AP42 Section:	1.1
Reference:	36
Title:	Toxics Assessment Report. Illinois Power Company. Baldwin Power Station- Unit 2. Baldwin, Illinois. Volumes I- Main Report. Roy F. Weston, Inc. West Chester, Pennsylvania. December, 1993.

27

Contract No. DE-AC22-93PC93255
WESTON Project No. 10016-011

TOXICS ASSESSMENT REPORT

ILLINOIS POWER COMPANY
BALDWIN POWER STATION - UNIT 2
BALDWIN, ILLINOIS

Volume I - Main Report
December 1993

DOE Project:

COMPREHENSIVE ASSESSMENT OF TOXIC EMISSIONS
FROM COAL-FIRED POWER PLANTS

Prepared for:

UNITED STATES DEPARTMENT OF ENERGY (DOE)
PITTSBURGH ENERGY TECHNOLOGY CENTER (PETC)
Pittsburgh, Pennsylvania 15236-0940
(412) 892-6000

PETC Project Manager -- T. Brown
Project Manager -- F. Eskey

Prepared by:

ROY F. WESTON, INC.
1 Weston Way
West Chester, Pennsylvania 19380-1499
(215) 692-3030

Program Manager -- B. L. Jackson
Project Leader -- J. D. O'Neill

(e.g., pesticides, PCBs, and amines). The CAAA HAPs investigated in this study are listed in Tables ES-1 and ES-2 by test method or analyte classification. A total of 44 CAAA HAPs were found in one or more streams exiting the process boundary. The HAPs that were determined in the flue gas emission stream are highlighted in Table ES-1, and the HAPs detected in one or more of the non-air process output streams are highlighted in Table ES-2. The average emission factors determined for these HAPs and for the other pollutants studied in this program are summarized in Table ES-3. The emission factors are expressed in terms of lb pollutant/10^{12} Btu except for particulate emissions which are reported in units of lb/10^6 Btu. The associated average process heat input rate and flue gas stream volumetric flow rate are also provided in this table. Detailed test results are presented and discussed in Sections 4 and 5 of this report. Results for other (non-CAAA listed) pollutants that were present in the process streams, and that could also be determined by the sampling and analysis methods used in this program, are also provided in these sections, along with the detailed results for associated criteria pollutants (i.e., particulate/PM_{10}, sulfur dioxide, carbon monoxide, volatile organic compounds, lead, and nitrogen oxides).

Key information, findings, and discussion for this assessment are provided below. Recommendations and considerations for future studies are presented in Section 7.

ES.1 PROCESS OPERATING CONDITIONS

Baldwin Power Station Unit 2 was operated under comparable, near steady-state conditions for all of the six sampling periods (see Section 2 of this report for details). This is evidenced by the uniformity shown for a number of the measured process variables including coal feed rate, steam production rate and conditions, flue gas composition, flue gas stream flow rates, ESP power conditions, and electrical output. The consistency of process operations during this program provided a sound basis for the intercomparison and interpretation of results obtained during the 6-day testing campaign.

ES.3.4 Flue Gas Stream Flow Rate

Representative samples and test data were obtained at the flue gas stream measurement sites [i.e., ESP inlet (duct) and outlet (stack)]. This is evidenced by the excellent flow balance (typically ± 5%) and consistent, expected pollutant results obtained between these locations for the duration of the study.

ES.4 FLUE GAS STREAM TEST RESULTS

Flue gas stream test results are presented and discussed in detail in Section 4 of this report. A synopsis of the information obtained for flue gas stream sampling and analysis activities is provided below.

ES.4.1 Particulate

Simultaneous testing of the ESP inlet and outlet flue gas streams was conducted to measure the concentration and mass rate of filterable particulate at each location and to determine the particulate collection efficiency of the ESP. During inorganics testing performed on Test Days 2, 4, and 6 (13, 15, and 19 July 1993, respectively) filterable particulate was determined from the combined EPA Method 17 and 26A test train utilized at the ESP inlet and the combined EPA Method 5 and 26A test train used at the ESP outlet. In addition to determining filterable particulate during the inorganic parameter test days, these multi-pollutant sampling trains were used to quantify filterable radionuclides, filterable and condensible halides, and halogens.

Filterable particulate was measured using EPA Method 17 (in-stack filtration) at the ESP inlet and EPA Method 5 (out-of-stack filtration) at the ESP outlet. A high-capacity glass fiber thimble was used in the Method 17 test train to permit extended sampling in the ESP inlet flue gas stream, which contained high concentrations of particulate.

WESTON

TABLE 1-7

ILLINOIS POWER COMPANY
BALDWIN POWER STATION - UNIT 2 - BALDWIN, ILLINOIS
GAS MATRIX POLLUTANTS/PARAMETERS AND ASSOCIATED
SAMPLING, TESTING, AND/OR ANALYTICAL METHODS

POLLUTANTS OR PARAMETERS	SAMPLING, TESTING, AND/OR ANALYTICAL METHODS*
Major, minor, and trace elements	Draft M29; 3010, 3020, and 7470; 6000 and 7000 series
Mercury speciation	Sorbent traps; CVAFS
Particulate, ionic species, and radionuclides	M17 (inlet) and M5 (outlet) with M26A; 9056, 350.3, and 9010; DOE Pb-01; APHA 7500-C; EPA 904.0; LANL ER200; EPA 908.1; and DOE U-02
Particle size distribution/ elements by size fraction	Andersen 3-stage cyclonic separator; M5 (gravimetric); 3010, 3020, and 7470; ICP-AES and ICP-MS
Volatile organics (ESP outlet only)	0030; 5030/8240
Semivolatile organics (including PCDD/PCDF at ESP outlet)	0010 (and M23 at outlet); 8270 (and M23 at outlet)
Formaldehyde, aldehydes, and ketones	0011
Carbon dioxide and oxygen (ESP inlet)	M3/M3A (integrated bag collection; instrumental analysis)
Carbon dioxide, oxygen, carbon monoxide, nitrogen oxides, sulfur dioxide, and total hydrocarbons (ESP outlet)	M3A, M10, M7E, M6C, and M25A (CEM methods)

* Flue gas stream moisture content, velocity, and volumetric flow rate were also measured in conjunction with each pollutant/parameter determination by M1, M2, and M4. Indicated methods are from 40 CFR 60 Appendix A or SW-846, except as noted.

WESTON MANAGERS DESIGNERS/CONSULTANTS

SECTION 2

UNIT DESCRIPTION, PROCESS OPERATION, AND ASSOCIATED PARAMETERS

The configuration of Baldwin Unit 2 is described, and a process flow diagram showing sampling/testing locations is provided, in this section. Process operation and key operating parameters during the study are also identified below.

2.1 UNIT DESCRIPTION

The Baldwin Power Station, is located in Baldwin, Illinois, and is owned and operated by Illinois Power Company. The power plant is comprised of three coal-fired units numbered 1 through 3. All three units are rated at 568 MWe. Unit 2 was studied in this program. This Babcock & Wilcox cyclone furnace unit, built in 1973, processes high-sulfur Illinois bituminous coal that is delivered to the station by train. Average coal characteristics for this study were 10.2% ash, 2.9% sulfur, 15.0% moisture, and 10,600 Btu/lb higher heating value.

A process flow diagram of Baldwin Unit 2 is shown in Figure 2-1. Program sampling/testing locations are shown therein. Unit 2 is operated from a control room (see Figure 2-2) which is common to all three units.

At Unit 2, coal is transferred from storage bunkers through feeders directly into 14 cyclones. The boiler is opposed-fired with a bottom row of four cyclones and a top row of three cyclones on each side. The combustion gases exit the furnace and enter the convective pass section of the boiler which includes superheater and reheater sections. Main and reheat steam temperatures are controlled primarily by flue gas recirculation and combustion air flow, and attemperation sprays for secondary control. Next, the combustion gases are directed through an economizer section.

