Item	A seam	B seam	C seam
	(%)	(%)	(%)
SiO_2	41.38 (34.54-48.66)	37.16 (35.54-38.78)	31.98 (25.94-40.85)
TiO_2	0.56 (0.49-0.63)	0.98 (0.97-0.99)	0.61 (0.58-0.65)
Al_2O_3	21.24 (16.96-27.27)	26.31 (25.21-26.41)	21.67 (18.80-28.30)
Fe_2O_3	25.65 (15.32-32.80)	21.17 (18.77-23.57)	25.53 (11.79-41.77)
MgO	1.92 (0.66-3.56)	2.79 (1.72-3.85)	2.99 (1.61-5.68)
CaO	4.10 (1.98-7.98)	6.54 (5.58-7.49)	10.13 (4.61-14.64)
Na_2O	0.72 (0.55-0.84)	0.72 (0.71-0.72)	0.62 (0.58-0.65)
K_2O	0.88 (0.51-1.58)	0.99 (0.88-1.09)	0.92 (0.67-1.27)
P_2O_5	0.21 (0.06-0.39)	0.21 (0.07-0.35)	0.13 (0.05-0.25)
SO_3	2.67 (0.82-5.83)	3.01 (2.25-3.77)	4.88 (3.93-5.55)
Fouling index $\frac{CaO+MgO}{Fe_2O_3}$	0.23 (0.09-0.40)	0.44 (0.39-0.50)	0.51 (0.15-1.43)

Note: A seam : Arithmetic mean of W-2, W-3 and S-1

B seam : Arithmetic mean of W-2 and W-3

C seam : Arithmetic mean of W-2, W-3, W-4 and the upper part of S-1

Values in ( ) show the ranges.

High Al_2O_3, Fe_2O_3, CaO and MgO contents are typical characteritics for Waringin coal. Na_2O content is desirable to be under 2 % for coal for power stations, with 0.84 % for the coal of A seam at W-2 as the maximum value. Others have less and so no problem will arise. Except C seam of W-4, the fouling index of Waringin coal is generally less than 1.0 %, which is accepted.

The X-ray powder diffraction analysis carried on the coal samples before the proximate analysis showed that the mineral matters in coal are mainly composed of kaolinite, quartz, siderite, pyrite (marcasite), calcite (aragonite) and dolomite (Dwg. 14). It is characteristic that no feldspar was found in them. Besides the above-mentioned minrals small amount of mica mineral were found. since Na_2O and TiO_2 were confirmed in the ash analysis, it is considered that feldspar and ilmenite may exist in such a small amount as they cannot be found by the X-ray diffraction analysis, and their contents are deemed very small.

The theoretical mineral compostions of ash (weight percent) were calculated based on the result of X-ray powder diffraction analysis together with chemical composition of ahs, the results are shown in the following table.

Coal seam	C seam at W-2	C seam at W-4	C seam at S-1
Depth (m)	462.83 - 463.60	280.40 - 287.16	364.50 - 372.50
Kaolin	45.09 %	22.32 %	68.65 %
Dolomite	3.51	25.18	1.15
Calcite, Aragonite	4.01	11.31	7.94
Siderite	40.96	4.03	15.87
Pyrite, Marcasite	2.78	7.73	1.25
Quartz	3.66	29.80	5.14

A wide fluctuations can be seen from it, presumably caused by the phenomenon that these mineral occurred secondarily in the coal seam. (dissemination along cracks, etc.) The major constituent mineral of the roof and floor of coal seam is kaolin accompanies with small amounts of mica minerals and quartz, and these minerals are considered to have existed primarily in the coal seams. Otherwise the minerals such as dolomite, calcite (aragonite), siderite and pyrite (marcasite) are considered to be of secondary origin.

Scanning electron microscopic observation did not find any pyrite or marcasite to be of primary origin in the coal sample. Consequently, all these minerals are thought of secondary origin and the fluctuation in the ash analytical values is considered to show the uneven distribution of mineral matters

in coal. This fact does not even contradict the sulfur analysis result by gravity separation (possible to remove by the float-and-sink dressing).

