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Market Research Report of Coal Industry in China

2007

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Appendix 1

According to *the Regulation of Coal Exploration* issued by the Committee of China Mineral Resources in 1986, coal resources are categorized into usable reserves and useless reserves.

Coal resources: The estimates cover all coal existing on the earth, which can be economically exploited and which may not be reasonable prospects for economic extraction at this stage, but probably in the feature.

Useable reserves: The coal resources that can be used under the present-day mining technological and economic conditions.
Useless reserves: The coal resources which can not be economically utilized under the current mining technology without causing problems of legislation and environments, because they are of too small thickness, or too high ash content, or too difficult to be mined as results of the complication of the geological and hydrogeological conditions.

In turn, the *Useable reserves* can also be divided into demonstrated reserves and recoverable or available reserves:
Demonstrated (or proven) reserves: The part of useable reserves which was measured and estimated by means of geological mapping, drilling, sampling and other geophysical investigation etc., and then was re-examined and approved by the authority of mineral resources of China (i.e., State Ore Reserve Committee). This category can be in divided into A, B, C and D grade, based on degree of exploration.

Recoverable reserves The currently remained demonstrated reserves of a given coalfield or a given mining area that is calculated from:

Recoverable reserves = Total demonstrated reserves –/+ Adjustment - Mined amount – Loss during the mining – Other reductions
Where the total demonstrated reserves is the reserves reported in the final exploration documents; the adjustment signifies the reserve change resulted during the re-examination of SORC, the mined amount is the updated outputs from this area/mine, and the coal loss during the mine includes all coal which are left underground and will never be mined as natural and technological reasons, which depends on mining methods. Other reduction may include all allowances for loss and dilution occurring during the coal exploitation. This category can be in divided into A, B, C and D grades, based on the density of controlling points.

Recoverable reserves are changeable in the mining districts.

Based on degree of geological exploration and research (Level A through C), referring to the current condition of technology and economics as well as demand of coal mining planning and design, the **demonstrated reserves** can be classified into A, B, C, and D, among of which A and B are the advanced reserves.
Grade A reserves (GA) the reserves based on data obtained at the precise exploration stage (Level A) from strictly controlling and detailed geological research. They provide a highest level of confidence in the deposit sufficient for detailed mine plan and provide specifications for a marketable production (likely correcting to measured reserve in Australia).
Grade B reserves (GB) the reserves based on data obtained at the stages of the detailed exploration (Level B)and the precise exploration (Level A) from the systematic explorative controlling and precise geological research. They provides a higher level of confidence in the deposit sufficient to generate mine plains and determine the likely quality of product coal (likely correcting to the indicated reserves in Australia).

Grade C reserves (**GC**) the reserves based on data obtained from less controlled areas during the different stages from the reconnaissance (Level C) to precise exploration (Level A). from the explorative controlling and geological research. Addition to GA and GB, They provide the basis to confirm potential for coal mine plan and further exploration.

Grade D reserves the reserves indicated by regional geological mapping and investigation (Level D) with some point controls and well as the all stage of exploration (Level D to A). They provide a relative lower confidence in deposit and basis for the further coal exploration or small scale coal mining plan.

Generally**, GA, GB,** and **GC** can be regarded as **industrial reserves**, whereas GD can be regarded as **prospective reserves**.

The reserve code for geological reporting in different exploration stages has been regulated as:

Prospecting reserves Coal estimates reported to the State Ore Reserve Committee (SORC) as result of regionally geological survey and mapping (Level D). After the approval of SORC, it becomes into Grade D reserves, which is regarded as the basis for further prospecting planning.

Reconnaissance reserves Results from the exploration Level C. After the approve of SORC, it becomes Grade C+D reserves, in which GC should not be less 20% to 30% of the all reserves.

Detailed-explored reserves Results from the exploration Level C and including Grade B+C+D reserves. Of the total reserves, Grade B+C are not less than 70%, and Grade B is not less than 20%-30%.

Precisely-explored reserves Reported reserves in the final documents of the exploration Level A. They turn into Grade A+B+C reserves after re-examination and approval of SORC, of these reserves, Grade A +B is mainly distributed in the shallow areas where coal mines will be set up at first.

The following table shows the correlation of Chinese reserve Categories with western countries.

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<tr><td rowspan="3">China
(1986)</td><td colspan="4">Demonstrated Reserves</td><td colspan="3" rowspan="2">Predicted Reserves (or resources)</td></tr>
<tr><td colspan="3">Industrial Reserves</td><td>Prospective Reserves</td></tr>
<tr><td>Grade A</td><td>Grade B</td><td>Grade C</td><td>Grade D</td></tr>
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<tr><td>U. N.</td><td colspan="2">Grade R-1</td><td colspan="2">Grade R-2</td><td colspan="3">Grade R-3</td></tr>
</table>

The categories and terminology of coal resources and reserves here may be different from the earlier documents, because the regulation and definition of them have been modified in several times.

