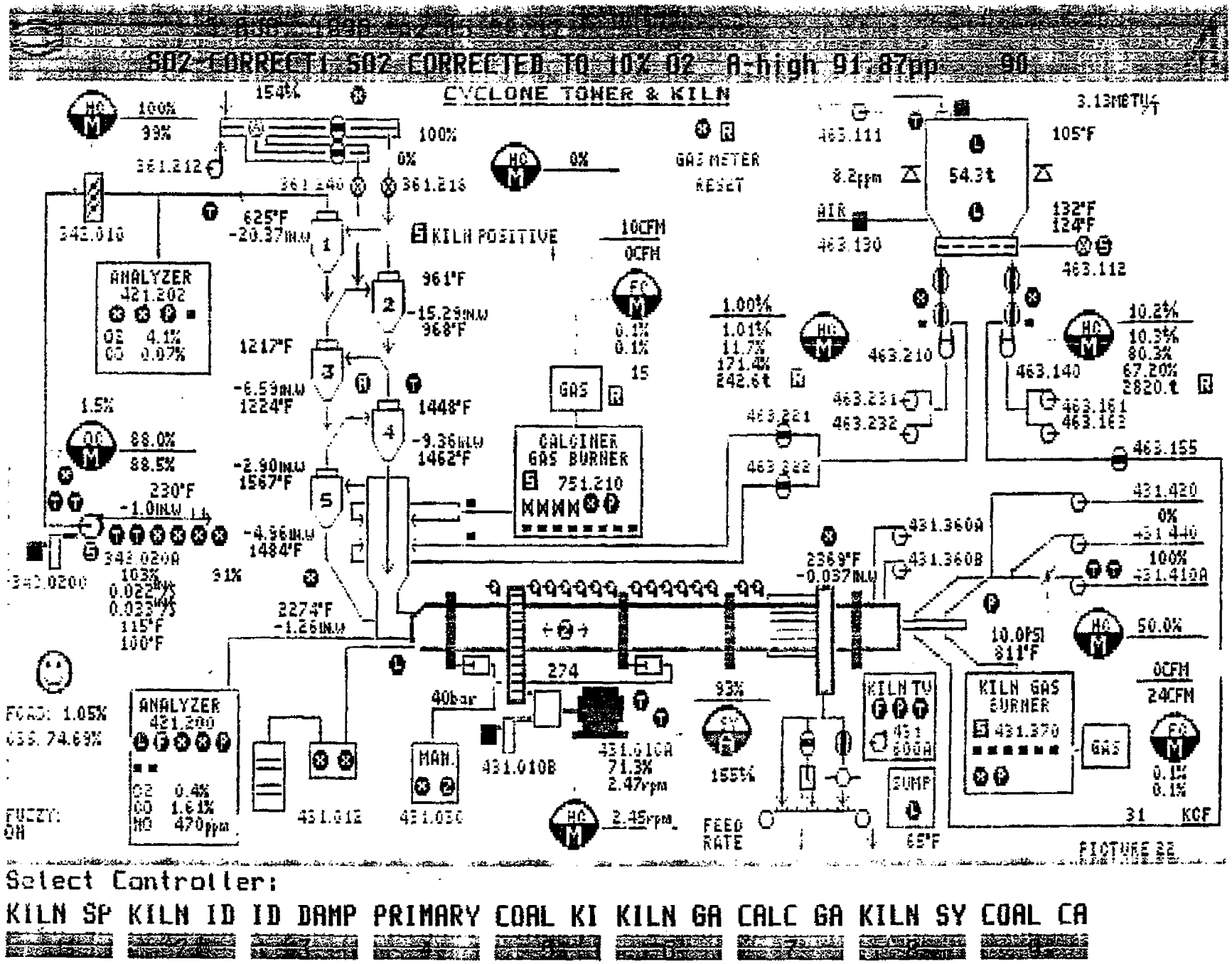
Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



