

$$0.518 \times 1.38 \times (160-25) = 96.5 \text{ KJ/kg}$$

As heat value of fuel is 8.50MJ/kg, loss can be calculated as 1.1 % of the heat which comes in. If the average load is 75t/h, energy saving of about 3,000t will be achieved annually. However, it is needless to say that adjustment must be made while confirming the balance of the whole boiler.

5-7-2. Non-Combustion Loss

In the case of bubbling fluidized-bed combustion, there is a large amount of carbon which hasn't burnt and scattered from the layer, and it was reported that there was lime with the high fuel ratio which exceeded 10-15%. With these as backgrounds, circulating fluidized-bed combustion has been developed. Non-combustion loss was estimated from the analysis results of ash under this test. For ash in the tested boiler, 2% was collected as excess bed materials, 15% was collected from the economizer, 5% from the air preheater, and 78% from the electric dust collector. As total carbon and CO₂ values had been obtained from the analysis results, the amount of carbon unburnt was obtained from the difference between them.

Mode No.	1	2	3	4
Type of fuel	Lyuko coal		Mixed coal	
Quantity of evaporation t/h	85	60	80	43
Unburnt carbon %*	2.4	1.6	1.3	1.1

*: The rate in fuel between the total carbon content of unburnt carbon contained in ash, provided that the unbalance of ash before and after combustion doesn't change.

From the table, it is found that non-combustion loss was around 1.1-2.4%.

If combustion efficiency (hc) is defined according to the following formula, combustion efficiency is as follows:

$$hc = (\text{net heat value} - (\text{unburnt loss} + \text{incomplete combustion})) / \text{net calorific value}$$

If combustion heat of carbon is 32,730kJ/kg and net heat value of raw coal is 7,667kJ/kg, loss calories due to unburnt ones is 193kJ/kg, and good combustion efficiency of 98.2% was achieved as a result.

6. Summary

According to the results of the test:

(1) The results of measurement of the desulfurization efficiency and NO_x in the hybrid fluidized-bed combustion boiler

The results showed a desulfurization efficiency of only 42-45% (when desulfurization agents were added, 23-34%). Concentration of NO_x was 40-80ppm lower than the pulverized-coal boiler.

(2) Insufficient Heat value at High Load

Although it is technically possible to make up for insufficient heat value by using fuel with a lower sulfur content, as CaSO₄ (gypsum) after desulfurization reaction in the range of the fluid-layer combustion passes the area of high-temperature combustion together with exhausted gas, a part of CaSO₄ is reduced and lowers the desulfurization efficiency.

(3) Investigation of Potentialities of Combustion System Improvement

If the oxygen concentration is lowered from 6% to 3%, energy will be saved by 1.1%. Combustion efficiency will be 98.2%.

If a hybrid fluidized-bed combustion boiler is introduced to the study area , it is required (a) to increase capacity of a stoker and a drier, (b) to aim at making temperature in the fluid layer uniform, and (c) to examine particle diameters of desulfurization agents and methods of feeding desulfurization agents. As mentioned above, there are many substantial problems to be solved technically. Measures against air pollution by means of a hybrid fluidized-bed combustion boiler using coal of low quality which contains a large amount of sulfur content are considered to be difficult to take at in the current stage.

TABLE 7-1-1 Analysis of Fuel and Burnt Ash (Mode 1)

Data of coal analysis:	Data of ash analysis:
Wet content	25.60 %
Ash content	38.10 %
Total carbon	24.40 %
Total sulphur	1.90 %
Total hydrogen	1.10 %
Nitrogen	0.40 %
Oxygen	8.50 %
Carbonate	
carbon-dioxide	1.80 %
Heat value	8.500 MJ/kg

Theoretical dry combustion air volume 2.163 m³/kg coal

Theoretical dry flue-gas volume 2.179 m³/kg coal

Theoretical quantity of combustion steam 0.354 kg/kg coal

Max. sulphur-dioxide concentration @6%O₂ 4241 vpm
12430 mg/m³

Efficiency of sulphur-bonding 31.0 %

Rate of nitrogen conversion 7.9 %

Analysis and other data of solid combustion residues:

	Slag	ECO p.	LH p.	EF p.
Wet content	0.9	0.2	0.4	0.3 %
Ignition loss	0.7	1.7	4.0	1.6 %
Total carbon	0.2	1.8	3.0	1.6 %
CO ₂	0.3	0.6	1.8	0.3 %
SO ₃	1.9	2.2	3.0	1.9 %
CaO	7.9	11.4	12.9	10.7
Ash rate	0.02	0.15	0.05	0.78

Calculated data of solid combustion residues:

	Slag	ECO p.	LH p.	EF p.
Combustible carbon	0.0012	0.0164	0.0252	0.0152 kg/kg
CaO/S mol.	3.81	6.36	7.14	7.58 -

TABLE 7-1-2 Analysis of Fuel and Burnt Ash (Mode 2)

Data of coal analysis:	Data of ash analysis:	
Wet content	25.70 %	CO ₂ 0.40 %
Ash content	37.90 %	SO ₃ 5.70 %
Total carbon	24.50 %	CaO 11.40 %
Total sulphur	1.90 %	
Total hydrogen	1.30 %	%
Nitrogen	0.40 %	Measured @SO ₂ 3222 ppm
Oxygen	8.30 %	Ca/S 1.30 -
Carbonate		
carbon-dioxide	1.70 %	
Heat value	8.500 MJ/kg	

Theoretical dry combustion air volume 2.235 m³/kg coal
 Theoretical dry flue-gas volume 2.237 m³/kg coal
 Theoretical quantity of combustion steam 0.373 kg/kg coal

Max. sulphur-dioxide concentration @6%O₂ 4130 vpm
 12106 mg/m³

Efficiency of sulphur-bonding 22.0 %

Rate of nitrogen conversion 8.2 %

Analysis and other data of solid combustion residues:

	Slag	ECO p.	LH p.	EF p.
Wet content	2.2	0.2	0.3	0.3 %
Ignition loss	1.0	2.2	2.2	1.7 %
Total carbon	0.2	1.2	2.0	1.2 %
CO ₂	0.5	1.5	0.7	0.9 %
SO ₃	2.7	3.3	2.0	2.3 %
CaO	7.2	14.7	10.0	12.2%
Ash rate	0.02	0.15	0.05	0.78

Calculated data of solid combustion residues:

	Slag	ECO p.	LH p.	EF p.
Combustible carbon	0.0007	0.0079	0.0181	0.0098 kg/kg
CaO/S mol.	3.81	6.36	7.14	7.58 -

TABLE 7-1-3 Analysis of Fuel and Burnt Ash (Mode 3)

Data of coal analysis:		Data of ash analysis:	
Wet content	24.00 %	CO ₂	1.60 %
Ash content	39.80 %	SO ₃	5.10 %
Total carbon	23.70 %	CaO	19.30 %
Total sulphur	1.70 %	SiO ₂	42.2 %
Total hydrogen	1.50 %	MgO	2.6 %
Nitrogen	0.40 %	Measured @SO ₂	2110 ppm
Oxygen	8.90 %	Ca/S	2.58 -
Carbonate			
carbon-dioxide	4.40 %		
Heat value	7.610 MJ/kg		

Theoretical dry combustion air volume 2.178 m³/kg coal

Theoretical dry flue-gas volume 2.176 m³/kg coal

Theoretical quantity of combustion

steam 0.374 kg/kg coal

Max. sulphur-dioxide concentration @6%O₂ 3799 vpm

11135 mg/m³

Efficiency of sulphur-bonding 44.5 %

Rate of nitrogen conversion 7.7 %

Analysis and other data of solid combustion residues:

	Slag	ECO p.	LH p.	EF p.
Wet content	3.7	0.2	0.4	0.2 %
Ignition loss	2.0	2.2	2.8	3.5 %
Total carbon	0.4	1.6	1.9	1.4 %
CO ₂	1.0	1.4	1.3	2.7 %
SO ₃	4.2	2.4	2.3	4.1 %
CaO	11.8	17.2	14.7	20.0%
Ash rate	0.02	0.15	0.05	0.78

Calculated data of solid combustion residues:

	Slag	ECO p.	LH p.	EF p.
Combustible carbon	0.0013	0.0122	0.0155	0.0066 kg/kg
CaO/S mol.	4.01	10.24	9.13	6.97 -

TABLE 7-1-4 Analysis of Fuel and Burnt Ash (Mode 4)

Data of coal analysis:		Data of ash analysis:	
Wet content	24.00 %	CO ₂	1.60 %
Ash content	39.80 %	SO ₃	5.10 %
Total carbon	23.70 %	CaO	19.30 %
Total sulphur	1.70 %	SiO ₂	40.10 %
Total hydrogen	1.50 %	MgO	2.10 %
Nitrogen	0.40 %	Measured @SO ₂	2139 ppm
Oxygen	8.90 %	Ca/S	2.58 -
Carbonate			
carbon-dioxide	4.40 %		
Heat value	7.610 MJ/kg		

Theoretical dry combustion air volume 2.178 m³/kg coal

Theoretical dry flue-gas volume 2.176 m³/kg coal

Theoretical quantity of combustion steam 0.374 kg/kg coal

Max. sulphur-dioxide concentration @6%O₂ 3799 vpm
11135 mg/m³

Efficiency of sulphur-bonding 43.7 %

Rate of nitrogen conversion 5.6 %

Analysis and other data of solid combustion residues:

	Slag	ECO p.	LH p.	EF p.
Wet content	4.3 0.2	0.3	0.4 %	
Ignition loss	2.3 4.1	3.5	4.4 %	
Total carbon	0.5 1.5	1.4	1.6 %	
CO ₂	1.3 3.3	2.7	3.5 %	
SO ₃	5.0 2.7	2.2	5.6 %	
CaO	12.9 15.7	13.2	22.9%	
Ash rate	0.02 0.15	0.05	0.78	

Calculated data of solid combustion residues:

	Slag	ECO p.	LH p.	EF p.
Combustible carbon	0.0015	0.0060	0.0067	0.0065 kg/kg
CaO/S mol.	3.69	8.31	8.57	5.84 -

Contrast Table for Boiler Operation Parameters and Channel No. (1)

Channel number	Description	
Flue gas temperatures [C°]		
21	after TH2	right
22		left
23	after TH3	right
24		left
25	after TH1	right
26		left
27	before ECO	right
28		left
29	after ECO	right
30		left
1	after air-heater	
Before-mill temperatures [C°]		
5	mill no.1.	
6	mill no.2.	
7	mill no.3.	
8	mill no.4.	
After-mill temperatures [C°]		
9	mill no.1.	
10	mill no.2.	
11	mill no.3.	
12	mill no.4.	
Supply-water temperatures [C°]		
2	before ECO	
3	after ECO	
Steam temperatures [C°]		
4	before TH1	
33	after TH1	
34	after first injection	
35	after TH2	
36	after second injection	
37	fresh steam	

Contrast Table for Boiler Operation Parameters and Channel No. (2)

Water- and steam pressures [bar]	
13	supply-water A
14	supply-water B
32	cylinder
31	fresh steam
mass flows of water and steam [kg/s]	
39	supply-water A
40	supply-water B
42	injection 1.
43	injection 2.
46	fresh steam
Air pressures [Pa]	
75	after air-heater
76	after fluid ventilator
77	air compartment; main layer
78	air compartment; left side secondary layer
79	air compartment; right side secondary layer
80	secondary air
45	Furnace-chamber pressure (draught) [Pa]
RPM of raw coal feeders [1/m]	
71	feeder 1.
72	feeder 1.
73	feeder 1.
74	feeder 1.
Layer temperatures [°C]	
47	T01
48	T02
49	T03
50	T04
51	T05
52	T06
53	T07
54	T08
55	T09
38	Water level of cylinder [mm]
44	total air quantity [m_N^3/S]
16	O ₂ before ECO [%]

Contrast Table for Boiler Operation Parameters and Channel No. (3)

Gas components measured after the flue-gas suction ventilator	
81	O ₂ [%]
100	SO ₂ [ppm]
83	NO [ppm]
85	CO [ppm]
86	CO ₂ [%]

Calculated characteristics	
Components of flue gas in case of 6% O ₂	
96	SO ₂ [ppm]
97	NO [ppm]
99	CO [ppm]
200	excess air factor [-]

TABLE 7-1-5 Boiler Operation Parameters (Average Value, Scatter) Mode 1

Operational mode No.1.
Average value

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	697	°C	2	192	°C	13	-3.57	bar	50	851	BM°C	5	241	°C
22	700	°C	3	292	°C	14	72.0	bar	47	805	FM°C	6	18.0	°C
23	651	°C	4	342	°C	32	76.7	bar	53	884	JM°C	7	186	°C
24	639	°C	33	446	°C	31	72.0	bar	51	891	BK°C	8	192	°C
25	594	°C	34	419	°C	39	0.124	kg/s	48	824	FK°C			
26	577	°C	35	477	°C	40	23.9	kg/s	54	892	JK°C	9	116	°C
27	457	°C	36	475	°C	42	1.04	kg/s	52	718	BH°C	10	59.8	°C
28	479	°C	37	496	°C	43	0.066	kg/s	49	686	FH°C	11	61.1	°C
29	343	°C				46	23.7	kg/s	55	752	JH°C	12	114	°C
30	341	°C	44	34.1	m³/s									
1	169	°C				61	85.3	t/h						
38	6.00	mm				75	1383	P1Pa	81	12.6	O2 %	200	2.52	°C
						76	6049	P2Pa	82	0	SO2p	96	3226	SO2r
71	780	1/m				77	5403	P3Pa	83	146	NO p	97	263	NO r
72	0	1/m				78	5758	P4Pa	85	35.6	CO p	99	64.3	CO r
73	736	1/m				79	4978	P5Pa	86	7.46	CO2%			
74	798	1/m				45	-117	P7Pa						

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Scatter

Nº	Mért	Dim.	Nº	Mért	Dim.									
21	4.31	°C	2	0.195	°C	13	0.023	bar	50	7.54	BM°C	5	6.08	°C
22	10.7	°C	3	0.641	°C	14	0.424	bar	47	7.37	FM°C	6	1.60	°C
23	3.13	°C	4	0.592	°C	32	0.426	bar	53	12.3	JM°C	7	8.50	°C
24	7.33	°C	33	1.33	°C	31	0.377	bar	51	7.72	BK°C	8	5.07	°C
25	3.02	°C	34	1.52	°C	39	0.098	kg/s	48	8.05	FK°C			
26	4.30	°C	35	1.81	°C	40	0.664	kg/s	54	7.55	JK°C	9	4.39	°C
27	0.953	°C	36	1.84	°C	42	0.016	kg/s	52	9.52	BH°C	10	4.06	°C
28	2.67	°C	37	1.75	°C	43	0.002	kg/s	49	9.12	FH°C	11	0.535	°C
29	0.610	°C				46	0.586	kg/s	55	15.5	JH°C	12	1.43	°C
30	0.939	°C	44	0.342	m³/s				61	2.11	t/h			
1	0.578	°C				75	13.3	P1Pa	81	0.230	O2 %	200	0.070	°C
38	8.17	mm				76	41.8	P2Pa	82	0	SO2p	96	52.7	SO2r
71	3.66	1/m				77	42.5	P3Pa	83	5.59	NO p	97	7.80	NO r
72	0	1/m				78	42.2	P4Pa	85	2.71	CO p	99	5.81	CO r
73	3.08	1/m				79	25.3	P5Pa	86	0.197	CO2%			
74	4.31	1/m				45	98.3	P7Pa						

A0215_1.DAT

TABLE 7-1-6 Boiler Operation Parameters (Minimum, Maximum) Mode 1

Operational mode No.1.

Minimum

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	689	°C	2	191	°C	13	-3.60	bar	50	834	BM °C	5	235	°C
22	671	°C	3	291	°C	14	71.1	bar	47	785	FM °C	6	15.7	°C
23	646	°C	4	341	°C	32	75.8	bar	53	849	JH °C	7	169	°C
24	620	°C	33	444	°C	31	71.4	bar	51	874	BK °C	8	184	°C
25	588	°C	34	416	°C	39	-0.05	kg/s	48	804	FK °C	9	112	°C
26	566	°C	35	473	°C	40	21.6	kg/s	54	871	JK °C	10	53.3	°C
27	456	°C	36	471	°C	42	0.996	kg/s	52	700	BH °C	11	60.2	°C
28	472	°C	37	492	°C	43	0.061	kg/s	49	668	FH °C	12	111	°C
29	341	°C				46	22.5	kg/s	-55	722	JH °C			
30	338	°C	44	33.1	m3/s									
1	168	°C				61	81.0	t/h						
38	-11.5	mm				75	1351	P1Pa	81	12.2	O2 %	200	2.39	°C
						76	5953	P2Pa	82	0	SO2p	96	3080	SO2r
71	770	1/m				77	5312	P3Pa	83	130	NO p	97	247	NO r
72	0	1/m				78	5662	P4Pa	85	28.8	CO p	99	53.0	CO r
73	725	1/m				79	4914	P5Pa	86	6.98	CO2%			
74	787	1/m				80	1223	P6Pa						
						45	-229	P7Pa						

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Maximum

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	707	°C	2	192	°C	13	-3.52	bar	50	868	BM °C	5	263	°C
22	725	°C	3	293	°C	14	72.7	bar	47	821	FM °C	6	21.3	°C
23	658	°C	4	343	°C	32	77.4	bar	53	909	JH °C	7	202	°C
24	655	°C	33	449	°C	31	72.7	bar	51	904	BK °C	8	202	°C
25	600	°C	34	423	°C				48	838	FK °C			
26	585	°C	35	480	°C	39	0.406	kg/s	54	906	JK °C	9	131	°C
27	459	°C	36	478	°C	40	25.0	kg/s	52	734	BH °C	10	67.3	°C
28	484	°C	37	499	°C	42	1.08	kg/s	49	704	FH °C	11	62.3	°C
29	344	°C				43	0.070	kg/s	55	782	JH °C	12	117	°C
30	342	°C	44	34.9	m3/s	46	24.6	kg/s						
1	170	°C				61	88.5	t/h						
38	30.3	mm				75	1424	P1Pa	81	13.2	O2 %	200	2.68	°C
						76	6141	P2Pa	82	0	SO2p	96	3367	SO2r
71	790	1/m				77	5492	P3Pa	83	156	NO p	97	282	NO r
72	0	1/m				78	5850	P4Pa	85	42.6	CO p	99	81.0	CO r
73	747	1/m				79	5019	P5Pa	86	7.82	CO2%			
74	808	1/m				80	1328	P6Pa						
						45	-0.44	P7Pa						

A0215_1.DAT

TABLE 7-1-7 Boiler Operation Parameters (Average Value, Scatter) Mode 2

Operational mode No.2.

Average value

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	616	°C	2	191	°C	13	-3.34	bar	50	851	BM°C	5	218	°C
22	576	°C	3	290	°C	14	69.4	bar	47	813	FM°C	6	11.0	°C
23	582	°C	4	336	°C	32	74.1	bar	53	870	JM°C	7	102	°C
24	551	°C	33	425	°C	31	71.5	bar	51	892	BK°C	8	181	°C
25	525	°C	34	422	°C	39	0.292	kg/s	48	834	FK°C	9	89.8	°C
26	504	°C	35	462	°C	40	17.3	kg/s	54	889	JK°C	10	37.2	°C
27	417	°C	36	458	°C	42	0	kg/s	52	739	BH°C	11	89.5	°C
28	431	°C	37	471	°C	43	0.067	kg/s	49	705	FH°C	12	114	°C
29	325	°C				46	16.6	kg/s	55	760	JH°C			
30	321	°C	44	34.3	m³/s									
1	154	°C				61	59.7	t/h						
38	-15.5	mm				75	1311	P1Pa	81	15.1	O2 %	200	3.58	°C
						76	6272	P2Pa	82	0	SO2p	96	2965	SO2r
71	815	1/m				77	5625	P3Pa	83	100	NO p	97	259	NO r
72	0	1/m				78	5989	P4Pa	85	87.6	CO p	99	226	CO r
73	0	1/m				79	5133	P5Pa	86	5.41	CO2%			
74	746	1/m				80	1202	P6Pa						
						45	-214	P7Pa						

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Scatter

Nº	Mért	Dim.	Nº	Mért	Dim.									
21	4.25	°C	2	0.339	°C	13	0.012	bar	50	10.6	BM°C	5	3.21	°C
22	2.03	°C	3	0.410	°C	14	0.434	bar	47	11.2	FM°C	6	0.074	°C
23	3.18	°C	4	0.732	°C	32	0.459	bar	53	13.4	JM°C	7	66.6	°C
24	30.2	°C	33	1.76	°C	31	0.476	bar	51	5.79	BK°C	8	2.34	°C
25	2.70	°C	34	1.68	°C	39	0.085	kg/s	48	7.62	FK°C	9	3.18	°C
26	1.57	°C	35	1.73	°C	40	1.45	kg/s	54	6.92	JK°C	10	0.583	°C
27	0.720	°C	36	1.74	°C	42	0	kg/s	52	6.93	BH°C	11	0.407	°C
28	0.853	°C	37	1.41	°C	43	0.002	kg/s	49	6.09	FH°C	12	0.833	°C
29	0.695	°C				46	0.319	kg/s	55	7.74	JH°C			
30	0.767	°C	44	0.362	m³/s									
1	0.293	°C				61	1.15	t/h						
38	19.2	mm				75	13.6	P1Pa	81	0.190	O2 %	200	0.126	°C
						76	27.6	P2Pa	82	0	SO2p	96	40.3	SO2r
71	3.34	1/m				77	28.3	P3Pa	83	4.70	NO p	97	9.95	NO r
72	0	1/m				78	28.9	P4Pa	85	4.14	CO p	99	14.8	CO r
73	0	1/m				79	15.8	P5Pa	86	0.163	CO2%			
74	5.71	1/m				80	21.1	P6Pa						
						45	50.9	P7Pa						

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TABLE 7-1-8 Boiler Operation Parameters (Minimum, Maximum) Mode 2

Operational mode No.2.

Minimum

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	607	°C	2	191	°C	13	-3.36	bar	50	826	BH°C	5	213	°C
22	572	°C	3	289	°C	14	68.6	bar	47	785	FH°C	6	10.9	°C
23	575	°C	4	335	°C	32	73.2	bar	53	835	JH°C	7	-195	°C
24	459	°C	33	420	°C	31	70.6	bar	51	879	BK°C	8	178	°C
25	519	°C	34	418	°C	39	0.100	kg/s	48	818	FK°C	9	84.9	°C
26	500	°C	35	458	°C	40	12.2	kg/s	54	874	JK°C	10	36.3	°C
27	416	°C	36	454	°C	42	0	kg/s	52	724	BH°C	11	88.9	°C
28	429	°C	37	469	°C	43	0.063	kg/s	49	692	FH°C	12	113	°C
29	324	°C				55	746	JH°C						
30	321	°C	44	33.5	m3/s	46	16.1	kg/s						
1	153	°C				61	58.0	t/h						
38	-49.6	mm				75	1284	P1Pa	81	14.9	O2 %	200	3.42	°C
						76	6213	P2Pa	82	0	SO2p	96	2865	SO2r
71	808	1/m				77	5569	P3Pa	83	87.7	NO p	97	237	NO r
72	0	1/m				78	5928	P4Pa	85	80.4	CO p	99	204	CO r
73	0	1/m				79	5093	P5Pa	86	4.77	CO2%			
74	730	1/m				80	1155	P6Pa						
						45	-229	P7Pa						

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Maximum

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	624	°C	2	192	°C	13	-3.32	bar	50	869	BH°C	5	222	°C
22	580	°C	3	291	°C	14	70.2	bar	47	830	FH°C	6	11.1	°C
23	587	°C	4	337	°C	32	74.8	bar	53	891	JM°C	7	239	°C
24	709	°C	33	426	°C	31	72.4	bar	51	901	BK°C	8	186	°C
25	529	°C	34	423	°C	39	0.501	kg/s	48	845	FK°C	9	94.1	°C
26	506	°C	35	464	°C	40	19.6	kg/s	54	901	JK°C	10	38.3	°C
27	419	°C	36	459	°C	42	0	kg/s	52	753	BH°C	11	90.3	°C
28	432	°C	37	473	°C	43	0.071	kg/s	49	716	FH°C	12	116	°C
29	327	°C				46	17.6	kg/s	55	774	JH°C			
30	324	°C	44	35.1	m3/s	61	63.3	t/h						
1	154	°C				75	1335	P1Pa	81	16.0	O2 %	200	4.17	°C
38	18.4	mm				76	6325	P2Pa	82	0	SO2p	96	3034	SO2r
						77	5685	P3Pa	83	108	NO p	97	286	NO r
71	824	1/m				78	6056	P4Pa	85	100	CO p	99	272	CO r
72	0	1/m				79	5158	P5Pa	86	5.63	CO2%			
73	0	1/m				80	1246	P6Pa						
74	760	1/m				45	-26.2	P7Pa						

A0215_2.DAT

TABLE 7-1-9 Boiler Operation Parameters (Average Value, Scatter) Mode 3

Operational mode No.3.
Average value

Nº	Hért	Dim.	Nº	Hért	Dim.	Nº	Hért	Dim.	Nº	Hért	Dim.	Nº	Hért	Dim.
21	684	°C	2	192	°C	13	3.82	bar	50	787	BH°C	5	298	°C
22	730	°C	3	292	°C	14	72.1	bar	47	737	FH°C	6	53.1	°C
23	643	°C	4	347	°C	32	76.9	bar	53	788	JH°C	7	106	°C
24	660	°C	33	457	°C	31	72.7	bar	51	910	BK°C	8	248	°C
25	590	°C	34	414	°C	39	3.35	kg/s	48	843	FK°C	9	138	°C
26	594	°C	35	471	°C	40	22.7	kg/s	54	908	JK°C	10	65.9	°C
27	458	°C	36	469	°C	42	1.60	kg/s	52	749	BH°C	11	61.3	°C
28	493	°C	37	491	°C	43	0.062	kg/s	49	704	FH°C	12	134	°C
29	344	°C	44	34.8	m³/s	46	22.1	kg/s	55	751	JH°C			
30	347	°C												
1	174	°C												
38	0.257	mm												
71	802	1/m												
72	0	1/m												
73	685	1/m												
74	795	1/m												

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Scatter

Nº	Hért	Dim.	Nº	Hért	Dim.	Nº	Hért	Dim.	Nº	Hért	Dim.	Nº	Hért	Dim.
21	7.85	°C	2	0.250	°C	13	0.498	bar	50	42.1	BH°C	5	12.5	°C
22	9.65	°C	3	0.489	°C	14	0.567	bar	47	40.6	FH°C	6	22.9	°C
23	6.07	°C	4	1.08	°C	32	0.576	bar	53	43.4	JH°C	7	159	°C
24	6.67	°C	33	2.88	°C	31	0.461	bar	51	15.2	BK°C	8	18.3	°C
25	6.50	°C	34	2.57	°C	39	0.071	kg/s	48	19.7	FK°C	9	2.97	°C
26	5.22	°C	35	2.70	°C	40	0.903	kg/s	54	15.9	JK°C	10	5.15	°C
27	2.42	°C	36	2.78	°C	42	0.040	kg/s	52	15.8	BH°C	11	4.20	°C
28	3.84	°C	37	2.60	°C	43	0.003	kg/s	49	14.0	FH°C	12	5.12	°C
29	1.19	°C	44	0.389	m³/s	46	0.872	kg/s	55	17.5	JH°C			
30	1.09	°C												
1	0.707	°C												
38	8.35	mm												
71	5.20	1/m												
72	0	1/m												
73	3.80	1/m												
74	3.85	1/m												

A0216_1.DAT

TABLE 7-1-10 Boiler Operation Parameters (Minimum, Maximum) Mode 3

Operational mode No.3.