SAMPLE NUMBER	SAMPLE IDENTIFICATION
SOLIDS:	
S1	BOILER FEED COAL
S2	BOTTOM ASH SLURRY (SOLIDS)
S3	ECONOMIZER ASH
S4A	ESP HOPPER ASH (FIELDS 1/2)
S4B	ESP HOPPER ASH (FIELDS 3/4)
LIQUIDS:	
L1	COAL PILE RUN-OFF
L2	BOTTOM ASH SLURRY (FILTRATE)
L3	CONDENSER INLET (BALDWIN LAKE) WATER
L4	CONDENSER OUTLET WATER
L5	BOTTOM, ECON., ESP SLUICE (BALDWIN LAKE) WATER*
L6	MAKEUP (KASKASKIA RIVER) WATER
L7	RIVER DISCHARGE WATER
AIR STREAM:	
A1	ESP INLET
A2	ESP OUTLET (STACK)

● SAMPLING POINTS

* SAME AS L3

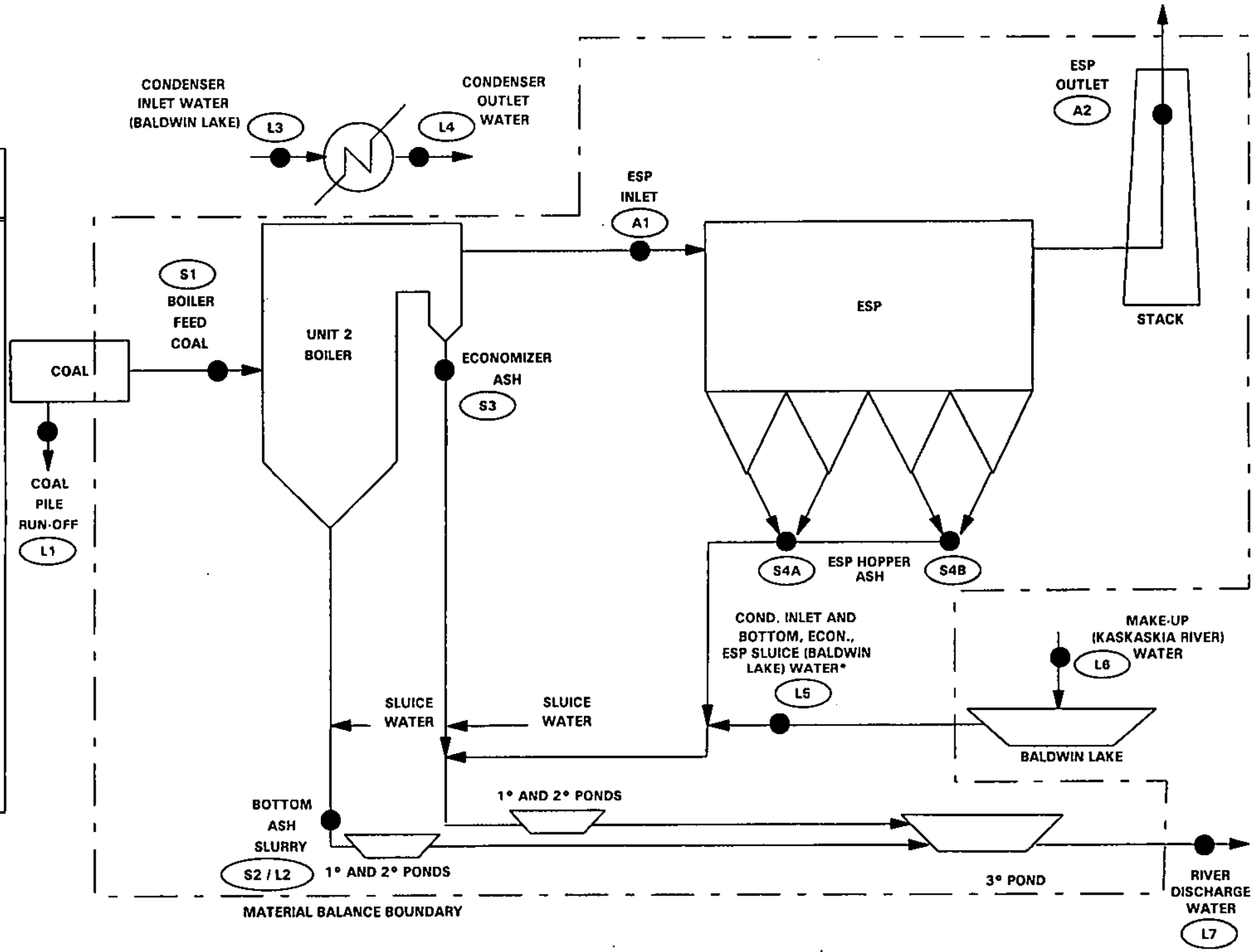

FIGURE 2-1
SAMPLING/TESTING LOCATIONS
BALDWIN POWER STATION UNIT NO. 2

DOE46a-D22

Some entrained particulate (i.e., soot) is deposited on various boiler wall and tube surfaces. Unit 2 is equipped with a series of soot blowers to remove this slagging and fouling material. The soot blowers are used on a regular basis, once per shift. Supplemental soot blowing is performed to clean surfaces and regain optimum steam temperature control and thermal efficiency when heat absorption patterns change. Soot blowing sequences are normally executed at least once per shift, but not necessarily at the same time during each shift.

what % of total particulate ? ~1%

Some overhead particulate is collected at the economizer outlet and is conveyed to an ash pond via a wet (water sluice) system. Final particulate control is effected by an electrostatic precipitator (ESP). The ESP ash is also sluiced to an ash pond.

The ESP consists of six chambers and each chamber is four fields deep. The ESP has a specific collection area of 179.8 ft^2/1,000 cfm and uses weighted wire electrodes. The collecting plates are spaced 9 inches apart. The aspect ratio is 0.8. Unit 2 has no other APCE.

The unit has its own stack. Ports at the ESP inlet and outlet (stack) were used for flue gas emission sampling/testing purposes.

The unit's condenser system is a tube heat exchanger. The average intake rate of condenser water is 50 ft^3/s. This system is served by a cooling reservoir (Baldwin Lake) that is 2,000 acres and 22,000 acre feet in size.

The bottom ash, economizer hopper ash, and ESP hopper ashes are sluiced to an on-site ash pond system. The bottom ash is sluiced to its own primary and secondary ponds. The economizer and ESP hopper ashes are sluiced to common primary and secondary ponds. The supernatant from both secondary ponds overflows to a single tertiary pond. The effluent from the tertiary pond is discharged to the nearby Kaskaskia River. All of the bottom ash is sold for commercial use.

TABLE 2-3

ILLINOIS POWER COMPANY
BALDWIN POWER STATION - UNIT 2 - BALDWIN, ILLINOIS
SUMMARY OF COAL FEED PARAMETERS AND
HEAT INPUT RATES[1]

PARAMETER[2]	UNITS	TEST DAY 1 - 7/12/93	TEST DAY 2 - 7/13/93		TEST DAY 3 - 7/14/93	TEST DAY 4 - 7/15/93		TEST DAY 5 - 7/18/93	TEST DAY 6 - 7/19/93	
			INORGANIC TESTS			INORGANIC TESTS			INORGANIC TESTS	
		ORGANIC TESTS	Non-Sootblowing Periods	Soot Blowing Periods	ORGANIC TESTS	Non-Sootblowing Periods	Soot Blowing Periods	ORGANIC TESTS	Non-Sootblowing Periods	Soot Blowing Periods
Coal Feed Rate[3]	lb/hr (dry)	460,600	459,100		467,900	459,600		466,160	452,900	
Coal Feed Rate[4]	lb/hr (wet)	515,750	543,785		517,000	541,100		535,280	520,610	
Coal Feed Rate[3]	lb/hr (wet)	536,100	534,700		544,900	550,100		554,800	529,400	
Coal Ash Content	%[5]	10.27	10.51	10.29	10.16	10.32	10.34	10.63	9.67	9.88
Coal Heating Value	Btu/lb[5]	10,765	10,681	10,737	10,722	10,412	10,519	10,426	10,794	10,557
Coal Sulfur Content	%[5]	2.91	2.91	2.94	2.89	2.84	2.80	2.78	3.05	2.78
Heat Input Rate (f-factor)	10^6Btu/hr	5,771	5,712		5,842	5,728		5,785	5,714	

1 All coal fired was bituminous mined locally in Illinois.

2 Daily or period specific averages reported.

3 F-Factor calculation.

4 From gravimetric feeder readings.

5 Analysis of composited coal sample on "as received" basis. Detailed coal analytical results are presented in Volume III, Appendix D.