5.5 Petrographic Analysis and Fluidity Test

The results of petrographic analysis are shown in Table 15.

The test is performed using the Gieseler Plastometer. Petrographic analyis indicates that B and C seams seem to be undergone slightly higher degree of coalification than A seam. The coke strength revealed from the analysis of Table 15 are D_{15}^{30} = 65 for B seam and D_{15}^{30} = less than 47 for A and C seams in terms of the drum strength of JIS. High coke strength can not be obtained from this coal alone. The result of the fluidity test is summarized as follows from Table 12.

Coal seam	A seam			B seam		C seam		
Borehole No.	W-2	W-3	S-1	S-2	W-3	W-2	S-1*1	S-1 *2
Softening temperature (C°)	413	409	410	407	411	407	404	407
Maximum fluidity (DDPM)	1.4	1.5	1.7	1.8	1.3	2.1	4.5	3.0
Maximum fluidity temperature (C°)	426	423	428	420	423	432	430	432
Resolid temperature (C°)	543	453	458	456	453	453	456	456
Range (C°)	40	44	43	49	42	46	52	49

Table15. Petrographic analysis of coal from S-1

Coal seam	A seam	B seam	Upper part of C seam	Lower part of C seam
Vitrinite type (Vol.%)				
V 6	43.3	14.0	10.4	3.4
V 7	43.3	50.3	70.7	80.1
V 8		18.1	5.2	0.8
Maceral type (Vol.%)				
Vitrinite	86.6	82.4	86.3	84.3
Vitrinite	86.6	82.4	86.3	84.3
Psuedo-vitrinite	—	—	—	—
Exinite	8.9	6.3	8.0	5.0
Exinite	8.9	6.3	8.0	5.0
Resinite	—	—	—	
Inertinite	3.0	3.6	3.9	6.3
Sclerotinite	2.3	3.0	2.3	2.2
Micrinite	0.7	0.6	1.6	4.1
Semi-fusinite	—	—	—	—
Fusinite	—	—	—	—
Mineral matter	1.5	7.7	1.8	4.4
Mean Maximum reflectance (%)	0.70	0.76	0.75	0.74
Reactive entity (Vol.%)	95.5	88.8	94.3	89.3
Inert ontity,(Vol.%)	4.5	11.3	5.7	10.7
Composition balance index	0.15	0.39	0.19	0.37
Strength Index	2.45	2.69	2.53	2.67
Calculated coke strength	0	11	0	8

Analyzed by Coal Mining Research Center, Japan.

Note :*1 The upper part of C seam (352.86 - 364.50 m)
*2 The lower part of C seam (364.50 - 372.50 m)
The test is performed using the Gieseler Plastometer.

The maximum fluidity is very low and fluid range is narrow for coals in all seams.

5.6 Evaluation of Coal Quality

After going through coal quality analysis and tests, following considerations may be given to the A, B and C seams.

(1) Although there is slight different all coal considered to have same quality.

(2) Waringin coal may be classified as bituminous coal Cl according to the Japanese classification system and high volatile A bituminous coal, in ASTM classification.

(3) The Waringin coal quality generally is as follows:

(Raw coal basis)

I.M. (%)	3 - 4
Ash (4)	4 - 6
V.M. (%)	38 - 41
F.C. (%)	51 - 53
Total sulfur (%)	0.5 - 1.5
C.S.N.	3 - $4\frac{1}{2}$
C.V. (Kcal/Kg)	7,400 - 7,500
H.G.I.	43 - 48
Ash melting point (°C)	1,340 - 1,370

(4) The fair guality of Waringin coal, such as low ash content, high calorific value and weak-coking porperty, is good for steam coal and suitable for bending in coke making.

(5) On the other hand, the nitrogen content (1.8 - 2.2 %) and sulfur content (1 - 2 %) are slightly higher than expected.

CHAPTER 6

COAL RESERVES

CHAPTER 6. COAL RESERVES

6.1 Method and Basis for Coal Reserves Estimation

The area for the coal reserves estimation included not only the current exploration drilling area, but up to Sawah Luhung area. The eastern limit of the area lay in the Ombilin River (Ombilin fault). For A coal calculation, the southern limit lay in a line connecting the spot 250 m south of S-2 and the outcrop found near the hospital. The south limti of C coal calculation is the southern termination of the goaf.