Minimum

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Hért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	670	°C	2	191	°C	13	3.01	bar	50	707	BH °C	5	281	°C
22	713	°C	3	291	°C	14	70.8	bar	47	658	FH °C	6	34.8	°C
23	632	°C	4	345	°C	32	75.6	bar	53	695	JH °C	7	-237	°C
24	647	°C	33	452	°C	31	71.6	bar	51	883	BK °C	8	216	°C
25	575	°C	34	409	°C	39	3.17	kg/s	48	809	FK °C	9	135	°C
26	585	°C	35	466	°C	40	20.6	kg/s	52	721	BH °C	10	58.4	°C
27	452	°C	36	464	°C	42	1.51	kg/s	49	678	FH °C	11	58.7	°C
28	488	°C	37	487	°C	43	0.056	kg/s	55	719	JH °C	12	125	°C
29	342	°C				46	20.7	kg/s						
30	346	°C	44	33.9	m³/s									
1	173	°C				61	74.4	t/h						
38	-20.7	mm				75	2079	P1Pa	81	12.5	O2 %	200	2.46	°C
						76	6146	P2Pa	82	0	SO2p	96	1900	SO2r
						77	5421	P3Pa	83	118	NO p	97	225	NO r
71	787	1/m				78	5808	P4Pa	85	13.0	CO p	99	23.0	CO r
72	0	1/m				79	4992	P5Pa	86	6.95	CO2%			
73	676	1/m				80	1540	P6Pa						
74	786	1/m				45	-229	P7Pa						

A0216_1.DAT

Maximum

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Hért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	702	°C	2	192	°C	13	4.68	bar	50	847	BH °C	5	326	°C
22	748	°C	3	293	°C	14	73.2	bar	47	795	FH °C	6	136	°C
23	657	°C	4	349	°C	32	78.1	bar	53	848	JH °C	7	320	°C
24	673	°C	33	463	°C	31	73.7	bar	51	938	BK °C	8	272	°C
25	603	°C	34	420	°C	39	3.50	kg/s	48	880	FK °C	9	143	°C
26	603	°C	35	476	°C	40	24.8	kg/s	52	778	BH °C	10	75.4	°C
27	462	°C	36	474	°C	42	1.70	kg/s	49	727	FH °C	11	75.7	°C
28	500	°C	37	496	°C	43	0.068	kg/s	55	782	JH °C	12	140	°C
30	350	°C	44	35.9	m³/s	46	23.8	kg/s						
1	176	°C				61	85.7	t/h						
38	16.5	mm				75	2160	P1Pa	81	13.5	O2 %	200	2.78	°C
						76	6253	P2Pa	82	0	SO2p	96	2380	SO2r
						77	5548	P3Pa	83	145	NO p	97	268	NO r
71	812	1/m				78	5941	P4Pa	85	22.1	CO p	99	43.2	CO r
72	0	1/m				79	5061	P5Pa	86	7.86	CO2%			
73	694	1/m				80	1541	P6Pa						
74	804	1/m				45	-3.32	P7Pa						

A0216_1.DAT

TABLE 7-1-11 Boiler Operation Parameters (Average Value, Scatter) Mode 4

Operational mode No.4.

Average value

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	537	°C	2	189	°C	13	2.06	bar	50	716	BM °C	5	253	°C
22	559	°C	3	285	°C	14	60.5	bar	47	682	FM °C	6	14.5	°C
23	518	°C	4	315	°C	32	71.9	bar	53	707	JH °C	7	29.2	°C
24	522	°C	33	415	°C	31	70.1	bar	51	870	BK °C	8	131	°C
25	414	°C	34	415	°C	39	1.96	kg/s	48	819	FK °C			
26	422	°C	35	460	°C	40	12.5	kg/s	54	865	JK °C	9	117	°C
27	339	°C	36	460	°C	42	0	kg/s	52	781	BH °C	10	41.2	°C
28	416	°C	37	470	°C	43	0	kg/s	49	744	FH °C	11	65.7	°C
29	287	°C				46	12.0	kg/s	55	778	JH °C	12	102	°C
30	288	°C	44	31.1	m3/s									
1	145	°C				61	43.3	t/h						
38	-14.2	mm				75	808	P1Pa	81	15.8	O2 %	200	4.08	°C
						76	5958	P2Pa	82	0	SO2p	96	1922	SO2r
						77	5345	P3Pa	83	60.7	NO p	97	179	NO r
71	647	1/m				78	5697	P4Pa	85	113	CO p	99	343	CO r
72	0	1/m				79	4863	P5Pa	86	4.09	CO2%			
73	0	1/m				80	733	P6Pa						
74	642	1/m				45	-185	P7Pa						

A0216_2.DAT

Scatter

Nº	Mért	Dim.	Nº	Mért	Dim.									
21	3.63	°C	2	0.248	°C	13	0.140	bar	50	15.6	BM °C	5	14.6	°C
22	4.71	°C	3	0.549	°C	14	0.352	bar	47	14.8	FM °C	6	0.848	°C
23	2.95	°C	4	0.078	°C	32	0.593	bar	53	15.3	JH °C	7	0.133	°C
24	3.54	°C	33	2.72	°C	31	0.567	bar	51	12.1	BK °C	8	3.99	°C
25	1.01	°C	34	2.59	°C	39	0.009	kg/s	48	16.1	FK °C			
26	16.5	°C	35	3.52	°C	40	1.57	kg/s	54	14.6	JK °C	9	3.75	°C
27	14.4	°C	36	3.52	°C	42	0	kg/s	52	14.6	DH °C	10	12.7	°C
28	2.18	°C	37	3.28	°C	43	0	kg/s	49	14.4	FH °C	11	2.82	°C
29	0.808	°C				46	0.428	kg/s	55	16.0	JH °C	12	2.15	°C
30	0.933	°C	44	0.329	m3/s				61	1.54	t/h			
1	0.703	°C				75	19.9	P1Pa	81	0.257	O2 %	200	0.245	°C
38	18.4	mm				76	76.0	P2Pa	82	0	SO2p	96	330	SO2r
						77	71.9	P3Pa	83	7.78	NO p	97	19.6	NO r
71	22.2	1/m				78	73.8	P4Pa	85	79.8	CO p	99	306	CO r
72	0	1/m				79	54.7	P5Pa	86	0.218	CO2%			
73	0	1/m				80	28.9	P6Pa						
74	14.6	1/m				45	79.7	P7Pa						

A0216_2.DAT

TABLE 7-1-12 Boiler Operation Parameters (Minimum, Maximum) Mode 4

Operational mode No. 4.

Minimum

Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.	Nº	Mért	Dim.
21	530	°C	2	188	°C	13	1.78	bar	50	687	BH °C	5	243	°C
22	545	°C	3	284	°C	14	59.7	bar	47	654	FM °C	6	13.2	°C
23	513	°C	4	315	°C	32	70.8	bar	53	676	JM °C	7	28.8	°C
24	514	°C	33	411	°C	31	69.1	bar	51	842	BK °C	8	122	°C
25	412	°C	34	412	°C	39	1.93	kg/s	48	783	FK °C	9	107	°C
26	416	°C	35	456	°C	40	7.97	kg/s	54	831	JK °C	10	15.7	°C
27	334	°C	36	456	°C	42	0	kg/s	52	748	BH °C	11	61.0	°C
28	412	°C	37	467	°C	43	0	kg/s	49	713	FH °C	12	96.6	°C
29	285	°C				46	10.7	kg/s	55	742	JH °C			
30	286	°C	44	30.2	m³/s									
1	144	°C				61	38.4	t/h						
38	-50.0	mm				75	757	P1Pa	81	15.5	O2 %	200	3.79	°C
						76	5697	P2Pa	82	0	SO2p	96	702	SO2r
71	627	1/m				77	5083	P3Pa	83	37.7	NO p	97	125	NO r
72	0	1/m				78	5438	P4Pa	85	80.2	CO p	99	228	CO r
73	0	1/m				79	4709	P5Pa	86	2.91	CO2%			
74	627	1/m				80	653	P6Pa						
						45	-231	P7Pa						

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Maximum

Nº	Mért	Dim.	Nº	Mért	Dim.									
21	547	°C	2	189	°C	13	2.24	bar	50	737	BH °C	5	294	°C
22	571	°C	3	286	°C	14	61.0	bar	47	702	FM °C	6	15.8	°C
23	526	°C	4	316	°C	32	72.8	bar	53	728	JM °C	7	29.4	°C
24	532	°C	33	420	°C	31	71.1	bar	51	887	BK °C	8	136	°C
25	417	°C	34	420	°C	39	1.98	kg/s	48	840	FK °C	9	121	°C
26	488	°C	35	467	°C	40	14.8	kg/s	52	807	BH °C	10	49.8	°C
27	388	°C	36	467	°C	42	0	kg/s	49	769	FH °C	11	69.9	°C
28	422	°C	37	477	°C	43	0	kg/s	55	809	JH °C	12	105	°C
29	288	°C				46	13.2	kg/s						
30	290	°C	44	31.8	m³/s				61	47.6	t/h			
1	147	°C				75	874	P1Pa	81	17.2	O2 %	200	5.53	°C
38	12.3	mm				76	6135	P2Pa	82	0	SO2p	96	2437	SO2r
						77	5505	P3Pa	83	74.1	NO p	97	210	NO r
71	701	1/m				78	5863	P4Pa	85	765	CO p	99	2787	CO r
72	0	1/m				79	4990	P5Pa	86	4.89	CO2%			
73	0	1/m				80	812	P6Pa						
74	681	1/m				45	6.99	P7Pa						

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DATA FOR CHAPTER 8

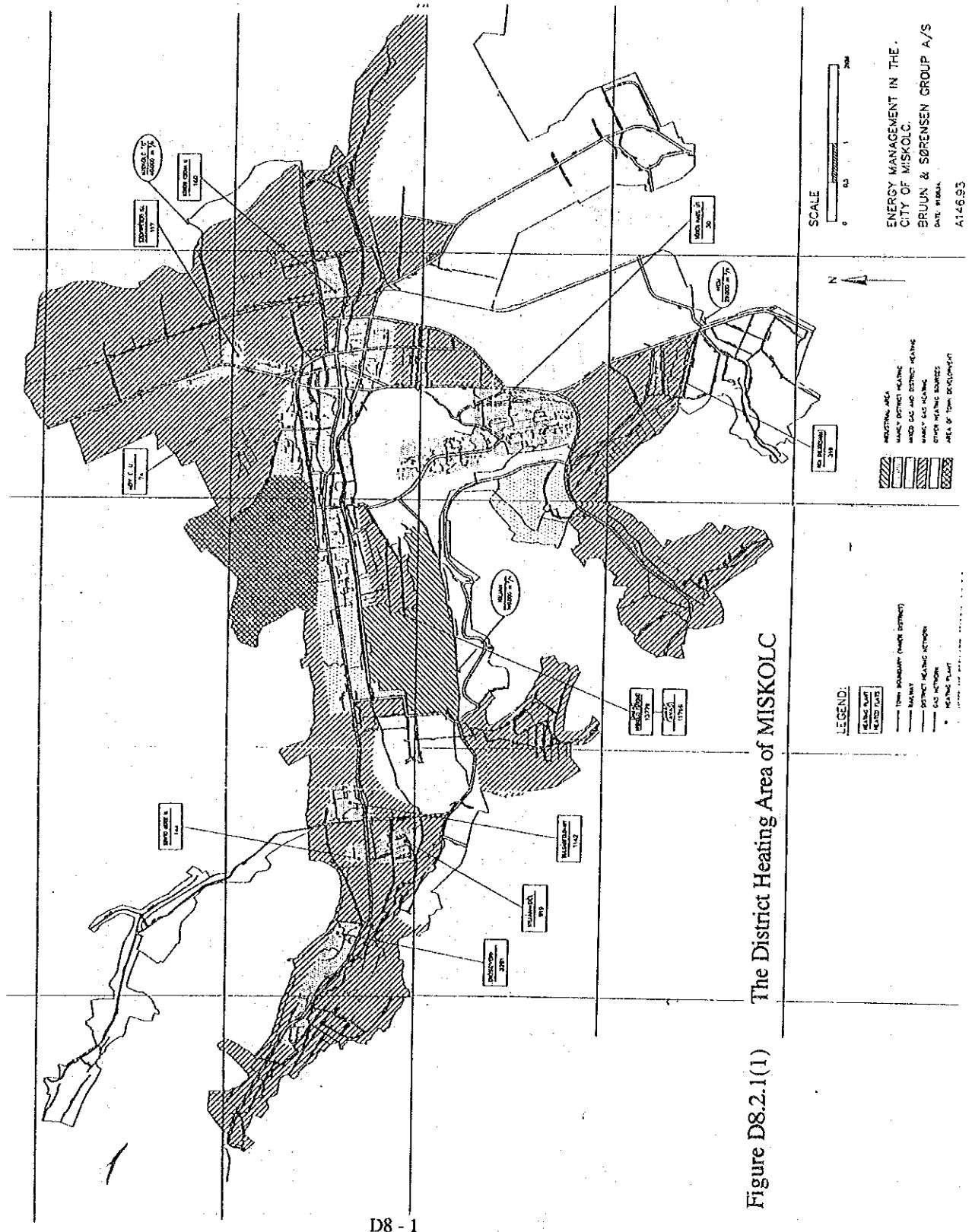


Figure D8.2.1(1)
The District Heating Area of MISKOLC

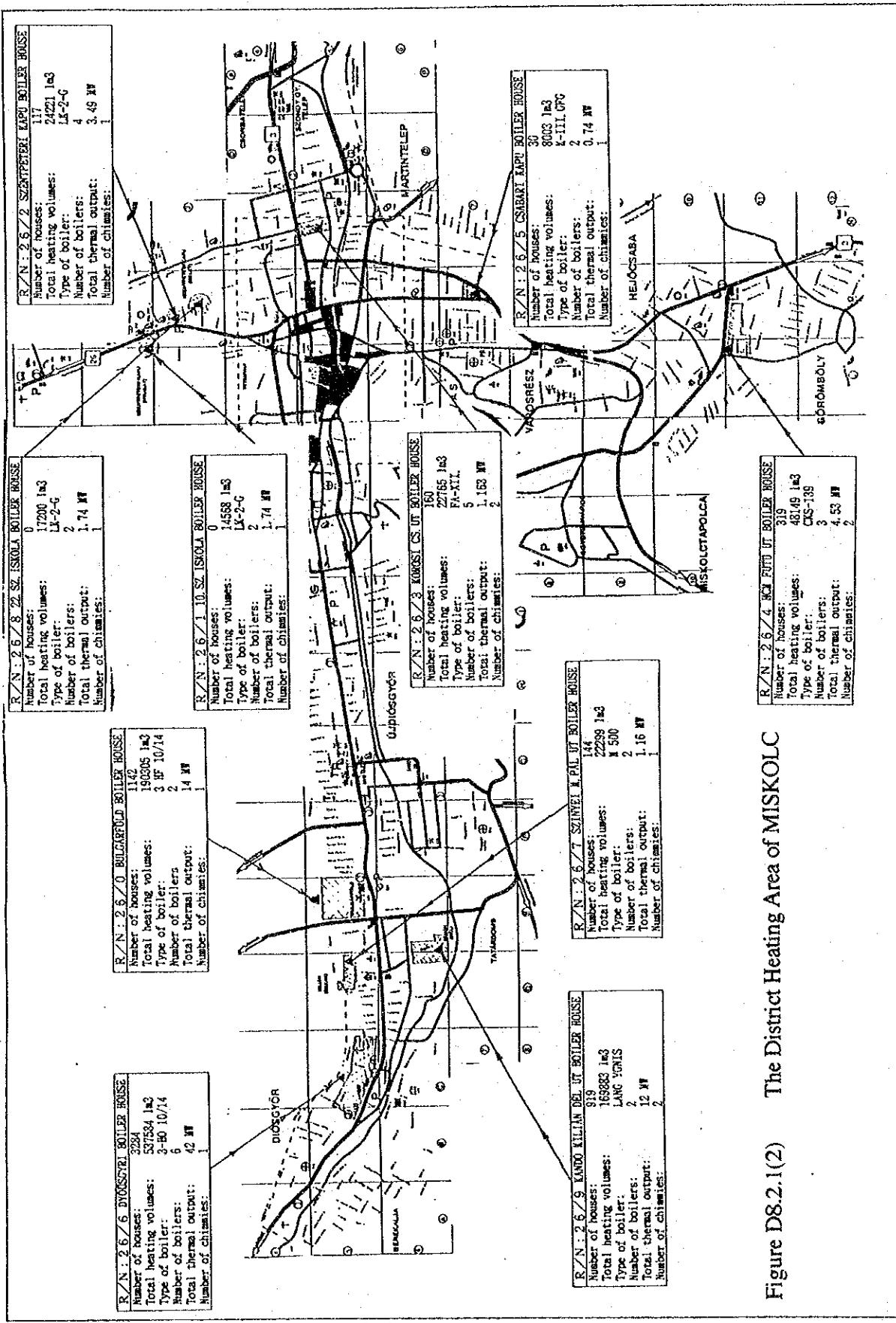


Figure D8.2.1(2) The District Heating Area of MISKOLC

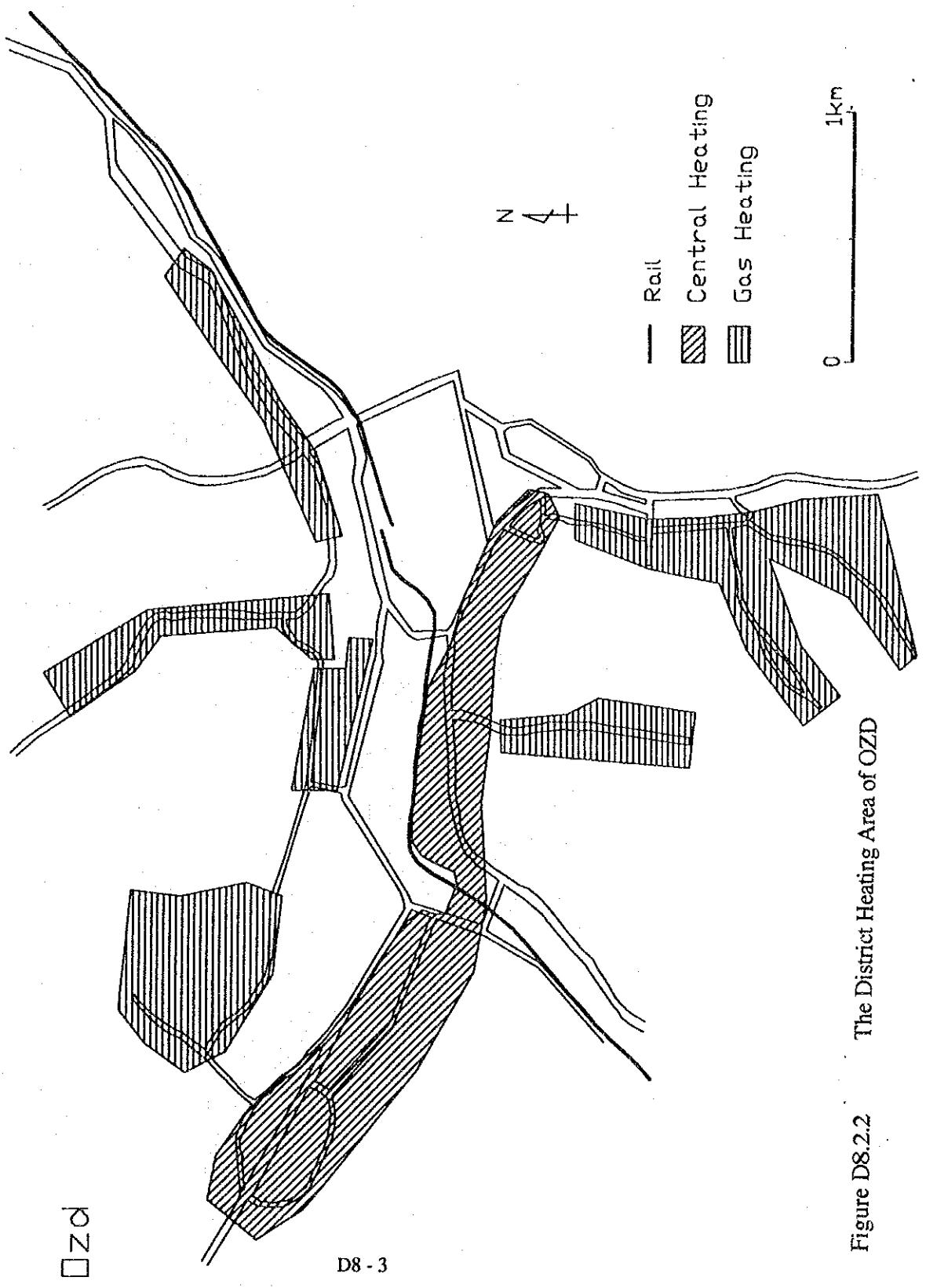
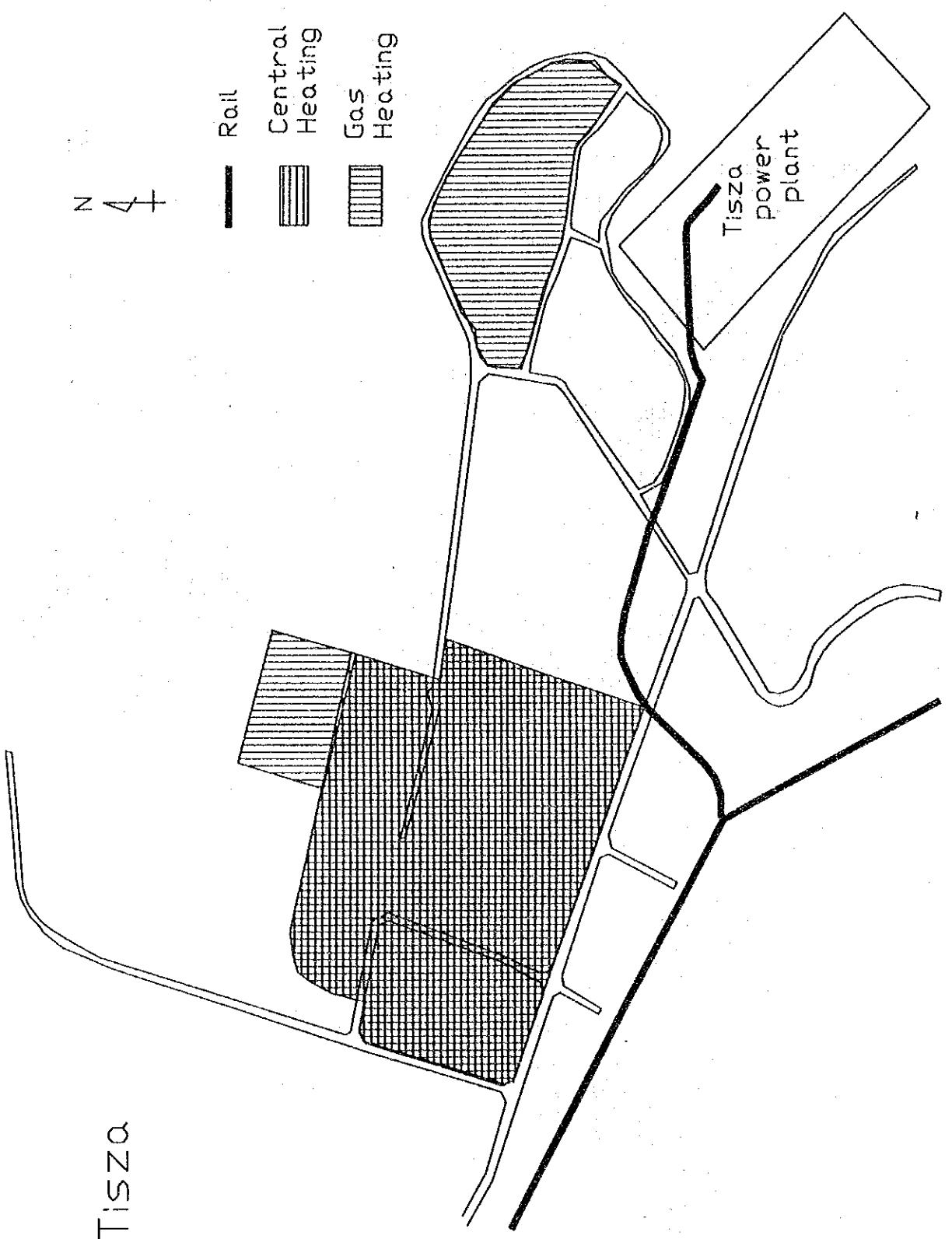