DOE018G.TBL

program because detection levels and blank concentrations are often on the same order of magnitude as sample values. When the results are then used for risk assessments or policy decisions, treatment of the data becomes important. This discussion describes how blank and non-detect values were treated in developing and presenting the reported results.

4.1.1 Non-Detects

The discussion presented below explains how averages, sums, and reported emission results were calculated for all species given various combinations of detected and nondetected analytical values.

All values detected. The arithmetic average or sum is used, as appropriate.

All values below the detection limit. For individual test runs or species, the data are reported as "ND < (detection limit)." For cases where all three runs were below the detection limit, the average is reported as nondetected less than the average detection limit of the three runs.

Some values are detected and some are nondetects. As an approximation, half of the detection limit for nondetect values and the actual value for detects were used to determine reported values. As an example of averaging, an average for three test runs with results of 10, 8, and ND < 6 would be 7. As an example for summing (such as for mercury fractions), individual species values of 50, ND < 1, and ND < 2 would be summed to provide a value of 50+0.5+1, or 51.5. In reporting these types of sums or averages, no "<" sign is used. The only exception to this rule occurs when the average is less than the highest detection limit of the nondetected values. In this case, the average is reported as "ND < (the highest detection limit)". For example, 5, ND < 4, and ND < 3 would be reported as "ND < 4".

This approach is also used to obtain test train totals which required analyses of separate fractions for each individual run. Specifically, the volatile organics, metals, and anion test train totals for each run were obtained by addition of test train fractions, which were analyzed separately.

Fractions from the volatile test train included separate analyses of the Tenax and Tenax/charcoal tubes for each sample period. Separate analyses were conducted on the filterable and condensible test train components for both the metals and anion test trains.

Detection limit ratio. These methods of treating the data may result in some loss of information in going from raw data to final values. Specifically, what is often lost is the amount of a final emission value that is attributable to detection limits and the amount that is attributable to measured values. In order to quantify and present this information, all results in this report are presented along with the "Detection Limit Component Ratio," which is calculated as the ratio of the contribution of detection limit values to a final emission result.

For example, the result for values of 16, ND < 6, and ND < 5 is reported as 7, with a detection limit ratio of 26% [(3+2.5)/(16+3+2.5)], while the result for values of 12, ND < 6, and 9 is reported as 8, with a detection limit ratio of 13%. The different ratios provide insight as to the extent something is "really there," and is intended to provide better information to those making decisions on risk and policy issues.

4.1.2 Values Outside the Calibration Range

Any reported laboratory data that are below the calibration range of the instrument are flagged with a qualifier (e.g., "J"). Data with the "J" flag have been tentatively identified and tentatively quantified. Data reported above the upper detection limit have been flagged with a qualifier (e.g., "E"). Data with the "E" flag have been positively identified and tentatively quantified. Data with both qualifiers are estimates. "J" and "E" values were considered quantitatively representative when calculating averages. Neither flag indicates a value to be weighted more or less important. The "J" and "E" data qualifiers appear in the respective laboratory analytical report. The data qualifiers do not appear on the calculated data summaries.

4.1.3 Blank Values

The level and treatment of blank values is important in interpreting data, since in some cases species are detected but not at levels significantly higher than blanks. In these cases measured values may not represent emissions, but rather limitations of the method. However, most of the test methods used in this program either do not allow subtraction of blanks or are silent on how to treat blank values.

For methods that do not specify how to adjust actual test sample results based on analyte background in the various blank samples, blank corrections were made to the actual sample concentrations or masses pursuant to standard laboratory practices. Laboratory and site/reagent blanks were analyzed and the results evaluated for identification of contamination. If an actual test sample pollutant analytical result was blank corrected, the data are flagged by a "B". If the value was blank corrected below the detection limit, the value was reported as "ND $\leq$ (detection limit) BC." A "C" flag indicates that the blank value was greater than the sample value. In no cases are the blank corrected values reported below the method detection limit.

4.2 SUMMARY OF FLUE GAS STREAM TEST RESULTS

4.2.1 Filterable Particulate

Simultaneous testing of the ESP inlet and outlet flue gas streams was conducted to measure the filterable particulate concentrations and mass rates at each location and to determine the overall ESP removal efficiency. During inorganics testing performed on Test Days 2, 4, and 6 (13, 15,

TABLE 4-1 (cont.)

ILLINOIS POWER COMPANY
BALDWIN POWER STATION – UNIT 2 – BALDWIN, ILLINOIS
SUMMARY OF PARTICULATE AND ANION EMISSION TEST RESULTS – INORGANIC PARAMETER TEST DAYS

ESP OUTLET											
Date	7-13-93	7-15-93	7-19-93								
Avg. gas stream volumetric flow, dscf/min.	1199200	1242000	1181200								
CO_2 / O_2, %	14.2 / 4.7	14.2 / 4.7	14.4 / 4.7								
Heat input, 10^6Btu/hr (F-Factor)	5712	5728	5714								
Coal firing rate, ton/hr (F-Factor)	267.4	275.1	264.7								
	RUN 1 mg/Nm^3	RUN 2 mg/Nm^3	RUN 3 mg/Nm^3	AVERAGE mg/Nm^3	DETECTION LIMIT RATIO (%)	STANDARD DEVIATION (i)	95 % CI	AVERAGE lb/hr	AVERAGE kg/hr	AVERAGE kg/Mg	AVERAGE lb/10^6Btu
PARTICULATE	138	98	202	146	0	43	107	612	278	1.14	0.107