Isopach lines were drawn on the basis of data of the drillings and of outcrops. The areas where the coal thickness is less than 1.0 m are omitted from estimation. Furthermore, the range with in 100 m from goaf is omitted for a water prevent pillar and the depth limit is down to 200 m below the sea level.

1) Block

The area is divided into 5 blocks of a, b, c, d and e by major faults, each of which is further divided into sub-blocks by the level, coal seam thickness and synclinal axis. As a result, A seam is divided into 63 sub-blocks, B seam into 4 ones and C seam into 32 ones.

2) Level

The level is divided into 5 groups of above +200 m, +200 m ∿ +100 m, +100 m ∿ ±0 m, ±0 m ∿ -100 m and -100 m ∿ -200 m.

3) Area

The area is determined on a plan of 1/5,000 by means of planimeter measurement.

4) Dip

Dips are determined from sturcture contour and the inclind area is calculated by multiplying the plan area by dip conversion ratios (secant).

5) Thickness of coal seam

Parting is not included in the thickness determination. Thicknesses of coal seam are determined from isopach lines drawn by the intra-and extrapolating methods on the basis of data of the drillings and outcrops. Thickness of coal seams in the current drillings (W and S series) are determined by multiplying apparent thicknesses by dip conversion ratios (cosine). Thicknesses of coal seams in the old drillings (SR and DH series) are determined by multiplying apparent thicknesses uniformly by 95 %, since dip angles are unkonwn. As for C seam coal reserves were estimated up to the thickness of 6 m and over it separately.

6) Specific gravity

The specific gravity of 1.3 is adopted uniformly. According to the analytical result specific gravity is 1.3 in about 5 % ash content. (Refer to Table 12).

7) Theoretical recoverable reserves

Theoretical recoverable reserves = Plan area x secant (inclined area) x thickness of coal seam x specific gravity (1.3)

The theoretical recoverable coal reserves stated here mean the coal reserves in situ within the range considered recoverable from the technical viewpoint.

8) Safety factor

The geological safety factor is determined for every sub-block based on stability of coal seam, that of geological structure and accuracy of survey (density of drillings and distance from the goaf). It ranges from 70 % to 85 %.

9) Safety reserves

Safety reserves = Theoretical recoverable reserves x safety factor

10) Recoverable factor

Since the recoverable factor is a element related to mining method and technique, it can not be decided without them. In the current calculation the usual value of 85 % is adopted for the recoverable factor.

11) Recoverable reserves

Recoverable reserves = Safety reserves x recoverable factor (85 %)

6.2 Coal Reserves

The coal reserves estimated based on the above-mentioned calculation methods and basis are as summarized follows from Table 16 and 17.

1,000 t

Coal seam	Theoretical recoverable coal reserves	Safety reserves	Recoverable reserves
A seam	15,610	12,145	10,316
B seam	1,606	1,285	1,092
C seam	18,238	14,016	11,912
Total	35,454	27,446	23,320

In the major part of the northern half of the area, only A seam exists, therefore, the reserve density (reserves / unit area) is rather low. Whether or not this northern half if exploitable depends upon the result of the feasibility study. Taking into consideration such factor as the high reserve density areas (where 2 or 3 seams of A, B and C coexists), distance from the supposed location of pit mouth expected in future (near the Lunto River), depth of coal seams and mining method, etc., the objective reserves for the future

are supposed to be in the following area and conditions:

Block e except for the east flank of the syncline.

Down to the depth of -100 m.

Up to the maximum workable thickness of 6 m in C seam.

(Refer to Dwg. 13)

The recoverable reserves according to the above-mentioned conditions are shown in the following table.