Figure D8.2.2 The District Heating Area of OZD



D8 - 4

Figure D8.2.3
The District Heating Area of TISZA

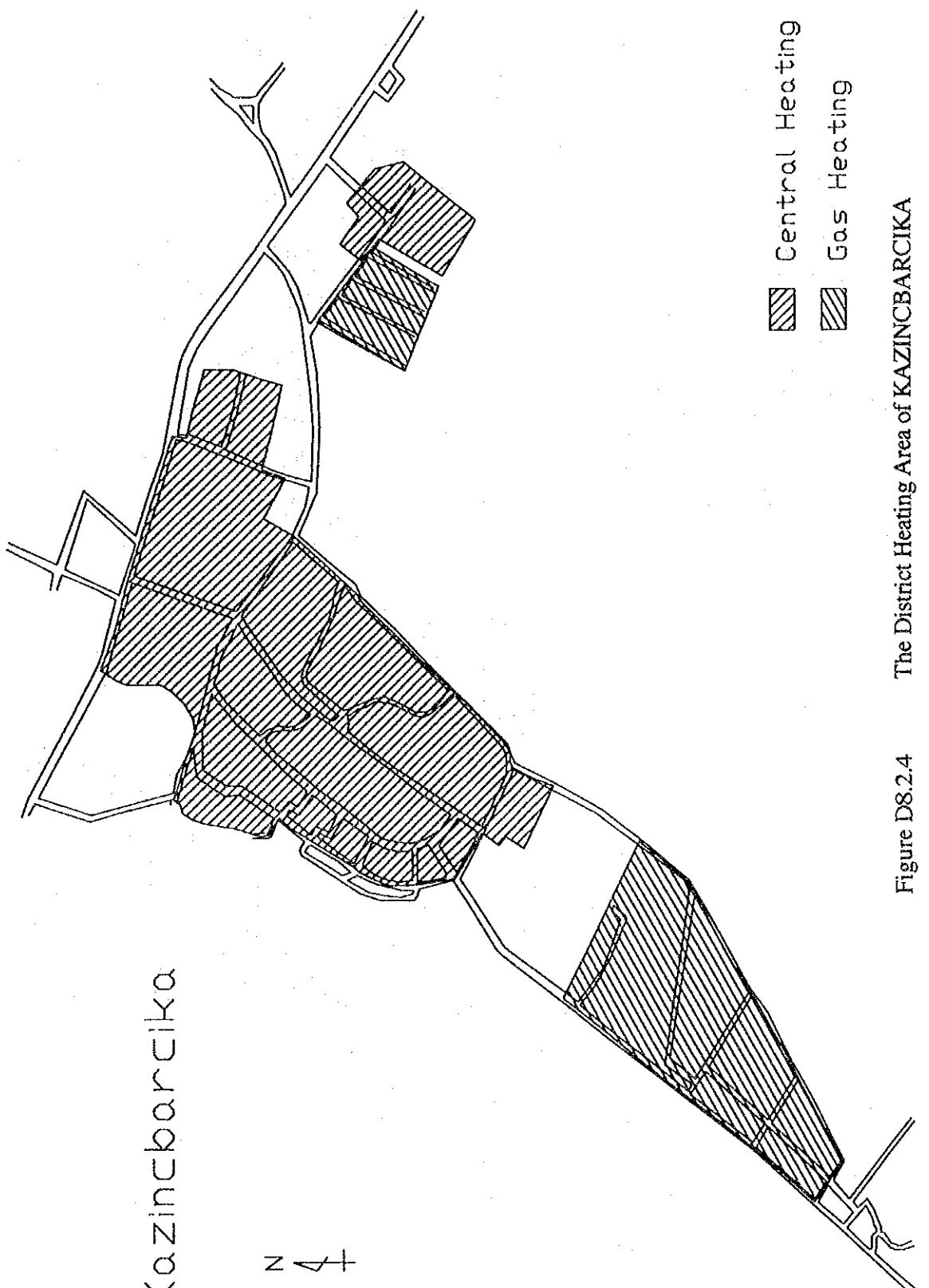
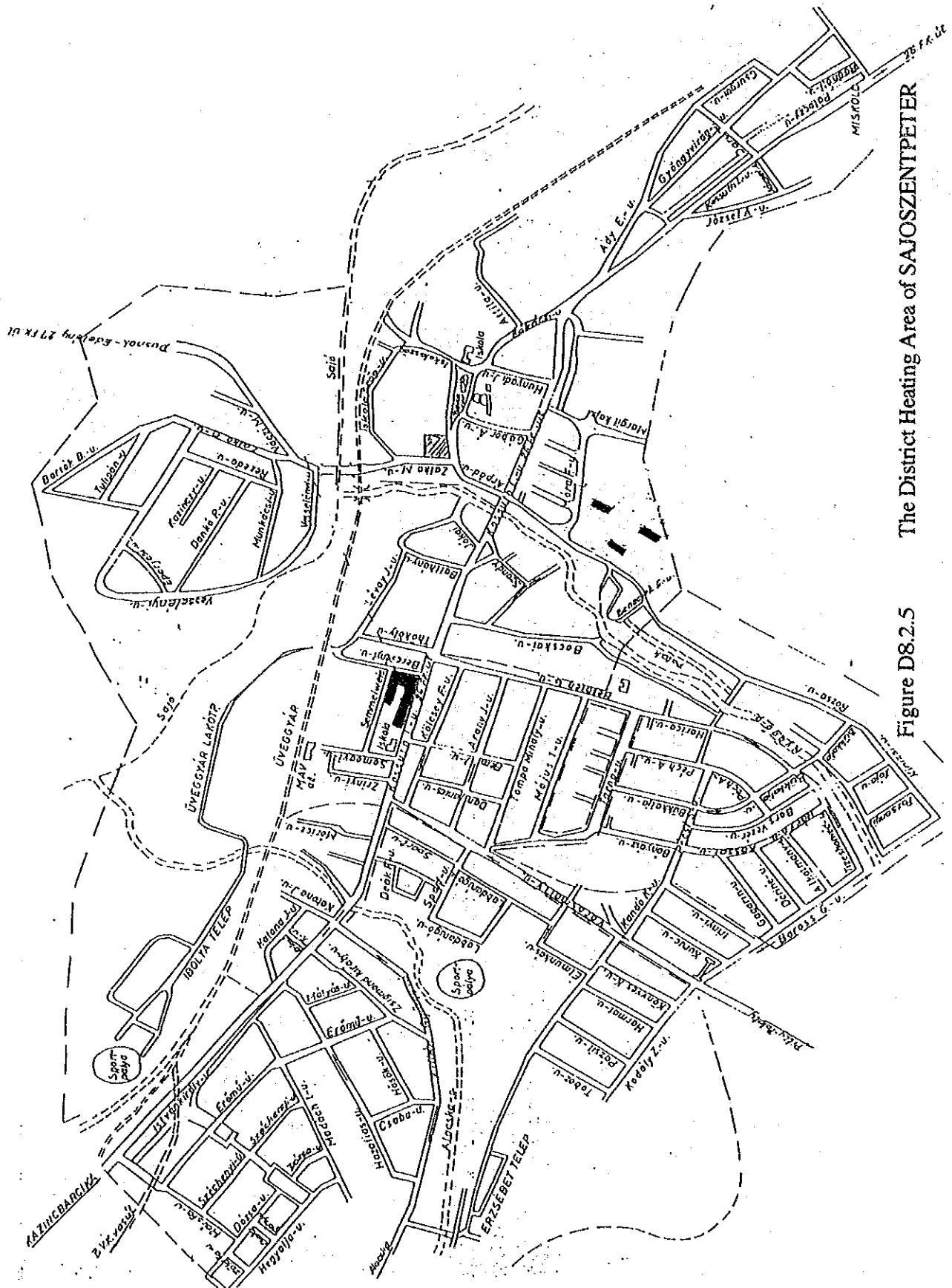


Figure D8.2.4 The District Heating Area of KAZINCBARCIKA

The District Heating Area of SAJOSZENTPETER

Figure D8.2.5



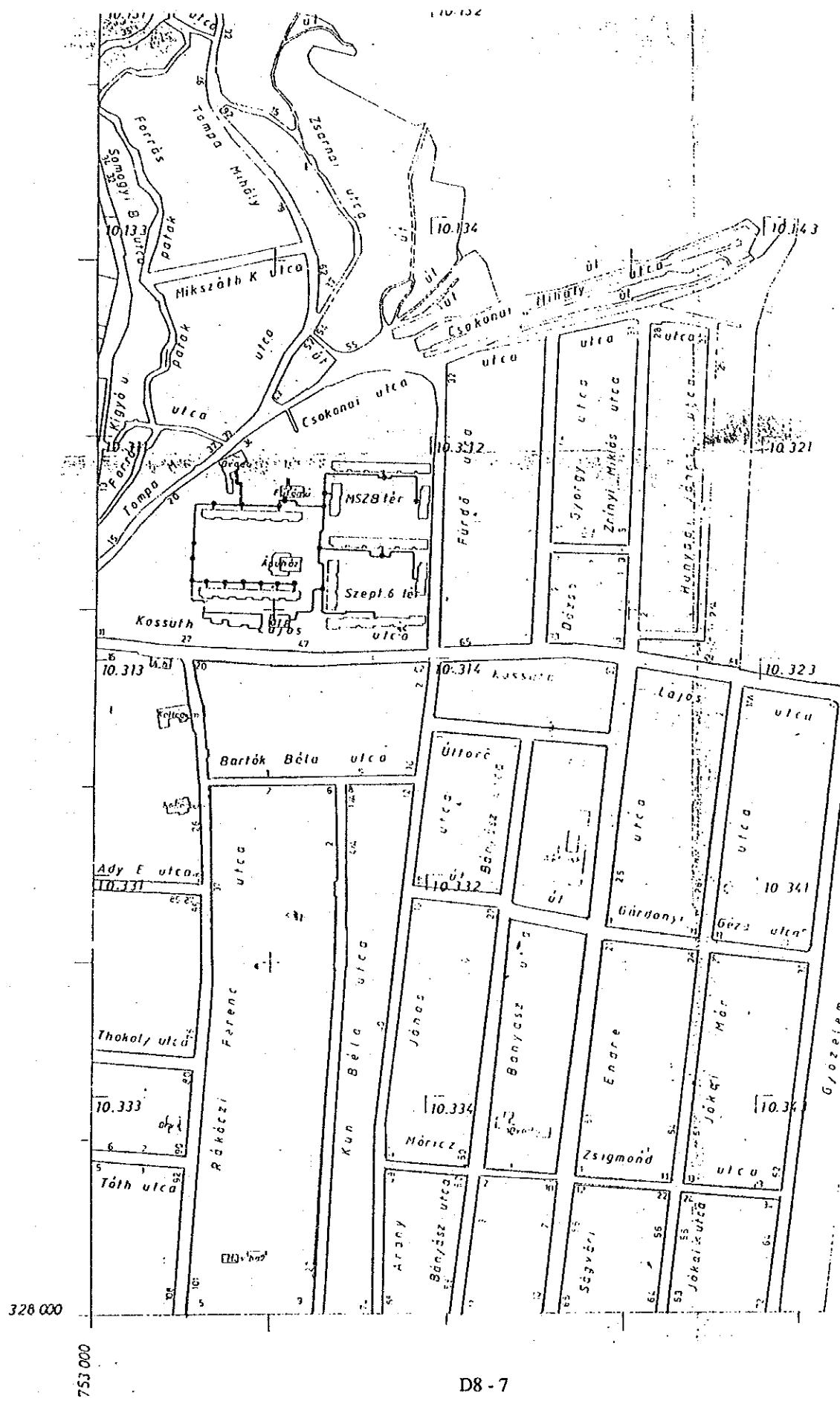


Figure D8.2.6 The District Heating Area of PUTNOK

A szakágú részletes helyszínrajz!
a 311979. (ÉP. Ért. II) ÉVM számú ütemlés
szerint készítette a Geodézia-Borsod Kft.
1992. év aug. hó 7-i állapot.

Table D8.3.1(1) Estimation of Fuel Consumption of Major Factories in 2005 (Without energy saving)

No.	R/N	Plant name and location	Type of Industry	Operation rate at present	Rising rate of fuel consumption	Main Product at present	Output at present	Kind of fuel	Fuel Used at present	Fuel Consumption in 2005	Remarks
1	02/1	OEDI KHASZATI ÜZEMEK 3602 OÖD ROMBAUER TEE. 1	Iron and Steel	65 % in 1992	0.00 %	Sveaa Electricity Steel Hot water	394,200 t/y 4.8 GWh 855,195 GJ 176,155 GJ	Brown Coal Natural Gas	34,824.60 t/y 19,095,000 M3/y in 1992	35,000 t/y 19,095,000 M3/y	Be in bankruptcy
2	02/3	PEKO AGELPARI ÁREVK 3600 OÖD GYAR U. 1. SZ. 3601 OÖD 1.	Iron Casting	55 % in 1992	0.85 %	Hot Rolling Steel	33,700 t/y	Natural Gas	3,686,750 M3/y in 1992	4,573,000 M3/y	Private company
3	02/4	OEDI AGELPÁR ET. 3602 OÖD	Iron Casting	<15 % in 1992	0.85 %	Martin Steel Dry ferro alloy Rod & Wires Hot water	8,201,35 t/y 25 t/y 24,901 t/y 17,322,5 GJ	Heating Oil Natural Gas Natural Gas Natural Gas	885,61 t/y 486,236 M3/y 1,121,327 M3/y 660,133 M3/y	1,070 t/y 603,000 1,391,000 819,000	Be in bankruptcy
4	02/7	FINGERSINGER MÜRKAS KFT 3729 SERÉNYALJA	Rolling Mill	10 % in 1992	0.85 %	Hot Rolling Form Steel Bar Steel	42,785,85 t/y	Coal (Material) Wood Flour (ditto) Light Oil Coal for boilers	8,081 t/y 2,673 t/y 20 t/y 206 t/y	10,000 t/y 3,000 t/y 20 250 t/y	
5	03/0	ESZAKMAGYARÉSZEGI TEGLA ES CSÉPÉTPÁR VALLALAT PUTNOK TEGLAGÁR 3729 SERÉNYALJA	Brick	30-35 % in 1992	0.85 %	Brick	25,387,000pc/y 24,573,000pc/y	Pre-drying Pro. Finished Pro. Coal for boilers	8,081 t/y 2,673 t/y 206 t/y	10,000 t/y 3,000 t/y 250 t/y	
6	04/1	BOESZDI KAZINCBARCICA BOLYAI TER 2.	Chemical	35 % in 1992	0.85 %	Vinyl chloride Polythylene PVC MDI	146,940 t/y 454,4 t/y 177,034 t/y 5,846 t/y	Natural Gas	18,367,300 M3/y in 1992	22,782,000 M3/y	
7	05/0	BOESZDI ENERGETIKAI KFT. (BOESZDI RÖGERMŰ) 3704 KAZINCBARCICA IPARI 7	Thermal Power	45.1% in 1991 40.5% in 1992 28.4% in 1993	1.59%	Electric power Steam Hot water	399 GWh 2,512,541 GJ 655,196 GJ in 1992	Brown Coal (9,184 MJ/kg)	1,174,307 t/y 31,857,000 M3/y in 1992	1,557,545 t/y (8,5 MJ/kg) 39,116,000 M3/y	Electricity output Heat energy 145 t/y
8	06/0	YTONG BORSOD FALAZOLELEM 3700 KAZINCBARCICA IPARI U.17	Construction Materials	30 % in 1992 40 % in 1993	0.85 %	Construction materials in use of fly ash	144,190 M3/y	Steam is pro- vided from other company	-	-	0
9	07/0	PANNORGÁS IPARI ET. 3770 SAJOSENTEPETER ÚVGYVAR PF. 20	Glass	20 % in 1991 20 % in 1992 30 % in 1993	0.35 %	Glasses and Bottles	56,865.5 t/y	Natural Gas	19,263,000 M3/y in 1992	23,893,000 M3/y	Be in bankruptcy
10	08/0	BOESZDI EGÉLKÖSZTÖ Kft. 3791 SÁKÓKÖSZTÖ	Ore Processing	15 % in 1992 <30 % in 1993	0.00 %	Ore prepara- tion	461,385 t/y	Natural Gas Coke & Coal	2,583,756 M3/y 30,913 t/y in 1992	0 M3/y 0 t/y	Be in bankruptcy To be closed (1996)
11	09/1	POZAN POLIJETAN GYÁR ES EEFEKSTO KFT. 3792 SÁKÓBONY P. 16	Chemical	10-20 % in 1992	1.02 %	Soft-polyure- thane	4,000 t/y	Propan + Butan (New)	210 kg/h in 1993	270 kg/h	
12	09/2	SAGROCHEN KFT 3792 SÁKÓBONY	Chemical	20 % in 1991 20 % in 1992 20 % in 1993	0.00 %	Phenil iso- cinnate Acetanilide Steara Electricity	900 t/y 6,000 L/y 172,914 t/y 3,58 GWh	Light Oil Heavy Oil	2,85 t/y 13,386.9 t/y in 1992	3,0 t/y 13,397 t/y	round off is made for gas

Table D8.3.1(2) Estimation of Fuel Consumption of Major Factories in 2005 (Without energy saving)

No.	U/N	Plant name and location	Type of industry	Operation rate at present	Wiring rate of fuel consumption	Weld product	Output at present	Kind of fuel	Fuel Used at present	Fuel consumption in 2005	Remarks	
13	07/4	INTERED KFT	Chemical	20 % in 1911 30 % in 1912 20 % in 1913	0.00 %	Boron Desulphurine Normalchalcide	400 t/y 9,426 t/y 9 t/y	Steam is produced from Sarochan	-	0		
14	10/0	3711 SAOABONY BECCHNER & PUCHNER	Wire	35 % in 1911 30 % in 1912 30 % in 1913	0.35 %	Wire, Electric wire, Plating cables	27,000 t/y Heat energy	Natural Gas	1,127,306 Km3/y in 1932	1,572,000.0 Km3/y Be in bankruptcy		
15	11/0	3501 MISKOLC BESNYOI U. 18. Sz 3527 MISKOLC BESNYOI U. 18. Sz	Mechanical Parts Farm Machine	50 % in 1912 Firm is under bankruptcy	1.26 %	Machine parts Hydride cylinders, brake valves	200,000,000 t/y	Natural Gas	800,000 Km3/y in 1932	6,685,000.0 Km3/y Be in bankruptcy	Be in limited company as of June 01, 1993	
16	11/0	BAUDAS ZAVY EPITZEGESITO ZS * 3527 MISKOLC TIVIZ U. 12	Heavy Machine Lease	Construction Firm is under bankruptcy	-	Lease for con- struction machines Holding 30 large size vehicles	16 t/y	Diesel Oil	16,800 t/y in 1992	1,018,000 Km3/y in 1992	Be in bankruptcy	
17	17/0	3105GÖRTÉ PARTGYAR LÉNYVILÁLAT 3535 MISKOLC HEGYALJA UT. 203/A	Paper Mill	50 % in 1912 50 % in 1987	1.02 %	Silic Paper	3000-3800 t/y	Natural Gas	2,175,000 Km3/y in 1992	2,755,000 Km3/y		
18	14/1	3105GÖRTÉ GEGYAR I-II. TELEP 3544 MISKOLC KÉPPELY ANTAL U. Transfer of firm's name in the register to AMV COOP KFT. 1993.07.01.	Machine	0 % in 1912 30-40 % in 1912 20-40 % in 1913 90 % for Hat Rolling	0.35 %	Machine rolling for hot rolling	2.2 - 2.4 bil- lion/t	Natural Gas	177,772,000 Km3/y in 1992	22,043,000 Km3/y Be in bankruptcy		
19	14/2	3105GÖRTÉ GEGYAR III. TELEP 3544 MISKOLC TITANOK Transfer of firm's name in the register to AMV COOP KFT. 1993.07.01.	Machine	0 % in 1912 50 % in 1913 50 % in 1993	0.65 %	Rolling for hot rolling	0.65 t/y	Natural Gas	1,063,200 Km3/y in 1992	1,319,000 Km3/y Be in bankruptcy		
20	15/1	3510 MISKOLC BESNYEI VESSAG 3510 MISKOLC HÉRCZEG FERENC 41.	Iron Casting	80 % in 1911 80 % in 1912 80 % in 1913	1.50 %	Semi-Goods Iron Works Shears	3,168 t/y 4,702 t/y 102 t/y	Natural Gas	4,610,000 Km3/y in 1992	6,348,000 Km3/y J/V With GERMAN Co. Operate of facility, large loss in energy #		
21	15/2	3105GÖRTÉ ACÉL ÉS VÍZSÍTÓ KFT 3540 MISKOLC HÉRCZEG FERENC 4143	Steel and Hold- ing	11 % in 1912 20 % in 1913	1.00 %	Steel casting Iron casting Electrosteel Sand preparation	2,803 t/y 64 t/y 499 t/y 4,350 t/y	Natural Gas (Blast Furnace) Gas (Electricity)	1,470,000 Km3/y 252,000 Km3/y in 1992	1,884,000 Km3/y 319,000 Km3/y		Be in bankruptcy
22	15/3	3510 MISKOLC BESNYEI VESSAG 3510 MISKOLC HÉRCZEG FERENC U	Machine Screw and Wire	100 % in 1911 38 % in 1910 27 % in 1991 16 % in 1912	1.02 %	Bits	2,201 t/y 2,103 t/y 4,704 t/y 126,7 t/y	Natural Gas	1,400,000 Km3/y 337,100 Km3/y in 1992	1,876,000 Km3/y 427,000 Km3/y		
23	15/4	3105GÖRTÉ NEVESZEL MŰVEK 3540 MISKOLC VASGYAR UT 43	Iron and Steel	32 % in 1911 54 % in 1912	0.00 %	pig iron Blast 2es Iron and Steel Elec. fur. steel Alloy steel Heat resist. G. Steam Hot input Polished steel	257,000 t/y 416,198,837563 t/y 244,544 t/y 36,235 t/y 72,516 t/y 2,933t/y, 548 t/y 158,333 t/y 178,343 t/y 54,457 t/y	Natural Gas Coke Blast Furnace Gas	63,116,400 Km3/y 133,377 t/y 40,824,000 Km3/y in 1992	63,910,400 Km3/y 0 t/y 0 Km3/y		Be in bankruptcy Blast furnace is not operated after 1936
24	15/5	3105GÖRTÉ NEVESZEL MŰVEK 3531 MISKOLC KISS ERNO UT. 19	Medicine	60 % in 1912	-	Dietetic Steam	30 t/y 21,840 GJ	Natural Gas	803,423 Km3/y in 1992	0 Km3/y to be shutdown		round off is made for gas

Note: * indicates that operation was to stop beyond October 1913
* indicates small scale stationary source

Table D8.3.1(3) Estimation of Fuel Consumption of Major Factories in 2005 (Without energy saving)

No.	E/N	Plant name and location	Type of industry	Operation rate at present	Rising rate of fuel consumption	Main Product at present	Output at present	Kind of fuel	Fuel Used at present	Fuel Consumption in 2005	Remarks	
25	17/1	HEJOSSABAI CEMENT - ES MEZSEIPARI RT. KOPORTI TELEP 3508 MISOLOC FOGARSI U. 6. SZ	Cement	50 % in 1992	1.02 %	Clinker Burned soild line Cement Lime stone	352,173 t/y 78,180 t/y 497,481 t/y 832,880 t/y	Natural Gas Fuel Oil	39,537,972 Nm ³ /y 9,360,480 Nm ³ /y 77,64 t/y	50,127,000 Nm ³ /y 11,867,000 Nm ³ /y 100 t/y		
26	18/0	HEJOSSABAI CEMENT - ES MEZSEIPARI RT. KOBANTA UZEM 3527 MISOLOC PARTIZAN U.	Construction	50-80 % in 1993 Trial test for new facility began from July in 1993	0.00 %	Boiling Asphalt	30,000 t/y	Natural Gas	in 1992 (1993.7.7- 1993.10.5)	176,000 Nm ³ /y		
27	19/0	MEZGÖR VALLALAT * 3561 FELSZÖLÖLA ALJOMAS U. 5 Sz.	Farm Machine	30 % in 1992	1.53 %	Pump Parts for farm machine	29 t/y	Fuel Oil	135 t/y	180 t/y		
28	20/0	AUZSOSOLCA VASBETONPARI VALLALAT 3571 AUZSOSOLCA CSAR U. SZ.	Construction Materials Cement and Iron	30 % in 1992	1.02 %	Ferroconcrete utility pole Roof panel	materi.(cement, fuel oil)(720/40) sand ,benton 40,000-50,000t used	Natural Gas Coal Wood Flour	47 t/y 1,882 t/y 121 t/y 4,770 t/y	60 t/y 2,400 t/y 150 t/y 6,000 t/y		
29	21/0	EMO TEGLA - ES CSEREPIPARI VALALAT MALMI TEGLATVARA 3424 MÁTYI	Brick	30 % in 1992	1.02 %	Brick	35,864,000pc./y 38,225,000pc./y	Natural Gas Finished Pro. Wood Flour	2,923,000 Nm ³ /y in 1992 in 1992	3,706,000 Nm ³ /y 150 t/y 6,000 t/y		
30	22/0	MISZOCI UTÉPITO KFT NYENI ASPALTEVEZO 3433 NYELDÖHEZA VAGCID U. 9.	Asphalt	30 % in 1992	0.85 %	Asphalt	71,000 t/y	Natural Gas	666,560 Nm ³ /y	827,000 Nm ³ /y		
31	23/1	TISZAI VEVŐ KÖRHAT RESVENTIASAG 3581 TISEAUDVAOS	Chemical	75 % in 1991 90 % in 1992 90 % in 1993	0.46 %	Olefins Ethyene Propylene	250,000-280,000 t/y, 280,000t/y	Natural Gas Oil Diesel oil Pyrolysis Gas Waste(Solid, Liquid,Paint)	66,433,000 Nm ³ /y 44,880 t/y 125,989 t/y 196,720 t/y 4,097.9 t/y	78,353,000 Nm ³ /y 53,000 t/y 149,000 t/y 232,000 t/y 4,800 t/y		
32	23/2	AKCI-PLK PESTEGYAKTO ES KERESKEDELMI RT 3581 TISEAUDVAOS	Paint	35 % in 1991 30 % in 1992 25 % in 1993	1.28 %	Paint bonding agent Solvent	15,000 ton/y	Natural Gas	425,708 Nm ³ /y	558,000 Nm ³ /y	J/V with Holland Co.	
33	24/0	MOL RT. TISZAI FINOMITO 3580 TISEAUDVAOS MEZOSZATI UT	Oil Refinery	50 % in 1984-85 31-33 % in 1991 30 % in 1992 30 % in 1993	1.53 %	Gasoline Diesel oil Fuel oil Sulfure Burned rubbish by incinerator	138,000 t/y 246,000 t/y 285,000 t/y 3,400 t/y 3,163 t/y	Natural Gas & Home generated Gas Sewage,oily sediment,solid waste Natural gas	837,000 Nm ³ /y in 1992	26,910,028 Nm ³ /y 1,133,000 Nm ³ /y	36,425,000 Nm ³ /y	
34	25/1	TISZAI EGOMI RT. I. HÓPÉGN 3581 TISEAUDVAOS	Thermal Power	48 % in 1992	-12.33%	Electric power Steam Hot water	932,46 GWh 2,422,451 GJ	Brown Coal Natural Gas Fuel Oil	1,328,871 t/y (9,599 MJ/Kg) 39,307,400 Nm ³ /y in 1992	270,588 t/y (8.5 MJ/Kg) 7,205,000Nm ³ /y 125 t/y	Electricity output 35 GWh Heat energy 1,700,000 GJ in 2005	
35	25/2	TISZAI EGOMI RT. II HÓPÉGN 3581 TISEAUDVAOS	Thermal Power	58 % in 1992	-3.71%	Electric power	2,615,66 GWh	Natural Gas Inert Gas Fuel Oil	282,928,000 Nm ³ /y 491,794,000 Nm ³ /y 181,230 t/y in 1992	172,620,000 Nm ³ /y 300,918,000 Nm ³ /y 110,889 t/y in 2005	Electricity output 1581 GWh made for gas	

Note: * indicates small scale stationary source

round off is
made for gas

Table D8.3.2(1) Estimation of Fuel Consumption of Major Factories in 2005(With Energy Saving)