ANIONS	RUN 1 mg/Nm^3	RUN 2 mg/Nm^3	RUN 3 mg/Nm^3	AVERAGE mg/Nm^3	DETECTION LIMIT RATIO (%)	STANDARD DEVIATION (i)	95 % CI	AVERAGE lb/hr	AVERAGE kg/hr	AVERAGE kg/Mg	AVERAGE lb/10^{12}Btu
Particulate Halides, Cl^-	ND < 5.89E-03	ND < 1.13E-02	ND < 1.25E-02	ND < 9.90E-03	100	2.88E-03	7.15E-03	ND < 4.18E-02	ND < 1.89E-02	ND < 7.76E-05	ND < 7.30E+00
Particulate Halides, F^-	ND < 4.01E-02	ND < 4.30E-02	ND < 4.38E-02	ND < 4.23E-02	100	1.59E-03	3.96E-03	ND < 1.78E-01	ND < 8.08E-02	ND < 3.31E-04	ND < 3.12E+01
Particulate Halides, Br^-	ND < 1.77E-02	ND < 1.70E-02	ND < 1.88E-02	ND < 1.78E-02	100	7.40E-04	1.84E-03	ND < 7.50E-02	ND < 3.40E-02	ND < 1.39E-04	ND < 1.31E+01
Hydrogen Halides, HCl	1.08E+02	1.03E+02	1.05E+02	1.05E+02	0	1.87E+00	4.64E+00	4.44E+02	2.01E+02	8.25E-01	7.76E+04
Hydrogen Halides, HF	1.58E+01	1.47E+01	9.59E+00	1.34E+01	0	2.70E+00	6.71E+00	5.65E+01	2.56E+01	1.05E-01	9.87E+03
Hydrogen Halides, HBr	5.00E-01	5.48E-01	5.31E-01	5.26E-01	0	2.00E-02	4.96E-02	2.22E+00	1.01E+00	4.12E-03	3.88E+02
Halogens, Cl_2	4.85E+00	9.05E+00	4.40E+00	6.10E+00	0	2.09E+00	5.19E+00	2.59E+01	1.17E+01	4.79E-02	4.53E+03
Halogens, F_2	ND < 1.41E-01	ND < 5.88E-01	ND < 1.40E-01	ND < 2.90E-01	100	2.11E-01	5.24E-01	ND < 1.24E+00	ND < 5.62E-01	ND < 2.28E-03	ND < 2.17E+02
Halogens, Br_2	ND < 1.08E-01	ND < 3.62E-01	ND < 1.05E-01	ND < 1.92E-01	100	1.20E-01	2.99E-01	ND < 8.19E-01	ND < 3.71E-01	ND < 1.51E-03	ND < 1.43E+02
Total, Cl^-	1.07E+02	1.04E+02	1.05E+02	1.05E+02	0	1.10E+00	2.73E+00	4.44E+02	2.01E+02	8.25E-01	7.76E+04
Total, F^-	1.51E+01	1.42E+01	9.19E+00	1.28E+01	0	2.59E+00	6.43E+00	5.42E+01	2.46E+01	1.00E-01	9.47E+03
Total, Br^-	5.31E-01	6.42E-01	5.61E-01	5.78E-01	0	4.68E-02	1.16E-01	2.44E+00	1.11E+00	4.53E-03	4.27E+02
Particulate Cyanide, CN^-	ND < 1.47E-03	ND < 1.41E-03	ND < 1.56E-03	ND < 1.48E-03	100	6.16E-05	1.53E-04	ND < 6.25E-03	ND < 2.83E-03	ND < 1.16E-05	ND < 1.09E+00
Total Hydrogen Cyanide, HCN	ND < 2.97E-03	ND < 3.13E-03	ND < 2.97E-03	ND < 3.02E-03	100	7.29E-05	1.81E-04	ND < 1.28E-02	ND < 5.78E-03	ND < 2.37E-05	ND < 2.23E+00
Total Ammonia, NH_3	2.59E-02	ND < 2.26E-02	ND < 2.05E-02	ND < 2.26E-02	45	2.23E-03	5.53E-03	ND < 9.81E-02	ND < 4.45E-02	ND < 1.78E-04	ND < 1.71E+01

TABLE 4-2

ILLINOIS POWER COMPANY
BALDWIN POWER STATION – UNIT 2 – BALDWIN, ILLINOIS
SUMMARY OF PARTICULATE TEST RESULTS – ORGANIC PARAMETER TEST DAYS

ESP INLET											
Date	7-12-93	7-14-93	7-18-93								
Avg. gas stream volumetric flow, dscf/min.	1162200	1154800	1222800								
CO_2 / O_2, %	14.1 / 4.6	14.7 / 4.3	14.9 / 4.1								
Heat input, 10^6 Btu/hr (F-Factor)	5771	5842	5785								
Coal firing rate, ton/hr (F-Factor)	268.1	272.5	277.4								
	RUN 1 mg/Nm^3	**RUN 2 mg/Nm^3**	**RUN 3 mg/Nm^3**	**AVERAGE mg/Nm^3**	**DETECTION LIMIT RATIO (%)**	**STANDARD DEVIATION (i)**	**95 % CI**	**AVERAGE lb/hr**	**AVERAGE kg/hr**	**AVERAGE kg/Mg**	**AVERAGE lb/10^6 Btu**
PARTICULATE	3941	4879	4790	4536	0	423	1051	18702	8483	34.3	3.22
ESP OUTLET											
Date	7-12-93	7-14-93	7-18-93								
Avg. gas stream volumetric flow, dscf/min.	1224700	1226300	1269200								
CO_2 / O_2, %	14.2 / 4.8	14.2 / 4.7	14.3 / 4.7								
Heat input, 10^6 Btu/hr (F-Factor)	5771	5842	5785								
Coal firing rate, ton/hr (F-Factor)	268.1	272.5	277.4								
	RUN 1 mg/Nm^3	**RUN 2 mg/Nm^3**	**RUN 3 mg/Nm^3**	**AVERAGE mg/Nm^3**	**DETECTION LIMIT RATIO (%)**	**STANDARD DEVIATION (i)**	**95 % CI**	**AVERAGE lb/hr**	**AVERAGE kg/hr**	**AVERAGE kg/Mg**	**AVERAGE lb/10^6 Btu**
PARTICULATE	165	156	167	163	0	5	11.8	705	320	1.29	0.122

TABLE 4-5 (cont.)

ILLINOIS POWER COMPANY
BALDWIN POWER STATION – UNIT 2 – BALDWIN, ILLINOIS
SUMMARY OF MAJOR, MINOR, AND TRACE ELEMENTS EMISSION TEST RESULTS – NON-SOOT BLOWING PERIODS (1)

ESP OUTLET	RUN 1 $\mu g/Nm^3$	RUN 2 $\mu g/Nm^3$	RUN 3 $\mu g/Nm^3$	AVERAGE $\mu g/Nm^3$	DETECTION LIMIT RATIO (%)	STANDARD DEVIATION (i)	95 % CI	AVERAGE lb/hr	AVERAGE kg/hr	AVERAGE kg/Mg	AVERAGE $lb/10^{12}$ Btu
Date	7-13-93	7-15-93	7-19-93								
Avg. gas stream volumetric flow, dscf/min.	1196500	1203200	1209000								
CO_2 / O_2, %	14.3 / 4.7	14.3 / 4.7	14.3 / 4.7								
Heat input, 10^6 Btu/hr (F-Factor)	5712	5728	5714								
Coal firing rate, ton/hr (F-Factor)	267.4	275.1	264.7								
Aluminum (Al)	7662	8369	6659	7564	0	701.46	1742.7	3.18E+01	1.44E+01	5.89E-02	5.55E+03
Antimony (Sb)	2	2	2	2	0	0.20	0.5	8.69E-03	3.94E-03	1.62E-05	1.52E+00
Arsenic (As)	9	10	36	18	0	12.32	30.6	7.68E-02	3.48E-02	1.44E-04	1.34E+01
Barium (Ba)	9	7	6	7	0	1.35	3.3	3.04E-02	1.38E-02	5.65E-05	5.32E+00
Beryllium (Be)	2	2	2	2	0	0.10	0.3	8.06E-03	3.66E-03	1.50E-05	1.41E+00
Boron (B)	11622	10037	9703	10454	0	837.19	2079.9	4.39E+01	1.99E+01	8.16E-02	7.67E+03
Cadmium (Cd)	4	4	4	4	0	0.14	0.3	1.72E-02	7.82E-03	3.21E-05	3.02E+00
Calcium (Ca)	358	482	487	442	0	59.41	147.6	1.86E+00	8.43E-01	3.45E-03	3.25E+02
Chromium (Cr)	75	73	58	69	0	7.61	18.9	2.89E-01	1.31E-01	5.37E-04	5.06E+01
Cobalt (Co)	9	10	9	9	0	0.38	0.9	3.89E-02	1.76E-02	7.22E-05	6.80E+00
Copper (Cu)	25	28	24	26	0	1.46	3.6	1.08E-01	4.91E-02	2.01E-04	1.89E+01
Iron (Fe)	11446	10969	11873	11429	0	369.07	916.9	4.80E+01	2.18E+01	8.93E-02	8.39E+03
Lead (Pb)	41	35	41	39	0	2.87	7.1	1.63E-01	7.41E-02	3.04E-04	2.86E+01
Magnesium (Mg)	459	415	311	395	0	62.01	154.0	1.66E+00	7.52E-01	3.08E-03	2.90E+02
Manganese (Mn)	32	30	29	30	0	1.34	3.3	1.27E-01	5.78E-02	2.37E-04	2.23E+01
Mercury (Hg)	6	5	4	5	0	0.79	2.0	2.19E-02	9.93E-03	4.07E-05	3.83E+00
Molybdenum (Mo)	50	50	38	46	0	5.92	14.7	1.93E-01	8.74E-02	3.58E-04	3.37E+01
Nickel (Ni)	31	32	28	30	0	1.51	3.7	1.26E-01	5.72E-02	2.34E-04	2.21E+01
Potassium (K)	1465	1413	938	1272	0	236.97	588.7	5.34E+00	2.42E+00	9.90E-03	9.33E+02
Phosphorus (P)	284	276	249	270	0	14.89	37.0	1.13E+00	5.14E-01	2.11E-03	1.98E+02
Selenium (Se)	251	114	166	177	0	56.34	140.0	7.42E-01	3.37E-01	1.38E-03	1.30E+02
Sodium (Na)	1639	1817	1315	1590	0	207.79	516.2	6.68E+00	3.03E+00	1.24E-02	1.17E+03
Titanium (Ti)	497	668	396	520	0	112.35	279.1	2.18E+00	9.91E-01	4.05E-03	3.82E+02
Vanadium (V)	146	150	113	137	0	16.58	41.2	5.74E-01	2.60E-01	1.07E-03	1.00E+02

(1) No results are shown for sulfur since the element was determined by continuous emissions monitoring performed at the baghouse outlet and was not quantified using Draft EPA Method 29. Silicon results are not reported due to high background levels of this element inherent in the Draft EPA Method 29 procedure.

