ILLINOIS ENVIRONMENTAL PROTECTION AGENCY — MEMORANDUM

RECEIVED
JAN 31 1985
[illegible]

DATE: January 18, 1985

TO: John Shrock - DAPC/AQPS

FROM: Jeff Benbenek - DAPC/Region III-FOS

SUBJECT: SO2 Excursions at the Barton Monitor in Alton on 6/7 and 25/26 of November, 1984

Pursuant to your request of December 4, 1984, the following information is submitted with regard to the monitored excursions of the N.A.A.Q.S. for SO_2 at the Barton Monitor in Alton in November, 1984.

Alton Packaging Corporation (I.D. 119010AAL), Illinois Power Co. - Wood River (I.D. 119020AAE), Kilngas R & D (I.D. 119020AAX), and Laclede Steel Company (I.D. 119010AAE) were all contacted and were requested to check their potential SO_2 sources' operational status for the subject time periods.

<u>Alton Packaging Corporation</u>

Ed Pyatt, Director of Environmental Control at this facility, provided me with steam production data for the facility's #6 and #7 coal-fired boilers. Both units were in operation the entire time periods of both excursions. Utilizing this information and a conversion factor of 8 lbs. steam/lb. of coal, which is Mr. Pyatt's estimate, I was able to approximate coal usage on an hourly basis. Sulfur dioxide emissions were then calculated using a factor of 38 (S) lbs. SO_2/ton of coal, where "S" is the weight percent sulfur in the coal. Mr. Pyatt indicated that the coal being burned during these time periods was from Peabody and had the following characteristics:

Btu/lb. - 10554
Moisture - 14.34
Ash % - 11.64
Sulfur % - 3.46

Stack exhaust flowrate was estimated based on comparison of the heat input for each hour to the boilers' rated heat input and maximum exhaust flowrate. Refer to attachments #1 - #4 for this information.

The #6 boiler has a stack height of 192 ft. and a diameter of 4.6 ft. Exhaust temperature can be assumed to be 350°F.

The #7 boiler has the same stack height of 192 ft. and a diameter of 8.8 ft. Exhaust temperature can be assumed to be 410°F.

The U.T.M. coordinates for both boilers of 747.8 E and 4307.1 N are correct.

Mr. Pyatt also provided me with the following dimensions for the "Most Significant Tier" developed by Murray & Trettel for downwash evaluation at this facility:

Height - 52.7 meters
Length - 14.6 meters
Width - 9.8 meters

Illinois Power Company

According to information I received from Don Mathias, Manager of Operations, and Dave Dorion, Results Supervisor, at this facility, coal-fired boiler #5 operated during the excursion period on 11/6-7, but not on 11/25-26. Coal-fired boiler #4 did not operate during either excursion period.

I was provided with information on half-hour instantaneous loads, in megawatts, for the #5 boiler during the period on 11/6-7. Utilizing that data and knowing the boilers rated loading and heat input, I estimated hourly heat input to the boiler for the subject time period. I was informed by Mr. Mathias that a test of a sample of the coal burned in the unit on 11/5/84 resulted in a Btu/lb. of 10977 and a weight percent of sulfur of 0.47. Utilizing the previously mentioned emission factor, hourly SO2 emissions from the boiler were calculated. Results are tabulated in attachment #5.

Stack exhaust flowrate was estimated in the same manner as that for Alton Packaging Corporation.

The #5 boiler stack has a height of 350 ft. and a diameter of 15 ft. An exhaust temperature of 285°F can be assumed.

Kilngas R & D

Mr. Larry McCormick, Plant Manager of this facility, provided me with estimates of SO2 emissions from the flare at this facility during both excursions periods. All gas generated was sent to the flare, whether desulfurized or not. No gas was sent, during either excursion period, to Illinois Power's #3 boiler. Refer to attachments #6 and #7 for these hourly estimates. As is shown, on 11/6-7, significant SO2 was emitted during only a four hour period. During 11/25-26, however, SO2 emissions from the flare ranged from 3 lbs/hr to 487 lbs/hr for the entire period.