1,000 t

Level / Designation of seam	+200 - +100	+100 - ±0	±0 - -100	Total
A seam	926	1,400	1,836	4,162
B seam	109	394	376	879
C seam	712	1,814	3,161	5,687
Total	1,747	3,604	5,373	10,728

The area of this range is about 2.63 Km^2 and the mean coal reserve density is 4.1 ton/m^2. The coal reserves in the part of C seam where the thickness of the coal seam exceed 6 m within the above-mentioned range is 2,826 x 1,000 ton, which will be able to be mined in the future.

Table16. Coal Reserves (Summary)

1000 t

Coal Seam	Level / Block	～±0 In situ	～±0 Recoverable factor	～±0 Recoverable	±0～−100 In situ	±0～−100 Recoverable factor	±0～−100 Recoverable	～−100 Sub total In situ	～−100 Sub total Recoverable factor	～−100 Sub total Recoverable	−100～−200 In situ	−100～−200 Recoverable factor	−100～−200 Recoverable	～−200 Total In situ	～−200 Total Recoverable factor	～−200 Total Recoverable
A	a	920	72.2	664				920	72.1	664				920	72.2	664
	b	1,387	65.1	903				1,387	65.1	903				1,387	65.1	903
	c	663	63.8	423	247	59.5	147	910	62.6	570				910	62.6	570
	d	1,580	65.7	1,038	663	68.0	451	2243	66.4	1,489				2243	66.4	1,489
	e	3,926	66.5	2612	3,681	65.0	2392	7,607	65.8	5,004	2543	66.3	1,686	10,150	65.9	6,690
	Total	8476	66.5	5,640	4591	65.1	2,990	13067	66.0	8630	2543	66.3	1,686	15,610	66.1	10,316
B	e	740	68.0	503	553	68.0	376	1,293	68.0	879	313	68.0	213	1,606	68.0	1092
C	d	1,252	59.5	744				1,252	59.5	744				1,252	59.5	744
	e max 6.0m	3,588	70.4	2526	4,611	68.6	3,161	8,199	69.4	5,687	3,804	66.2	2519	12,003	68.4	8206
	e +6.0m	2,181	59.4	1,297	2,572	59.5	1,529	4,753	59.5	2826	230	59.5	136	4,983	59.5	2962
	e Sub total	5,769	66.3	3,823	7,183	65.3	4,690	12952	65.7	8513	4,034	65.8	2,655	16,986	65.7	11,168
	Total	7,021	65.0	4,567	7,183	65.3	4,690	14,204	65.2	9257	4,034	65.8	2,655	18238	65.3	11,912
Grand total		16237	66.0	10,710	12,327	65.4	8056	28564	65.7	18766	6,890	66.1	4,554	35,454	65.8	23,320

Reserves expected to be mined at early stage

recoverable 1000t

Coal Seam \ Level	～+100	+100～±0	±0～−100	Total
A	926	1,400	1,836	4,162
B	109	394	376	879
C	712	1,814	3,161	5,687
Total	1,747	3,604	5,373	10,728

Remasks

- Block" e" except east wing of syncline
- up to −100m
- 6m of maximum minable thickness for C seam

Table 17 Coal reserves caluculation

(i)