TABLE 4–29 (cont.)

ILLINOIS POWER COMPANY
BALDWIN POWER STATION – UNIT 2 – BALDWIN, ILLINOIS
SUMMARY OF SEMIVOLATILE ORGANICS AND PAHs EMISSION TEST RESULTS

ESP OUTLET	RUN 1 µg/Nm³	RUN 2 µg/Nm³	RUN 3 µg/Nm³	AVERAGE µg/Nm³	DETECTION LIMIT RATIO (%)	STANDARD DEVIATION (i)	95 % CI	AVERAGE lb/hr	AVERAGE kg/hr	AVERAGE kg/Mg	AVERAGE lb/10¹² Btu
Date	7-12-93	7-14-93	7-18-93								
Avg. gas stream volumetric flow, dscf/min.	1220100	1224900	1219100								
CO_2 / O_2, %	14.2 / 4.8	14.2 / 4.7	14.3 / 4.7								
Heat input, 10^6 Btu/hr (F-Factor)	5771	5842	5785								
Coal firing rate, ton/hr (F-Factor)	268.1	272.5	277.4								
SEMIVOLATILE ORGANICS											
Phenol	1.338	0.819	ND < 1.561	ND < 1.561	27	3.11E-01	7.72E-01	ND < 6.64E-03	ND < 3.01E-03	ND < 1.20E-05	ND < 1.15E+00
2-Methylphenol	5.402	ND < 1.564	ND < 2.137	2.417	26	1.69E+00	4.20E+00	1.03E-02	4.67E-03	1.91E-05	1.78E+00
Acetophenone	1.638	1.738	1.661	1.679	0	4.26E-02	1.06E-01	7.16E-03	3.25E-03	1.31E-05	1.23E+00
3,4-Methylphenol	2.393	ND < 0.590	ND < 0.992	1.061	25	7.73E-01	1.92E+00	4.52E-03	2.05E-03	8.38E-06	7.82E-01
Isophorone	1.037	41.744	64.153	35.645	0	2.61E+01	6.49E+01	1.52E-01	6.89E-02	2.76E-04	2.62E+01
Naphthalene (1)	ND < 3.740	0.609	2.569	ND < 3.740	37	1.29E+00	3.21E+00	ND < 1.59E-02	ND < 7.23E-03	ND < 2.97E-05	ND < 2.76E+00
Biphenyl	ND < 0.803	ND < 0.518	ND < 2.260	ND < 1.194	100	7.63E-01	1.89E+00	ND < 5.09E-03	ND < 2.31E-03	ND < 9.26E-06	ND < 8.78E-01
Di-n-butylphthalate	ND < 4.059	ND < 1.686	3.818	ND < 4.059	43	1.07E+00	2.65E+00	ND < 1.73E-02	ND < 7.84E-03	ND < 3.23E-05	ND < 3.00E+00
bis(2-Ethylhexyl)phthalate	1.654	7.152	10.000	6.269	0	3.46E+00	8.61E+00	2.67E-02	1.21E-02	4.87E-05	4.60E+00
POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)											
Naphthalene (1)	ND < 0.5334	0.1844	0.7021	ND < 0.5334	23	2.16E-01	5.36E-01	ND < 2.27E-03	ND < 1.03E-03	ND < 4.24E-06	ND < 3.94E-01
2-Methylnapthalene	ND < 0.0420	ND < 0.0470	0.0259	ND < 0.0470	63	9.00E-03	2.24E-02	ND < 2.01E-04	ND < 9.11E-05	ND < 3.69E-07	ND < 3.44E-02
2-Chloronapthalene	0.0002	0.0006	0.0006	0.0005	0	1.93E-04	4.80E-04	2.01E-06	9.11E-07	3.66E-09	3.46E-04
Acenapthylene	0.0059	0.0685	0.0560	0.0434	0	2.71E-02	6.72E-02	1.85E-04	8.41E-05	3.38E-07	3.19E-02
Acenapthene	ND < 0.0074	ND < 0.0048	ND < 0.0136	ND < 0.0086	100	3.71E-03	9.22E-03	ND < 3.66E-05	ND < 1.66E-05	ND < 6.69E-08	ND < 6.32E-03
Fluorene	ND < 0.0066	ND < 0.0060	0.0021	ND < 0.0066	75	2.02E-03	5.01E-03	ND < 2.81E-05	ND < 1.27E-05	ND < 5.24E-08	ND < 4.87E-03
Phenanthrene	0.0467	0.0792	0.1063	0.0774	0	2.43E-02	6.04E-02	3.30E-04	1.50E-04	6.03E-07	5.69E-02
Anthracene	ND < 0.0036	0.0024	0.0002	ND < 0.0036	41	1.42E-03	3.53E-03	ND < 1.52E-05	ND < 6.91E-06	ND < 2.84E-08	ND < 2.64E-03
Fluoranthene	0.0082	0.0335	0.0295	0.0237	0	1.11E-02	2.77E-02	1.01E-04	4.59E-05	1.85E-07	1.74E-02
Pyrene	ND < 0.0038	0.0068	ND < 0.0005	ND < 0.0038	24	2.58E-03	6.41E-03	ND < 1.63E-05	ND < 7.37E-06	ND < 3.03E-08	ND < 2.82E-03
Benzo(a)anthracene	ND < 0.0005	ND < 0.0031	ND < 0.0012	ND < 0.0016	100	1.09E-03	2.70E-03	ND < 6.81E-06	ND < 3.09E-06	ND < 1.25E-08	ND < 1.17E-03
Chrysene (2)	ND < 0.0013	0.0014	ND < 0.0028	ND < 0.0028	60	7.15E-04	1.78E-03	ND < 1.20E-05	ND < 5.46E-06	ND < 2.17E-08	ND < 2.08E-03
Benzo(b)fluoranthene (3)	ND < 0.0013	ND < 0.0057	ND < 0.0034	ND < 0.0035	100	1.82E-03	4.53E-03	ND < 1.49E-05	ND < 6.74E-06	ND < 2.72E-08	ND < 2.56E-03
Benzo(k)fluoranthene (3)	ND < 0.0004	0.0002	ND < 0.0018	ND < 0.0018	82	7.17E-04	1.78E-03	ND < 7.78E-06	ND < 3.53E-06	ND < 1.40E-08	ND < 1.35E-03
Benzo(e)pyrene	ND < 0.0010	ND < 0.0029	ND < 0.0028	ND < 0.0023	100	8.62E-04	2.14E-03	ND < 9.63E-06	ND < 4.37E-06	ND < 1.76E-08	ND < 1.66E-03
Benzo(a)pyrene	ND < 0.0005	ND < 0.0007	ND < 0.0010	ND < 0.0007	100	2.03E-04	5.04E-04	ND < 3.15E-06	ND < 1.43E-06	ND < 5.76E-09	ND < 5.44E-04
Perylene	ND < 0.0003	ND < 0.0004	ND < 0.0004	ND < 0.0004	100	6.42E-05	1.59E-04	ND < 1.58E-06	ND < 7.16E-07	ND < 2.89E-09	ND < 2.72E-04
Indeno(1,2,3,-cd)pyrene	ND < 0.0007	ND < 0.0026	ND < 0.0013	ND < 0.0015	100	7.80E-04	1.94E-03	ND < 6.47E-06	ND < 2.93E-06	ND < 1.18E-08	ND < 1.11E-03
Dibenzo(a,h)anthracene	ND < 0.0002	ND < 0.0004	ND < 0.0005	ND < 0.0004	100	1.31E-04	3.27E-04	ND < 1.69E-06	ND < 7.67E-07	ND < 3.09E-09	ND < 2.91E-04
Benzo(g,h,i)perylene	ND < 0.0006	ND < 0.0025	ND < 0.0015	ND < 0.0015	100	7.48E-04	1.86E-03	ND < 6.58E-06	ND < 2.99E-06	ND < 1.20E-08	ND < 1.13E-03