No.	R/N	Plant name and Location	Type of Industry	Operation rate at present	Rising rate of fuel consumption	Main Product at present	Output at present	Kind of fuel	Fuel used at present	Fuel Consumption in 2005	Remarks
1	02/1	OZDI KORASZATI ÜZEMEK TORLESVAR 3602 CED. ROMBAUER TER. 1.	Iron and Steel	65 % in 1992	0.00 %	Steam Electricity Steam Hot Water	394,200 t/y 4.8 GWh 855,195 GJ 176,195 GJ	Brown Coal Natural Gas	34,824.60 t/y 19,095,000 m ³ /y in 1992	31,000 t/y 17,195,000 m ³ /y	Be in bankruptcy
2	02/3	PEKO ACÉLI PARÁ MOEVK 3600 CED. GYAR U. 1. SZ.	Iron Casting	55 % in 1992	0.85 %	Hot Rolling Steel	33,700 t/y	Natural Gas	3,686,750 m ³ /y in 1992	4,116,000 m ³ /y	Private company
3	02/4	OZDI ACÉLI RT. 3602 CED.	Iron Casting	<15 % in 1992	0.85 %	Martin Steel Dry ferro alloy Hot & Wurr Hot water	8,201.35 t/y 25 t/y 17,822.5 GJ	Heating Oil Natural Gas Natural Gas	865.61 t/y 486,256 m ³ /y 1,121,327 m ³ /y 660,133 m ³ /y	970 t/y 542,000 m ³ /y 1,232,000 m ³ /y	Be in bankruptcy
4	02/7	FINOMHEGESZÉK MUNKAS KFT 3501 CED. 1.	Rolling Mill	10 % in 1992	0.85 %	Hot rolling Form Steel and Bar Steel	42,765.35 t/y	Natural Gas	3,803,795.5 m ³ /y in 1992	4,246,000 m ³ /y	;
5	03/0	ESZAKOMAGYAROSZÁGI TEGLA ES CSEREP IPARI VALLALAT PUTNOK TEGLAFTAR 3729 Szentendre	Brick	30-35 % in 1992	0.85 %	Brick	Pre-drying Pro- cess 23,887,000pc/y 24,573,000pc/y	Coal (Material) Wood flour/dust Light Oil Coal for boilers	8,081 t/y 2,673 t/y 20 t/y 206 t/y	9,000 t/y 2,000 t/y 230 t/y	;
6	04/1	BORSODI KAZINCBARCINA BOLVAI TER 2.	Chemical	35 % in 1992	0.85 %	Vinyl chloride Polythylene PVC MDI	146,940 t/y 177,034 t/y 5,846 t/y	Natural Gas	18,367,500 m ³ /y in 1992	22,555,000 m ³ /y	;
7	05/0	BORSODI ENERGETIKAI KFT. (BORSODI NÉGERMÉ) 3704 KAZINCBARCICA IPARI 7	Thermal Power	45.1% in 1991 40.5% in 1992 28.4% in 1993 from the year of 2000	3.40 %	Electric power Steam Hot Water	598 GWh 2,512,541 GJ 655,198 GJ in 1992	Brown Coal Natural Gas Oil in 1992	1,174,307 t/y 31,857,000 m ³ /y 118 t/y in 1992 for current facilities	Brown Coal CFBC HFFC Total 3,943,000 m ³ /y	CPBC:150 MW (new) 460t/h boiler CPBC boiler efficiency: Brown coal:90% boiler load:100% FBFC-4 hybrid boilers 100t/h x4 Boiler eff.:80% Boiler load:60%, Desulfurization rate:40-45% Newly established rate:40-45%
8	06/0	YTONG BORSOD FALAZOLENY 3700 KAZINCBARCICA IPARI 17	Construction Materials	30 % in 1992 40 % in 1993	0.85 %	Construction Materials in use of fly ash	144,190 m ³ /y	- Steam is pro- vided from other company	-	0	Private company
9	07/0	SAJOSZENTPETERI ÜVEGVÁR 3770 SAJOSZENTPETERI GYARTELEP PF. 20	Glass	20 % in 1991 20 % in 1992 20 % in 1993	0.85 %	Glasses and Bottles	56,855.5 t/y	Natural Gas	19,263,000 m ³ /y in 1992	23,654,000 m ³ /y	Be in bankruptcy
10	08/0	BORSODI EGYÜGEZETITÓ MU ZSIBIGRTÓ KFT. 3791 Szentendre	Ore Processing	15 % in 1992 <10 % in 1993	0.00 %	Ore prepara- tion	461,385 t/y	Natural Gas Coke & Coal	2,583,756 m ³ /y in 1992 30,913 t/y in 1993	0 m ³ /y 0 t/y	Be in bankruptcy To be closed (1995)
11	09/1	POMB POLYURETAN GYAR KFT 3792 Sajombony Pf. 16	Chemical	10-20 % in 1992 1993	1.02 %	Soft-polyure- thane	4,000 t/y	Propan + Butan (New) in 1993	210 kg/t	260 kg/t	;
12	09/2	SACROCHEN KFT 3792 Sajombony	Chemical	20 % in 1991 20 % in 1993	0.00 %	Phenil iso- Climate Acetanilide Steam Electricity	900 t/y 6,000 t/y 172,914 t/y 3,58 GWh	Light Oil Heavy Oil	2.85 t/y 13,336.9 t/y in 1992	2.85 t/y 13,000 t/y	round off is made for gas means 10 % energy saving in factory

Table D8.3.(2) Estimation of Fuel Consumption of Major Factories in 2005(With Energy Saving)

No.	R/N	Plant name and location	Type of Industry	Operation rate at present	Existing rate of fuel consumption	Main Product	Output at present	Kind of fuel	Fuel Used at present	Fuel Consumption in 2005	Remarks
13	09/4	INTERED KFT	Chemical	20 % in 1991 20 % in 1992 20 % in 1993	0.06 %	Boron Boramide Desulphurization	480 t/y 9,426 t/y 9 t/y	Stearas is provided from Szerencs	-	0	
14	10/0	DECEMBER 4. DROTHENEX	Wire	35 % in 1991 30 % in 1992 20 % in 1993	0.85 %	Wire, Electric Wire, Plating cables	27,000 t/y 182,660 GJ	Natural Gas Natural Gas	1,267,306 M3/y 5,389,848 M3/y	1,415,000.0 M3/y	Be in bankruptcy
		3501 MISKOLC BESESTOI U.18. SZ				Heat energy			6,017,000.0 M3/y		
15	11/0	MISKOLCI REZIGER VALULAT charged to --- MHG KFT.	Mechanical Parts	50 % in 1992	1.28 %	Machine parts Hybrid cylinder, brake valves	200,000,000 t/y	Natural Gas	800,000 M3/y	944,000 M3/y	Be in bankruptcy
		3527 MISKOLC BESESTOI U.10 *	Farm Machine						in 1992		Be in liquidated company as of June 01. 1993. ♦
16	12/0	BALMAS EASY FÉTÉSGEPESSZTŐ ES SZÖLÖKÁLTATÓ KFT	Heavy Machine Lease	Construction Firm is under Bankruptcy	-	Lease for construction Holding 50 large size vehicles	166	Diesel Oil	16,800 t/y	17,000 t/y	Be in bankruptcy
		3527 MISKOLC TÜZER UT. 12							in 1992		
17	13/0	DIOSGYÖR PAPIRENYE LEANYVALULAT	Paper Mill	60 % in 1992	1.02 %	Slick Paper	3000-3600 t/y	Natural Gas	2,173,000 M3/y	2,479,000 M3/y	♦
		3525 MISKOLC HEYALKA UT. 203/A				Steam	25,854 t/y				
18	14/1	DIOSGYÖR GEGETAR I-II. TELEP	Machine	95% in 1987 30-40% in 1992 20-40% in 1993 90 % for Hot Rolling	0.85 %	Machine rolling for hot rolling	2.2 - 2.4 billion/y	Natural Gas	17,772,000 M3/y	19,839,000 M3/y	Be in bankruptcy
		3544 MISKOLC KÉPÉLY ÁNTAL U.							in 1992		
19	14/2	DIOSGYÖR GEGETAR III. TELEP	Machine		0.85 %			Natural Gas	1,063,200 M3/y	1,167,000 M3/y	Be in bankruptcy
		3544 MISKOLC TÁRAKKI							in 1992		
		Transfer of firm's name in the register to ARNY COOP KFT. 1993.07. 01									♦
20	15/1	EMBOSZENTMÁRSAG	Iron Casting	80 % in 1991 60 % in 1992 <50 % in 1993	1.53 %	Semi-goods Iron Wheels Shafts	3,158 t/y 4,742 t/y 902 t/y	Natural Gas	4,690,300 M3/y	5,713,000 M3/y	J/V with German Co. Ownership of facility. Large loss in energy. ♦
		3540 MISKOLC HERCZEG FERENC 43.				Heat treated M.	4,060 t/y				
21	15/2	DIOSGYÖR ACÉL ES VASINT KFT	Steel and Molting	11 % in 1992 20 % in 1993	1.02 %	Steel casting Electrosteel Sand preparation	2,843 t/y 4,929 t/y 4,350 t/y	Natural Gas (Blast Furnace) Gas (Electricity)	1,410,000 M3/y 1,252,000 M3/y	1,677,000 M3/y	Be in bankruptcy
		3540 MISKOLC HERCZEG FERENC 4143							in 1992		
22	15/3	CSAVAS- ES RÉZOTTAKI KFT.	Machine	100 % in 1989 38 % in 1990 27 % in 1991 16 % in 1992 32 % in 1993	1.02 %	Bolts Metal parts	2,231 t/y 2,103 t/y 4,734 t/y 129,7 t/y	Natural Gas	1,480,000 M3/y 337,100 M3/y	1,689,000 M3/y	♦
		3520 MISKOLC HERCZEG FERENC U 4143	Screw and Wire						in 1992		
23	15/4	DNÖ DIOSGYÖRI NESEACEL KÖVEK FA.	Iron and Steel	54 % in 1992	0.00 %	Pig iron Blast gas Iron and steel Etc. fur. steel	257,010.5 t/y 496,198.875 M3/y 284,524 t/y 34,225 t/y	Natural Gas Blast Coke Blast Furnace Gas	63,910,400 M3/y 139,377 t/y 40,824,800 M3/y	57,519,000 M3/y	Be in bankruptcy
		3540 MISKOLC VASGYÁR UT. 43				Alloy steel Heat resist. G. Steam	72,586 t/y 2,936.1 t/y 158,383 t/y		0 t/y 0 M3/y		Blast furnace is not operated after 1995 ♦
24	16/0	CHINOLIN RT. DIOSGYÖR TELEP	Medicine	60 % in 1992	-	Polished steel Medicine Diuretic	54,457 t/y 30 t/y 21,830 GJ	Natural Gas	809,423 M3/y	0 M3/y	round off is made for gas to be shutdown
	X	3531 MISKOLC KISS ERNO UT. 19									♦ means 10 % energy saving in factory

Note: X indicates that operation was to stop beyond October 1993

* indicates small scale stationary source

Table D8.3.2(3) Estimation of Fuel Consumption of Major Factories in 2005(With Energy Saving)

No. & N	Plant name and Location	Type of Industry	Operation rate at present	Rising rate of fuel consumption	Main Product	Output at present	Kind of fuel at present	Fuels Used at present	Fuel Consumption in 2005	Remarks	
25 17/1	HEJSZAKAI CEMENT- ES NEZEPANI RT. KOPONTI TELOS 3508 MISKOLC FOGARASI U. 6. SZ	Cement	50 % in 1982	1.02 %	Clinker Burned solid lime	352,173 t/y 78,180 t/y	Natural Gas Fuel Oil	39,537,972 M ³ /y 9,380,480 M ³ /y	45,114,000 M ³ /y 10,681,000 M ³ /y		
	HEJSZAKAI CEMENT- ES MESEPARU RT. KOBANTA UZEN				Cement lime stone	497,481 t/y 832,880 t/y					
26 18/0	STRABAG HUNGARIA STIT KFT 3527 MISKOLC PARTIZAN U.	Construction	60-80 % in 1983 trial test for new facility began from July in 1993	0.00 %	Rolling Asphalt	30,000 t/y	Natural Gas	77,64 t/y in 1982	176,000 M ³ /y (1982-7.7-- 1992-10.5)	90 t/y 176,000 M ³ /y	
27 19/0	MEZŐREG VALLALAT 3561 FELSÖSOLCA ALLOMAS U. 5 SZ.	Farm Machine	30 % in 1982	1.53 %	Pump Parts for farm machine	29 t/y	Fuel Oil	135 t/y in 1982	160 t/y	#	
28 20/0	ALIOSZSOLCA VASBETON(PART: VALLALAT 3571 ALIOSZSOLCA NYAR U. SZ.	Construction Materials Cement and Iron	30 % in 1982	1.02 %	Refractory material (cement, sand, beton) Roof panel	Fuel Oil(120/40) Fuel Oil(150/130)		47 t/y 1,832 t/y	50 t/y 2,100 t/y		
29 21/0	ENO. TEGLA- ES CSEREPPIAK 3434 MALYI	Brick	30 % in 1982 35 % in 1993	1.02 %	Brick	40,000-50,000 m ³	Pre-drying Pro. Iron(10,000)t/y is used	2,923,000 M ³ /y Coal	3,335,000 M ³ /y 121 t/y	140 t/y 4,770 t/y	
30 22/0	MISKOLCI ÜVEGPIKO KFT 3433 NYEL ÁSTAFALKEVE TISZALÜDÉMÉNY VÁROSHÍD U. 9.	Asphalt	30 % in 1982	0.85 %	Asphalt	38,226,000 pcp./y	Finished Pro. Wood flour	in 1982	5,400 t/y		
31 23/1	TISZAI VÉGÜ KOMBINAT RESZENTYARASAG 3581 TISZAÚJVÁROS	Chemical	75 % in 1981 90 % in 1982 90 % in 1983 30 %	0.46 % 0.00 %	Olefins Ethylene Propylene (Fertilizer plant)	250,000-280,000 t/y, 280,000 t/y	Diesel oil Pyrolysis Gas Waste(Solid, Liquid,Paint)	66,423,015 M ³ /y 125,993 t/y 136,720 t/y 4,097.9 t/y in 1982	70,517,000 M ³ /y 44,880 t/y 134,000 t/y 209,000 t/y 4,300 t/y		
32 23/2	AZDO-TVK TESTEGYARO ES KERÉKEDÉLMI RT 3581 TISZAÚJVÁROS	Paint	35 % in 1981 20 % in 1982 25 % in 1993	1.28 %	Paint Boarding agent Solvent	15,000 ton/y	Natural Gas	425,708 M ³ /y	502,300 M ³ /y	J/V with Holland Co. #	
33 24/0	MOL RT. TISZAI FINOMITO 3580 TISZAÚJVÁROS MEZCOSATI UT	Oil Refinery	50 % in 1984-85 31-33 % in 1991 30 % in 1992 30 % in 1993	1.53 %	Gasoline Diesel oil Fuel oil Sulfur Burned rubbish by incinerator	138,300 t/y 246,000 t/y 285,000 t/y 3,400 t/y 3,163 t/y	Natural Gas gas House generated gas	in 1982	26,910,028 M ³ /y	32,782,000 M ³ /y	
34 25/1	TISZAI ERGÖL RI. L. HÓRÖRTU 3581 TISZAÚJVÁROS	Thermal Power	48 % in 1982	-12.33 %	Electric power Steam Hot Water	932,46 GWh 2,422,451 GJ	Sewage oily sedi- ment, solid waste Natural gas	3,162 t/y 827,000 M ³ /y in 1982	2,980 t/y 1,020,000 M ³ /y		
35 25/2	TISZAI ERGÖL RT. L. HÓRÖRTU 3581 TISZAÚJVÁROS	Thermal Power	53 % in 1982	-3.71 %	Electric power	2,615,66 GWh	Natural Gas Inert Gas Fuel Oil	1,328,871 t/y 39,307,400 M ³ /y 181,230 t/y in 1982	270,538 t/y 7,205,000 M ³ /y 110,889 t/y	Production of electricity will be reduced rapidly.	
										Found off its made for gas	
										# means 10 % energy saving in factory	

Note: * indicates small scale stationary source

Table D8.3.3(1) Effects of Control Measures Planned by Factories(2005)

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Fuel Consumption	Nox Emission (t/Yr)	Unit Rate of Fuel Consumption	Nox Emission	Fuel Consumption	Nox Emission (t/Yr)	Kind of Fuel	Emission (t/Yr)	Nox Emission (t/Yr)	Kind of Fuel	Emission (t/Yr)
03/0 TELEKMECHANI KAZ T CENTRAL WALLAKI THERMI TECHNICS	P-014 P-002	Coal (t/yr)	8,081			9,000		10.5 (t/yr)	Gas	9,000			
		Wood Flour (t/yr)	2,673	290.9	23.31	0.85%	3,000	324	26.01 (t/yr)	Wood Pellet (t/yr)	3,000	162	26.01
Remarks		Based on the ceramics academy association. (SZILIKAPARI TUDOMANYOS EGYESULET 106; Budapest, Anken KU 1-3, Nov.1989) Fuel change from coal to natural gas is suitable measures.											

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Fuel Consumption	Nox Emission (t/Yr)	Unit Rate of Fuel Consumption	Nox Emission	Fuel Consumption	Nox Emission (t/Yr)	Kind of Fuel	Emission (t/Yr)	Nox Emission (t/Yr)	Kind of Fuel	Emission (t/Yr)
15/1 HAMOR REZSENY- TARSASAG	P-001 P-003~ P-007 P-009 P-011	Natural Gas (t/100kg/hr)	4,650	0	3.5 (EXP)	1.53%	5,713	0	4.3 (WPs)	53,782	0		
Remarks		Case 1: Furnace improvement, fuel change from natural gas to electricity.											

Name of Plant	Source No.	Present				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Fuel Consumption	Nox Emission (t/Yr)	Unit Rate of Fuel Consumption	Nox Emission	Fuel Consumption	Nox Emission (t/Yr)	Kind of Fuel	Emission (t/Yr)	Nox Emission (t/Yr)	Kind of Fuel	Emission (t/Yr)
15/2 DOSITORYI ACEL ES VASONT KFT	P-014	Natural Gas (t/100kg/hr)	517 (*)	0	0.695 (*)	1.02%	590	0	0.793 (t/100kg/hr)	531	0	0.714 (*)	
Remarks		#1 Based on actual measurement of NOx in 1993. (0.422kg/h with consumption of natural gas of 314m3/h and assuming same operational hours of 1645h.) EF : Fuel consumption (Natural Gas) 866 Nm ³ /yr in 1992. *2 Retrofitting of furnace and introducing recuperator for energy saving about 10%.											

Table D8.3.3(2) Effects of Control Measures Planned by Factories(2005)

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Fuel Consumption [t/a]	NOx Emission [t/a]	S02 Emission [t/a]	Kind of Fuel	NOx Emission [t/a]	S02 Emission [t/a]	Case 1 Using Ammonia additive	Case 2 Using Pur. Siv N	Case 3		
23/1	(*)	0	657 (EKT)	0	0	697	0	0	(*)	0	35 (*)4)		
TISZAI VEGYI KOMBINAT	P-002	-----	(EKT)	0.46%	-----	-----	0	174	-----	-----	-----		
	Production of Nitric Acid	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		
		-----	0	1,121 (*)2)	0	1,190	0	298 (*)3)	0	60 (*)4)	-----		
		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		

Remarks
*1 Emission from the reaction-process.

*2 Actual measurement data of NOx in 1993: 210kg/h and assuming 5337h as well as 1992.

*3 75% NOx reduction by using ammonia additive method.

*4 35% NOx reduction by using pur. Siv N method.

Table D8.3.4 (1) Community-Specific Gas-Diffusion of Households for the Study Area as Expected by the Year 2005

	2005(*)A Number of households that gas company is able to provide gas in 2005	Case 2 A' IF C<A THEN A'=C IF C>A THEN A'=A	Case 1 A" A"=(C-B)*.55+B IF A<A" THEN A"=A IF A>A" THEN A"=A"	Present condition 1993(*)B Households with gas supply by the year	C Number of households in 1990	Case 2 Dissimi-nation-ratio A'/C (%)	Case 1 Dissimi-nation-ratio A"/C (%)	Present condition Dissimi-nation-ratio B/C (%)
1 Miskolc	90,754	73,500	66,837	58,693	73,500	100	91	80
2 Edelény	2,411	2,411	2,411	1,917	3,934	61	61	49
3 Kazincbarcika	11,084	11,084	10,963	9,051	12,528	88	88	72
4 Aggtelek	126	126	112	0	204	62	55	0
5 Alacska	282	282	202	88	295	96	68	30
6 Alsószuhá	108	108	96	0	175	62	55	0
7 Alsótelekes	82	82	48	0	87	94	55	0
8 Alsózsolca	1,177	1,177	1,177	939	1,754	67	67	54
9 Arló	180	180	180	0	1,333	14	14	0
10 Arnót	604	604	562	487	624	97	90	78
11 Bánhorváti	448	448	351	0	638	70	55	0
12 Bánréve	588	552	401	217	552	100	73	39
13 Berzék	230	230	230	184	294	78	78	63
14 Boldva	441	441	441	343	748	59	59	46
15 Borsodbóta	142	142	142	0	394	36	36	0
16 Borsodszirák	305	305	291	241	332	92	88	73
17 Bőcs	703	703	703	555	836	84	84	66
18 Bükkaranyos	267	267	223	0	405	66	55	0
19 Bükkzentkeresz	382	382	261	0	475	80	55	0
20 Csernely	160	160	160	0	463	35	35	0
21 Csokvaomány	196	196	196	0	481	41	41	0
22 Dédestapolesány	330	330	330	0	652	51	51	0
23 Dőrvény	78	78	76	0	138	57	55	0
24 Dubicsány	72	72	58	0	106	68	55	0
25 Emőd	1,401	1,401	1,021	0	1,857	75	55	0
26 Égerszög	45	45	26	0	48	94	54	0
27 Felsőkelecsény	90	90	87	0	158	57	55	0
28 Felsőnyírád	222	222	222	0	433	51	51	0
29 Felsőtelekes	242	242	152	0	277	87	55	0
30 Felsőzsolca	1,778	1,778	1,778	1,422	2,228	80	80	64
31 Fony	164	164	97	0	177	93	55	0
32 Gesztely	583	583	583	466	848	69	69	55
33 Mezőcsát	1,120	1,120	1,120	0	2,416	46	46	0
34 Tiszújváros	7,196	6,250	6,072	5,854	6,250	100	97	94
35 Ózd	14,366	14,366	12,067	7,096	16,135	89	75	44
36 Girincs	183	183	131	0	239	77	55	0
37 Gömörszólós	36	36	24	0	44	82	55	0
38 Hangony	120	120	120	0	627	19	19	0
39 Harsány	381	381	370	0	672	57	55	0
40 Hejőbába	192	192	192	0	503	38	38	0
41 Hejőkeresztúr	240	240	192	0	349	69	55	0
42 Hejőkürt	75	75	75	0	141	53	53	0
43 Hejőpapi	191	209	191	0	409	51	47	0
44 Hejőszalonta	210	210	122	0	221	95	55	0
45 Hernádkak	288	288	288	231	350	82	82	66
46 Hernádnémeti	1,014	1,014	962	812	1,084	94	89	75
47 Hét	260	260	143	63	209	124	68	30
48 Igrici	180	180	180	0	449	40	40	0
49 Imola	52	52	30	0	54	96	56	0

Case 1 : Natural gas is supplied to 55% of households not having the supply at present within the limit of A above.

Case 2 : Natural gas is supplied all households within the limit of A above.

Source : (*) Tigaz (GAS DISTRIBUTION COMPANY)

Table D8.3.4 (2) Community-Specific Gas-Diffusion of Households for the Study Area as Expected by the Year 2005

	2005(*)A Number of households that gas company is able to provide gas in 2005	Case 2 A' IF C < A THEN A'=C IF C > A THEN A'=A	Case 1 A" A"=(C-B)*.55+B IF A < A" THEN A"=A IF A > A" THEN A"=A"	Present condition 1993(*)B Households with gas supply by the year	C Number of households in 1990	Case 2 Dissimi-nation-ratio A'/C (%)	Case 1 Dissimi-nation-ratio A"/C (%)	Present condition Dissimi-nation-ratio B/C (%)
50 Izófalva	287	287	287	0	1,623	18	18	0
51 Jákfalva	78	78	78	0	151	52	52	0
52 Jósvað	107	107	81	0	147	73	55	0
53 Kánó	79	79	48	0	88	90	55	0
54 Kelemér	60	60	60	0	178	34	34	0
55 Kesznyéten	369	369	329	0	598	62	55	0
56 Királd	161	161	161	0	401	40	40	0
57 Kicscés	34	34	28	0	50	68	56	0
58 Kisgyör	306	306	306	0	581	53	53	0
59 Kistokaj	522	476	449	417	476	100	94	88
60 Kondó	149	149	119	0	217	69	55	0
61 Köröm	183	183	179	0	326	56	55	0
62 Kuriyán	493	493	331	0	601	82	55	0
63 Mályi	1,158	1,064	1,002	927	1,064	100	94	87
64 Múcsony	665	665	652	0	1,186	56	55	0
65 Putnok	1,562	1,562	1,562	523	2,534	62	62	21
66 Sajószentpéter	3,636	3,636	3,636	2,918	4,629	79	79	63
67 Szikszo	1,612	1,612	1,170	0	2,128	76	55	0
68 Muhi	786	180	130	69	180	100	72	38
69 Nagybarca	280	280	204	0	370	76	55	0
70 Nagycsécs	383	298	164	0	298	100	55	0
71 Nemesbikk	153	153	153	0	333	46	46	0
72 Nyékládháza	1,537	1,524	1,387	1,220	1,524	100	91	80
73 Nyomár	102	102	66	0	120	85	55	0
74 Onga	928	928	928	731	1,298	71	71	56
75 Ónod	917	750	558	324	750	100	74	43
76 Oszlárv	222	177	126	63	177	100	71	36
77 Parasznya	357	357	235	0	427	84	55	0
78 Radostyán	157	157	121	0	220	71	55	0
79 Ragály	144	144	135	0	245	59	55	0
80 Rudabánya	246	246	246	126	1,173	21	21	11
81 Sajóbábony	982	982	797	443	1,086	90	73	41
82 Sajóccseg	323	323	316	252	368	88	86	68
83 Sajógalgó	127	120	66	0	120	100	55	0
84 Sajóhidvég	208	208	208	164	335	62	62	49
85 Sajóivánka	130	130	95	0	172	76	55	0
86 Sajókaza	706	706	567	0	1,031	68	55	0
87 Sajókápolna	183	160	109	47	160	100	68	29
88 Sajókeresztür	471	471	440	376	492	96	89	76
89 Sajólád	512	512	512	407	912	56	56	45
90 Sajólászlófalva	150	150	101	25	164	91	62	15
91 Sajómerese	98	98	75	0	136	72	55	0
92 Sajónémeti	92	92	92	0	265	35	35	0
93 Sajóörös	308	294	162	0	294	100	55	0
94 Sajópálfala	208	208	206	167	237	88	87	70
95 Sajópetri	242	242	242	193	460	53	53	42
96 Sajópüspöki	96	96	96	0	220	44	44	0
97 Sajósenye	130	120	93	61	120	100	78	51
98 Sajószöged	608	608	369	0	670	91	55	0

Case 1 : Natural gas is supplied to 55% of households not having the supply at present within the limit of A above.

Case 2 : Natural gas is supplied all households within the limit of A above.

Source : (*) Tigaz (GAS DISTRIBUTION COMPANY)

Table D8.3.4 (3) Community-Specific Gas-Diffusion of Households for the Study Area as Expected by the Year 2005

	2005(*)A Number of households that gas company is able to provide gas in 2005	Case 2 A' IF C<A THEN A'=C IF C>A THEN A'=A	Case 1 A" A"=(C-B)*.55+B IF A<A" THEN A"=A IF A>A" THEN A"=A"	Present condition 1993(*)B Households with gas supply by the year	C Number of households in 1990	Case 2 Dissimi-nation-ratio A/C (%)	Case 1 Dissimi-nation-ratio A"/C (%)	Present condition Dissimi-nation-ratio B/C (%)
99 Sajóvámos	658	658	567	387	715	92	79	54
100 Sajóvölgy	272	272	211	91	309	88	68	29
101 Sáta	211	211	211	0	525	40	40	0
102 Serényfalva	250	250	223	49	366	68	61	13
103 Szakáld	169	169	115	0	209	81	55	0
104 Szalonna	293	293	193	0	350	84	55	0
105 Szendrőlád	287	287	206	0	375	77	55	0
106 Szirmabesenyő	1,386	1,386	1,386	1,276	1,706	81	81	75
107 Szőlősardó	84	81	45	0	81	100	56	0
108 Szuhafő	60	60	45	0	82	73	55	0
109 Szuhakálló	299	299	214	0	389	77	55	0
110 Szuhogya	347	347	228	0	415	84	55	0
111 Tardona	236	236	226	0	411	57	55	0
112 Teresztenye	29	24	13	0	24	100	54	0
113 Tiszalúc	1,087	1,087	1,087	597	1,684	65	65	35
114 Tiszapalkonya	712	604	422	199	604	100	70	33
115 Tornakápolna	14	13	7	0	13	100	54	0
116 Trizs	66	66	58	0	105	63	55	0
117 Uppony	79	79	79	0	212	37	37	0
118 Vadna	190	190	105	0	190	100	55	0
119 Varbó	390	390	226	0	411	95	55	0
120 Zádorfalva	102	102	98	0	178	57	55	0
121 Ziliz	128	128	79	0	144	89	55	0
122 Zubogy	208	208	122	0	221	94	55	0
Total	172,583	153,138	138,339	100,711	178,180	86	78	57

Case 1 : Natural gas is supplied to 55% of households not having the supply at present within the limit of A above.