Coal Seam	Block №	Wing	Level	Plane area 1000㎡	Incl. degree	sec.	Calculation area 1000㎡	Coal thickness m	S.G	In situ reserves 1000t	Safety factor %	Safety reserves 1000t	Recov. factor %	Recoverable reserves 1000t	Remarks
	a1	W	～+200	108.3	13	1.026	111.1	1.25	1.3	181	85	153	85	130	
	a2－1	W	+200～+100	147.9	13	1.026	151.7	1.25	1.3	247	85	210	85	178	
	a2－2	〃	〃	29.5	〃	〃	28.2	1.50	〃	55	〃	47	〃	40	
	a2－3	E	〃	52.5	10	1.015	53.3	1.25	〃	87	〃	74	〃	63	include ～+200
	a2－4	〃	〃	155.5	11	1.019	158.5	1.70	〃	350	〃	298	〃	253	－do－
	a2 Sub total		+200～+100							739		629		534	
	a total									920		782		664	
A	b1－1	W	+200～+100	118.6	17	1.046	124.1	1.25	1.3	202	70	141	85	120	
	b1－2	〃	〃	78.1	〃	〃	81.7	1.50	〃	159	80	127	〃	108	
	b1－3	E	〃	156.0	16	1.040	162.2	1.75	〃	369	〃	295	〃	251	
	b1－4	〃	〃	99.8	〃	〃	103.8	2.00	〃	270	70	189	〃	161	
	b1 Sub total		+200～+100							1,000		752		640	
	b2－1	W	+100～±0	103.0	9	1.012	104.2	1.75	1.3	237	80	190	85	161	
	b2－2	E	〃	65.3	〃	〃	66.1	〃	〃	150	〃	120	〃	102	
	b2 Sub total		+100～±0							387		310		263	
	b total									1,387		1,062		903	
	c1－1	W	～+200	137.5	14	1.031	141.8	1.25	1.3	230		196		166	
	c2－1	W	+100～±0	53.0	10	1.015	53.8	1.25	1.3	87	70	61	85	52	
	c2－2	〃	〃	66.5	〃	〃	67.5	1.75	〃	154	〃	107	〃	91	
	c2－3	E	〃	68.0	15	1.035	70.4	2.10	〃	192	〃	134	〃	114	
	c2 Sub total		+100～±0							433		302		257	

Coal seam	Block №	Wing	Level	Plane area 1000㎡	Incl. degree	sec.	Calculation area 1000㎡	Coal thickness m	S.G	In situ reserves 1000t	Safety factor %	Safety reserves 1000t	Recov. factor %	Recoverable reserves 1000t	Remarks
	c3—1	W	±0～—100	53.0	10°	1.015	53.8	2.00	1.3	140	70	98	85	83	
	c3—2	E	〃	40.5	〃	〃	41.1	2.00	〃	107	〃	75	〃	64	
	c3 Sub total		±0～—100							247		173		147	
	c Total									910		671		570	
	d1—1	W	～+200	159.5	14	1.031	164.4	1.75	1.3	374	80	299	85	254	
	d1—2	〃	〃	111.0	〃	〃	114.4	1.25	〃	186	70	130	〃	111	include +200～
A	d Sub total		～+200							560		429		365	
	d2—1	W	+100～±0	141.3	11	1.019	144.0	1.25	1.3	234	70	164	85	139	include ～+100
	d2—2	〃	〃	164.3	〃	〃	167.4	1.75	〃	381	80	305	〃	259	
	d2—3	〃	〃	67.4	〃	〃	68.7	2.00	〃	179	〃	143	〃	121	
	d2—4	E	〃	80.0	15	1.035	82.8	2.10	〃	226	〃	181	〃	154	
	d2 Sub total		+100～±0							1,020		793		673	
	d3—1	W	±0～	180.4	11	1.019	183.8	2.10	1.3	502	80	401	85	341	
	d3—2	E	〃	57.0	15	1.035	59.0	2.10	〃	161	〃	129	〃	110	
	d3 Sub total		±0～							663		530		451	
	d Total									2,243		1,752		1,489	
	e1—1	W	+200～+100	166.6	16	1.040	173.3	2.10	1.3	473	80	378	85	322	
	e1—2	〃	〃	99.6	〃	〃	103.6	1.75	〃	236	〃	189	〃	160	
	e1—3	〃	〃	85.8	〃	〃	89.2	1.75	〃	145	70	102	〃	86	
	e1—4	〃	〃	23.6	24	1.095	25.8	1.25	〃	42	〃	29	〃	25	
	e1—5	〃	〃	21.6	〃	〃	23.7	1.75	〃	54	85	46	〃	39	
	e1—6	〃	〃	98.3	〃	〃	107.6	2.00	〃	280	〃	238	〃	202	include ～+200
	e1—7	〃	〃	35.2	〃	〃	38.5	1.75	〃	88	〃	75	〃	63	—do