Sum is 3.91 ×10⁻³

(1) Naphthalene was determined during both the low resolution SVOC and high resolution PAH analysis procedures.
(2) Reported values include Triphenylene.
(3) Reported values include a contribution from Benzo(j)fluoranthene.
NOTE: Only the semivolatile compounds detected at either the ESP inlet or the ESP outlet are presented.

TABLE 4-30

ILLINOIS POWER COMPANY
BALDWIN POWER STATION – UNIT 2 – BALDWIN, ILLINOIS
SUMMARY OF DIOXIN AND FURAN EMISSION TEST RESULTS

ESP OUTLET	RUN 1 ng/Nm³	RUN 2 ng/Nm³	RUN 3 ng/Nm³	AVERAGE ng/Nm³	DETECTION LIMIT RATIO (%)	STANDARD DEVIATION (i)	95 % CI	AVERAGE lb/hr	AVERAGE kg/hr	AVERAGE kg/Mg	AVERAGE lb/10¹² Btu
Date	7-12-93	7-14-93	7-18-93								
Avg. gas stream volumetric flow, dscf/min.	1220100	1224900	1219100								
CO_2 / O_2, %	14.2 / 4.8	14.2 / 4.7	14.3 / 4.7								
Heat input, 10^6 Btu/hr (F-Factor)	5771	5842	5785								
Coal firing rate, ton/hr (F-Factor)	268.1	272.5	277.4								
DIOXINS											
2,3,7,8-TCDD	5.99E-04	ND < 5.22E-04	ND < 3.45E-03	ND < 3.45E-03	77	1.36E-03	3.39E-03	ND < 1.47E-08	ND < 6.66E-09	ND < 2.65E-11	ND < 2.54E-06
1,2,3,7,8-PeCDD	ND < 9.99E-04	ND < 3.48E-04	ND < 3.45E-04	ND < 5.64E-04	100	3.08E-04	7.64E-04	ND < 2.40E-09	ND < 1.09E-09	ND < 4.44E-12	ND < 4.15E-07
1,2,3,4,7,8-HxCDD	ND < 9.99E-04	ND < 3.48E-04	ND < 3.45E-04	ND < 5.64E-04	100	3.08E-04	7.64E-04	ND < 2.40E-09	ND < 1.09E-09	ND < 4.44E-12	ND < 4.15E-07
1,2,3,6,7,8-HxCDD	ND < 7.99E-04	ND < 3.48E-04	ND < 1.73E-04	ND < 4.40E-04	100	2.64E-04	6.56E-04	ND < 1.88E-09	ND < 8.51E-10	ND < 3.47E-12	ND < 3.24E-07
1,2,3,7,8,9-HxCDD	ND < 9.99E-04	ND < 3.48E-04	ND < 3.45E-04	ND < 5.64E-04	100	3.08E-04	7.64E-04	ND < 2.40E-09	ND < 1.09E-09	ND < 4.44E-12	ND < 4.15E-07
1,2,3,4,6,7,8-HpCDD	2.00E-03	ND < 1.74E-03	1.73E-03	ND < 1.74E-03	19	1.25E-04	3.11E-04	ND < 7.44E-09	ND < 3.37E-09	ND < 1.37E-11	ND < 1.27E-06
OCDD	1.40E-02	ND < 1.22E-02	3.45E-03	ND < 1.22E-02	26	4.60E-03	1.14E-02	ND < 5.21E-08	ND < 2.36E-08	ND < 9.56E-11	ND ≤ 8.91E-06
Total TCDD	2.00E-03	1.74E-03	1.73E-03	1.82E-03	0	1.25E-04	3.11E-04	7.76E-09	3.52E-09	1.43E-11	1.34E-06
Total PeCDD	ND < 9.99E-04	ND < 3.48E-04	8.63E-04	ND < 9.99E-04	44	2.80E-04	6.96E-04	ND < 4.25E-09	ND < 1.93E-09	ND < 7.94E-12	ND < 7.37E-07
Total HxCDD	7.99E-04	6.96E-04	2.42E-03	1.30E-03	0	7.87E-04	1.96E-03	5.55E-09	2.52E-09	1.01E-11	9.59E-07
Total HpCDD	5.99E-03	ND < 1.74E-03	3.45E-03	3.44E-03	8	1.75E-03	4.34E-03	1.46E-08	6.64E-09	2.70E-11	2.53E-06
Total PCDD	2.33E-02	9.57E-03	1.19E-02	1.49E-02	0	5.99E-03	1.49E-02	6.36E-08	2.88E-08	1.17E-10	1.10E-05
FURANS											
2,3,7,8-TCDF	5.99E-04	3.48E-04	ND < 1.73E-03	ND < 1.73E-03	48	5.99E-04	1.49E-03	ND < 7.34E-09	ND < 3.33E-09	ND < 1.32E-11	ND < 1.27E-06
1,2,3,7,8-PeCDF	ND < 9.99E-04	8.70E-04	8.63E-04	ND < 9.99E-04	22	6.26E-05	1.56E-04	ND < 4.25E-09	ND < 1.93E-09	ND < 7.94E-12	ND < 7.37E-07
2,3,4,7,8-PeCDF	2.00E-03	1.74E-03	3.45E-03	2.40E-03	0	7.53E-04	1.87E-03	1.02E-08	4.63E-09	1.87E-11	1.76E-06
1,2,3,4,7,8-HxCDF	3.00E-03	2.61E-03	4.31E-03	3.31E-03	0	7.29E-04	1.81E-03	1.41E-08	6.39E-09	2.58E-11	2.43E-06
1,2,3,6,7,8-HxCDF	9.99E-04	8.70E-04	1.38E-03	1.08E-03	0	2.17E-04	5.38E-04	4.62E-09	2.09E-09	8.45E-12	7.96E-07
1,2,3,7,8,9-HxCDF	ND < 7.99E-04	ND < 3.48E-04	ND < 1.73E-04	ND < 4.40E-04	100	2.64E-04	6.56E-04	ND < 1.88E-09	ND < 8.51E-10	ND < 3.47E-12	ND < 3.24E-07
2,3,4,6,7,8-HxCDF	ND < 2.00E-03	ND < 1.74E-03	1.73E-03	ND < 2.00E-03	52	1.25E-04	3.11E-04	ND < 8.51E-09	ND < 3.86E-09	ND < 1.59E-11	ND < 1.47E-06
1,2,3,4,6,7,8-HpCDF	2.20E-03	1.91E-03	1.90E-03	2.00E-03	0	1.38E-04	3.42E-04	8.54E-09	3.87E-09	1.57E-11	1.47E-06
1,2,3,4,7,8,9-HpCDF	ND < 1.20E-03	ND < 3.48E-04	ND < 3.45E-04	ND < 6.31E-04	100	4.02E-04	9.98E-04	ND < 2.69E-09	ND < 1.22E-09	ND < 4.97E-12	ND < 4.64E-07
OCDF	9.99E-03	3.48E-03	3.45E-03	5.64E-03	0	3.08E-03	7.64E-03	2.40E-08	1.09E-08	4.44E-11	4.15E-06
Total TCDF	2.00E-03	ND < 5.22E-03	ND < 1.73E-03	ND < 5.22E-03	63	1.59E-03	3.94E-03	ND < 2.23E-08	ND < 1.01E-08	ND < 4.10E-11	ND < 3.82E-06
Total PeCDF	6.59E-03	4.00E-03	5.69E-03	5.43E-03	0	1.07E-03	2.67E-03	2.31E-08	1.05E-08	4.25E-11	3.99E-06
Total HxCDF	2.00E-03	6.96E-03	1.38E-02	7.59E-03	0	4.84E-03	1.20E-02	3.23E-08	1.47E-08	5.88E-11	5.57E-06
Total HpCDF	5.99E-03	3.48E-03	3.45E-03	4.31E-03	0	1.19E-03	2.96E-03	1.84E-08	8.33E-09	3.38E-11	3.17E-06
Total PCDF	2.66E-02	2.05E-02	2.73E-02	2.48E-02	0	3.02E-03	7.51E-03	1.06E-07	4.79E-08	1.94E-10	1.82E-05