Case 2 : Natural gas is supplied all households within the limit of A above.

Source : (*) Tigaz (GAS DISTRIBUTION COMPANY)

Table D8.3.5(1) Effects of Additional Control Measures for Some Factories(2005)

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Fuel Consumption (t/yr)	NOx Emission (t/yr)	Fuel Consumption (t/yr)	SO2 Emission (t/yr)	Fuel Consumption (t/yr)	NOx Emission (t/yr)	Fuel Consumption (t/yr)	Case 1 (Fuel change)	Case 2 (Fuel change)	Case 3 (Fuel change)	Case 4 (Fuel change)
02/1 OZD KOHASZAT	P-036	Stove oil (t/yr)	34,560	528.8	149.6	31,104 (60%)	457.9	134.6	Stove oil (t/yr)	4,164 (8%)	63.7	60.0	
		Natural Gas (t/therm/yr)	13,824		0.0% (*1)	12,442 (40%)			Natural Gas (t/therm/yr)	28.287 (92%)			
Remarks		*1 Fuel consumption in 2005 considers 10% energy saving.											

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Fuel Consumption (t/yr)	NOx Emission (t/yr)	Fuel Consumption (t/yr)	SO2 Emission (t/yr)	Fuel Consumption (t/yr)	NOx Emission (t/yr)	Fuel Consumption (t/yr)	Case 1 (Change of Fuel Quality)	Case 2 (Fuel change)	Case 3 (Fuel change)	Case 4 (Fuel change)
03/0 SZANTAGTÓRSZÁZ TERÉZ 15 CS. Szentpéteri Vállalat Termel Téglaigaz	P-014 P-002	Gas (t/yr)	8,081			9,000			Gas (t/yr)	9,000			
		Wood flour (t/yr)	2,673	290.9	23.31	0.85%	3,000	324	Wood flour (t/yr)	26.01	162	25.01	
Remarks		Based on the ceramics academy association. Fuel change from coal to natural gas is suitable measures.											

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Fuel Consumption (t/yr)	NOx Emission (t/yr)	Fuel Consumption (t/yr)	SO2 Emission (t/yr)	Fuel Consumption (t/yr)	NOx Emission (t/yr)	Fuel Consumption (t/yr)	Case 1 (Fuel change)	Case 2 (Fuel change)	Case 3 (Fuel change)	Case 4 (Fuel change)
04/1 BORSODCHEM	P-061	Solvent (t/yr)	153.1 (EFF)	0	2.9 (EFF)	0.85%	170.9	0	Solvent (t/yr)	170.9	0	0.16 (*2)	
		Incineration Solvent (t/yr)	124.6 (Actual in 1993) (*)1	0	16.4 (Actual in 1993) (*)1	0.85%	135.1	0	Solvent (t/yr)	139.1	0	0.92 (*2)	
Remarks		*1 Based on actual measurement in 1993 and assuming same operational hour of 3560h. *2 High NOx concentration can be reduced to reaching 150 - 200 ppm by using two-stages combustion method, and it is attainable.											

Table D8.3.5(2) Effects of Additional Control Measures for Some Factories(2005)

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Nox Emission (t/yr)	Fuel Consumption (t/yr)	Nox Emission (t/yr)	Fuel Consumption (t/yr)	Nox Emission (t/yr)						
09/2 SATORCHEM KFT.	P-055 Insitufer	Fatty acids & Solid (t/yr)	103	0	0.056 (ENF)	103	0	0.056 (ENF)	103	0	0.014 (*)		
					0.0%								
15/2 DIOSEVORI ACEL ES VASONI KFT	P-014			0	0.952 (*)		0	1.80		0	0.45 (*)		
Remarks		<p>*1 Based on actual measurement in 1993 and assuming same operational hour of 1872h. *2 75% NOx reduction by using two-stages combustion method.</p>											

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Nox Emission (t/yr)	Fuel Consumption (t/yr)	Nox Emission (t/yr)	Fuel Consumption (t/yr)	Nox Emission (t/yr)						
15/2 DIOSEVORI ACEL ES VASONI KFT	P-014	Natural Gas (100Nm ³ /h)	517 (*)	0	0.685 (*)	590	0	0.738 (ENF)	531	0	0.714 (*)		
17/1 REJOSABA CEMENT	P-010												
Remarks		<p>*1 Based on actual measurement of NOx in 1993 (0.423kg/h with consumption of natural gas of 31463/h and assuming same operational hours of 1645h.) ENF : Fuel consumption (Natural Gas) 666 Nm³/yr in 1992. *2 Retrofitting of furnace and introducing recuperator for energy saving about 10%.</p>											

Name of Plant	Source No.	Present (1992)				No Measures (2005)				Control Measures Alternative (2005)			
		Kind of Fuel	Nox Emission (t/yr)	Fuel Consumption (t/yr)	Nox Emission (t/yr)	Fuel Consumption (t/yr)	Nox Emission (t/yr)						
17/1 REJOSABA CEMENT	P-010	Natural Gas (100Nm ³ /h)	18.745	0	125 (ENF)	21.388	0	143 (ENF)	21.388	0	100 (*)		
		Gas oil (t/yr)	706	0	1.024	805	0	941	805	0	609 (*)		
Remarks		<p>*1 Based on actual measurement of NOx 325kg/h in 1993 and assuming same operational hours of 2332h as same as 1992. *2 30% NOx reduction by using low NOx burner. (*) possible, if it is better to avoid using waste oil.)</p>											

unit: $\mu\text{g}/\text{m}^3$

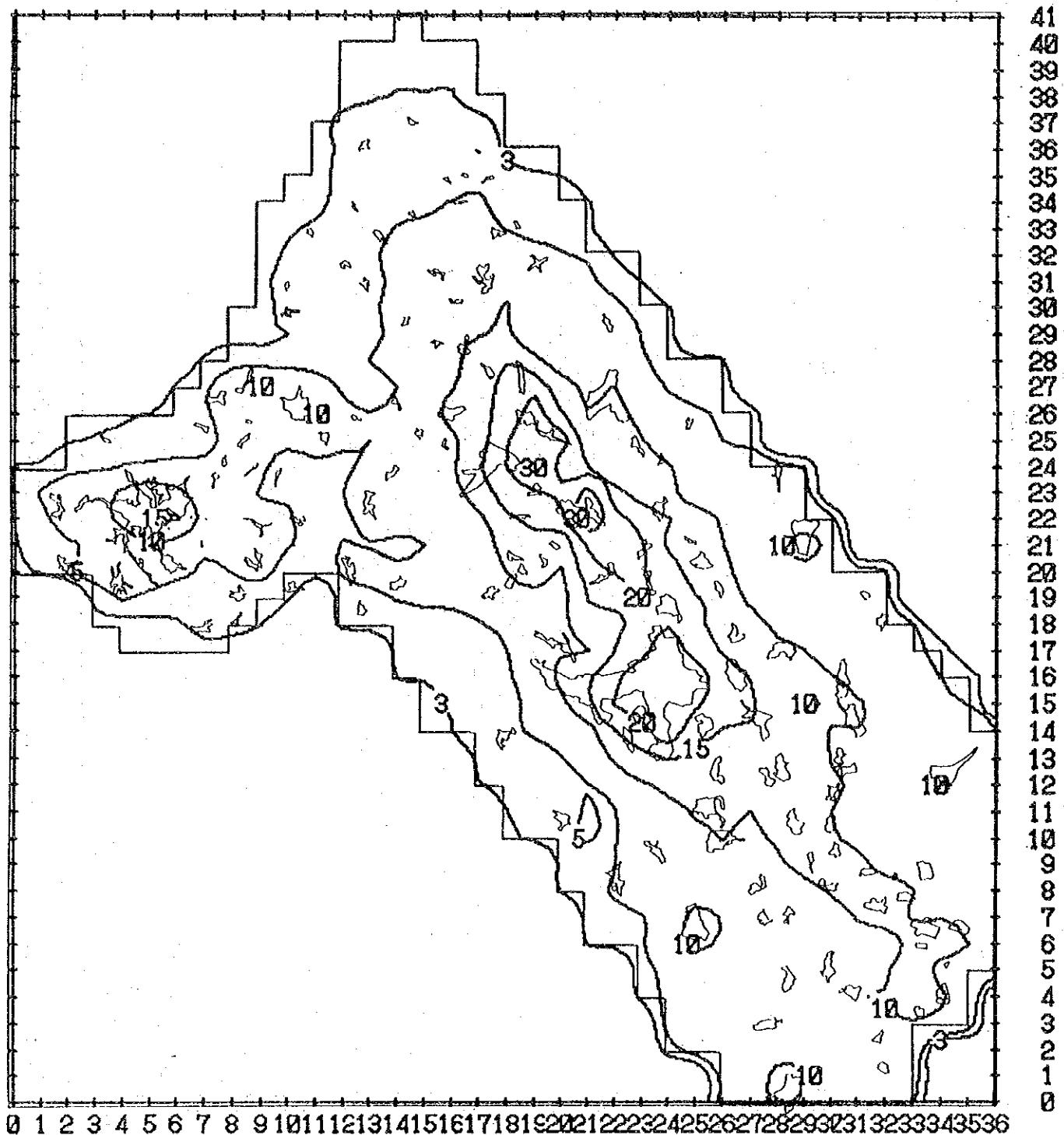


Figure D8.4.1 Average Concentration Isopleth for SO₂ in Non-heating Season (2005, Case F-0, All Sources)

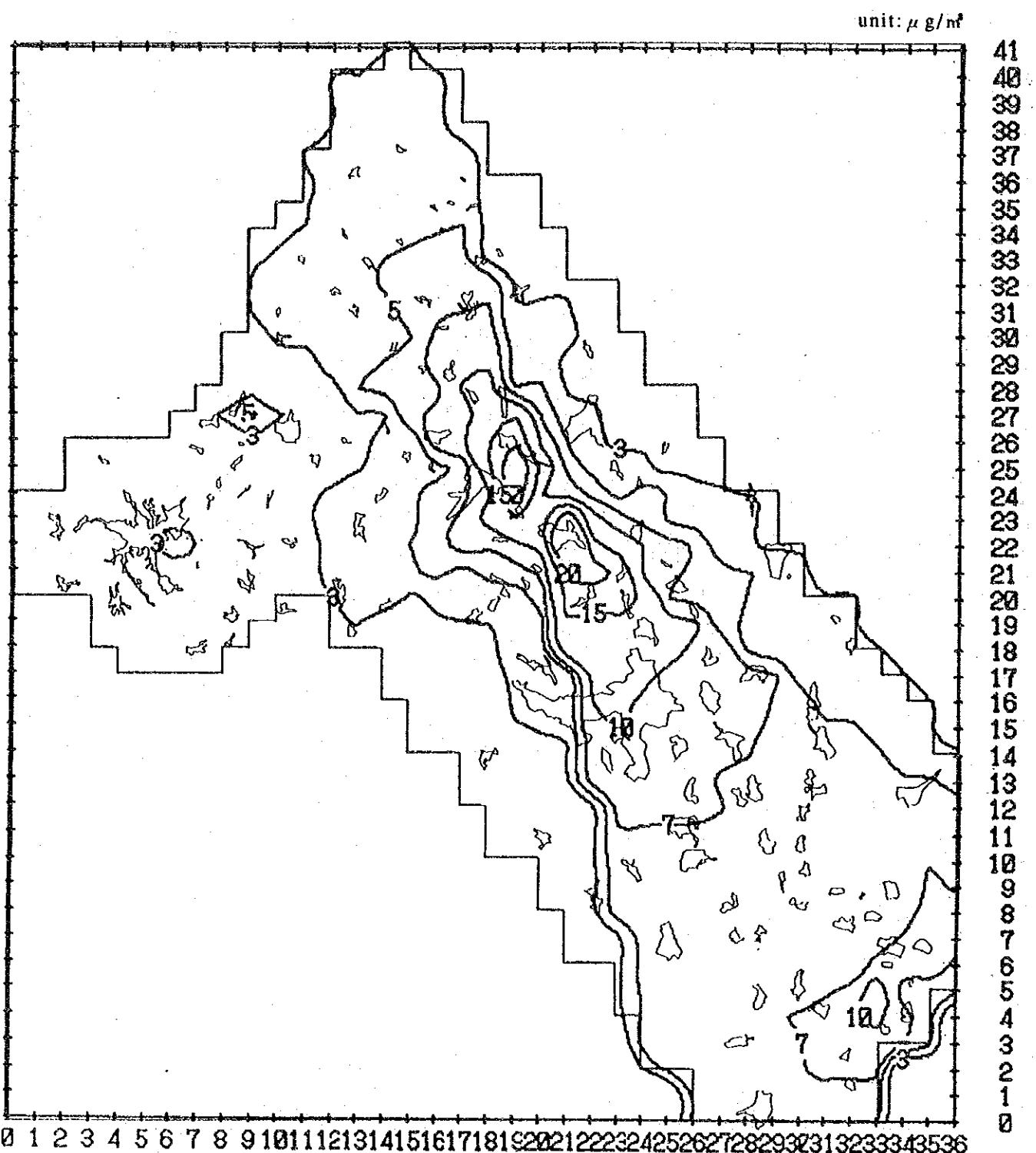


Figure D8.4.2 Annual Average Concentration Isopleth for SO₂ in 2005 (Case F-0,Industries)

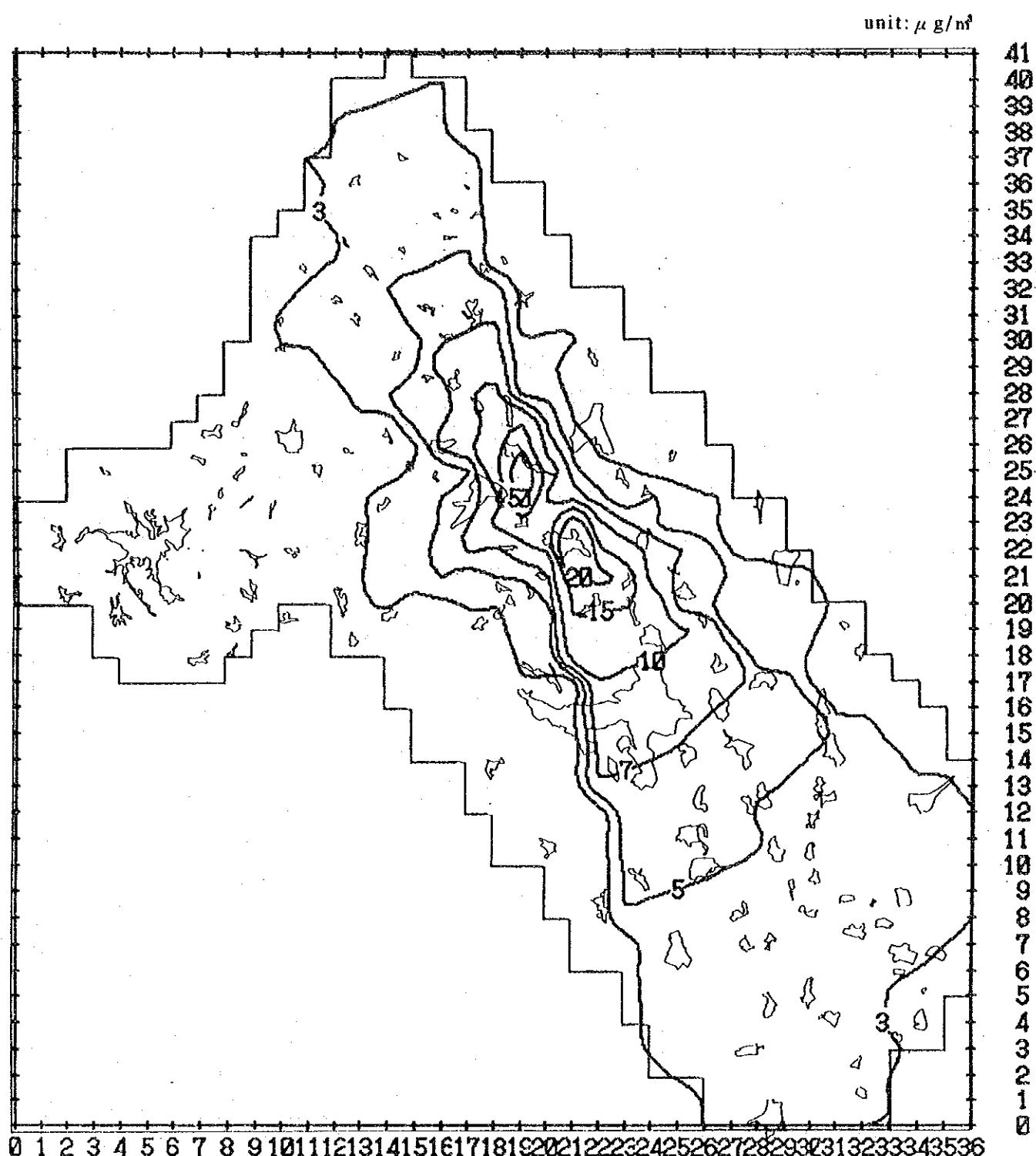


Figure D8.4.3 Annual Average Concentration Isopleth for SO₂ in 2005 (Case F-0, Borsod P.S.)

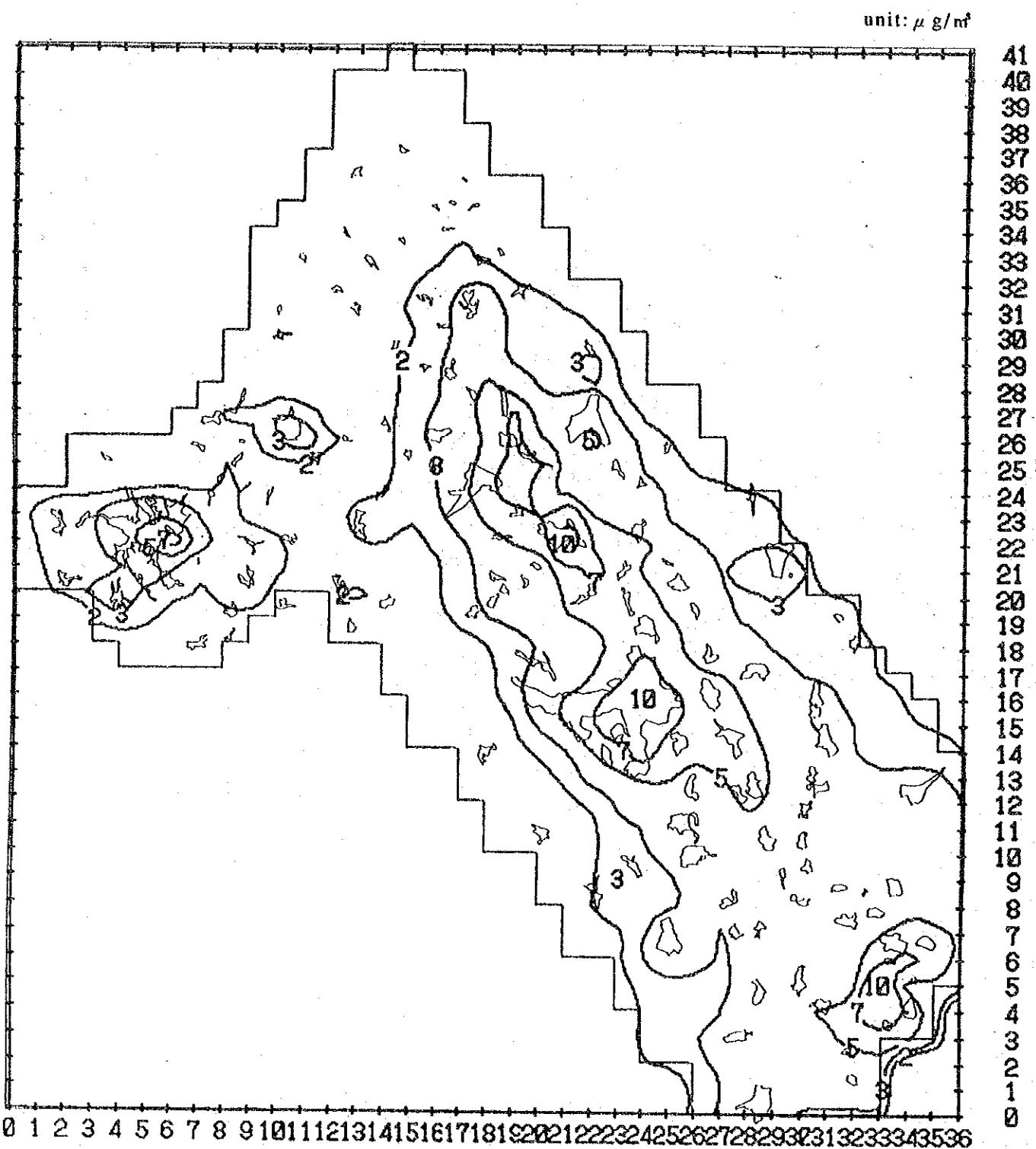


Figure D8.4.4 Average Concentration Isopleth for SO₂ in Non-heating Season (2005, Case F-1, All Sources)

unit: $\mu\text{g}/\text{m}^3$

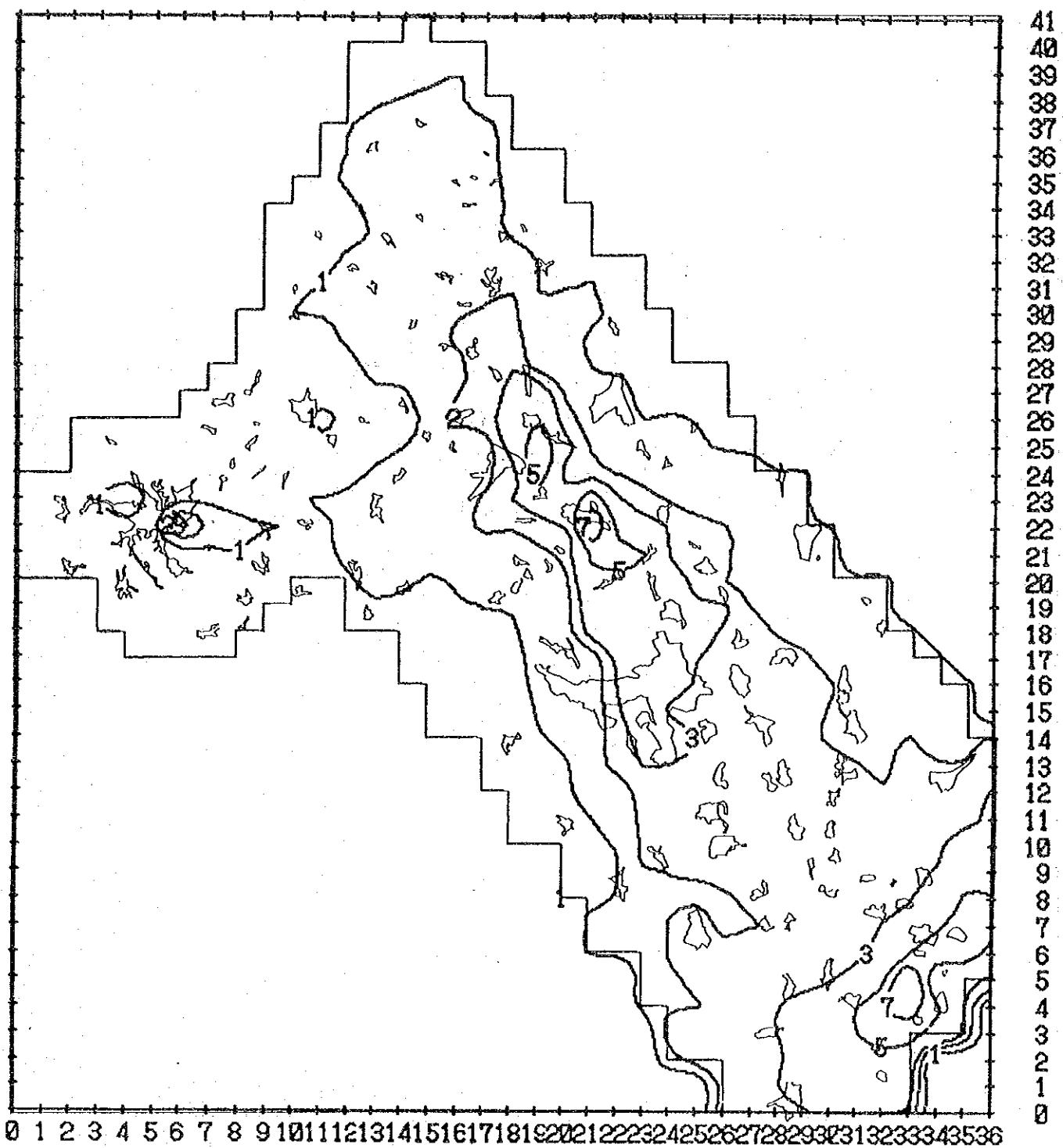


Figure D8.4.5 Annual Average Concentration Isopleth for SO₂ in 2005 (Case F-1,Industries)