Coal seam	Block №	Wing	Level	Plane area 1000㎡	Incl. degree	sec.	Calculation area 1000㎡	Coal thickness m	S.G	In situ reserves 1000t	Safety factor %	Safety reserves 1000t	Recov. factor %	Recoverable reserves 1000t	Remarks
	e 2-8	W	+200～+100	24.3	24	1.095	26.6	1.25	1.3	43	80	35	85	29	
			+200～+100							1,361		1,092		926	
	e 2-1	W	+100～±0	466.3	18	1.051	490.1	2.15	1.3	1,370	80	1,096	85	931	
	e 2-2	〃	〃	50.3	〃	〃	52.9	1.75	〃	120	〃	74	〃	63	
A	e 2-3	〃	〃	50.3	〃	〃	52.9	1.25	〃	86	70	60	〃	51	
	e 2-4	〃	〃	54.5	〃	〃	57.3	1.25	〃	93	〃	65	〃	55	
	e 2-5	〃	〃	52.9	〃	〃	55.6	1.75	〃	126	85	108	〃	91	
	e 2-6	〃	〃	72.7	21	1.071	77.9	2.00	〃	202	〃	172	〃	146	
	e 2-7	〃	〃	28.0	25	1.103	30.9	1.75	〃	70	〃	60	〃	51	
	e 2-8	〃	〃	9.6	〃	〃	10.6	1.25	〃	17	80	14	〃	12	
	e 2-9	E	〃	79.4	15	1.035	82.2	2.00	〃	214	70	150	〃	127	
	e 2-10	〃	〃	113.5	〃	〃	117.5	1.75	〃	267	〃	187	〃	159	
	e2 Sub total		+100～±0							2565		1,986		1,686	
	e 3- 1	W	±0～-100	545.0	14	1.031	561.9	2.05	1.3	1,497	80	1,198	85	1,018	
	e 3- 2	〃	〃	265.0	〃	〃	273.2	1.80	〃	639	〃	510	〃	433	
	e 3- 3	〃	〃	69.5	16	1.040	72.3	1.75	〃	164	〃	101	〃	86	
	e 3- 4	〃	〃	64.0	〃	〃	66.6	1.25	〃	108	70	76	〃	64	
	e 3- 5	〃	〃	44.0	20	1.064	46.8	1.25	〃	76	〃	53	〃	45	
	e 3- 6	〃	〃	45.6	23	1.086	49.5	1.75	〃	113	85	96	〃	81	
	e 3- 7	〃	〃	28.4	25	1.103	31.3	2.00	〃	81	〃	69	〃	59	
	e 3- 8	〃	〃	27.4	〃	〃	30.2	1.75	〃	69	〃	58	〃	50	
	e 3- 9	E	〃	64.5	15	1.035	66.8	2.00	〃	174	70	121	〃	103	
	e 3-10	〃	〃	237.6	〃	〃	245.9	1.75	〃	559	〃	392	〃	333	
	e 3-11	〃	〃	106.7	〃	〃	110.4	1.40	〃	201	〃	141	〃	120	
	e3 Sub total		±0～-100							3,681		2,815		2,392	

Coal seam	Block №	Wing	Level	Plane area 1000㎡	Incl. degree	sec.	Calculation area 1000㎡	Coal thickness m	S.G	In situ reserves 1000t	Safety factor %	Safety reserves 1000t	Recov. factor %	Recoverable reserves 1000t	Remarks
	e4-1	W	-100～-200	565.0	13	1,026	579.7	1.70	1.3	1,281	80	1,025	85	871	
	e4-2	〃	〃	58.5	〃		60.0	1.40	〃	109	〃	87	〃	74	
	e4-3	〃	〃	88.8	16	1,040	92.4	2.00	〃	240	〃	192	〃	163	
A	e4-4	〃	〃	72.0	17	1,046	75.3	1.75	〃	171	〃	137	〃	117	
	e4-5	〃	〃	47.0	20	1,064	50.0	1.25	〃	81	70	57	〃	48	
	e4-6	〃	〃	38.5	23	1,086	41.8	1.25	〃	68	〃	48	〃	40	
	e4-7	〃	〃	63.6	〃	〃	69.1	1.75	〃	157	85	134	〃	114	
	e4-8	E	〃	33.8	18	1,051	35.5	1.70	〃	79	70	55	〃	47	
	e4-9	〃	〃	186.5	〃	〃	196.0	1.40	〃	357	〃	250	〃	212	
	e4 Sub total		-100～-200							2,543		1,985	〃	1,686	
	e Total									10,150		7,878	〃	6,690	
	A Seam Total									15,610		12,145		10,316	
	e1	W	～+100	117.0	19	1,058	123.8	1.00	1.3	161	80	129	85	109	
	e2	〃	+100～±0	382.5	〃	〃	404.7	1.10	〃	579	〃	463	〃	394	
B	e3	〃	±0～-100	314.5	16	1,040	327.1	1.30	〃	553	〃	442	〃	376	
	e4	〃	-100～-200	174.3	20	1,064	185.5	1.30	〃	313	〃	251	〃	213	
	B Seam Total									1,606		1,285		1,092	
	d1	W	～+200	150.0	15	1,035	155.3	4.50	1.3	908	70	636		540	
C	d2	〃	+200～+100	85.1	〃	〃	88.1	3.00	〃	344	〃	240		204	
	d Total									1,252		876		744	