The flare has a height of 80 ft. and a tip diameter of 25 ft. The exit temperature can be assumed as 1600°F.

Laclede Steel Co.

According to information received from Mr. Dale Eisenreich, Senior Environmental Engineer at this facility, no significant emission of SO2 was occurring at this plant. Combustion sources were utilizing natural gas.

Attachments #8, #9, #10 and #11 show the relationships with regard to location between Illinois Power and Kilngas and also indicate the sizes of the various buildings in the two facilities. Note that the Illinois Power Building is not within five stack heights of the flare at Kilngas.

From these drawings and plot plans, I have estimated dimensions of Illinois Power's boilerhouse and Kilngas' plant buildings.

Attachment #10, lays out the boilerhouse building and the dimensions are as follows:

Section	Length	Width	Height
A	50	44	41
B	220	44	41
C	220	75	51.5
D	194	31	84
E	187.5	69	97.5
F	169	31	81.5
G	156	87	49
H	106	87	132
I	189	112.5	94
J	189	31	142
K	189	109	190

On Attachment #11, the dimensions of the buildings in the Kilngas plant are as follows:

Building #	Length	Width	Height
1	(See Notes)		
2	140	64	16
3	50	40	16
4	54	26	30.5
5	230	44	72
6	44	26	157
7	44	40	187
8	150	45	37
9	97.5	40	20
10	100	40	20
11	80	40	14
12	70	47.5	34.5

Note: #1 is Illinois Power's boilerhouse.

Also from this attachment, it can be seen that the distance between building #1 and building #12 is 35 ft.

JJB:pbo

cc: Region III

Attach. . . 1

Alton Packaging Corporation - I.D. 119 010 AAL

Boiler #6

	Time [Interval beginning @]	Steam Flow x 1000 lbs/hr	Coal lbs/hr.	Coal tons/hr.	SO_2 lbs/hr.	Stack acfm
11/6	2000	65	8125	4.063	534.2	29850
	2100	68	8500	4.2500	558.8	31230
	2200	66	8250	4.125	542.4	30310
	2300	67	8375	4.188	550.6	30770
11/7	2400	64	8000	4.000	525.9	29390
	100	63	7875	3.938	517.8	28930
	200	67	8375	4.188	550.6	30770
	300	70	8750	4.375	575.2	32140
	400	72	9000	4.500	591.7	33060
	500	76	9500	4.750	588.4	34900
	600	69	8625	4.313	567.1	31690
	700	72	9000	4.500	591.7	33060
	800	71	8875	4.438	583.5	32610
	900	69	8625	4.313	567.1	31690
	1000	64	8000	4.000	525.9	29390
	1100	65	8125	4.063	534.2	29850
	1200	62	7750	3.875	509.5	28470
	1300	60	7500	3.750	493.1	27550
	1400	63	7875	3.938	517.8	28930
	1500	65	8125	4.063	534.2	29850
	1600	65	8125	4.063	534.2	29850
	1700	62	7750	3.875	509.5	28470
	1800	62	7750	3.875	509.5	28470
	1900	65	8125	4.063	534.2	29850

Alton Packaging Corporation - I.D. 119 010 AAL

Boiler #7

	Time [Interval beginning @]	Steam Flow x 1000 lbs/hr	Coal lbs/hr.	Coal tons/hr.	SO_2 lbs/hr.	Stack acfm
11/6	2000	180	22500	11.250	1479.2	94130
	2100	165	20625	10.313	1356.0	86290
	2200	180	22500	11.250	1479.2	94130
	2300	178	22250	11.125	1462.7	93090
11/7	000	200	25000	12.500	1643.5	104590
	100	185	23125	11.563	1520.3	96750
	200	175	21875	10.938	1438.1	91520
	300	180	22500	11.250	1479.2	94130
	400	180	22500	11.250	1479.2	94130
	500	183	22875	11.438	1503.9	95710
	600	170	21250	10.625	1397.0	88900
	700	190	23750	11.875	1561.3	99360
	800	190	23750	11.875	1561.3	99360
	900	170	21250	10.625	1397.0	88900
	1000	180	22500	11.250	1479.2	94130
	1100	180	22500	11.250	1479.2	94130
	1200	190	23750	11.875	1561.3	99360
	1300	200	25000	12.500	1643.5	104590
	1400	195	24375	12.188	1602.5	101980
	1500	190	23750	11.875	1561.3	99360
	1600	190	23750	11.875	1561.3	99360
	1700	190	23750	11.875	1561.3	99360
	1800	190	23750	11.875	1561.3	99360
	1900	190	23750	11.875	1561.3	99360