unit: $\mu\text{g}/\text{m}^3$

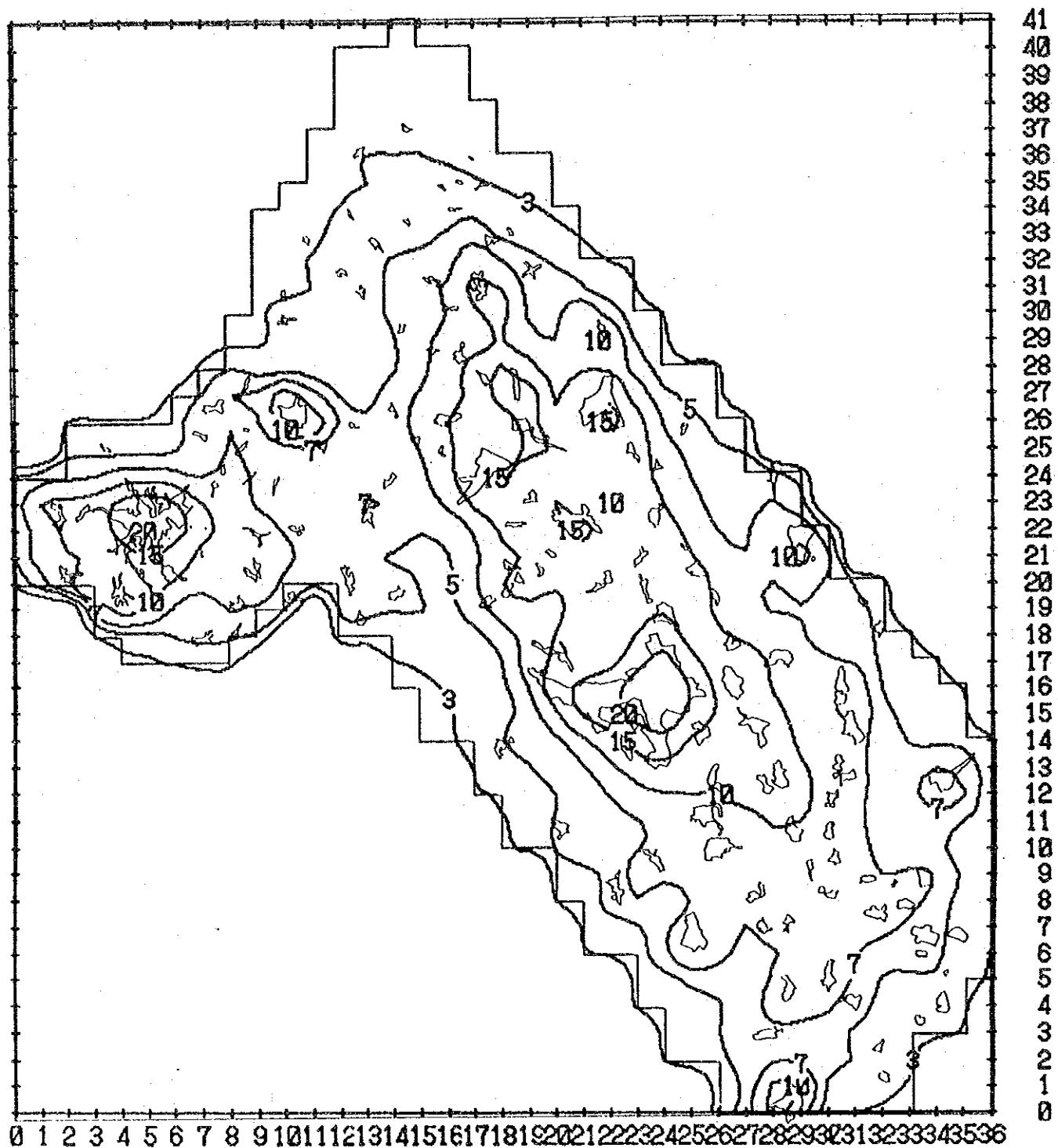


Figure D8.4.6 Annual Average Concentration Isopleth for SO₂ in 2005 (Case F-1, Communal Sources)

unit: $\mu\text{g}/\text{m}^3$

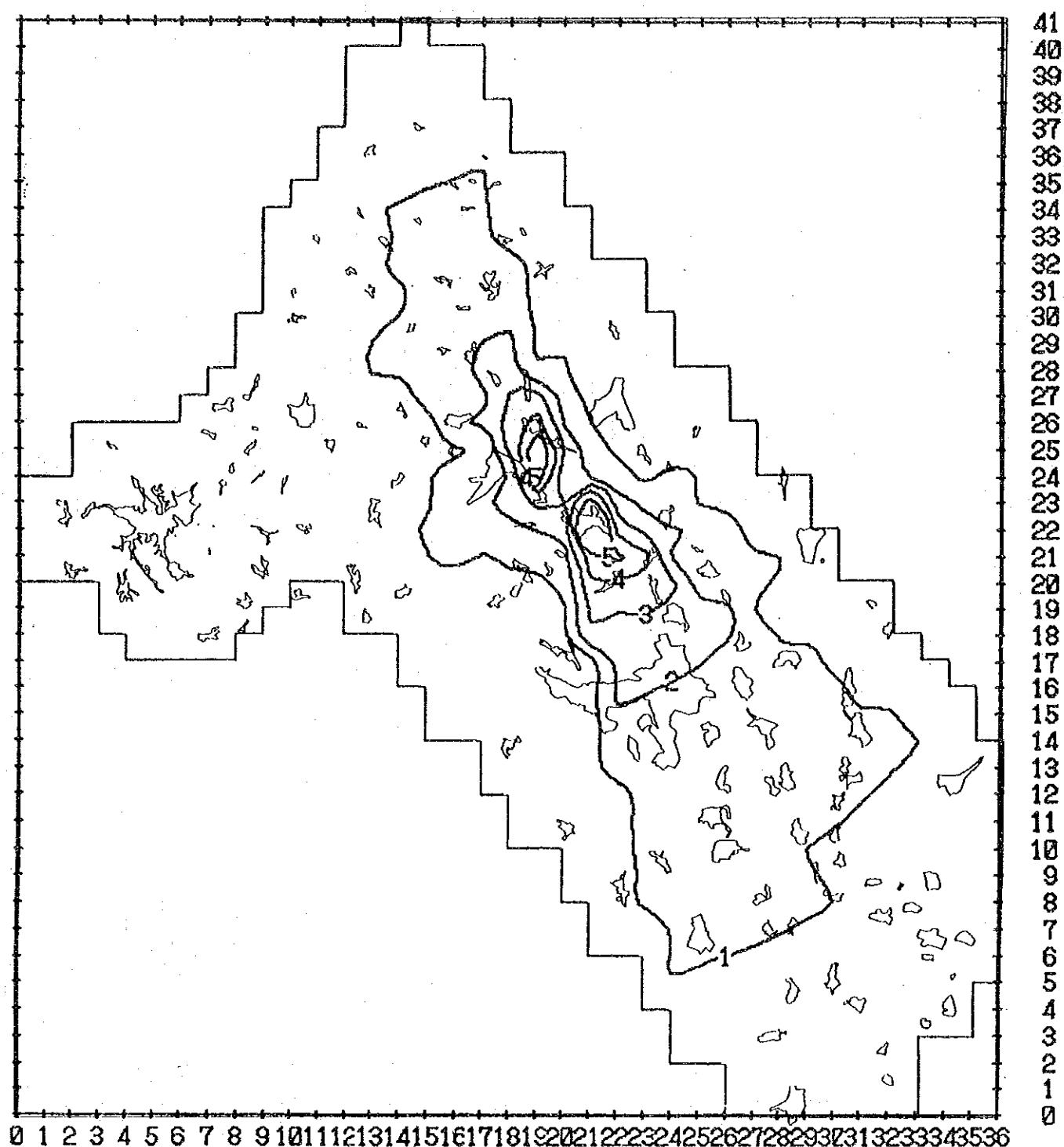


Figure D8.4.7 Annual Average Concentration Isopleth for SO₂ in 2005 (Case F-1, Borsod P.S.)

unit: $\mu\text{g}/\text{m}^3$

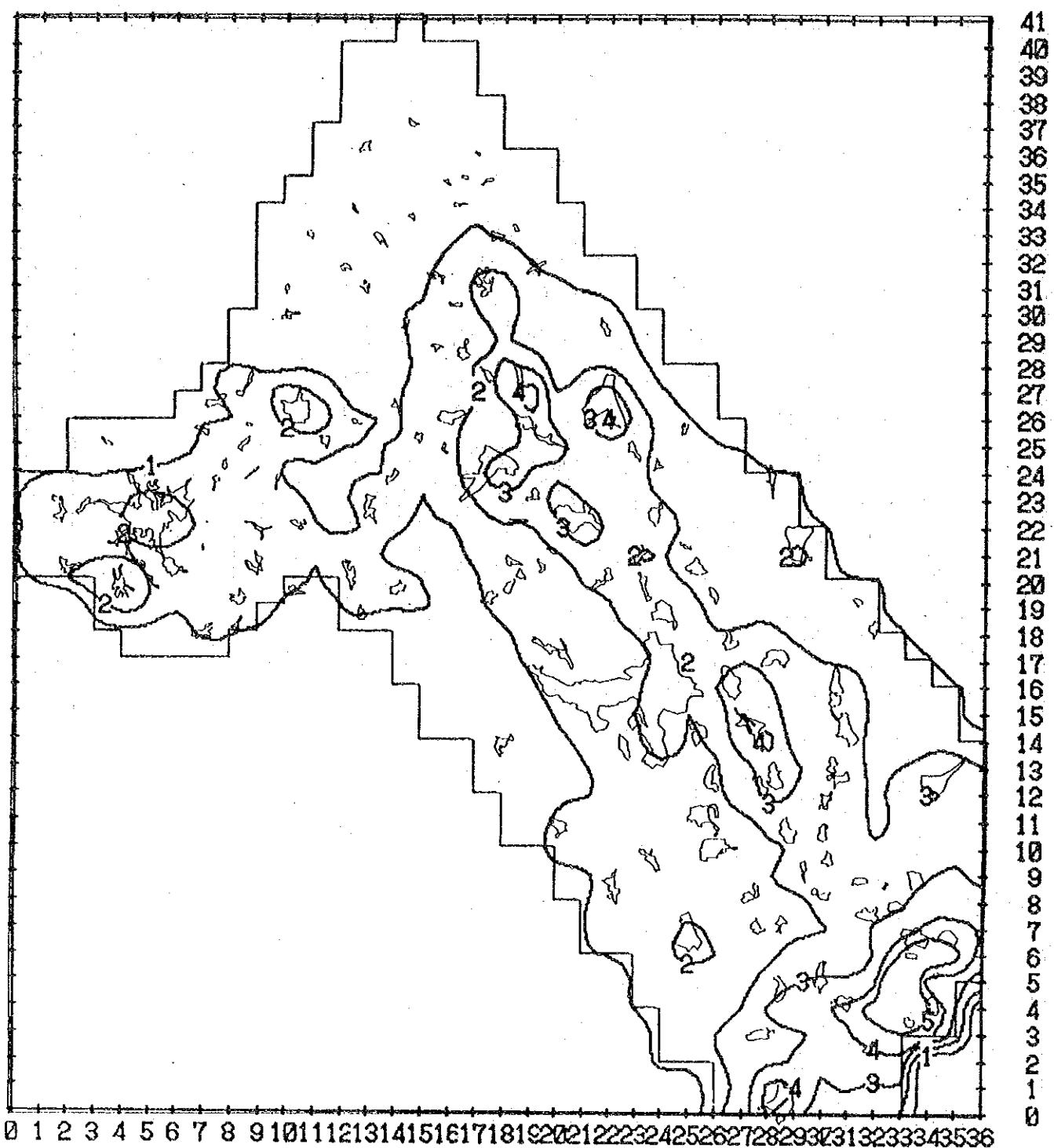


Figure D8.4.8 Average Concentration Isopleth for SO_2 in Non-heating Season (2005, Case F-2, All Sources)

unit: $\mu\text{g}/\text{m}^3$

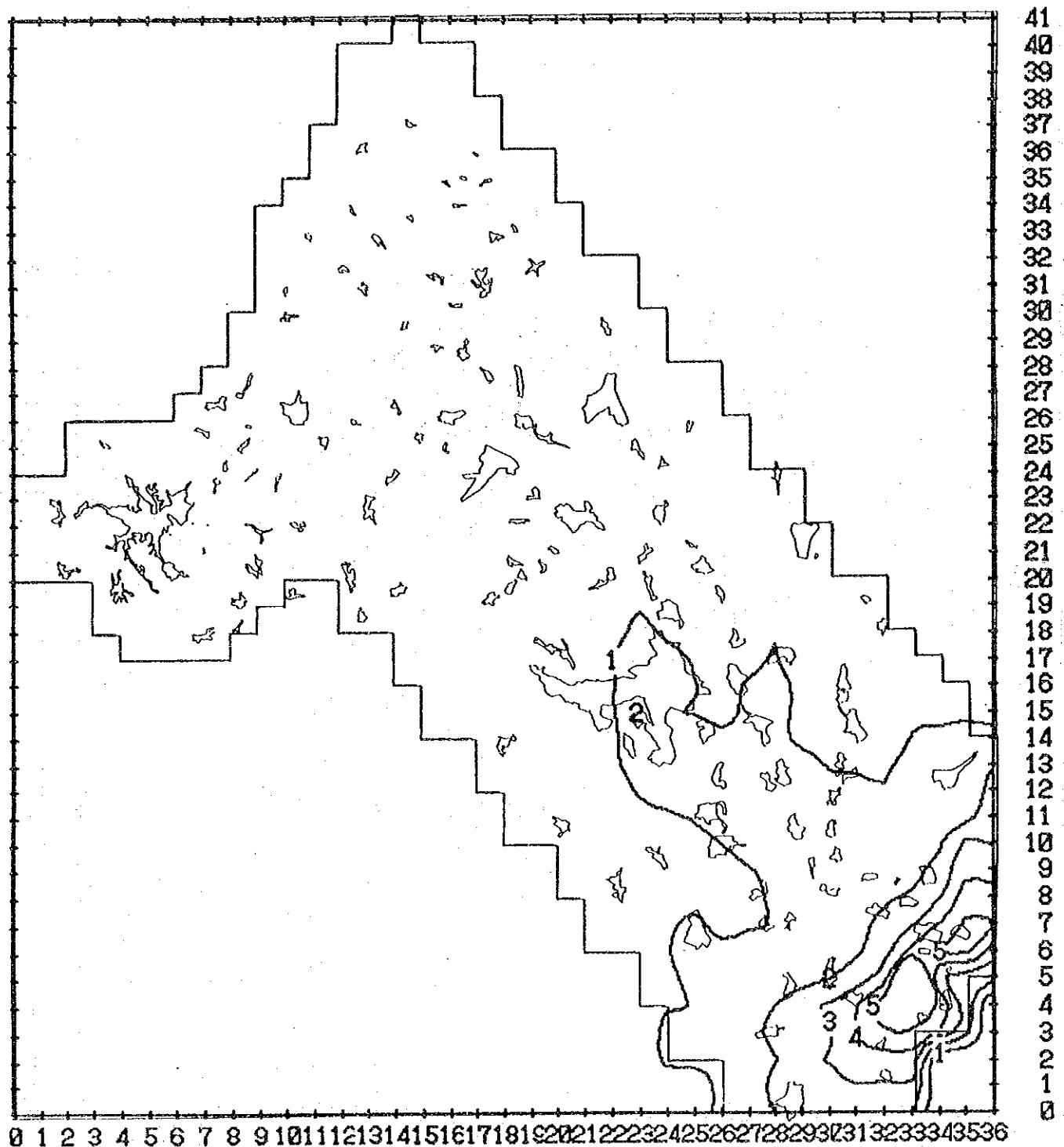


Figure D8.4.9 Annual Average Concentration Isopleth for SO₂ in 2005 (Case F-2, Industries)

unit: $\mu \text{g}/\text{m}^3$

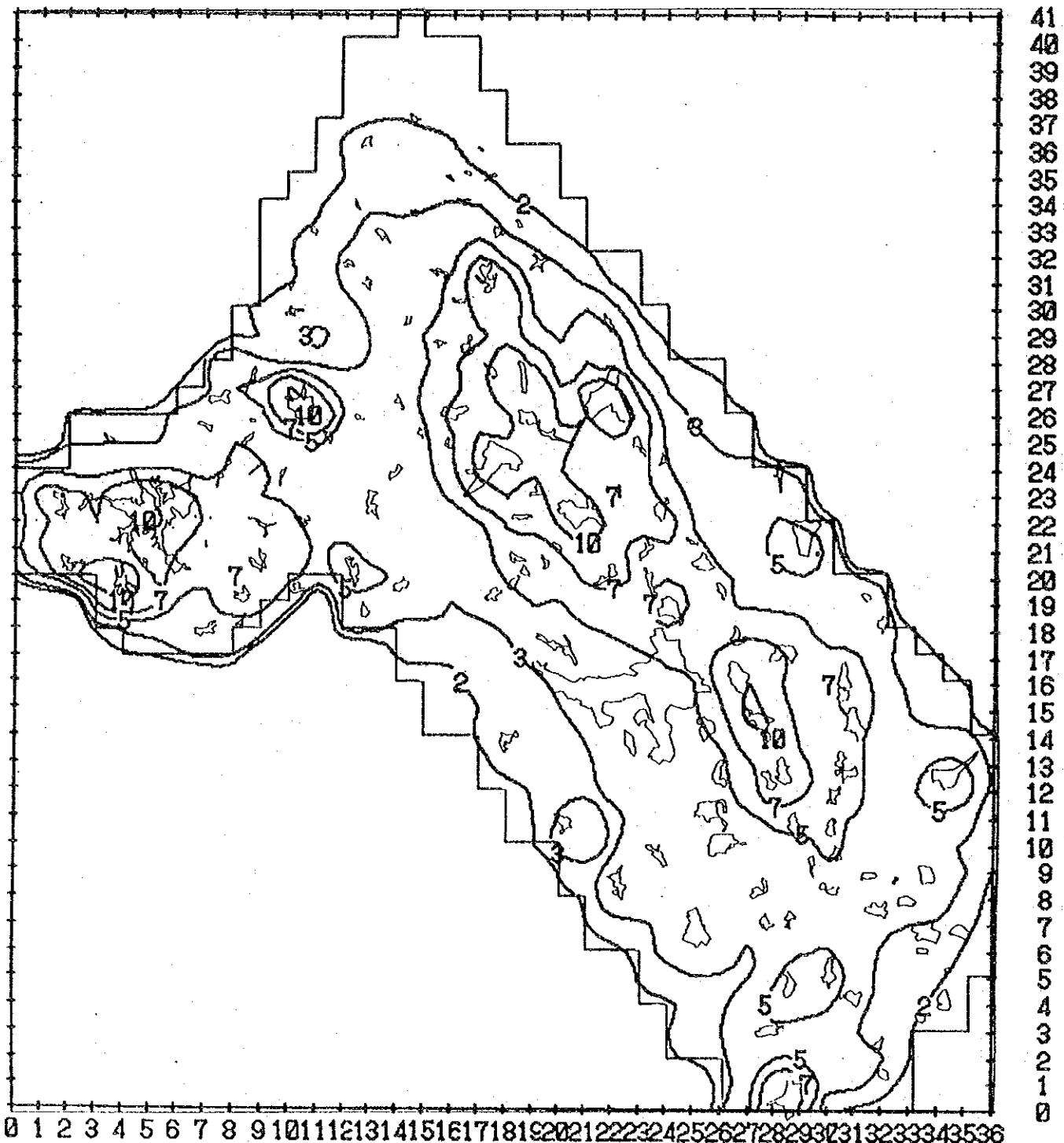


Figure D8.4.10 Annual Average Concentration Isopleth for SO₂ in 2005 (Case F-2, Communal Sources)

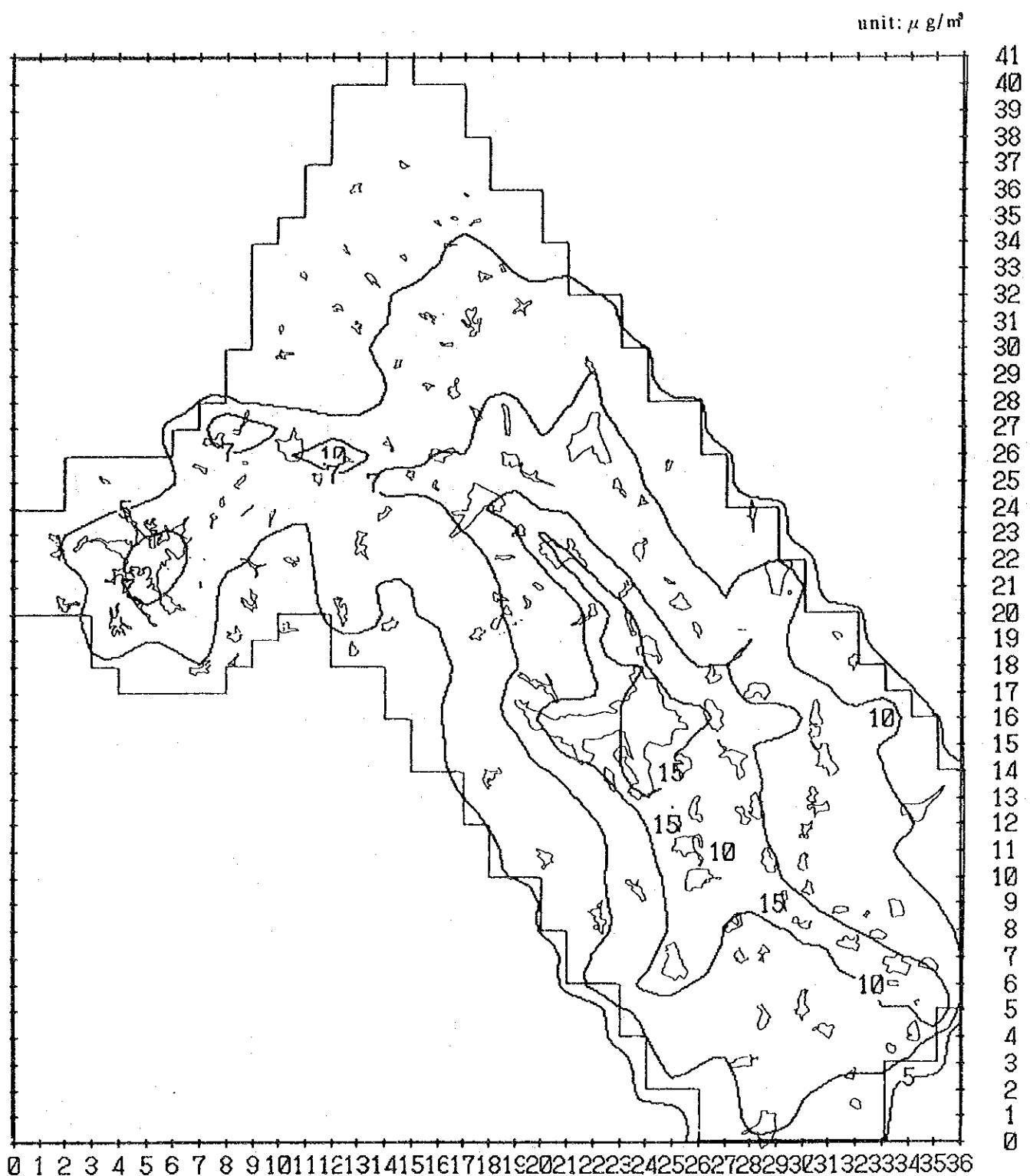


Figure D8.4.11 Average Concentration Isopleth for NO₂ in Non-heating Season (2005, Case F-0, All Sources)

unit: $\mu\text{g}/\text{m}^3$

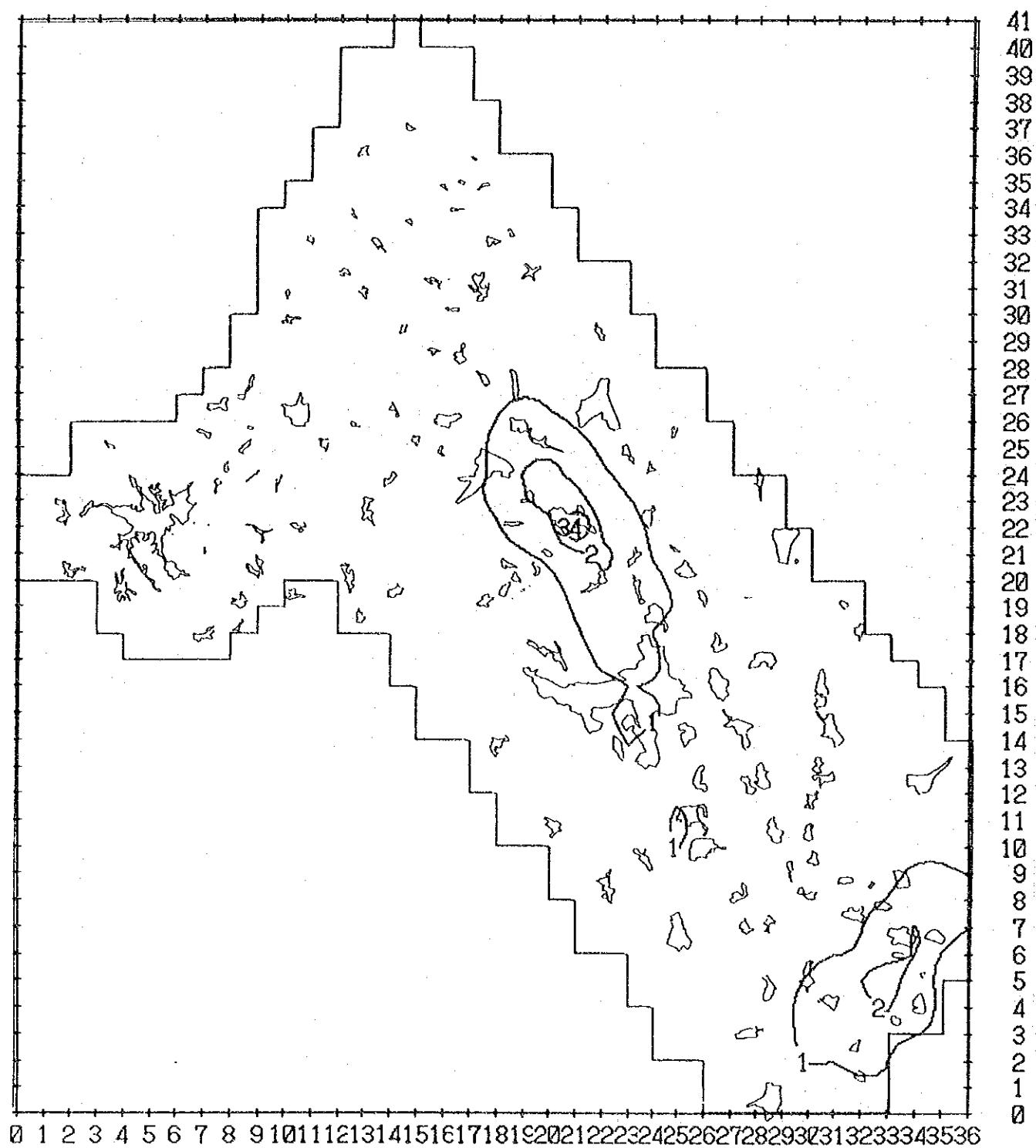


Figure D8.4.12 Annual Average Concentration Isopleth for NO₂ in Non-heating Season (2005, Case F-0, Industries)