Appendix 2

Classifications of coal ranks of China
(1986 standard)

In China, the classification of coal ranks is mainly based on following indexes:
V_{daf}(%) : Volatile matter on dry ash-free basis;
$G_{R\cdot I}$: G index, caking index
Y(mm): Maximum thickness of plastic layer or plasteometer index
b (%): Dilatation;
H_{daf} (%): Hydrogen content on dry ash-free basis;
P_M (%): Transmittance;
$Q_{gr,maf}$ (MJ/kg): Gross calorific value on moist ash-free basis.

Type	Code	No	Classification Index						
			V_{daf}(%)	$G_{R\cdot I}$①	Y(mm)	b (%)	H_{daf}②(%)	P_M③(%)	$Q_{gr,maf}$ (MJ/kg)
Anthracite	WY	01 02 03	≤3.5 >3.5-6.5 >6.5-10.0				≤2.0 >2.0-3.0 >3.0		
Meager coal	PM	11	>10.0-20.0	≤5					
Meager-lean coal	PS	12	>10.0-20.0	>5-20					
Lean coal	SM	13 14	>10.0-20.0 >10.0-28.0	>20-30 >50-65					
Coking coal	JM	15 24 25	>10.0-28.0 >20.0-28.0 >20.0-28.0	>65 >50-65 >65	≤25.0 ≤25.0	(≤150) (≤150)			
1/3 coking coal	1/3JM	35	>28.0-37.0	>65	≤25.0	(≤220)			
Fat coal	FM	16 26 36	>10.0-20.0 >20.0-28.0 >28.0-37.0	>85 >85 >85	>25.0 >25.0 >25.0	(>150) (>150) (>220)			
Gas-fat coal	QF	46	>37.0	>85	>25.0	(>220)			
Gas coal	QM	34 43	>28.0-37.0 >37.0	>50-65 >35-50					
Gas coal	QM	44 45	>37.0 >37.0	>50-65 >65	≤25.6				
½ medium caking coal	1/2ZM	23 33	>20.0-28.0 >28.0-37.0	>30-50 >30-50		(≤220)			
Weakly caking coal	RN	22 32	>20.0-23.0 >28.0-37.0	>5-30 >5-30					
Non-caking coal	BN	21 31	>20.0-28.0 >28.0-37.0	≤5 ≤5					
Flame (or Long flame) coal	CY	41 42	>37.0 >37.0	≤5 >5-35				>50	
Brown Coal	HM	51 52	>37.0 >37.0					≤30 >30-50	≤24