Coal seam	Block No.	Wing	Level	Plane area 1000㎡	Incl. degree	sec.	Calculation area 1000㎡	Coal thickness m	S.G	In situ reserves 1000t	Safety factor %	Safety reserves 1000t	Recov. factor %	Recoverable reserves 1000t	Remarks
	e1-1	W	~+100	16.8	18	1.051	17.7	2.00	1.3	46	70	32	85	27	maximum
	e1-2	〃	〃	25.6	20	1.064	27.2	4.50	〃	159	80	127	〃	108	6.0 m
	e1-3	〃	〃	24.2	21	1.071	25.9	6.00	〃	202	85	172	〃	146	
	e1-4	〃	〃	54.8	〃	〃	58.7	〃	〃	458	〃	389	〃	331	
	e1-5	〃	〃	8.1	24	1.095	8.9	〃	〃	69	〃	59	〃	50	
	e1-6	〃	〃	14.4	28	1.133	16.3	4.00	〃	85	70	59	〃	50	
C	e1 Sub total		~+100							1,019		838		712	
	e'1-3	W	~+100	24.2	21	1.071	25.9	1.50	1.3	51	70	35	85	30	+6.0 m
	e'1-4	〃	〃	54.8	〃	〃	58.7	4.50	〃	343	〃	240	〃	204	
	e'1-5	〃	〃	8.1	24	1.095	8.9	1.50	〃	17	〃	12	〃	10	
	e'1 Sub total	〃	~+100							411		287		244	
	e1+e'1 Sub total		~+100							1,430		1,125		956	
	e2-1	W	+100~±0	42.0	15	1.035	43.5	1.00	1.3	57	70	40	85	34	
	e2-2	〃	〃	29.0	17	1.046	30.3	2.00	〃	79	70	55	〃	47	maxim
	e2-3	〃	〃	39.3	〃	〃	41.1	4.50	〃	240	80	192	〃	164	6.0 m
	e2-4	〃	〃	42.0	〃	〃	43.9	6.00	〃	343	85	291	〃	248	
	e2-5	〃	〃	74.4	18	1.051	78.2	〃	〃	610	〃	518	〃	441	
	e2-6	〃	〃	82.0	21	1.071	87.8	〃	〃	685	〃	582	〃	495	
	e2-7	〃	〃	17.4	〃	〃	18.6	〃	〃	145	〃	124	〃	105	
	e2-8	〃	〃	13.5	24	1.095	14.8	〃	〃	115	〃	98	〃	83	
	e2-9	〃	〃	20.0	25	1.103	22.1	〃	〃	172	〃	146	〃	124	
	e2-10	〃	〃	21.0	27	1.112	23.6	4.00	〃	123	70	86	〃	73	
	e2 Sub total									2,569		2,132	〃	1,814	