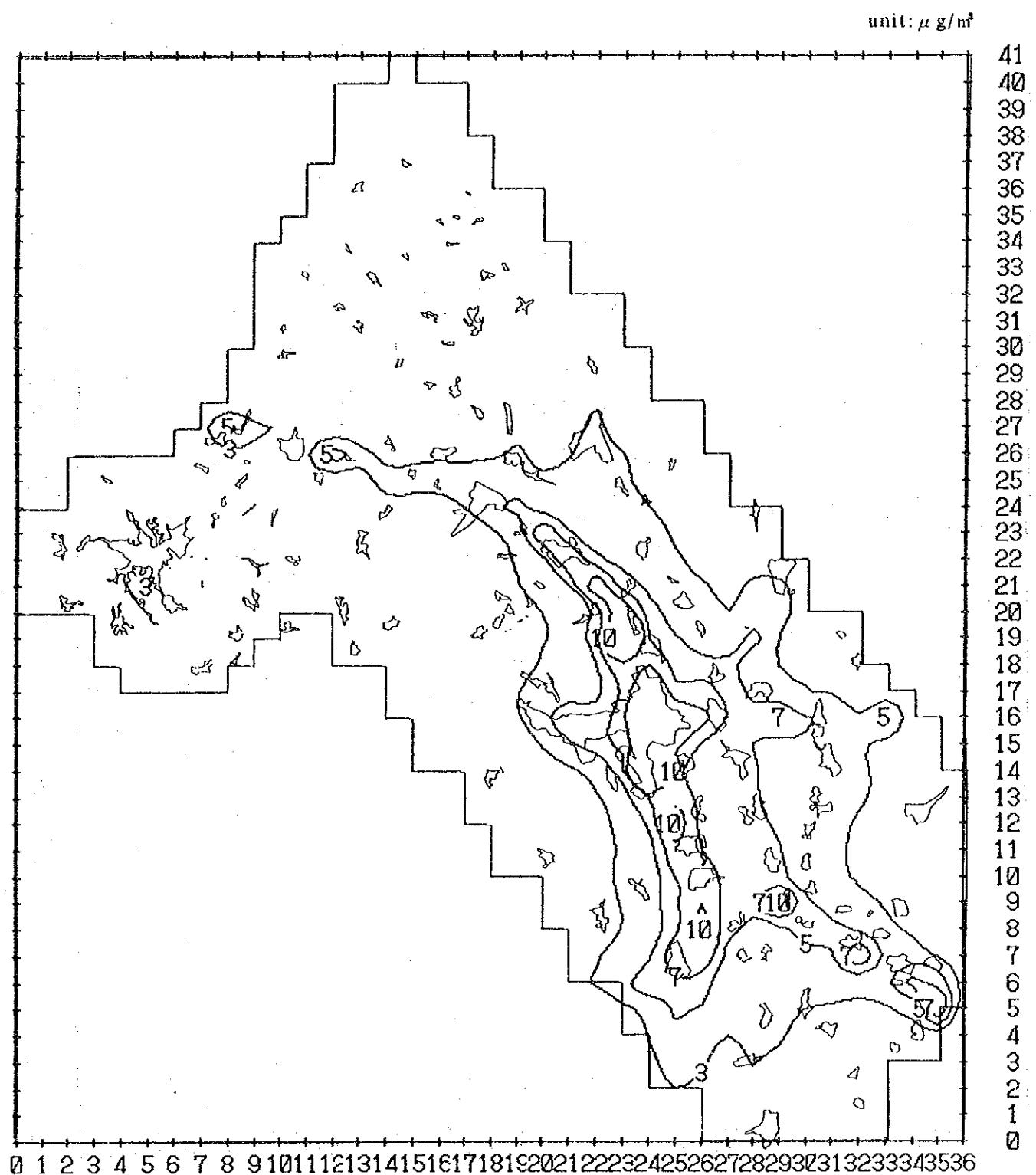


Figure D8.4.13 Annual Average Concentration Isopleth for NO₂ in Non-heating Season (2005, Case F-0, Motor Vehicles)

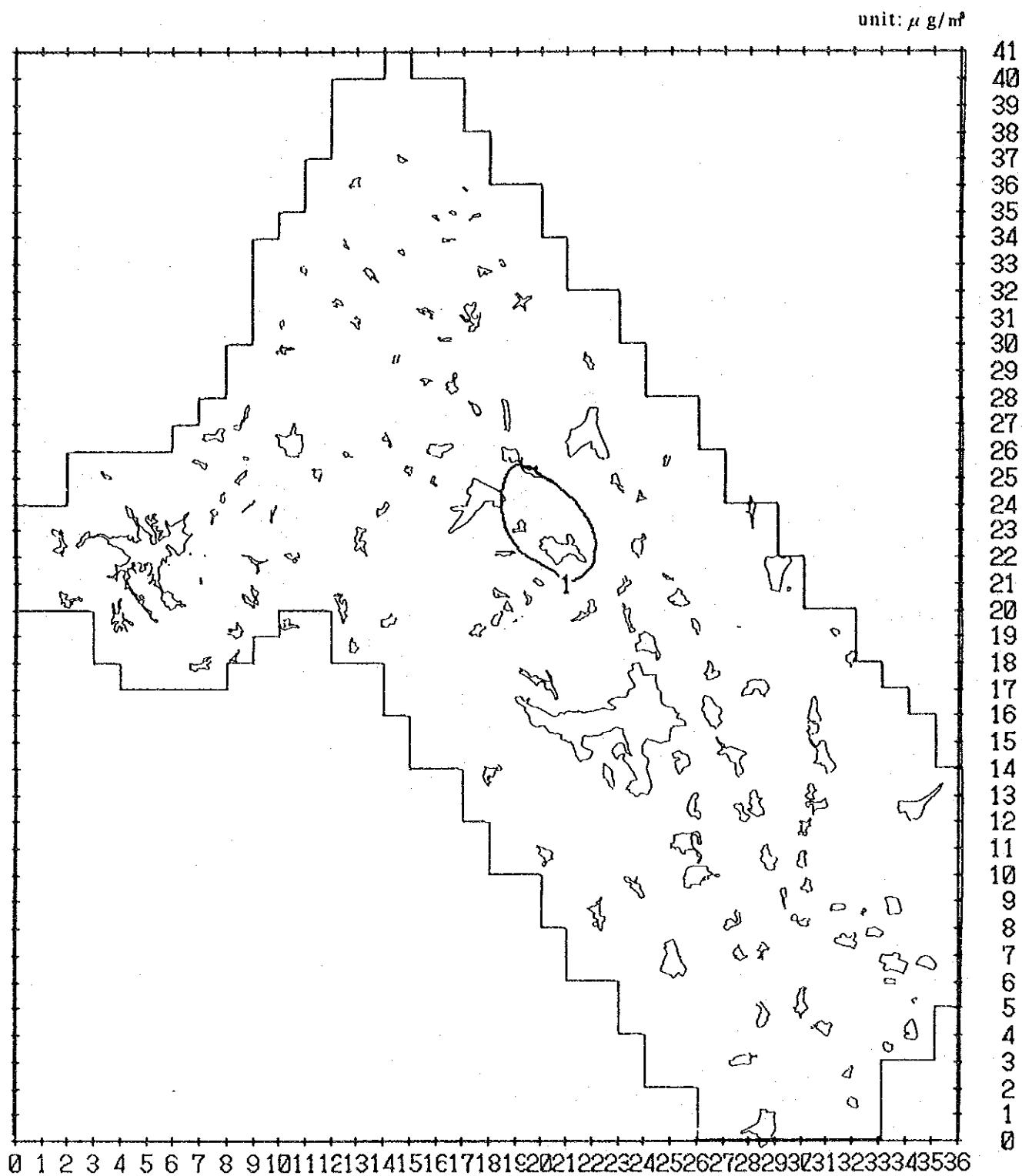


Figure D8.4.14 Annual Average Concentration Isopleth for NO₂ in 2005 (Case F-0, Borsod P.S.)

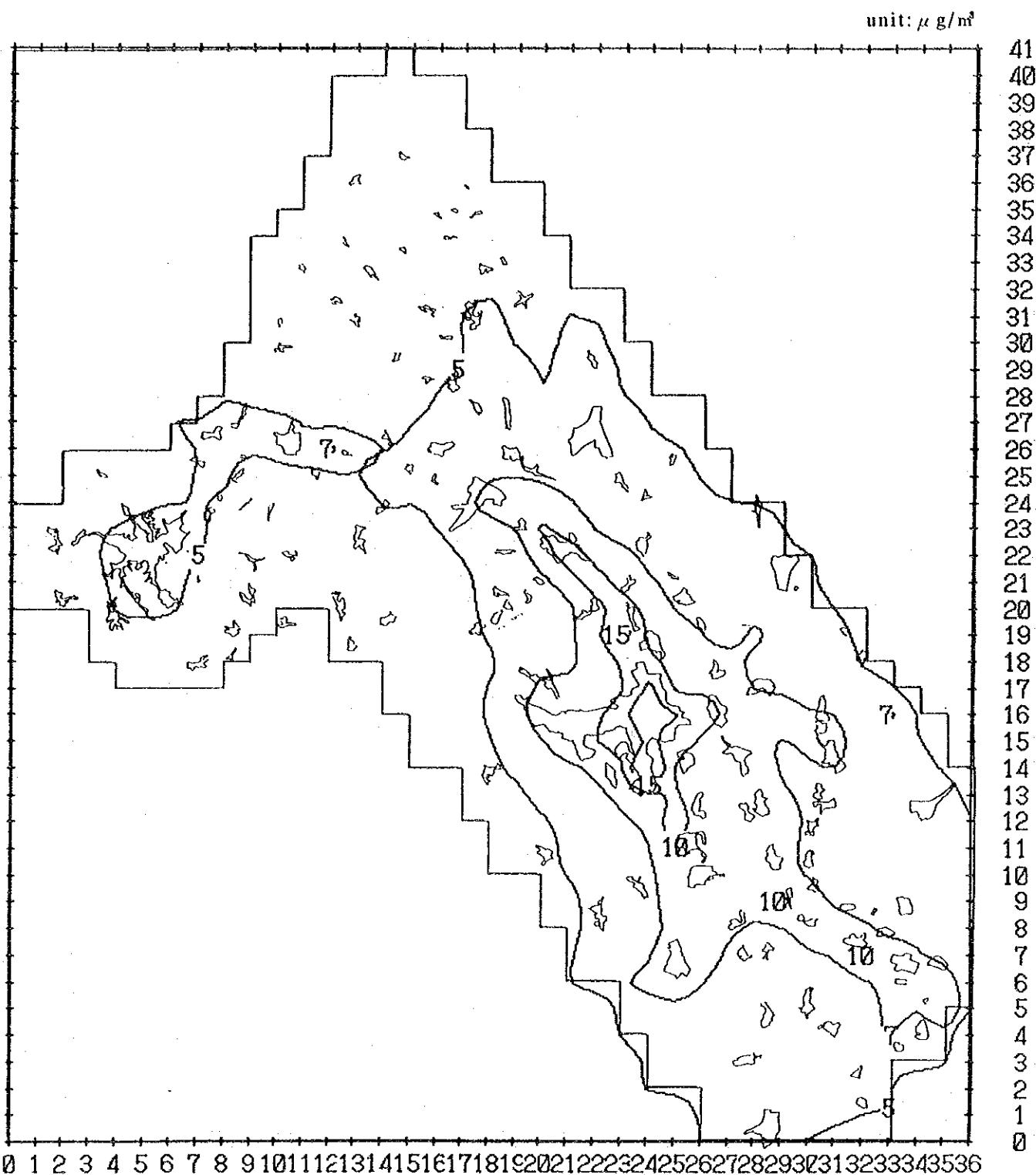


Figure D8.4.15 Average Concentration Isopleth for NO₂ in Non-heating Season (2005, Case F-1, All Sources)

unit: $\mu \text{g}/\text{m}^3$

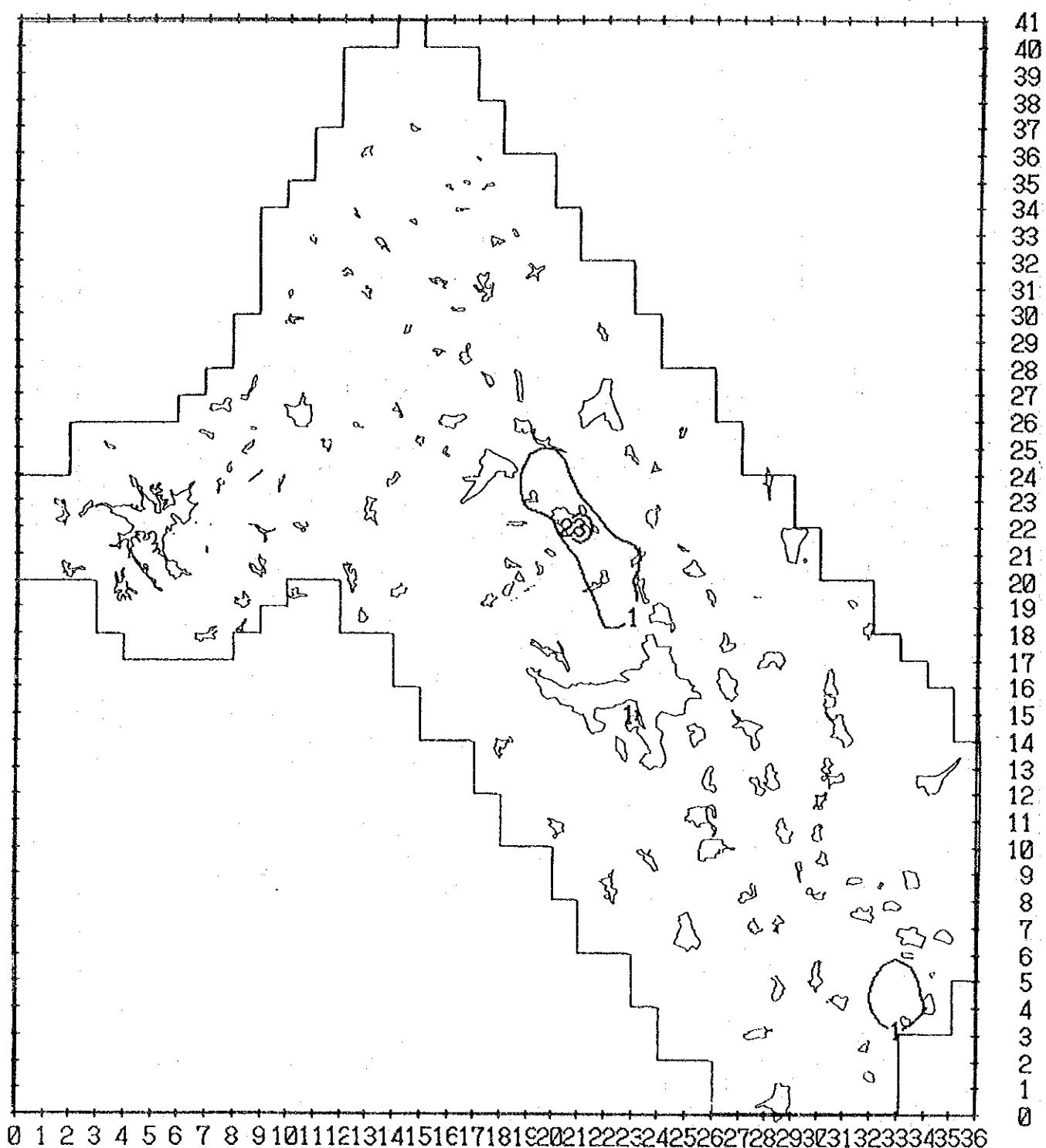


Figure D8.4.16 Annual Average Concentration Isopleth for NO₂ in 2005 (Case F-1, Industries)

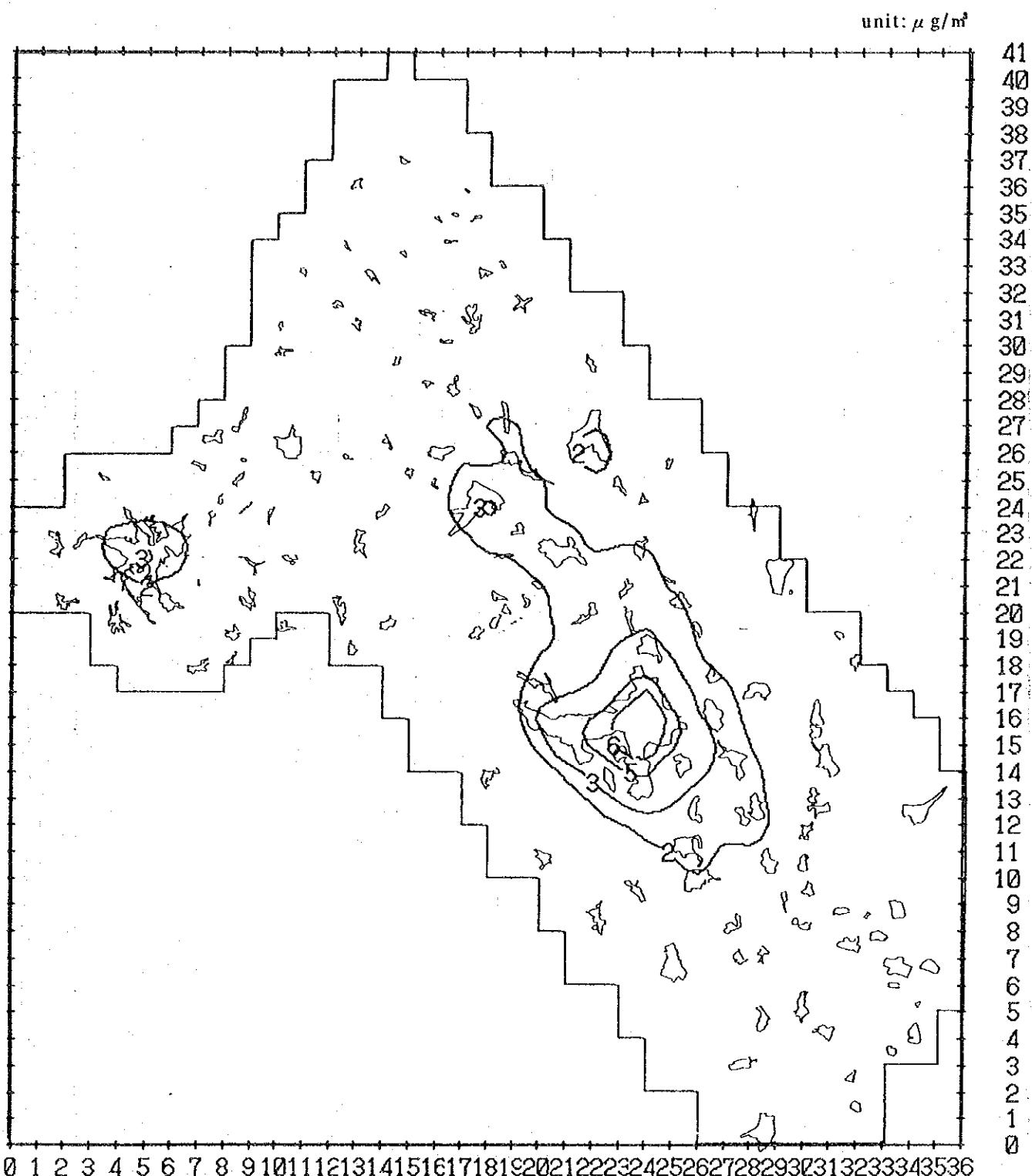


Figure D8.4.17 Annual Average Concentration Isopleth for NO₂ in 2005 (Case F-I, Communal Sources)

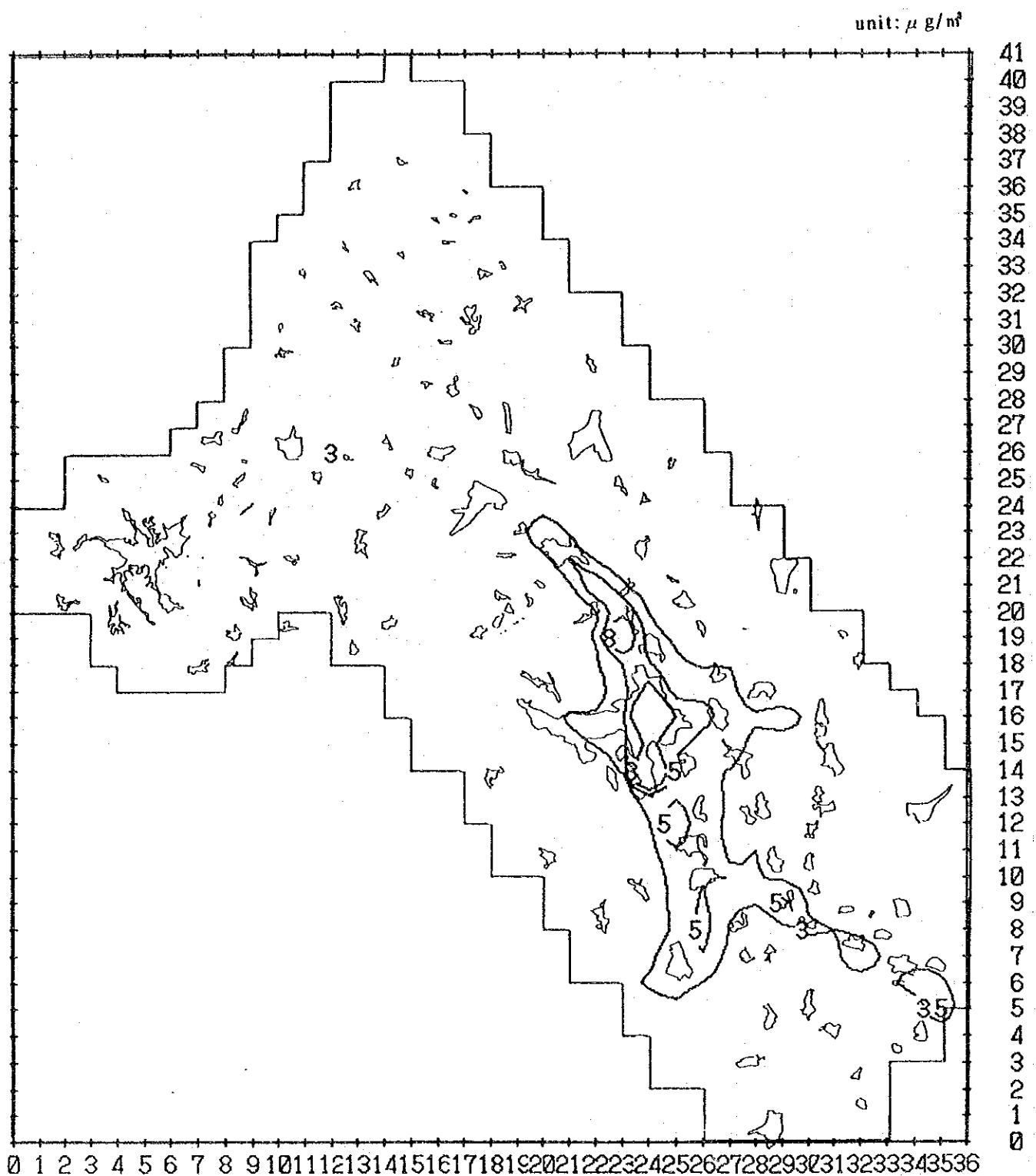


Figure D8.4.18 Annual Average Concentration Isopleth for NO₂ in 2005 (Case F-1, Motor Vehicles)

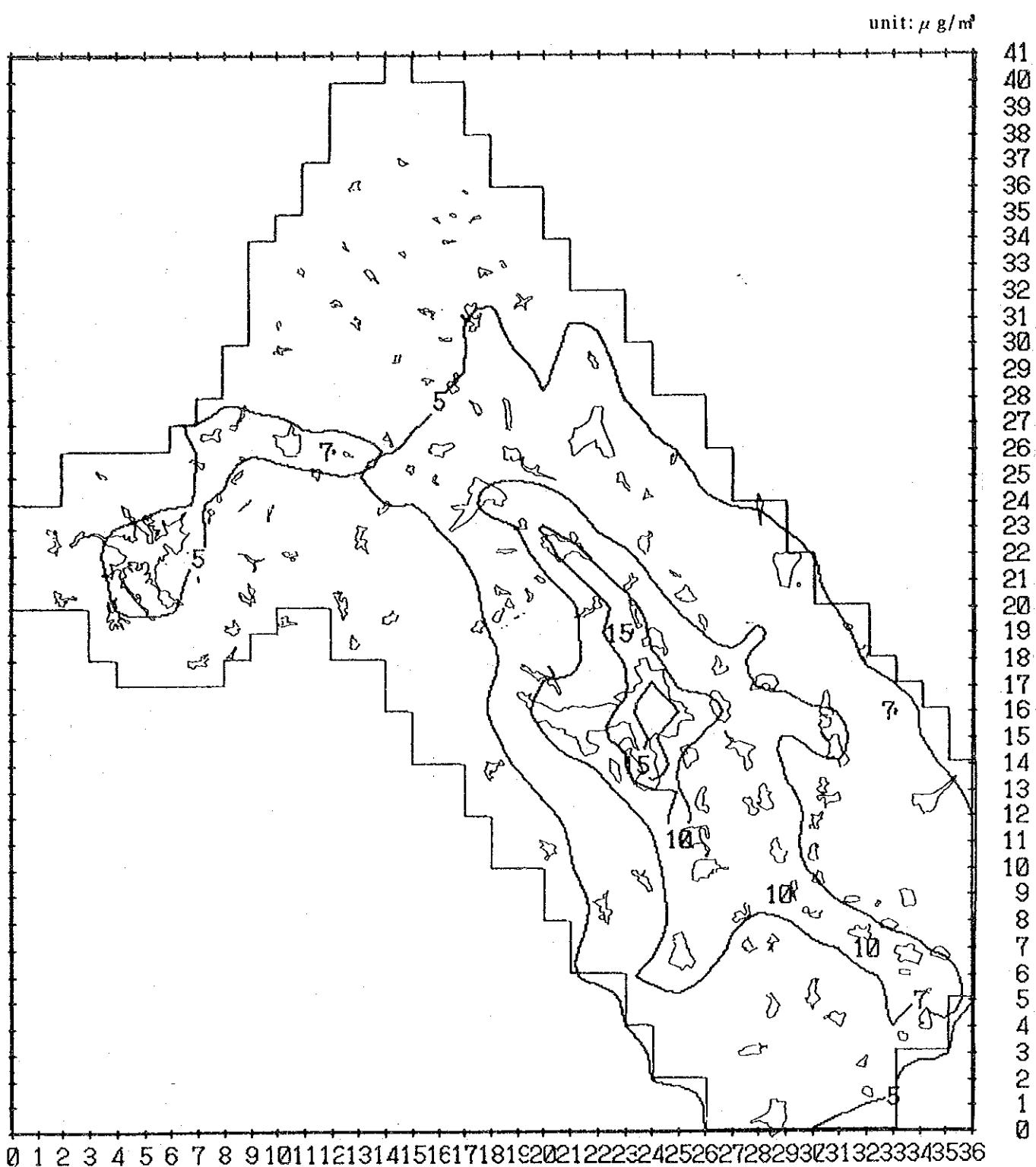


Figure D8.4.19 Average Concentration Isopleth for NO₂ in Non-heating Season (2005, Case F-2, All Sources)