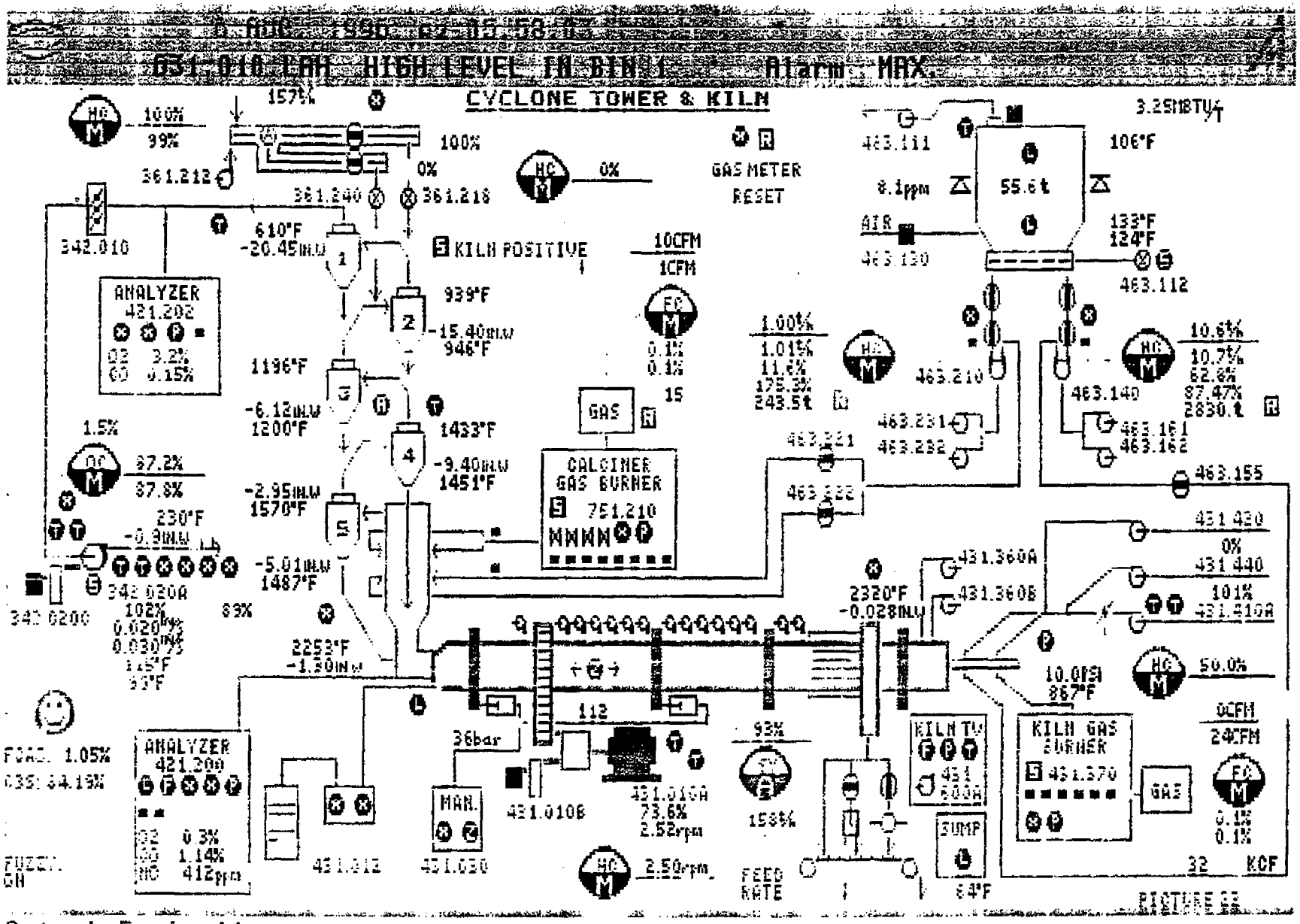
Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



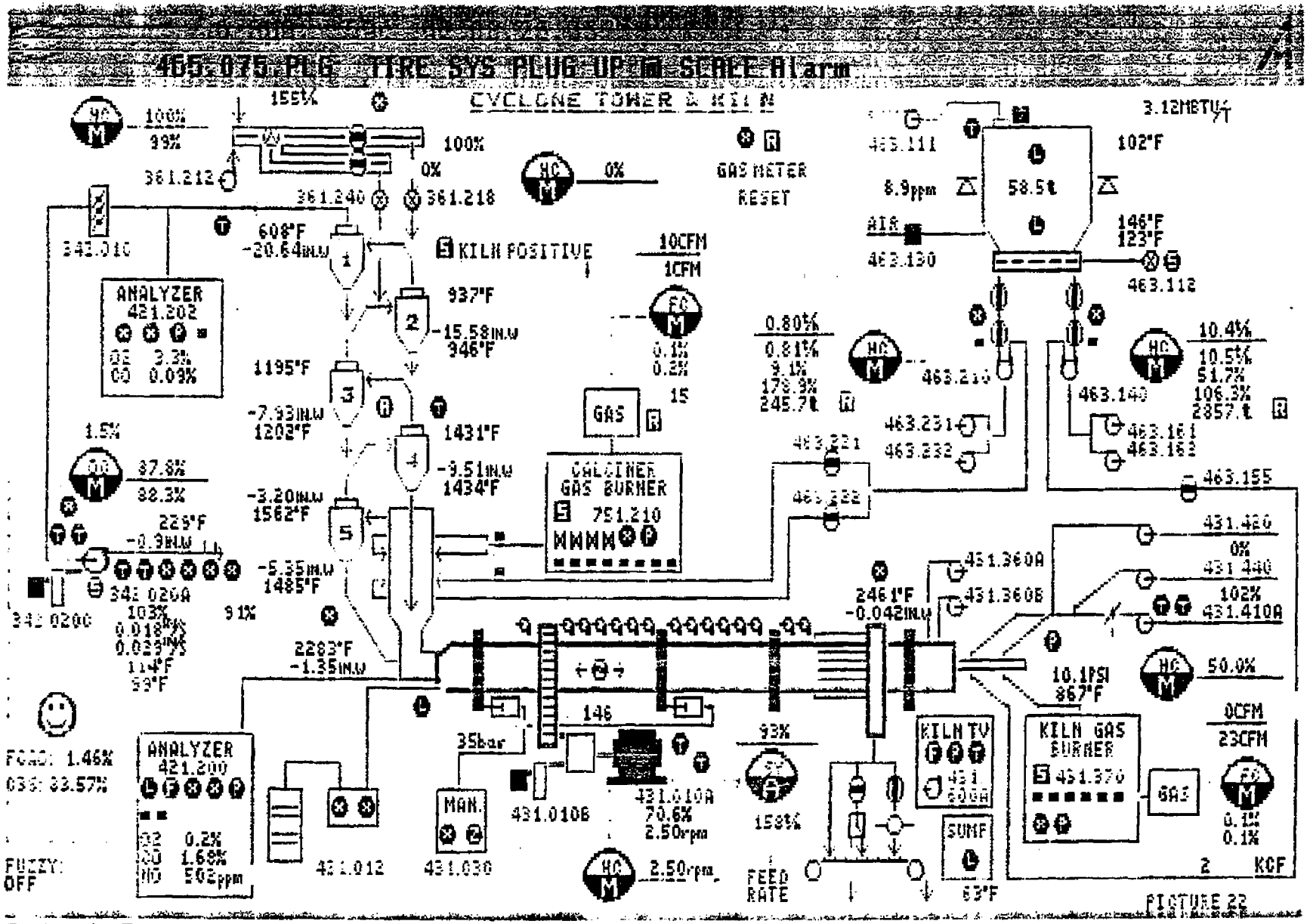
Select Controller:

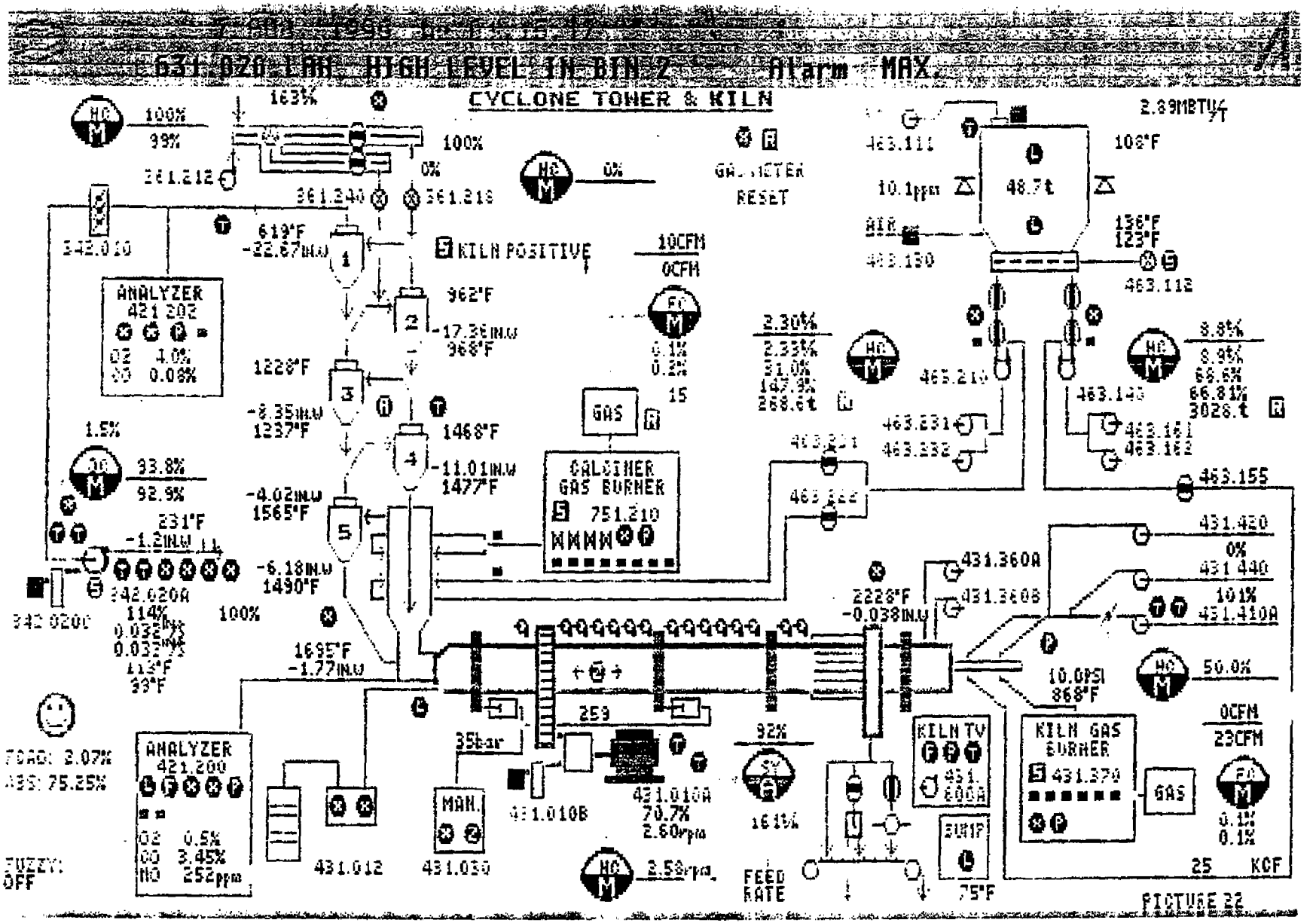
KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



Select Controller:

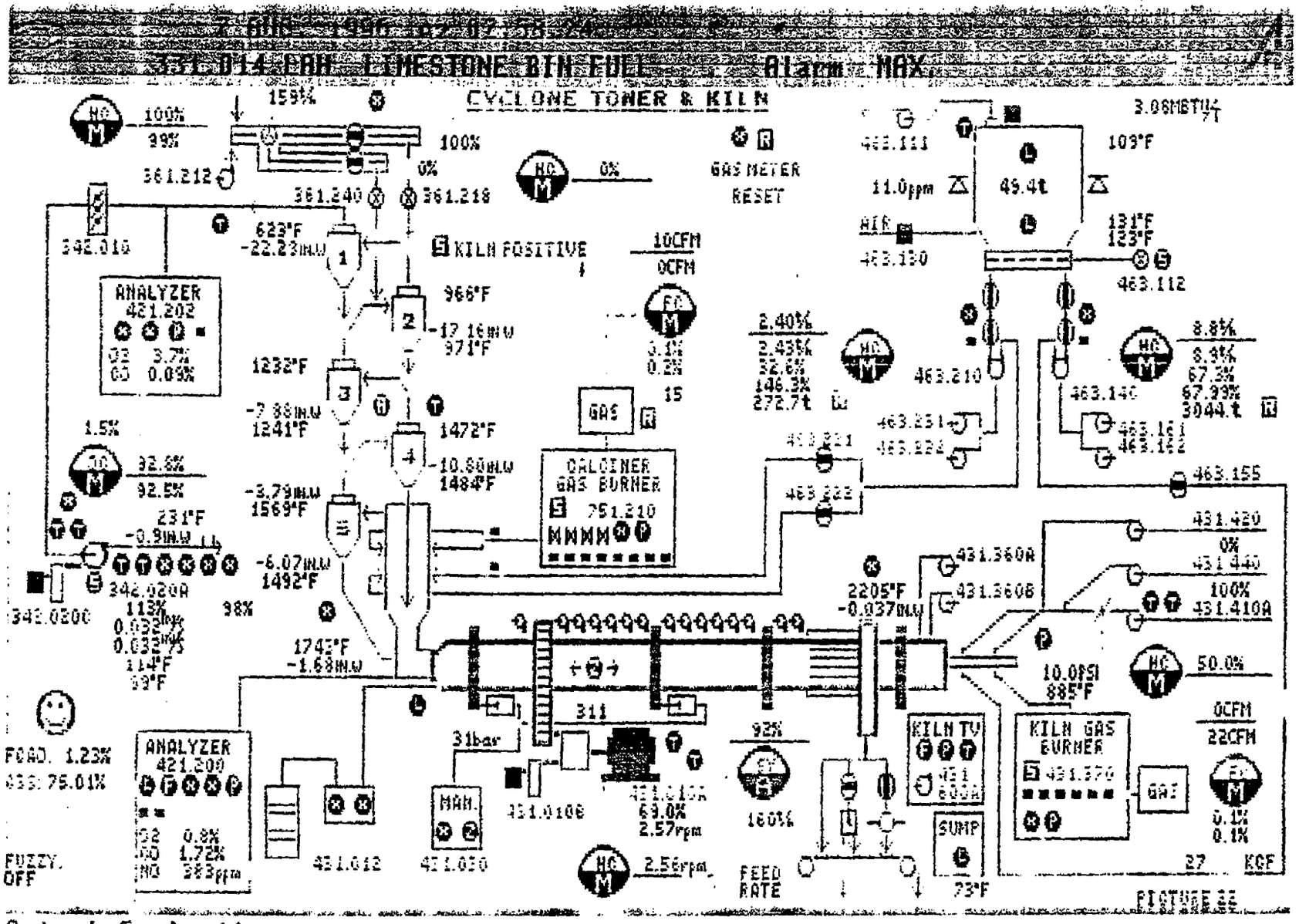
KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA


465.075.PLC TIRE SYS PLUG UP in SCALE Alarm
CYCLONE TOWER & KILN
155%
100%
99%
361.212
100%
0%
361.240
361.218
0%
GAS METER RESET
3.12MBTU/T
463.111
102°F
8.9ppm
58.5t
AIR
463.130
146°F
123°F
463.112
341.010
608°F
-20.64IN.W
KILN POSITIVE
10CFM
1CFM
937°F
-15.58IN.W
946°F
ANALYZER 421.202
O2 3.3%
CO 0.09%
1195°F
-7.93IN.W
1202°F
1431°F
-9.51IN.W
1434°F
-3.20IN.W
1562°F
-5.35IN.W
1485°F
0.80%
0.81%
9.1%
178.3%
245.7t
463.210
10.4%
10.5%
51.7%
106.3%
2857.t
463.140
463.161
463.162
463.231
463.232
463.221
463.222
463.155
GAS
CALCINER GAS BURNER
751.210
1.5%
37.8%
38.3%
229°F
-0.9IN.W
341.020A
341.020B
103%
91%
2283°F
-1.35IN.W
2461°F
-0.042IN.W
431.360A
431.360B
431.420
0%
431.440
102%
431.410A
10.1PSI
867°F
50.0%
146
35bar
93%
431.010A
70.6%
2.50rpm
431.010B
158%
FEED RATE
KILN TV
KILN GAS BURNER
431.370
GAS
0CFM
23CFM
0.1%
0.1%
SUMP
63°F
2 KCF
FOAD: 1.46%
036: 33.57%
ANALYZER 421.200
O2 0.2%
CO 1.68%
NO 502ppm
FUZZY: OFF
431.012
MAN.
431.030
2.50rpm
PICTURE 22
Select Controller:
KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