Coal seam	Block №	Wing	Level	Plane area 1000㎡	Incl. degree	sec.	Calculation area 1000㎡	Coal thickness m	S.G	In situ reserves 1000t	Safety factor %	Safety reserves 1000t	Recov. factor %	Recoverable reserves 1000t	Remarks
	e'2-4	W	+100~±0	42.0	17	1.046	43.9	1.50	1.3	86	70	60	85	51	
	e'2-5	〃	〃	74.4	18	1,051	78.2	4.50	〃	457	〃	320	〃	272	
	e'2-6	〃	〃	82.0	21	1.071	87.8	7.50	〃	856	〃	599	〃	509	
	e'2-7	〃	〃	17.4	〃	〃	18.6	10.00	〃	242	〃	170	〃	144	
	e'2-8	〃	〃	13.5	24	1.095	14.8	4.50	〃	86	〃	61	〃	51	
C	e'2-9	〃	〃	20.0	25	1,103	22.1	1.50	〃	43	〃	30	〃	26	
	e'2 Sub total		+100~±0							1,770		1,240		1,053	
	e2+e'2 Sub total		+100~±0							4,339		3,372		2867	
	e3-1	W	±0~-100	404.5	15	1,035	418.7	2.00	1.3	1,089	70	762	85	648	
	e3-2	〃	〃	87.0	16	1,040	90.5	4.50	〃	529	80	423	〃	360	
	e3-3	〃	〃	55.0	〃	〃	57.2	6.00	〃	446	85	379	〃	322	
	e3-4	〃	〃	150.0	〃	〃	156.0	〃	〃	1,217	〃	1,034	〃	879	
	e3-5	〃	〃	91.9	17	1,046	96.1	〃	〃	750	〃	637	〃	542	
	e3-6	〃	〃	41.5	18	1,051	43.6	〃	〃	340	〃	289	〃	246	
	e3-7	〃	〃	20.5	20	1,064	21.8	〃	〃	170	〃	145	〃	123	
	e3-8	〃		12.5	21	1,071	13.4	4.00	〃	70	70	49	〃	41	
	e3 Sub total									4,611		3,718		3,161	
	e'3-3	W	±0~-100	55.0	16	1,040	57.2	1.50	1.3	112	70	78	85	66	
	e'3-4	〃	〃	150.0	〃	〃	156.0	4.50	〃	913	〃	639	〃	543	
	e'3-5	〃	〃	91.9	17	1,046	96.1	7.50	〃	937	〃	656	〃	558	
	e'3-6	〃	〃	41.5	18	1,051	43.6	10.00	〃	567	〃	397	〃	337	
	e'3-7	〃	〃	20.5	20	1,064	21.8	1.50	〃	43	〃	30	〃	25	
	e'3 Sub total		±0~-100							2,572		1,800		1,529	
	e3+e'3 Sub total		±0~-100							7,183		5,518		4,690	

Coal seam	Block №	Wing	Level	Plane area 1000㎡	Incl. degree	sec.	Calculation area 1000㎡	Coal thickness m	S.G	In situ reserves 1000t	Safety factor %	Safety reserves 1000t	Recov. factor %	Recoverable reserves 1000t	Remarks
	e4-1	W	-100～-200	390.9	16	1.040	406.8	2.00	1.3	1,057	70	740	85	629	
	e4-2	〃	〃	185.9	15	1.035	192.4	4.50	〃	1,126	80	900	〃	765	
	e4-3	〃	〃	55.9	〃	〃	57.9	6.00	〃	451	85	384	〃	326	
C	e4-4	〃	〃	68.5	21	1.071	73.4	2.00	〃	191	70	134	〃	113	
	e4-5	〃	〃	81.8	〃	〃	87.6	4.50	〃	513	80	410	〃	349	
	e4-6	〃	〃	55.8	〃	〃	59.8	6.00	〃	466	85	396	〃	337	
	e4 Sub total		-100～-200							3,804		2,964		2,519	
	e'4-3	W	-100～-200	55.9	15	1.035	57.9	1.50	1.3	113	70	79	85	67	
	e'4-4	〃	〃	55.8	21	1.071	59.8	1.50	〃	117	〃	82	〃	69	
	e'4 Sub total		-100～-200							230		161		135	
	e4+e'4 Sub total		-100～-200							4,034		3,125		2,655	
	e total									16,986		13,140		11,168	
	C Seam total									18,238		14,016		11,912	

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