TABLE 4-31

ILLINOIS POWER COMPANY
BALDWIN POWER STATION – UNIT 2 – BALDWIN, ILLINOIS
SUMMARY OF FORMALDEHYDE, ALDEHYDES, AND KETONES EMISSION TEST RESULTS

ESP INLET

Date	7-12-93	7-14-93	7-18-93
Avg. gas stream volumetric flow, dscf/min.	903900	1180700	1200000
CO_2 / O_2, %	14.1 / 4.7	14.7 / 4.3	15.0 / 4.0
Heat input, 10^6Btu/hr (F-Factor)	5771	5842	5785
Coal firing rate, ton/hr (F-Factor)	268.1	272.5	277.4

	RUN 1 µg/Nm³	RUN 2 µg/Nm³	RUN 3 µg/Nm³	AVERAGE µg/Nm³	DETECTION LIMIT RATIO (%)	STANDARD DEVIATION (i)	95 % CI	AVERAGE lb/hr	AVERAGE kg/hr	AVERAGE kg/Mg	AVERAGE lb/10^{12}Btu
Formaldehyde	51.24	27.04	104.03	60.77	0	32.15	79.9	2.36E-01	1.07E-01	4.31E-04	4.08E+01
Acetaldehyde	39.42	24.36	50.68	38.15	0	10.78	26.8	1.46E-01	6.61E-02	2.66E-04	2.51E+01
Acrolein	8.42	6.95	110.91	42.10	0	48.66	120.9	1.73E-01	7.86E-02	3.13E-04	2.99E+01
Acetone [1]	37.38	ND < 1.83	ND < 1.36	12.99	4	16.87	41.9	4.15E-02	1.88E-02	7.73E-05	7.19E+00
Propanal	ND < 3.87	ND < 2.64	108.19	37.15	3	49.47	122.9	1.55E-01	7.03E-02	2.79E-04	2.68E+01
Crotonaldehyde	20.63	8.74	11.10	13.49	0	5.14	12.8	4.92E-02	2.23E-02	9.05E-05	8.49E+00
n-Butyraldehyde	38.99	43.50	45.55	42.68	0	2.74	6.8	1.64E-01	7.46E-02	3.01E-04	2.83E+01
Methyl ethyl ketone	3.98	5.79	10.08	6.62	0	2.56	6.4	2.62E-02	1.19E-02	4.78E-05	4.52E+00
Benzaldehyde	99.66	70.45	65.63	78.58	0	15.03	37.3	2.93E-01	1.33E-01	5.38E-04	5.06E+01
iso-Valeraldehyde	12.47	9.42	ND < 5.14	8.15	11	3.00	7.5	2.96E-02	1.34E-02	5.47E-05	5.11E+00
Valeraldehyde	16.17	13.08	1.16	10.14	0	6.47	16.1	3.66E-02	1.66E-02	6.76E-05	6.30E+00
o-Tolualdehyde	ND < 4.72	25.60	16.79	14.92	5	8.56	21.3	6.11E-02	2.77E-02	1.11E-04	1.05E+01
m/p-Tolualdehyde	12.32	8.54	4.68	8.52	0	3.12	7.7	3.12E-02	1.42E-02	5.75E-05	5.39E+00
Hexaldehyde	19.60	14.54	4.44	12.86	0	6.30	15.7	4.68E-02	2.12E-02	8.63E-05	8.06E+00
2,5-Dimethyl benzaldehyde	48.31	36.78	23.83	36.31	0	10.00	24.8	1.35E-01	6.11E-02	2.47E-04	2.32E+01

ESP OUTLET

Date	7-12-93	7-14-93	7-18-93
Avg. gas stream volumetric flow, dscf/min.	1192600	1173100	1226500
CO_2 / O_2, %	14.2 / 4.8	14.3 / 4.7	14.2 / 4.7
Heat input, 10^6Btu/hr (F-Factor)	5771	5842	5785
Coal firing rate, ton/hr (F-Factor)	268.1	272.5	277.4

	RUN 1 µg/Nm³	RUN 2 µg/Nm³	RUN 3 µg/Nm³	AVERAGE µg/Nm³	DETECTION LIMIT RATIO (%)	STANDARD DEVIATION (i)	95 % CI	AVERAGE lb/hr	AVERAGE kg/hr	AVERAGE kg/Mg	AVERAGE lb/10^{12}Btu
Formaldehyde	ND < 2.33	ND < 1.90	4.45	ND < 2.33	32	1.1	2.8	ND < 9.70E-03	ND < 4.40E-03	ND < 1.81E-05	ND < 1.68E+00
Acetaldehyde	16.15	13.90	26.72	18.92	0	5.6	13.9	7.95E-02	3.61E-02	1.45E-04	1.37E+01
Acrolein	3.34	2.53	8.73	4.87	0	2.7	6.8	2.05E-02	9.32E-03	3.74E-05	3.55E+00
Acetone [1]	ND < 1.53	ND < 1.25	ND < 1.57	ND < 1.45	100	0.1	0.4	ND < 6.08E-03	ND < 2.76E-03	ND < 1.11E-05	ND < 1.05E+00
Propanal	ND < 2.21	23.21	ND < 2.26	8.48	9	9.9	24.6	3.48E-02	1.58E-02	6.39E-05	5.97E+00
Crotonaldehyde	ND < 8.70	ND < 7.10	1.65	ND < 8.70	83	3.0	7.5	ND < 3.62E-02	ND < 1.64E-02	ND < 6.75E-05	ND < 6.27E+00
n-Butyraldehyde	8.04	6.68	ND < 9.79	ND < 9.79	25	1.3	3.2	ND < 4.19E-02	ND < 1.90E-02	ND < 7.55E-05	ND < 7.24E+00
Methyl ethyl ketone	2.96	2.49	9.75	5.07	0	3.3	8.2	2.14E-02	9.72E-03	3.90E-05	3.70E+00
Benzaldehyde	19.74	15.86	30.84	22.15	0	6.3	15.8	9.31E-02	4.22E-02	1.70E-04	1.61E+01
iso-Valeraldehyde	ND < 5.81	ND < 4.74	ND < 5.96	ND < 5.50	100	0.5	1.4	ND < 2.30E-02	ND < 1.04E-02	ND < 4.22E-05	ND < 3.97E+00
Valeraldehyde	2.63	4.20	14.64	7.16	0	5.3	13.2	3.03E-02	1.37E-02	5.50E-05	5.23E+00
o-Tolualdehyde	31.27	ND < 1.90	3.97	12.06	3	13.4	33.3	5.04E-02	2.28E-02	9.35E-05	8.72E+00
m/p-Tolualdehyde	10.52	8.23	5.34	8.03	0	2.1	5.3	3.34E-02	1.52E-02	6.16E-05	5.77E+00
Hexaldehyde	10.72	9.58	20.54	13.62	0	4.9	12.2	5.73E-02	2.60E-02	1.05E-04	9.88E+00
2,5-Dimethyl benzaldehyde	18.56	13.58	26.99	19.71	0	5.5	13.7	8.28E-02	3.76E-02	1.51E-04	1.43E+01

(1) Commonly used laboratory solvent that was detected in samples and blanks; the reported values may not be representative.