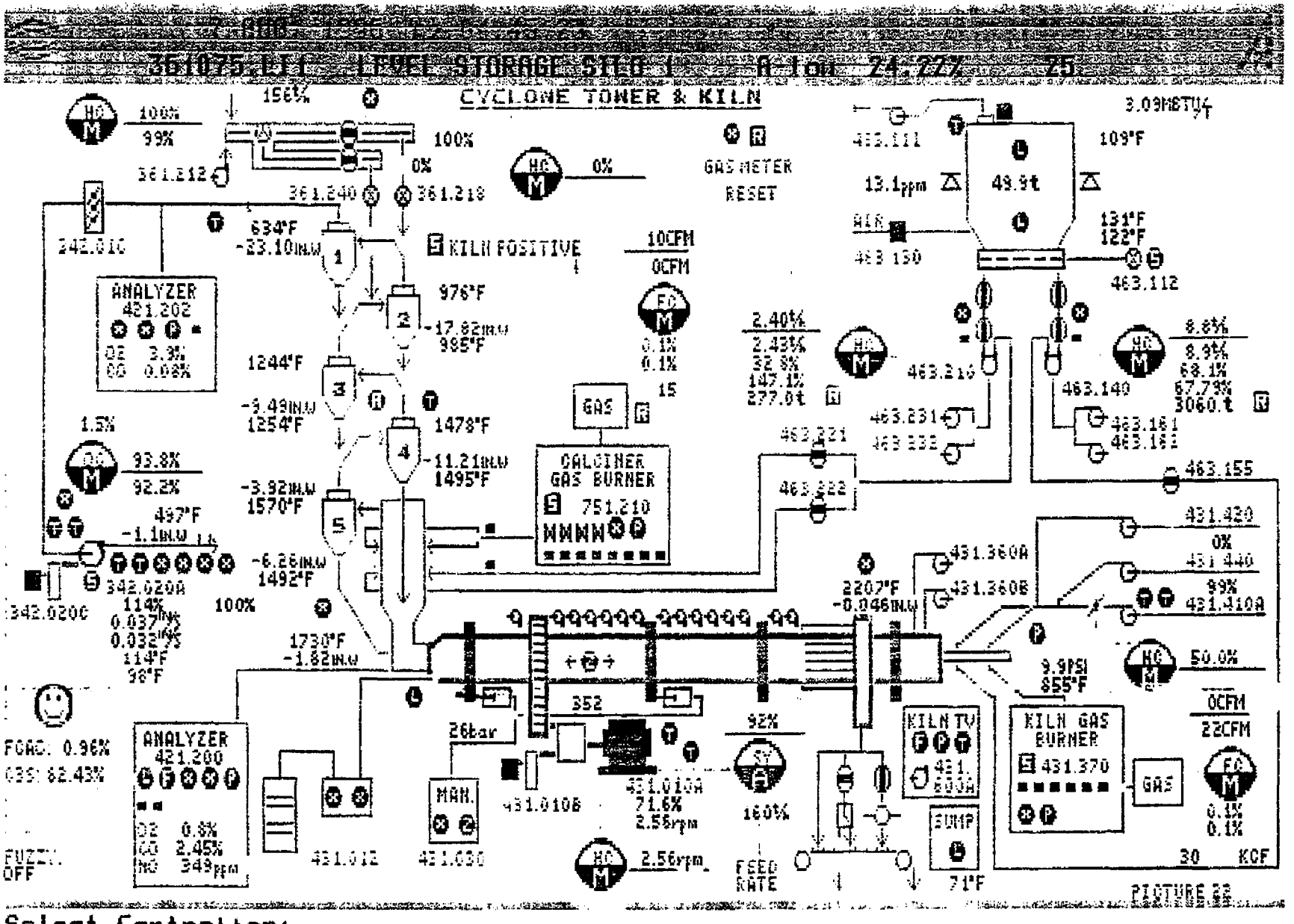
Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



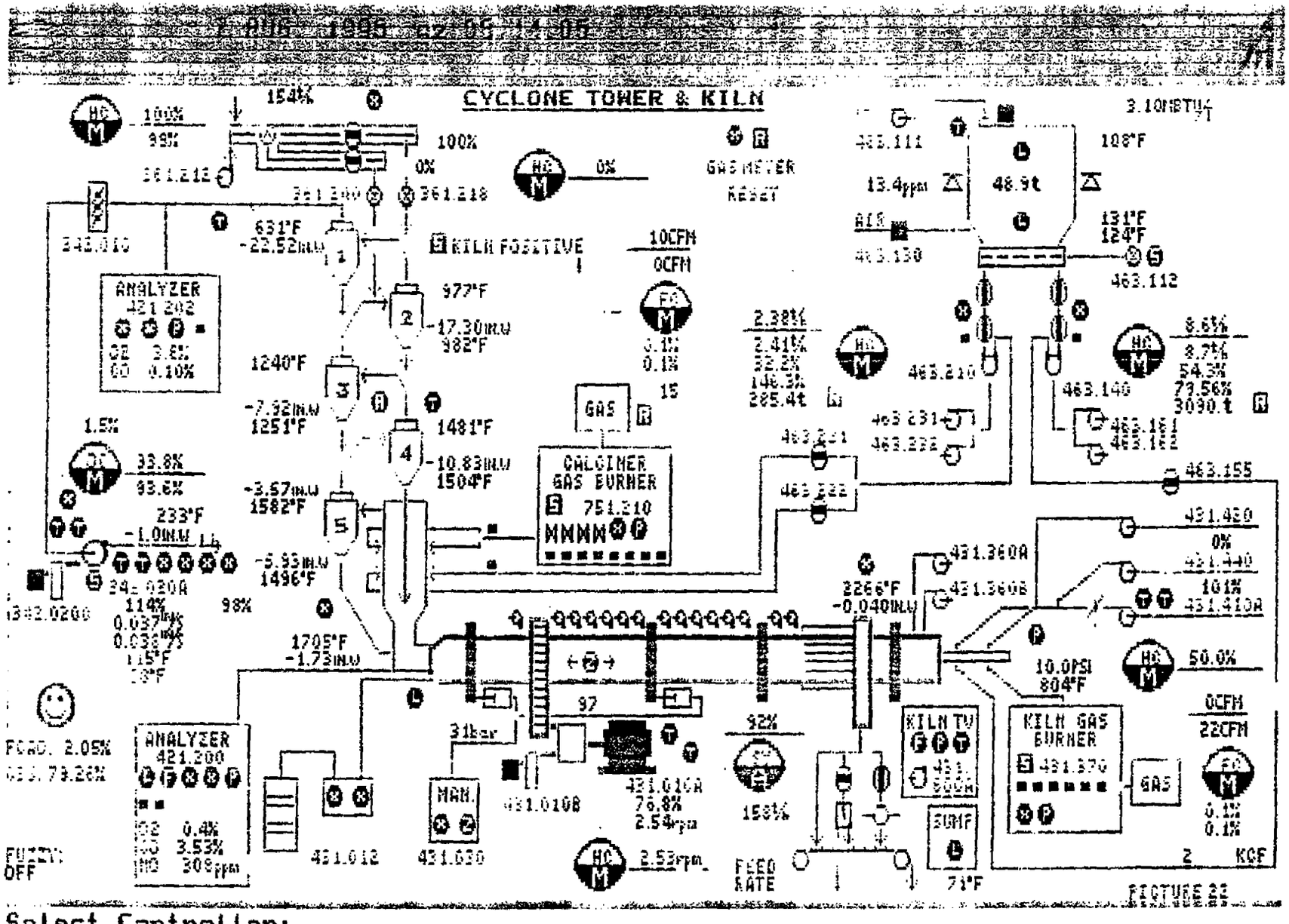
Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