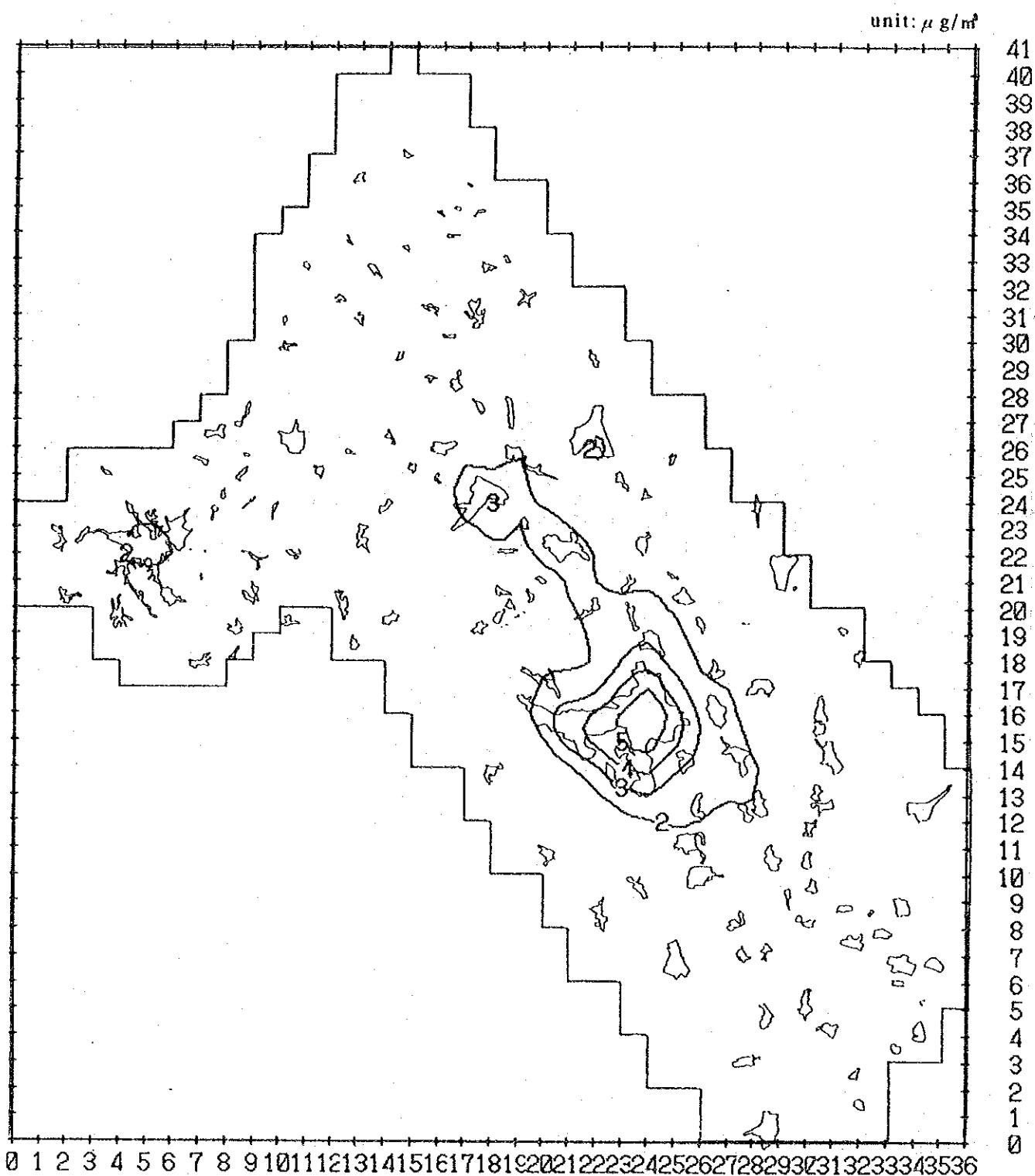


Figure D8.4.20 Annual Average Concentration Isopleth for NO₂ in 2005 (Case F-2, Communal Sources)

Future Condition (Non-Control)																			
SO ₂ , All Sources (All Season)																			
																			unit: μg/m ³
42									10	9									
41									10	10	10	10	10	7					
40									11	11	11	11	11	8					
39									12	12	13	12	12	9	9				
38									12	14	14	14	14	13	12	10			
37									11	14	16	16	16	15	14	11	10	10	
36									11	12	14	16	16	17	17	17	13	12	12
35									11	12	13	15	18	18	19	20	21	16	15
34									12	13	14	16	20	21	21	22	26	19	17
33									12	14	16	19	21	24	24	26	30	29	23
32									13	14	16	19	22	23	26	30	34	33	24
31									12	12	17	17	18	20	24	25	31	35	37
30									13	13	15	16	18	20	23	28	34	35	37
29									18	21	18	17	17	17	21	23	28	30	32
28									17	22	29	33	45	32	21	20	24	32	38
27									15	16	16	16	19	24	28	27	43	47	53
26									18	18	19	18	20	23	27	26	25	29	35
25									23	25	27	31	32	30	27	27	26	22	29
24									20	36	48	60	65	55	37	28	26	25	25
23									25	33	40	59	73	62	41	29	26	32	45
22									18	25	33	40	59	73	62	41	29	26	35
21									27	31	41	50	43	31	30	29	27	24	30
20									16	23	27	31	41	31	30	29	27	24	30
19									12	18	25	33	36	36	32	27	24	22	20
18									19	14	15	18	19	19	18	17	17	16	16
17									10	11	11	13	15	14	14	15	15	15	15
16									12	13	14	16	19	29	47	60	73	85	100
15									11	13	16	21	23	26	36	54	59	69	76
14									15	20	21	21	23	27	40	51	56	50	44
13									13	16	18	22	25	28	37	42	43	41	41
12									14	17	22	25	24	32	35	38	39	37	39
11									13	16	22	25	22	32	34	34	37	35	37
10									17	19	23	34	33	32	34	34	36	37	37
9									15	17	24	31	28	32	33	34	35	33	36
8									16	19	21	30	40	36	30	33	32	32	36
7									14	16	19	29	40	35	27	30	32	33	31
6									18	23	26	26	25	30	35	34	30	26	30
5									16	20	22	24	26	32	33	32	28	27	26
4									20	23	24	27	28	28	27	26	25	25	22
3									16	21	22	26	28	29	26	26	25	21	
2									20	24	39	38	24	24	22	18			
1									21	25	41	63	20	18	17	15			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Figure D8.4.21 Annual Average Concentration for SO₂ in 2005 (Case F-0, All Sources)

Future Condition (Non-Control)																		
SO ₂ , All Sources																		
(Heating Season)																		
																		unit: $\mu\text{g}/\text{m}^3$
42																		
41																		
40																		
39																		
38																		
37																		
36																		
35																		
34																		
33																		
32																		
31																		
30																		
29																		
28																		
27																		
26																		
25																		
24																		
23																		
22																		
21																		
20																		
19																		
18																		
17																		
16																		
15																		
14																		
13																		
12																		
11																		
10																		
9																		
8																		
7																		
6																		
5																		
4																		
3																		
2																		
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108
	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126
	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144
	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162
	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198
	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216
	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234
	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252
	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270
	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288
	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306
	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324
	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342
	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360

Figure D8.4.22 Average Concentration for SO₂ in Heating Season (2005, Case F-0, All Sources)

Future Condition (Non-Control)																
(Non-Heating Season)																
SO ₂ ; All Sources																
42								2	2							
41								2	2	3	3	3	3	2		
40								3	3	3	3	3	3	2		
39								3	3	3	3	3	3	2	2	
38								3	3	3	3	4	3	3	2	
37								2	3	4	4	4	4	4	3	3
36								2	3	3	4	4	4	4	3	3
35								2	3	3	3	4	4	5	5	3
34								3	3	3	4	4	5	5	6	4
33								3	3	4	4	5	6	6	8	6
32								3	3	4	4	5	5	7	8	9
31								2	2	4	4	4	5	5	6	8
30								2	3	3	3	4	5	5	7	9
29								4	4	4	3	3	3	5	6	7
28								4	5	7	10	9	7	4	4	5
27								3	3	3	3	4	5	6	6	7
26								3	3	3	3	4	5	5	5	5
25								3	4	4	5	6	6	6	7	8
24								3	5	6	7	8	5	5	5	6
23								3	5	6	7	8	5	5	5	6
22								3	4	5	6	7	8	5	5	6
21								2	3	5	6	7	6	5	5	4
20								1	5	5	4	4	4	3	4	3
19								2	2	2	3	3	3	3	3	3
18								2	2	2	3	3	3	3	3	3
17								3	3	3	4	5	7	11	14	19
16								3	3	4	4	5	9	11	12	19
15								3	3	4	5	5	6	8	15	19
14								3	5	5	5	6	11	13	15	14
13								3	3	4	4	5	6	9	11	12
12								3	3	5	5	5	8	9	10	11
11								3	3	5	5	4	8	8	9	10
10								3	4	5	9	8	8	9	10	11
9								3	3	5	8	7	8	9	9	10
8								3	4	5	8	11	10	8	9	9
7								3	4	4	8	11	10	7	8	9
6								4	6	7	7	7	8	9	9	9
5								3	6	6	7	7	9	10	10	10
4								6	7	7	8	8	8	9	9	10
3								4	6	6	7	8	8	8	9	9
2								6	7	11	11	8	8	8	7	7
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	33	34	35	36	37											

Figure D8.4.23 Average Concentration for SO₂ in Non-heating Season (2005, Case F-0, All Sources)

Future Condition (Non-Control)																	
(All Season)																	
SO ₂ , Industries																	
42																	
41																	
40																	
39																	
38																	
37																	
36																	
35																	
34																	
33																	
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9																	
8																	
7																	
6																	
5																	
4																	
3																	
2																	
1																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51

Figure D8.4.24 Annual Average Concentration for SO₂ in 2005 (Case F-0,Industries)

Future Condition (Non-Control)																																					
(Heating Season)																			unit: $\mu\text{g}/\text{m}^3$																		
SO ₂ , Industries																																					
42																																					
41																																					
40																																					
39																																					
38																																					
37																																					
36																																					
35																																					
34																																					
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6																																					
5																																					
4																																					
3																																					
2																																					
1																																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37

Figure D8.4.25 Average Concentration for SO₂ in Heating Season (2005, Case F-0, Industries)

		Future Condition (Non-Control) (Non-Heating Season)																																							
SO ₂ , Industries																																							unit: μg/m ³		
42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37					

Figure D8.4.26 Average Concentration for SO₂ in Non-heating Season (2005, Case F-0, Industries)

Future Condition (Non-Control)

SO₂, Borsod Pwer Plant Only (All Season)

unit: $\mu\text{g}/\text{m}^3$

Figure D8.4.27 Annual Average Concentration for SO₂ in 2005 (Case F-0, Borsod P.S.)

		Future Condition (Non-Control)																																				
		SO ₂ , Borsod Pwer Plant Only (Heating Season)																																				
Row	Column																																					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
42																																						
41																																						
40																																						
39																																						
38																																						
37																																						
36																																						
35																																						
34																																						
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6																																						
5																																						
4																																						
3																																						
2																																						
1																																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	

Figure D8.4.28 Average Concentration for SO₂ in Heating Season (2005, Case F-0, Borsod P.S.)

Future Condition (Non-Control)

SO₂, Borsod Pwer Plant Only (Non-Heating Season)

unit: $\mu\text{g}/\text{m}^3$

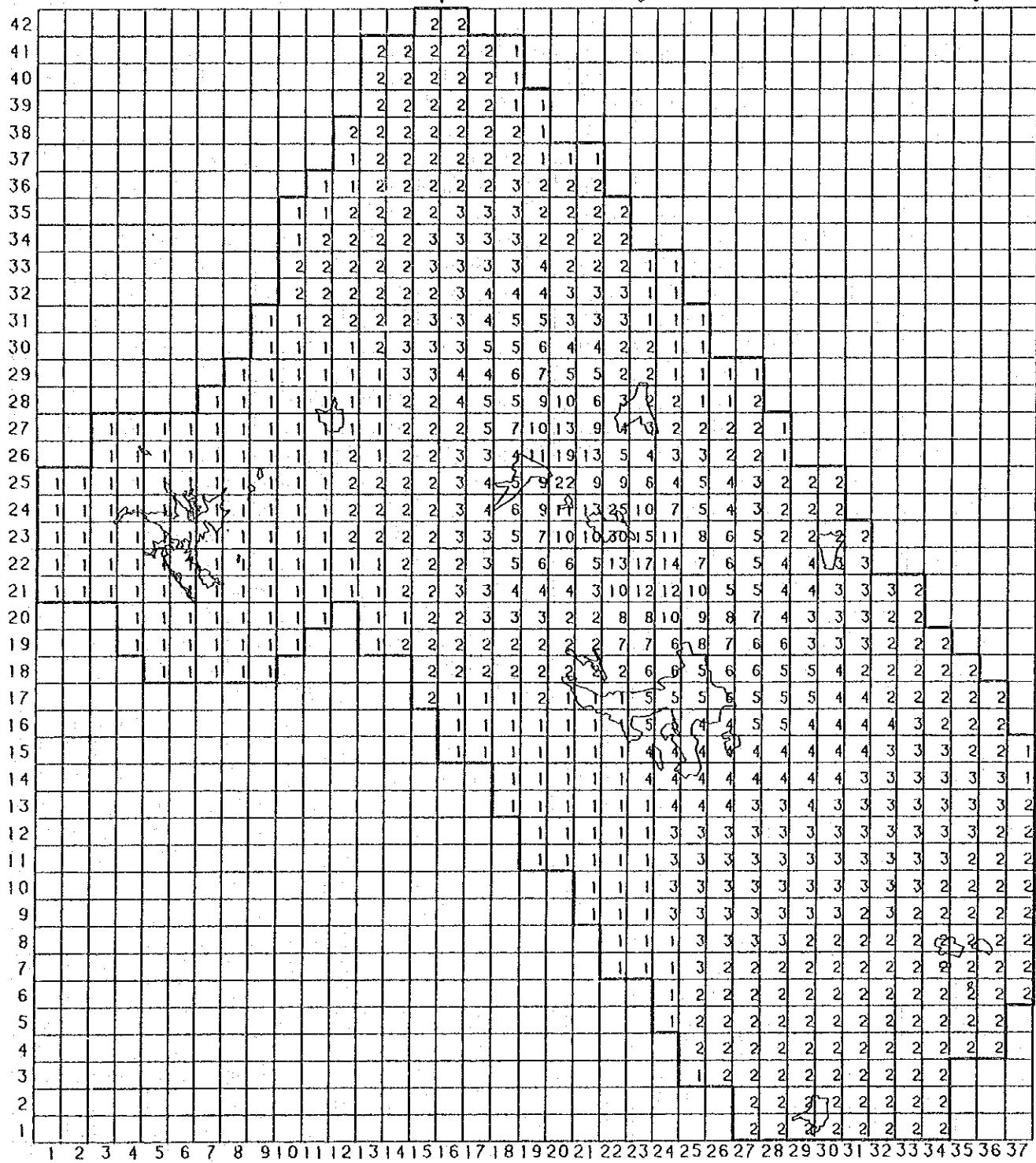


Figure D8.4.29 Average Concentration for SO₂ in Non-heating Season (2005, Case F-0, Borsod P.S.)

			Future Condition (Non-Control)					
NOx, All Sources			(All Season)			unit: $\mu\text{g}/\text{m}^3$		
42				7	7			
41				8	8	8	8	7
40				8	8	8	8	8
39				8	8	8	8	8
38				8	8	9	9	8
37				8	9	9	9	8
36				8	8	9	9	9
35				8	8	9	10	10
34				8	9	9	10	10
33				8	9	9	10	11
32				8	9	9	10	11
31				8	9	9	10	10
30				9	9	9	10	10
29				11	12	11	10	10
28				13	14	20	18	18
27				9	9	10	10	11
26				10	10	10	10	11
25				10	10	11	12	13
24				13	15	18	21	19
23				9	11	13	14	12
22				9	10	11	13	18
21				8	9	11	13	15
20				11	13	12	11	11
19				9	9	9	10	10
18				8	8	9	9	9
17					9	9	10	11
16					9	10	11	12
15					9	9	11	12
14					10	11	12	13
13					9	10	11	13
12						13	14	15
11						10	11	12
10						10	11	12
9						11	12	14
8						10	11	14
7						11	15	17
6						11	15	17
5						14	16	20
4						13	15	18
3						14	16	16
2						13	15	15
1						14	15	17
	1	2	3	4	5	6	7	8
	9	10	11	12	13	14	15	16
	17	18	19	20	21	22	23	24
	25	26	27	28	29	30	31	32
	33	34	35	36	37			

Figure D8.4.30 Annual Average Concentration for NOx in 2005 (Case F-0,All Sources)

Future Condition (Non-Control)																		
NO ₂ , All Sources (All Season)																		
unit: μg/m ³																		
42							6	6										
41							6	6	6	6	6	6						
40							6	6	6	6	6	6						
39							6	6	7	6	6	6	6					
38							6	7	7	7	7	7	7	6				
37							6	7	7	7	7	7	7	6	6			
36							6	7	7	7	7	7	7	7	7	7		
35							6	7	7	7	7	8	8	8	8	7	7	7
34							7	7	7	7	8	8	8	8	9	8	8	8
33							7	7	7	8	8	8	9	9	10	10	9	8
32							7	7	7	8	8	9	9	9	10	10	9	8
31							7	7	7	7	8	8	9	9	10	10	11	10
30							7	7	7	8	8	8	9	10	10	10	11	12
29							8	9	8	8	8	8	9	10	11	12	13	12
28							9	10	14	13	13	13	10	9	9	11	11	10
27							7	7	7	8	8	10	11	11	12	13	12	10
26							7	8	8	8	8	10	10	9	9	10	10	9
25							8	8	8	9	9	10	10	10	11	12	13	11
24							8	9	10	11	13	13	13	11	10	10	10	9
23							7	8	9	11	13	13	13	11	10	10	10	10
22							7	8	9	9	12	14	12	10	12	13	15	17
21							6	7	8	10	11	11	9	9	8	8	8	8
20							9	9	9	9	9	8	8	8	9	11	11	10
19							7	7	7	8	8	8	9	10	12	14	15	17
18							6	6	7	7	7	7	8	8	10	13	15	16
17																		
16																		
15																		
14																		
13																		
12																		
11																		
10																		
9																		
8																		
7																		
6																		
5																		
4																		
3																		
2																		
1																		

Figure D8.4.31 Annual Average Concentration for NO₂ in 2005 (Case F-0,All Sources)

			Future Condition (Non-Control)					
NO ₂ , All Sources			(Heating Season)			unit: μg/m ³		
1	2	3	4	5	6	7	8	9
42					9 9			
41					9 9 9 9 9 9			
40					10 10 10 10 10 10 9			
39					10 10 10 10 10 10 10 9			
38					10 10 10 11 10 10 10 10			
37					10 11 11 11 11 11 10 10 10			
36					10 10 11 11 11 11 11 11 10			
35					10 10 10 11 11 12 12 12 12 12 11 11 11			
34					10 10 11 11 12 12 12 13 14 13 12 12 12			
33					10 11 11 12 12 13 13 13 15 14 13 13 13 12 11			
32					10 11 11 12 13 13 14 14 16 15 14 14 14 13 12			
31					10 10 11 11 12 13 14 14 15 16 16 14 14 16 15 13 12			
30					11 11 11 12 12 12 13 15 15 16 17 15 15 17 17 14 13			
29					13 13 12 12 12 12 13 13 15 16 18 19 17 15 17 17 15 14 13 13			
28					14 15 20 18 19 16 14 13 14 16 17 18 21 20 17 19 20 16 15 14 13			
27					11 11 11 12 13 15 16 16 13 20 20 17 16 17 19 19 20 22 19 19 21 19 16 15 14 13			
26					12 12 12 12 13 15 15 14 14 15 15 15 18 18 19 23 23 23 23 20 20 20 17 16 15 14			
25					12 12 13 14 15 15 15 15 15 14 13 13 14 15 15 16 18 22 26 26 23 21 20 20 18 17 15 15 15 14			
24					12 14 15 22 20 20 17 14 14 14 13 14 15 15 15 16 19 22 24 29 25 21 21 20 17 16 16 16 15			
23					11 13 15 16 22 24 22 17 14 14 13 13 14 14 14 16 19 22 24 23 24 22 22 19 17 16 18 17 14			
22					11 12 13 15 15 20 19 15 14 14 14 13 14 13 13 14 15 18 20 21 25 33 24 22 21 18 17 19 14 16			
21					10 11 13 15 16 17 16 14 14 14 13 12 14 14 13 13 15 18 20 20 23 26 33 25 22 20 18 18 18 16 14 13			
20					13 14 14 13 13 13 13 12 13 13 13 13 14 16 18 19 22 25 42 27 23 21 19 20 17 16 15 13			
19					10 11 11 12 12 12 11 11 12 11 12 12 13 14 17 20 21 24 31 32 26 23 22 19 17 16 15 14 12			
18					10 10 10 11 11 11 11 11 12 12 14 18 22 23 25 32 43 29 27 23 20 18 17 16 14 13 12			
17					11 11 11 12 14 17 23 28 29 34 53 37 29 24 21 21 20 19 16 17 13 12			
16					11 11 12 13 15 19 25 28 24 33 34 26 25 21 18 19 19 16 14 13 12			
15					10 11 12 13 14 16 19 23 28 28 25 23 22 19 19 19 16 15 14 13 12			
14					11 13 14 15 16 19 23 28 28 24 23 22 20 19 18 17 15 15 15 13			
13					11 12 13 14 15 17 19 23 30 24 22 22 21 19 18 16 16 16 15 13			
12					11 12 14 15 16 18 20 26 24 22 22 21 19 18 16 15 15 15 13			
11					11 12 14 15 15 18 19 24 26 22 22 21 19 18 16 16 15 15 14			
10					13 13 15 18 19 22 26 22 21 19 18 17 17 15 14			
9					12 13 15 17 18 22 27 21 20 19 21 21 20 18 17 16 14			
8					13 15 17 19 25 26 19 20 18 19 20 24 18 19 17 14			
7					12 15 17 20 23 22 18 18 18 19 18 17 19 23 20 14			
6					15 17 20 19 17 18 17 18 18 17 17 16 17 16 14			
5					14 15 19 18 17 18 18 17 17 16 17 16 15 14			
4					15 17 17 16 17 17 16 16 16 16 15 14 13			
3					14 16 16 16 17 17 16 16 16 15 14			
2					15 16 18 17 14 13 12 12			
1	1	2	3	4	5	6	7	8

Figure D8.4.32 Average Concentration for NO₂ in Heating Season (2005, Case F-0, All Sources)

Future Condition (Non-Control)																	
(Non-Heating Season)																	
NO ₂ , All Sources																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
42									4	4							
41									4	4	4	4	4	4	4		
40									4	4	4	4	4	4	4		
39									4	4	4	4	4	4	4		
38									4	4	4	4	4	4	4		
37									4	4	5	5	5	5	4	4	4
36									4	4	4	5	4	5	5	5	4
35									4	4	4	4	5	5	5	5	5
34									4	4	4	5	5	5	5	5	5
33									4	4	5	5	5	5	6	5	5
32									4	4	4	5	5	5	5	6	5
31									4	4	4	4	5	5	5	6	5
30									4	4	4	5	5	5	6	7	6
29									5	5	5	5	5	5	6	6	5
28									6	6	9	8	7	6	5	5	5
27									4	4	5	5	5	6	7	10	8
26									4	4	5	5	5	6	6	5	5
25									4	4	5	5	5	6	6	7	8
24									4	5	5	5	6	6	5	6	7
23									4	5	5	5	6	5	5	6	7
22									4	4	5	5	5	5	5	6	7
21									4	4	5	5	6	5	5	6	5
20									5	6	5	5	5	5	5	6	6
19									5	5	4	5	5	4	5	6	6
18									5	5	5	5	5	5	5	6	6
17									5	5	5	5	6	5	6	7	6
16									5	5	5	6	6	8	10	12	12
15									5	5	5	6	6	7	8	9	10
14									5	5	6	6	7	8	10	12	12
13									5	5	5	6	6	7	8	10	11
12									5	5	6	6	7	7	9	11	11
11									5	5	6	6	7	7	8	10	10
10									5	5	6	7	8	11	14	10	11
9									5	5	6	7	8	10	14	10	11
8									6	7	8	9	13	13	9	9	8
7									6	8	9	11	11	10	8	8	8
6									7	8	9	9	8	8	8	9	10
5									6	7	8	8	7	8	8	8	9
4									7	7	7	7	8	7	7	7	7
3									6	7	7	7	7	7	7	7	6
2									6	7	7	7	7	7	7	6	6
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Figure D8.4.33 Average Concentration for NO₂ in Non-heating Season (2005, Case F-0, All Sources)

NO ₂ , Industries			Future Condition (Non-Control) (All Season)			unit: μg/m ³		
42			0 0					
41			0 0 0 0 0 0					
40			0 0 0 0 0 0					
39			0 0 0 0 0 0 0					
38			0 0 0 0 0 0 0 0					
37			0 0 0 0 0 0 0 0 0					
36			0 0 0 0 0 0 0 0 0					
35			0 0 0 0 0 0 0 0 0					
34			0 0 0 0 0 0 0 0 0					
33			0 0 0 0 0 0 0 0 0					
32			0 0 0 0 0 0 0 0 0					
31			0 0 0 0 0 0 0 0 0	0	1	0	0	0 0 0
30			0 0 0 0 0 0 0 0 0	0	1	1	1	0 0 0 0 0
29			0 0 0 0 0 0 0 0 0	0	1	1	1	1 0 0 0 0 0
28			0 0 0 1 0 0 0 0 0	0	1	1	1	1 0 0 0 0
27			0 0 0 0 0 0 0 0 0	0	0	1	1	1 1 0 0 0 0
26			0 0 0 0 0 0 0 0 0	0	0	0	1	2 2 1 1 1 1 0 0 0
25			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 2 2 2 1 1 1 1 0 0 0 0
24			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 2 2 2 1 1 1 1 0 0 0 0
23			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 2 2 2 1 1 1 1 0 0 0 0
22			0 0 0 0 0 0 0 0 0	0	0	0	0	0 1 2 2 2 1 1 1 1 0 0 0
21			0 0 0 0 0 0 0 0 0	0	0	0	0	0 1 1 2 1 1 1 1 1 1 1 0 0 0 0
20			0 0 0 0 0 0 0 0 0	0	0	0	0	0 1 1 1 1 1 1 1 1 1 1 0 0 0 0
19			0 0 0 0 0 0 0 0 0	0	0	0	0	0 1 1 1 1 1 1 1 1 1 1 0 0 0 0
18			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
17			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
16			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
15			0 0 0 0 0 0 0 0 0	0	1	1	1	1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
14			0 0 0 0 0 0 0 0 0	0	0	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
13			0 0 0 0 0 0 0 0 0	0	0	0	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
12			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
11			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
10			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
9			0 0 0 0 0 0 0 0 0	0	0	0	0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
8			0 0 0 0 0 0 0 0 0	0	0	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7			0 0 0 0 0 0 0 0 0	0	0	0	1	1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 1 1
6			0 0 0 0 0 0 0 0 0	0	0	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 2 3 1 1
5			0 0 0 0 0 0 0 0 0	0	0	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 1 1
4			0 0 0 0 0 0 0 0 0	0	0	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
3			0 0 0 0 0 0 0 0 0	0	1	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
2			0 0 0 0 0 0 0 0 0	0	1	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1			0 0 0 0 0 0 0 0 0	0	1	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	1	2	3	4	5	6	7	8
	9	10	11	12	13	14	15	16
	17	18	19	20	21	22	23	24
	25	26	27	28	29	30	31	32
	33	34	35	36	37			

Figure D8.4.34 Annual Average Concentration for NO₂ in 2005 (Case F-0,Industries)

			Future Condition (Non-Control)					
			(Heating Season)			unit: $\mu\text{g}/\text{m}^3$		
NO ₂ , Industries								
42				0	0			
41				0	0	0	0	0
40				0	0	0	0	0
39				0	0	0	0	0
38				0	0	0	0	0
37				0	0	0	0	0
36				0	0	0	0	0
35				0	0	0	0	0
34				0	0	0	0	0
33				0	0	0	0	0
32				0	0	0	0	0
31				0	0	0	0	0
30				0	0	0	0	0
29				0	0	0	0	0
28				0	0	1	0	0
27	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
17				0	0	0	0	0
16				0	0	0	0	0
15				0	0	0	0	0
14				0	0	0	0	0
13				0	0	0	0	0
12				0	0	0	0	0
11				0	0	0	0	0
10				0	0	0	0	0
9				0	0	0	0	0
8				0	0	0	0	0
7				0	0	0	0	0
6				0	1	1	1	1
5				0	0	1	1	1
4				1	1	1	1	1
3				0	1	1	1	1
2				1	1	1	1	1
1				1	1	1	1	1

Figure D8.4.35 Average Concentration for NO₂ in Heating Season (2005, Case F-0, Industries)