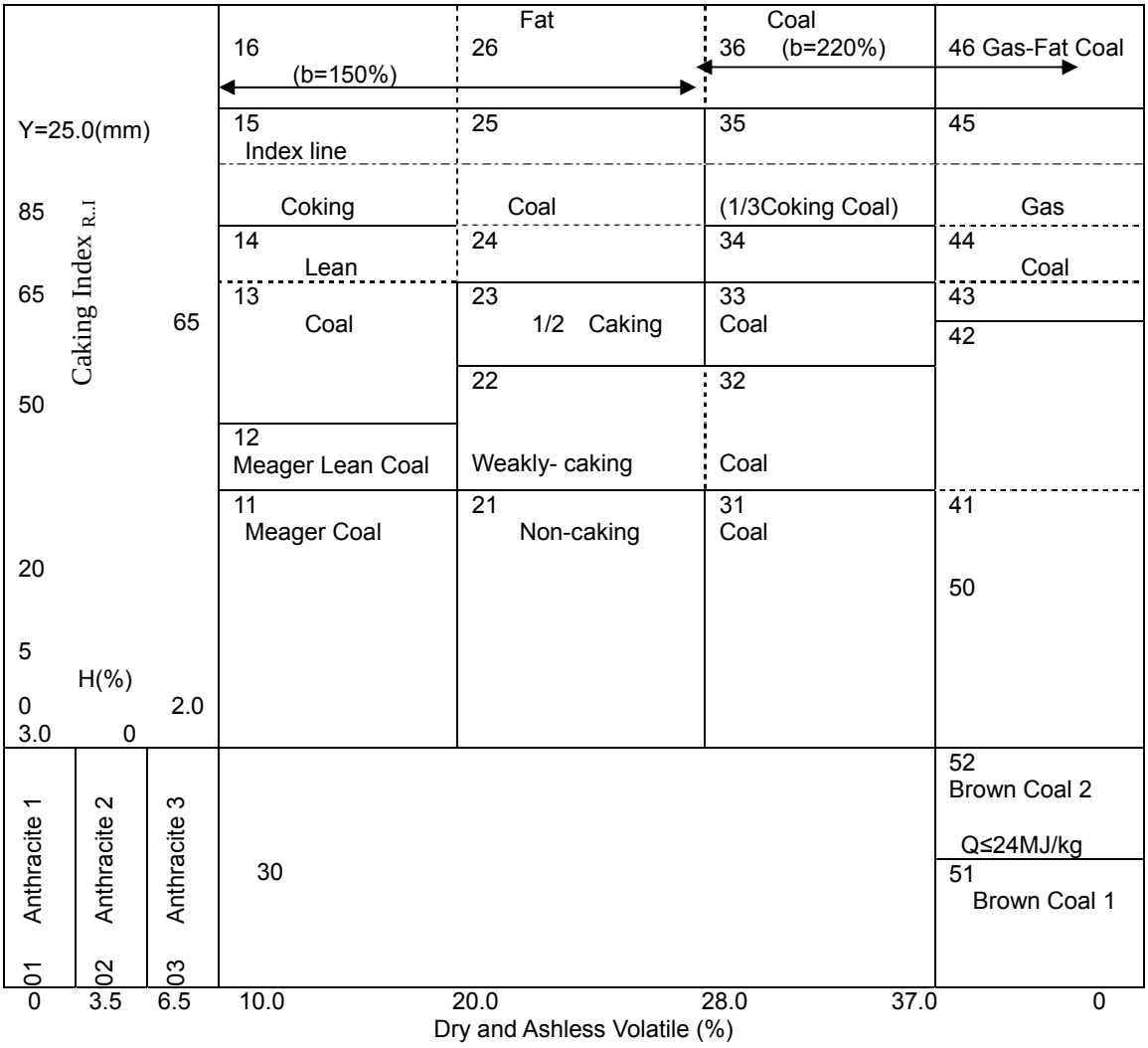
Notes:① When G>85, we can use the value of Y(or b) to classify fat coal; Gas-fat coal and other types. When Y>25.0mm,if V_{daf}≤37.0%, it should be classified into fat coal; If Y≤25.0,

then it should be classified into other corresponding types of coals, according to the value of V_{daf}. When using the value of b to classify fat coal, gas-fat coal and other types, if V_{daf}≤28.0%, we temporarily classify that, whose value of b>150%, into fat coal. If V_{daf}>28.0% and b>220%, we regard it as fat coal or gas-fat coal (V_{daf}>37%). When there're some conflicts between the classifications (by value of b and Y), we 'll choose the latter one.

②When there are some conflicts in the classifications of sub-divisions by V_{daf} and H_{daf}, we should choose the latter. During the daily inspection of producing plants and mines, which have been classified into the sub-type of Anthracite, we may make classifications only by V_{daf}. During the geological exploration, we should determine both value of V_{daf} and H_{daf}, when classifying the sub-divisions of the new fields, or re-classifying the sub-divisions of the producing mines and plants. We should determine the sub-divisions, according to the rules.

③When V_{daf}>37.0%, and $G_{R.I}$≤5,We can judge whether it's long flame coal or lignite by the value of P_M. If P_M>30%-50%, then re-testing $Q_{gr,maf}$, if it's value is over 24MJ/kg, then it should be classified into long flame coal. Then we can distinguish bituminous and lignite by P_M.

The following diagram illustrates the relationship between different ranks and their definitions:



Sampling and preparation for classification must be based on GB474-83 of the National Standard of China.

The line of G=85 represents the special limit. Over this line (G>85), both Y and b can be used as classification index to distinguish fat coal or gas-fat coal from other types. If Y of coal >25.0 mm, it should be classified into fat coal or gas-fat coal; When V_{daf}≤28.0%, the value of b can temporarily be settled by 150%; When V_{daf}>28.0%, the value of b is 220%. When there're some conflicts between value of b and y in classifying the coal types, Y should be taken as key index.

When there're some conflicts in making sub-divisions of anthracite by using H_{daf} and $V_{daf,}$ we'll choose the former (H_{daf}).

If V_{daf}>37.0%, P_M>50%, it is bituminous coal; when P_M between 30% and 50%, and $Q_{gr,maf}$ is >24MJ/kg, it is long flame coal.

Sampling and preparation for classification must be based on GB474-83 of the National Standard of China.

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When there're some conflicts in making sub-divisions of anthracite by using H_{daf} and $V_{daf,}$ we'll choose the former ($H_{daf)}$.

If V_{daf}>37.0%, PM>50%, it is bituminous coal; when PM between 30% and 50%, and $Q_{gr,maf}$ is >24MJ/kg, it is long flame coal.