I-3.2 Summary of glyphosate technical

I-3.2.1 Capacity and the Percentage of Different Pathways

The content of glyphosate technical produced by Chinese manufacturers is usually 95%, and only a very small part of bulk glyphosate has the contents that are over 95% (highest 98%) or smaller than 95% (lowest 90%). The total capacity of glyphosate technical in 2005 and 2006 are 212,000t/a and 240,800t/a, with the year-on-year growth rate being 11.8% and 13.6%, respectively. The estimated capacity in 2007 will reach 346,500 tonnes which is 43.9 percent higher than that in 2006.

Except for 2004, the capacity of glyphosate technical by AEA pathway was more than that by IDA pathway before 2006 although the latter has many advantages. However, based on the estimation, the capacity by the two pathways will be very close in 2007 when 4 players who adopts IDA pathway will enlarge their capacity by technological modification and 2 new sets of device by IDA pathway will be also put into production. New device and capacity-enlarging modification projects of IDA pathway are as follows:
W-E Chem: from 12,000t/a to 30,000t/a
Huaxing Chemical: from 5,000t/a to 15,000t/a
Zhenjiang Jiangnan: from 6,000t/a to 20,000t/a
Sanonda: from 5,000t/a to 20,000t/a
Sichuan Bei'er: 20,000t/a
Hubei Xingfa: 6,000t/a

Table I-3.2.1-1 Capacity of glyphosate technical produced by different pathways in past years

Pathway		2001	2002	2003	2004	2005	2006	2007
AEA	Number of producers	16	17					
	Capacity (t/a)	60,300	73,300					
	Capacity%	75.6	66.8					
	Annual growth rate (%)	-	22					
IDA	Number of producers	7	12					
	Capacity (t/a)	18,000	33,000					
	Capacity%	22.6	30.1					
	Annual growth rate (%)	-	83					
Other	Capacity (t/a)	1,500	3,500					
Total	Number of producers	22	28					
	Capacity (t/a)	79,800	109,800					
	Annual growth rate (%)	-	38					

I-3.2.3 Glyphosate technical production by different areas

At present, there are totally 32 active manufacturers who produce glyphosate technical and its formulations. Similar to the situation in the past, Jiangsu Province still owns the most glyphosate enterprises and the No.2 is Zhejiang Province. The chemical industry of Jiangsu

and Zhejiang Provinces has been advanced for a long time, and many chemical products including glyphosate are produced in the two provinces.

Compared with 2005, the number of active glyphosate manufacturers decreased in number in 2006, but, in contrast, the regional distribution of manufacturers became broader. During the past two years, new process units of glyphosate have been established in Shandong Province, Hunan Province and Hubei Province, respectively. There are two causes that can explain the change of regional distribution. One is that the technology for glyphosate production is mature and easily mastered by the entrants; the other is that players want to get closer to end users of glyphosate viz. peasants, by which they can save the cost of transportation. For example, Shandong Province is the largest agricultural province who consumed the largest amount of agrochemicals in China, while, several years ago, there was no glyphosate enterprises in Shandong Province. Nowadays, four glyphosate enterprises have been located in Shandong Province since the first production line was established in 2003.

As of the end of 2006, 11 provinces have glyphosate technical plants. Among these provinces, Jiangsu owns the biggest capacity that is 93,000t/a; and the followings provinces are Zhejiang, Anhui, Shandong, respectively. The capacity of above four provinces accounts for 85 per cent of the total capacity in China. As far as the actual output is concerned, Zhejiang Province is No.1 production base of glyphosate technical. The following table gives the detailed information about regional distribution of manufacturer, capacity and output in the past.

Table I-3.2.3-1 Glyphosate technical production by different areas

Province	Number of producers				Capacity (t/a)				Output (t)			
	2001	2003	2005	2006	2001	2003	2005	2006	2001	2003	2005	2006
Jiangsu	7	10										
Zhejiang	6	8										
Anhui	3	6										
Shanghai	1	3										
Fujian	1	1										
Shandong	0	1										
Hebei	3	2										
Sichuan	0	1										
Henan	1	1										
Hubei	0	0										
Hunan	0	0										
Total	***22***	***33***										

I-4 Current production of glyphosate formulations in China

I-4.1 Overall situations of glyphosate formulation

◆ **Specification**

The solubility of glyphosate technical is quite weak (1.2% at 25℃). But its salts have good solubility in the water without losing the activity. E.g. the solubility of both glyphosate isopropyl

ammonium (IPA) and glyphosate sodium is 500g/L, and the solubility of glyphosate ammonium is 300g/L. Thus in actual application, glyphosate is converted into the following formulations:

Water formulation

- ✓ 10% glyphosate ammonium/sodium solution (SL)
- ✓ 41% glyphosate IPA salt
- ✓ 62% glyphosate IPA salt, etc.

Soluble powder or wettable powder

- ✓ 30% glyphosate SP/WP
- ✓ 50% glyphosate SP/WP
- ✓ 65% glyphosate SP/WP
- ✓ 75.7% glyphosate SP/WP etc.

Among the various salts of glyphosate, the activity of glyphosate IPA is the strongest, then the ammonium salt and sodium salt.

Since 1990s, China has developed versatile formulations including the water solution (41% IPA, 45%IPA, 62%IPA, etc.) and WP forms (28%, 30%, 50%, 58%, 65%, etc.). This changed the situation of monotonous type in the past (10% formulation). Now China can produce almost all the specifications of glyphosate. CCM has sourced all the Chinese manufacturers of glyphosate formulations, including all those glyphosate technical producers and those who are merely producing glyphosate formulations.

Table I-4.1-1 Glyphosate formulations species and number of producers in China

Specifications	Number of producers		
	2003	2005	2006
88.8%WP			
75.7% WP			
73.3%WP			
65% WP			
58% WP			
50% WP			
46% 2-methyl-glyphosate WP			
41%WP			
30% WP			
73.3% WDG			
62% IPA			
48%IPA			
41% IPA			
16% IPA			
30% ammonium solution			
10% SL			
7.5% SL			