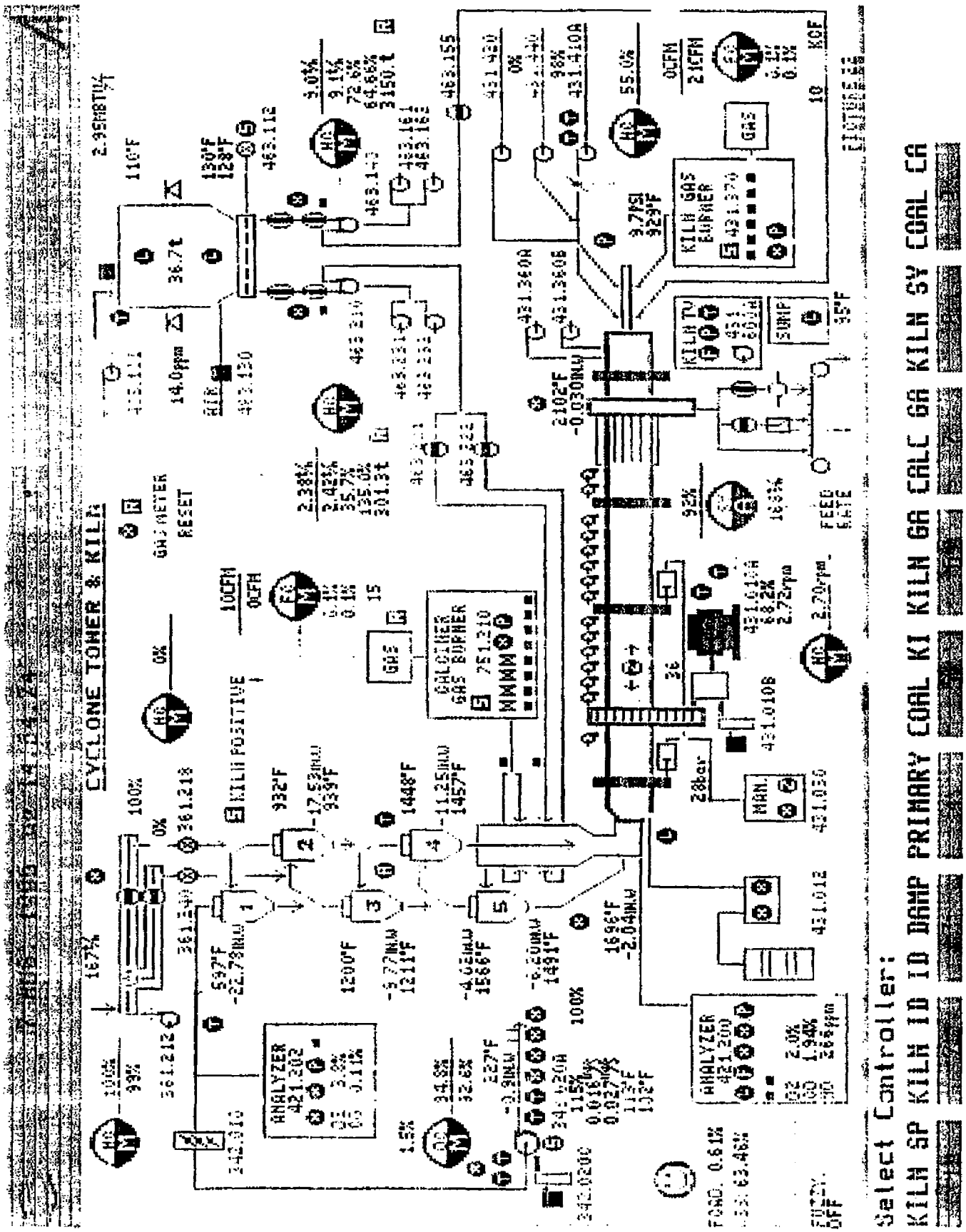
Select Controller:

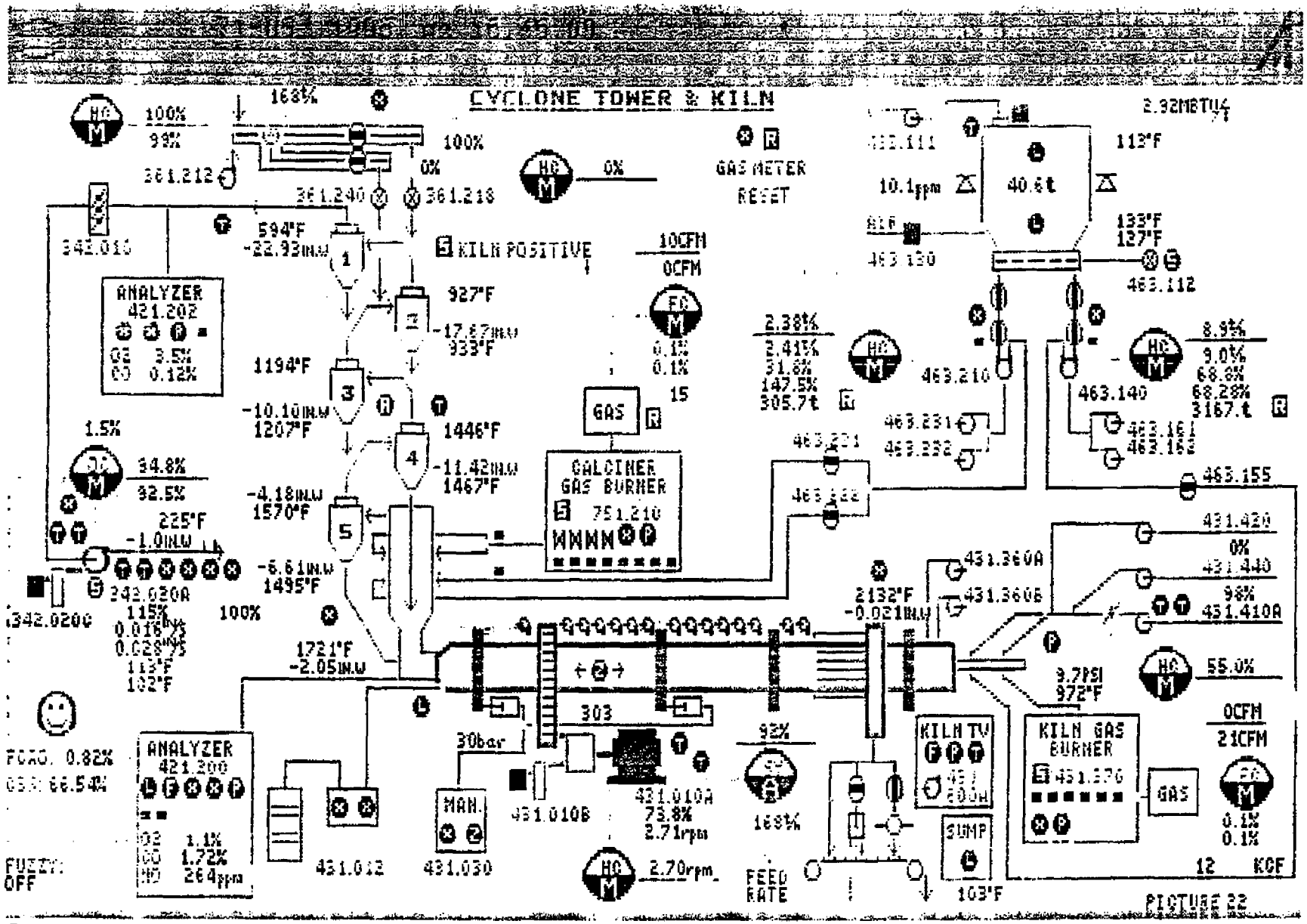
KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA


CYCLONE TOWER & KILN
KILN POSITIVE
GAS METER RESET
CALCINER GAS BURNER
KILN GAS BURNER
KILN TV
SUMP
FEED GATE
ANALYZER
MAN.
Select Controller:
KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA



Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA

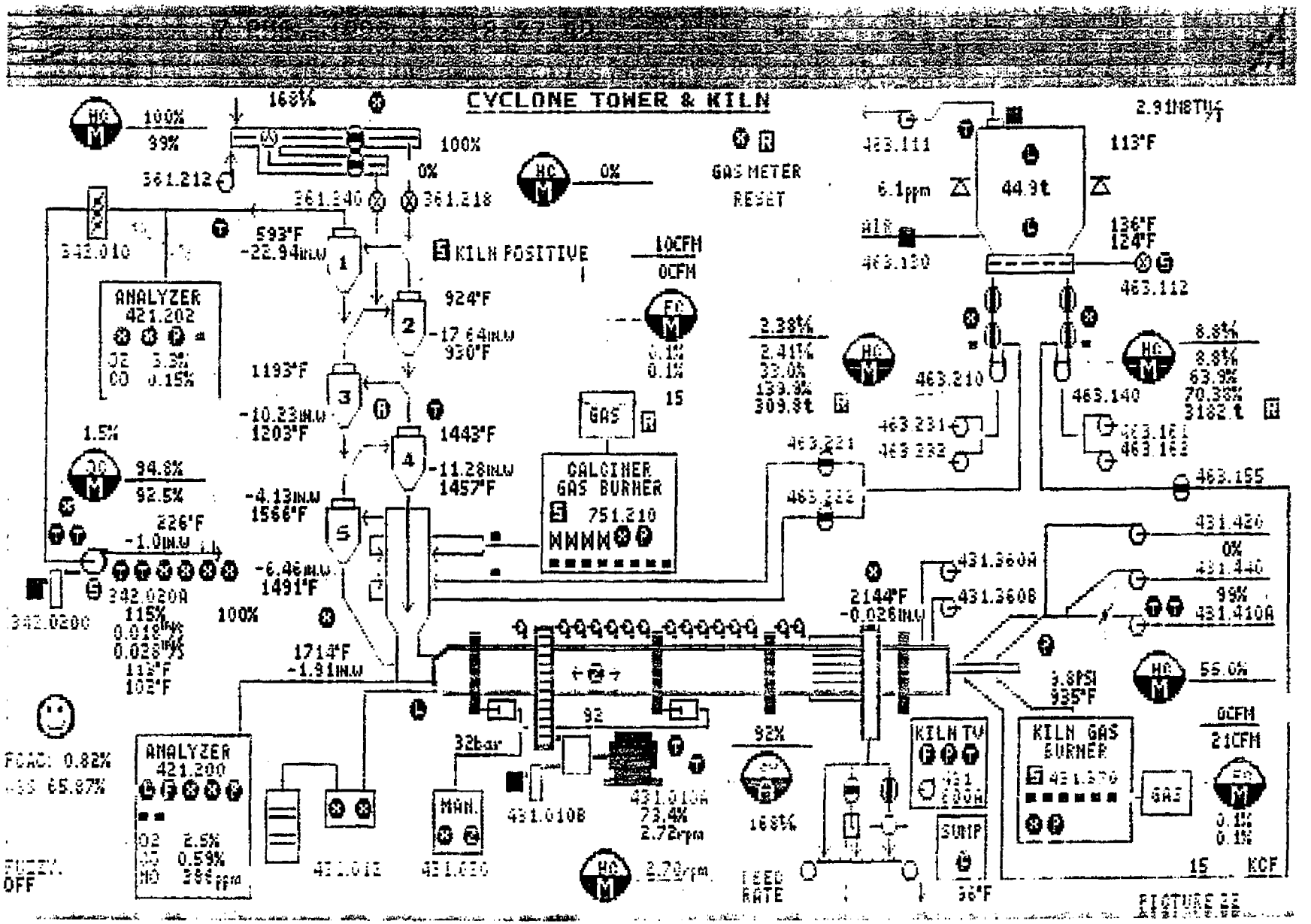
STR96332

249

10/3/96

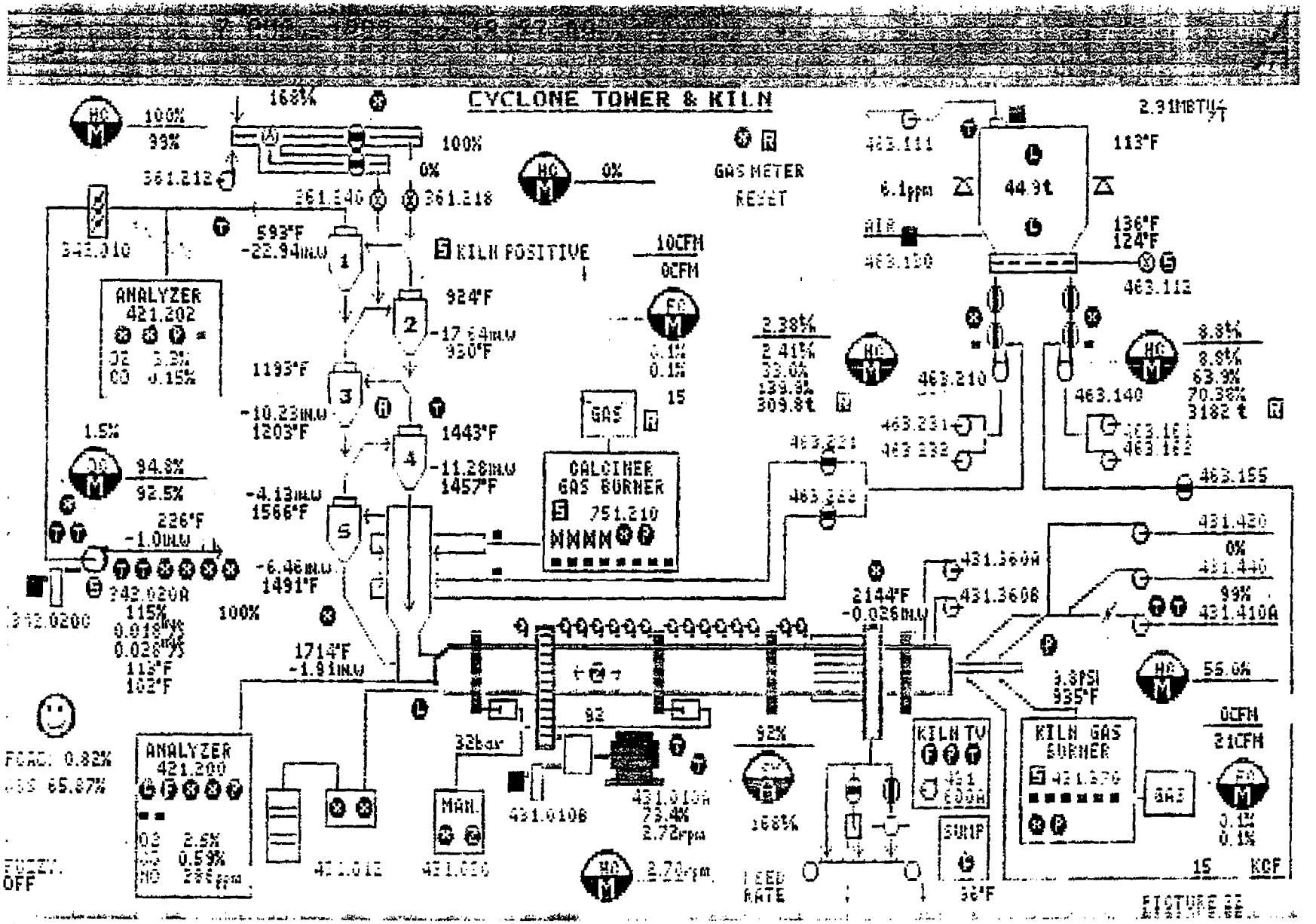
AGCS2M000159

S4000602



Select Controller:

KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA


CYCLONE TOWER & KILN
GAS METER RESET
KILN POSITIVE
ANALYZER 421.202
ANALYZER 421.200
CALCINER GAS BURNER
KILN TV
KILN GAS BURNER
Select Controller:
KILN SP KILN ID ID DAMP PRIMARY COAL KI KILN GA CALC GA KILN SY COAL CA