TABLE 4 – 32

ILLINOIS POWER COMPANY
BALDWIN POWER STATION – UNIT 2 – BALDWIN, ILLINOIS
SUMMARY OF VOLATILE ORGANICS EMISSION TEST RESULTS

ESP OUTLET	RUN 1 ng/Nm^3	RUN 2 ng/Nm^3	RUN 3 ng/Nm^3	AVERAGE ng/Nm^3	DETECTION LIMIT RATIO (%)	STANDARD DEVIATION (i)	95 % CI	AVERAGE lb/hr	AVERAGE kg/hr	AVERAGE kg/Mg	AVERAGE lb/10^{12}Btu
Date	7-12-93	7-14-93	7-18-93								
Avg. gas stream volumetric flow, dscf/min. (1)	1220100	1224900	1219100								
CO_2 / O_2, % (1)	14.2 / 4.8	14.2 / 4.7	14.3 / 4.7								
Heat input, 10^6Btu/hr (F-Factor)	5771	5842	5785								
Coal firing rate, ton/hr (F-Factor)	268.1	272.5	277.4								
Bromomethane (Methyl bromide)	ND < 232	ND < 169	3760	1320	5	1678	4169	5.63E-03	2.55E-03	1.03E-05	9.70E-01
Trichlorofluoromethane	4401	4128	1974	3501	0	1085	2696	1.49E-02	6.77E-03	2.74E-05	2.57E+00
Iodomethane	ND < 77	ND < 75	1666	581	4	749	1862	2.48E-03	1.12E-03	4.54E-06	4.27E-01
Carbon disulfide	125	395	ND < 77	186	7	140	349	7.94E-04	3.60E-04	1.46E-06	1.37E-01
Methylene chloride (2)	19412	21730	33641	24928	0	6233	15486	1.06E-01	4.82E-02	1.95E-04	1.83E+01
n-Hexane	268	121	278	222	0	72	178	9.48E-04	4.30E-04	1.74E-06	1.64E-01
Benzene	415339	36784	42942	165021	0	177019	439775	7.04E-01	3.19E-01	1.29E-03	1.21E+02
Toluene (2)	3753	1583	2833	2723	0	889	2209	1.16E-02	5.27E-03	2.13E-05	2.00E+00
Ethylbenzene	ND < 77	ND < 75	440	172	15	171	425	7.33E-04	3.33E-04	1.34E-06	1.26E-01
m-/p-Xylene	1721	1675	2106	1834	0	193	480	7.82E-03	3.55E-03	1.43E-05	1.35E+00
o-Xylene	841	706	555	701	0	117	290	2.99E-03	1.36E-03	5.48E-06	5.15E-01
Styrene	ND < 115	235	519	270	7	169	421	1.15E-03	5.23E-04	2.11E-06	1.99E-01

Sum is 1.87.

NOTE: Only the detected compounds are listed above. Detailed test data and results for all compounds are provided in Appendix B.
(1) Volumetric flow rates were obtained from the concurrent SW-846 Method 0010 (SVOC/PAH) test run.
(2) Commonly used laboratory solvent that was detected in samples and blanks; the reported values may not be representative.

TEST REPORT TITLE:	Toxics Assessment Report. Illinois Power Company. Baldwin Power Station- Unit 2. Volumes I through IV. Roy F. Weston, Inc. December, 1993
COAL EF DATABASE REFERENCE NO.	27
FILENAME	DOE3.WK1
FACILITY:	Baldwin, Illinois

PROCESS DATA

Coal type a	Bituminous
Boiler configuration a	Cyclone
Coal source a	Illinois
SCC	10100203
Control device 1 b	ESP
Control device 2	None
Control device 3	None
Data Quality	B
Process Parameters a	568 MW
Test methods c	EPA, or EPA-approved, test methods
Number of test runs d	6 for filterable PM, 3 for other pollutants
Coal HHV, as received (Btu/lb) e	10,633
Coal HHV, as received (Btu/ton)	21,266,000
Coal HHV, as received (MMBtu/ton)	21.3

a Page 2-1
b Page 2-4
c Page 1-12
d See pages referenced below by groups of EFs.
e Page 2-23. Average of 10765, 10681, 10722, 10412, 10426 and 10794 Btu/lb, as received, non-soot blowing periods.

METALS EMISSION FACTORS

Pollutant	Emission Factor (lb/10^12 Btu) a	Emission Factor (lb/MMBtu)	Emission Factor (lb/ton)
Aluminum	5.55E+03	5.55E-03	1.18E-01
Antimony	1.52E+00	1.52E-06	3.23E-05
Arsenic	1.34E+01	1.34E-05	2.85E-04
Barium	5.32E+00	5.32E-06	1.13E-04
Beryllium	1.41E+00	1.41E-06	3.00E-05
Boron	7.67E+03	7.67E-03	1.63E-01
Cadmium	3.02E+00	3.02E-06	6.42E-05
Calcium	3.25E+02	3.25E-04	6.91E-03
Chromium	5.06E+01	5.06E-05	1.08E-03

Cobalt	6.80E+00	6.80E-06	1.45E-04
Copper	1.89E+01	1.89E-05	4.02E-04
Iron	8.39E+03	8.39E-03	1.78E-01
Lead	2.86E+01	2.86E-05	6.08E-04
Magnesium	2.90E+02	2.90E-04	6.17E-03
Manganese	2.23E+01	2.23E-05	4.74E-04
Mercury	3.83E+00	3.83E-06	8.14E-05
Molybdenum	3.37E+01	3.37E-05	7.17E-04
Nickel	2.21E+01	2.21E-05	4.70E-04
Potassium	9.33E+02	9.33E-04	1.98E-02
Phosphorous	1.98E+02	1.98E-04	4.21E-03
Selenium	1.30E+02	1.30E-04	2.76E-03
Sodium	1.17E+03	1.17E-03	2.49E-02
Titanium	3.82E+02	3.82E-04	8.12E-03
Vanadium	1.00E+02	1.00E-04	2.13E-03

a Page 4-18, "Average" values.

SEMIVOLATILE ORGANICS EMISSION FACTORS

Pollutant	Emission Factor (lb/10^12 Btu) a	Emission Factor (lb/MMBtu)	Emission Factor (lb/ton)
Phenol b	1.15E+00	1.15E-06	2.45E-05
Acetophenone	1.23E+00	1.23E-06	2.62E-05
Isophorone	2.62E+01	2.62E-05	5.57E-04
Biphenyl d	8.78E-01	8.78E-07	1.87E-05
Di-n-butylphthalate c	3.00E+00	3.00E-06	6.38E-05
bis(2-Ethylhexyl)phthalate	4.60E+00	4.60E-06	9.78E-05

a Page 4-74

b Detection limit values (1/2) for one run used in developing EF.

c Detection limit values (1/2) for two runs used in developing EF.

d Pollutant not detected in any sampling runs.

PAH EMISSION FACTORS

Pollutant	Emission Factor (lb/10^12 Btu) a	Emission Factor (lb/MMBtu)	Emission Factor (lb/ton)
Naphthalene B	3.94E-01	3.94E-07	8.38E-06
Acenaphthylene	3.19E-02	3.19E-08	6.78E-07
Acenaphthene d	6.32E-03	6.32E-09	1.34E-07
Fluorene c	4.87E-03	4.87E-09	1.04E-07
Phenanthrene	5.69E-02	5.69E-08	1.21E-06
Anthracene b	2.64E-03	2.64E-09	5.61E-08
Fluoranthene	1.74E-02	1.74E-08	3.70E-07
Pyrene c	2.82E-03	2.82E-09	6.00E-08
Benz(a)anthracene d	1.17E-03	1.17E-09	2.49E-08