A[redacted]n Packaging Corporation - I.D. [redacted]19 010 AAL

Boiler #6

	Time [Interval beginning @]	Steam Flow x 1000 lbs/hr	Coal lbs/hr.	Coal tons/hr.	SO_2 lbs/hr.	Stack acfm
11/25	1000	63	7875	3.938	517.8	28930
	1100	62	7750	3.875	509.5	28470
	1200	61	7625	3.813	501.3	28020
	1300	55	6875	3.438	452.0	25260
	1400	55	6875	3.438	452.0	25260
	1500	52	6500	3.250	427.3	23880
	1600	55	6875	3.438	452.0	25260
	1700	54	6750	3.375	443.7	24800
	1800	52	6500	3.250	427.3	23880
	1900	53	6625	3.313	435.6	24340
	2000	55	6875	3.438	452.0	25260
	2100	58	7250	3.625	476.6	26630
	2200	58	7250	3.625	476.6	26630
	2300	57	7125	3.563	468.5	26180
11/26	00	58	7250	3.625	476.6	26630
	100	62	7750	3.875	509.5	28470
	200	59	7375	3.688	484.9	27100
	300	57	7125	3.563	468.5	26180
	400	56	7000	3.500	460.2	25720
	500	59	7375	3.688	484.9	27100
	600	56	7000	3.500	460.2	25720
	700	62	7750	3.875	509.5	28470
	800	58	7250	3.625	476.6	26630
	900	62	7750	3.875	509.5	28470
	1000	53	6625	3.313	435.6	24340
	1100	52	6500	3.250	427.3	23880
	1200	60	7500	3.750	493.1	27550
	1300	63	7875	3.938	517.8	28930
	1400	64	8000	4.000	525.9	29390
	1500	61	7625	3.813	501.3	28020
	1600	64	8000	4.000	525.9	29390
	1700	64	8000	4.000	525.9	29390
	1800	61	7625	3.813	501.3	28020
	1900	59	7375	3.688	484.9	27100

Attachment #4

Alton Packaging Corporation - I.D. 119 010 AAL

Boiler #7

	Time [Interval beginning @]	Steam Flow x 1000 lbs/hr	Coal lbs/hr.	Coal tons/hr.	SO_2 lbs/hr.	Stack acfm
11/25	1000	190	23750	11.875	1561.3	99360
	1100	195	24375	12.188	1602.5	101980
	1200	190	23750	11.875	1561.3	99360
	1300	195	24375	12.188	1602.5	101980
	1400	190	23750	11.875	1561.3	99360
	1500	180	22500	11.250	1479.2	94130
	1600	175	21875	10.938	1438.1	91520
	1700	175	21875	10.938	1438.1	91520
	1800	165	20625	10.313	1356.0	86290
	1900	165	20625	10.313	1356.0	86290
	2000	180	22500	11.250	1479.2	94130
	2100	190	23750	11.875	1561.3	99360
	2200	195	24375	12.188	1602.5	101980
	2300	195	24375	12.188	1602.5	101980
11/26	000	200	25000	12.500	1643.5	104590
	100	205	25625	12.813	1684.7	107210
	200	200	25000	12.500	1643.5	104590
	300	195	24375	12.188	1602.5	101980
	400	190	23750	11.875	1561.3	99360
	500	190	23750	11.875	1561.3	99360
	600	175	21875	10.938	1438.1	91520
	700	195	24375	12.188	1602.5	101980
	800	180	22500	11.250	1479.2	94130
	900	190	23750	11.875	1561.3	99360
	1000	165	20625	10.313	1356.0	86290
	1100	165	20625	10.313	1356.0	86290
	1200	195	24375	12.188	1602.5	101980
	1300	195	24375	12.188	1602.5	101980
	1400	195	24375	12.188	1602.5	101980
	1500	180	22500	11.250	1479.2	94130
	1600	195	24375	12.188	1602.5	101980
	1700	200	25000	12.500	1643.5	104590
	1800	180	22500	11.250	1479.2	94130
	1900	180	22500	11.250	1479.2	94130

Attachment 4

Illinois Power Company - Wood River I.D. 119 020 AAE

Unit #5

Time [Interval beginning @]		Megawatts	Btu/hr x 10^6	Coal lbs/hr.	Coal tons/hr.	SO_2 lbs/hr.	Stack acfm
11/6	2000	188.5	1847.3	168288	84.144	1502.8	567750
	2100	160.0	1568.0	142844	71.422	1275.6	481910
	2200	146.0	1430.8	130345	65.173	1164.0	439740
	2300	130	1274.0	116061	58.031	1036.4	391550
11/7	000	130	1274.0	116061	58.031	1036.4	391550
	100	130	1274.0	116061	58.031	1036.4	391550
	200	130	1274.0	116061	58.031	1036.4	391550
	300	130	1274.0	116061	58.031	1036.4	391550
	400	130	1274.0	116061	58.031	1036.4	391550
	500	130	1274.0	116061	58.031	1036.4	391550
	600	145	1421.0	129452	64.726	1156.0	436730
	700	162.5	1592.5	145076	72.538	1295.5	489440
	800	257.5	2523.5	229890	114.945	2052.9	775570
	900	322.5	3160.5	287920	143.960	2571.1	971340
	1000	272.5	2670.5	243281	121.641	2172.5	820750
	1100	217.5	2131.5	194179	97.090	1734.0	655090
	1200	185.0	1813.0	165164	82.582	1474.9	557200
	1300	155.0	1519.0	138380	69.190	1235.7	466850
	1400	232.5	2278.5	207570	103.785	1853.6	700270
	1500	247.5	2425.5	220962	110.481	1973.2	745450
	1600	281.5	2758.7	251316	125.658	2244.3	847850
	1700	363.0	3557.4	324078	162.039	2894.0	1093320
	1800	357.0	3498.6	318721	159.361	2846.2	1075250
	1900	227.0	2224.6	202660	101.330	1809.8	683700

Attachment #6

Hour-by-Hour SO_2 Emission Estimates

11/6 2000 hours → 11/7 2100 hours

Hour	SO_2 Emission Estimate, Lb/Hr	
2000-2100	0	
-2200	0	
-2300	0	
-2400	0	
-0100	0	
-0200	0	
-0300	0	
-0400	0	
-0500	0	
-0600	0	
-0700	0	
-0800	0	
-0900	0	
-1000	0	(711) Ref:
16 -1100	21	2.65 0.47
17 -1200	59	7.43 1.33
18 -1300	80	10.08 1.80
19 -1400	56	7.06 1.26
19 -1500	6	0.76 0.14
-1600	0	
-1700	0	
-1800	0	
-1900	0	
-2000	0	
-2100	0	

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116A W. MAIN ST.
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Product Gas was routed to Flare for entire period.
Coal feed off until ~ 1000 on 11/87.
Stretford off until ~ 1300 on 11/87.

Attachment #7

ESTIMATED FCM SO2 EMISSIONS CALCULATION

DATE	TIME	COAL FEED LB/HR	PRODUCT GAS FLOW LB/HR	PROD. GAS MOLE WT LB/MOLE	PRODUCT GAS CONCENTRATIONS H2S	COS Note 1	CS2 Note 1	PRODUCT GAS FLOW MOLE/HR	EQUIV. SO2 EMISSIONS FLOW, LB/HR	PRODUCT GAS [illegible]	STRETFORD SYSTEM STATUS
[illegible]5/84	[illegible]	0	9,[illegible]	[illegible]	0.00	.04	.04	[illegible]	[illegible]	[illegible]	On-Line
	11:00	0	[illegible]	27.80	[illegible]	.04	.04	245	19	"	"
	12:00	[illegible]	10,457	28.08	[illegible]	.04	.04	[illegible]	[illegible]		"
	13:00	0	7,914	25.07	0.00	.04	.04	257	28	"	"
	14:00	0	9,872	28.03	0.00	.04	.04	352	28	"	"
	15:00	0	10,[illegible]	28.25	0.00	.04	.04	385	21	"	"
	16:00	0	10,626	28.34	0.00	.04	.04	375	30	"	Off at 16:00
	17:00	0	5,831	28.75	0.00	.04	.04	2[illegible]	16	"	Off-Line
	18:00	0	2,435	28.75	0.00	.04	.04	85	7	"	"
	19:00	0	3,761	27.97	0.00	.04	.04	134	11	"	"
	20:00	0	3,291	27.91	0.00	.04	.04	118	9	"	"
	21:00	0	5,[illegible]	28.2[illegible]	0.00	.04	.04	201	16	"	"
	22:00	0	11,772	28.20	0.00	.04	.04	415	33	"	"
	23:00	0	12,005	28.69	0.00	.04	.04	419	33	"	"
	24:00	0	1,117	29.58	0.00	.04	.04	37	3	"	"
26/84	01:00	1,896	10,891	29.62	0.00	.04	.04	363	29	"	On at 00:18
	02:00	9,434	14,668	28.48	0.00	.04	.04	515	41	"	On-Line
	03:00	[illegible]	15,186	28.43	0.00	.04	.04	534	42	"	"
	04:00	17,912	16,139	28.45	0.00	.04	.04	567	45	"	"
	05:00	18,974	41,256	27.62	0.00	.04	.04	1,494	118	"	"
	06:00	18,464	47,579	26.76	0.00	.07	.04	1,776	114	"	"
	07:00	20,463	57,707	26.[illegible]	0.00	.07	.04	2,193	140	"	Off at 07:23
	08:00	21,067	67,592	25.73	.19	.07	.04	2,627	487	"	Off-Line
	09:00	17,894	44,238	26.74	0.00	.07	.04	1,654	106	"	On 9:07-9:23
	10:00	6,622	22,90[illegible]	25.99	.72	.07	.04	[illegible]	462	"	Off-Line
	11:00	5	9,252	26.53	.61	.07	.04	[illegible]	159	"	"
	12:00	.8	[illegible]	[illegible]	.22	.07	.04	[illegible]	52	"	"
	13:00	1,947	6,829	24.17	.13	.07	.04	283	36		"
	14:00	3,256	5,647	[illegible]	.02	.07	.04	254	19	"	"
	15:00	[illegible]	[illegible]	24.97	.05	.07	.04	246	26	"	"
	16:00	[illegible]	6,720	23.73	.04	.07	.04	[illegible]	20	"	
	17:00	17	11,491	29.47	.04	.07	.04	390	35	"	
	18:00	18	9,413	28.70	.09	.07	.04	328	40	"	"
	19:00	11	6,959	28.68	0.00	.07	.04	243	16	"	
	20:00	10	7,574	28.68	0.00	.07	.04	264	17	"	"
		4,294	15,[illegible]	27.6[illegible]	.05	.07	.04	557	57		

Note 1: COS & CS2 Concentrations are based on grab samples taken at 20:10 on 1/25/84 and [illegible] on 1/26/85

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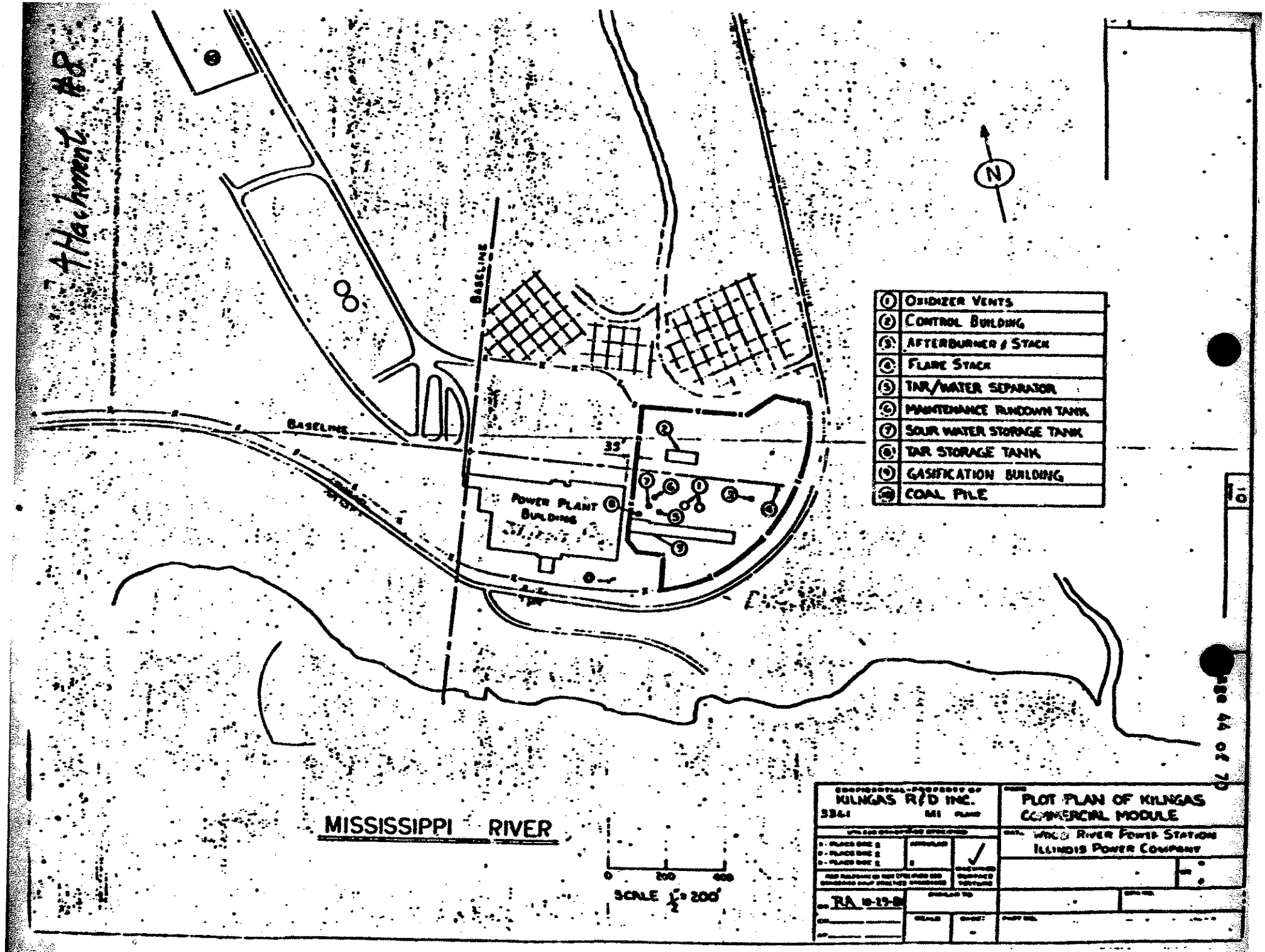
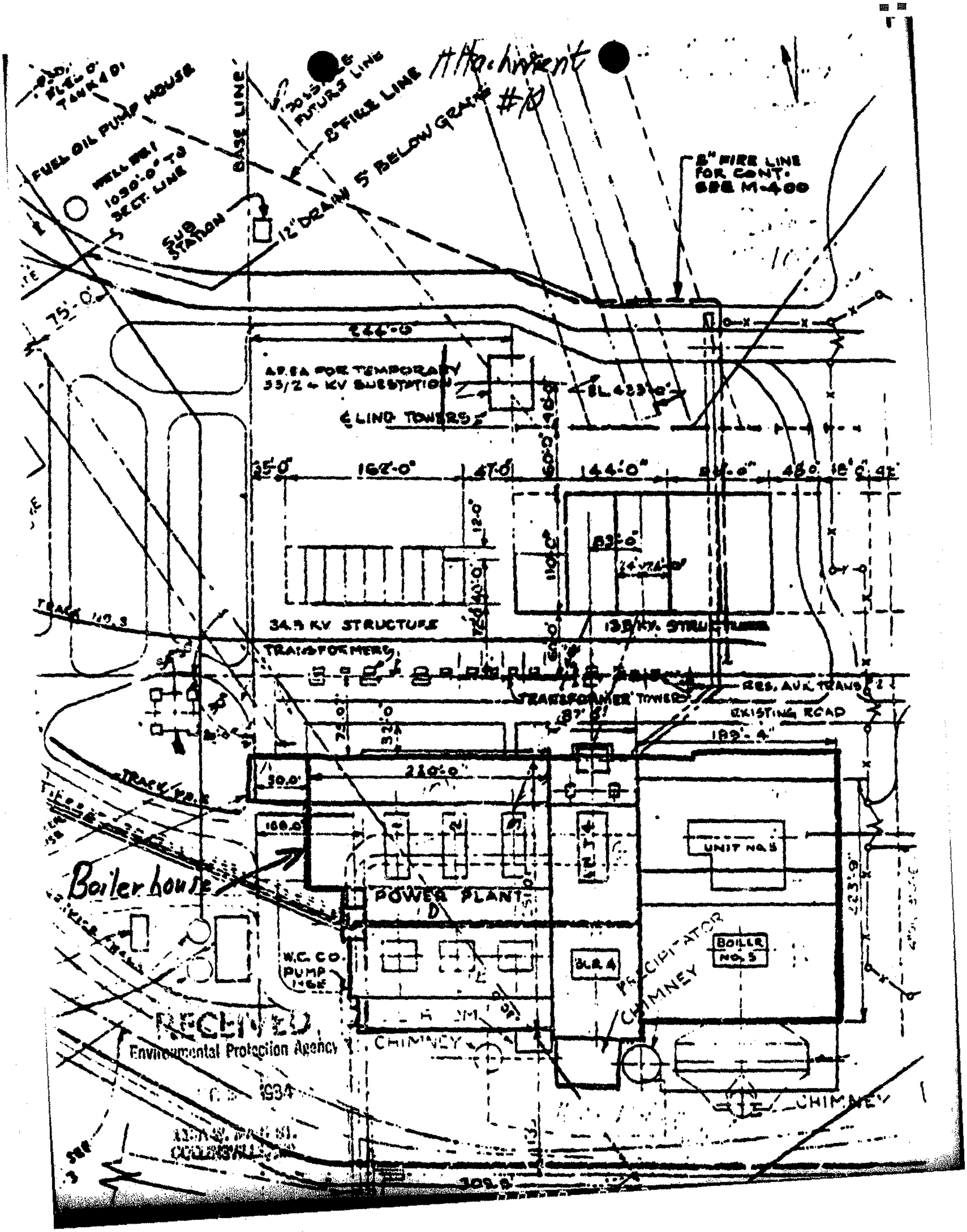
Environmental Protection Agency
DEC 31 1984
115A W. MAIN ST.
COLLINSVILLE, ILL.

Attachment #8




Attachment #10
FUEL OIL PUMP HOUSE
WELL NO. 1
1030'-0" TO SECT. LINE
SUB STATION
BASE LINE
12" DRAIN 5' BELOW GRADE
8" FIRE LINE
FUTURE LINE
8" FIRE LINE FOR CONT. SEE M-400
75'-0"
246'-0"
AREA FOR TEMPORARY 33/2.4 KV SUBSTATION
EL. 433'-0"
℄ LINE TOWERS
35'-0"
162'-0"
47'-0"
144'-0"
34.5 KV STRUCTURE
138 KV. STRUCTURE
TRANSFORMERS
TRANSFORMER TOWER
RES. AUX. TRANS
EXISTING ROAD
189'-4"
210'-0"
UNIT NO. 5
POWER PLANT
Boiler house
W.C. CO. PUMP HSE
BLR. 4
BOILER NO. 5
PRECIPITATOR
CHIMNEY
CHIMNEY
CHIMNEY
RECEIVED
Environmental Protection Agency