

Taiwan's Petrochemical Industry

By Sidney H. Chow

Mr. Chairman, Ladies and Gentlemen,

I am pleased and honored to be given the opportunity to address this distinguished audience and to share with you some of my thoughts and observations on Taiwan's petrochemical industry. Before I do so perhaps it would be helpful to some of the people in the audience who are not very familiar with Taiwan if I spent a few minutes to give you some basic data and general information on Taiwan.

Taiwan is an island located in the southwestern Pacific off the coast of mainland China. It has a land area of 36,000 square kilometers and a population of 23 million. Taiwan is one of the so-called four tigers of Asia. Taiwan's per capita GNP in 2005 was US\$15,676 and her rate of GNP growth in 2005 was 4.09%.

Taiwan's Petrochemical Industry

In the 1960's, Taiwan's plastics processing industry and textile industry grew rapidly based entirely on imported resin and synthetic fiber intermediates. Taiwan's petrochemical industry was established at that time to meet the need for local production of petrochemical products. In the 1960's, the only organization in Taiwan that had the technical capability and the financial resources to undertake a naphtha cracking project was the state-owned Chinese Petroleum Corp. (CPC). Private sector, on the other hand, was allowed to participate in the downstream units associated with the naphtha cracker. Thus an unique structure of Taiwan's petrochemical industry was formed with the cracker owned and operated by the government and the downstream plants owned and operated by individual private companies. This pattern continued through subsequent naphtha cracking capacity additions until late 1998 when Formosa Plastics started up the No.6 Naphtha cracking project. I will discuss this project in more detail later but let us first take a look at the petrochemical plants associated with CPC's Naphtha crackers and aromatics units. (Table I, II and III)

FPC Petrochemical Complex (NC 6)

Formosa Plastics Group built this complex in Mailiao in central Taiwan. A large part of this complex was built on reclaimed land. The complex consists of an oil refinery with a capacity of 450,000 bbl/day, two naphtha crackers with a combined ethylene capacity of 1.7 million MTA, two aromatics extraction units, and the associated down stream units. Total investment is more than US\$10 billion. Tables IV and V depict the units contained in the complex.

Formosa Plastics is building a third naphtha cracker with an ethylene capacity of 1.2 million MTA. This huge cracker with its associated downstream units are scheduled to be completed in the first quarter 2007.

Problems facing Taiwan's Petrochemical Industry

1) Decline in domestic demand –

The major cause of this decline is China. Because of China's abundant supply of inexpensive labor, many of Taiwan's plastic converters have moved all or part of their manufacturing operations to China and this trend is continuing.

2) Competition from Imports –

Fifteen years ago, before Korea had completed the massive expansion of her petrochemical industry, most of the imports we saw in Taiwan were from Japan, North America and Western Europe. Today, materials from the Middle East and Southeast Asia constitute more than half of the imports. With significant feedstock cost advantage and surprisingly low freight cost, materials from the Middle East pose the greatest threat to local producers.

3) Environmental and other issues –

- a) Ever tightening pollution control regulations have troubled the local petrochemical producers. Energy tax and other levies collected from petrochemical producer to clean up the environment will definitely increase the cost of manufacturing petrochemicals in Taiwan.

- b) Water shortage and reliability of power supply.
- c) Petrochemical industry has an image problem and has trouble attracting bright young people.
- d) Over fifty percent of petrochemical products produced in Taiwan are exported to China. This over-dependence on a single market is unhealthy.

Future Development

1) Capacity additions –

CPC and a number of local petrochemical producers have formed a joint venture company to undertake a huge project which consists of an oil refinery and a naphtha cracker plus associated downstream units. This project is still in the early stages and has already encountered oppositions from the community as well as environmental groups.

2) Investment in China –

Provided the political relationship between China and Taiwan does not deteriorate, there will be more petrochemical investment in China by Taiwan producers. Since China is the largest market for Taiwanese petrochemical producers and since the demand for such products is increasing in China at a fast rate, it makes economic sense for Taiwan to increase its petrochemical investment in China.

3) CPC Privatization –

The Government has decided to privatize CPC but obstacles remain. However, without privatization, CPC has very little hope to compete successfully against FPC.

TABLE I

Ethylene Based Petrochemicals

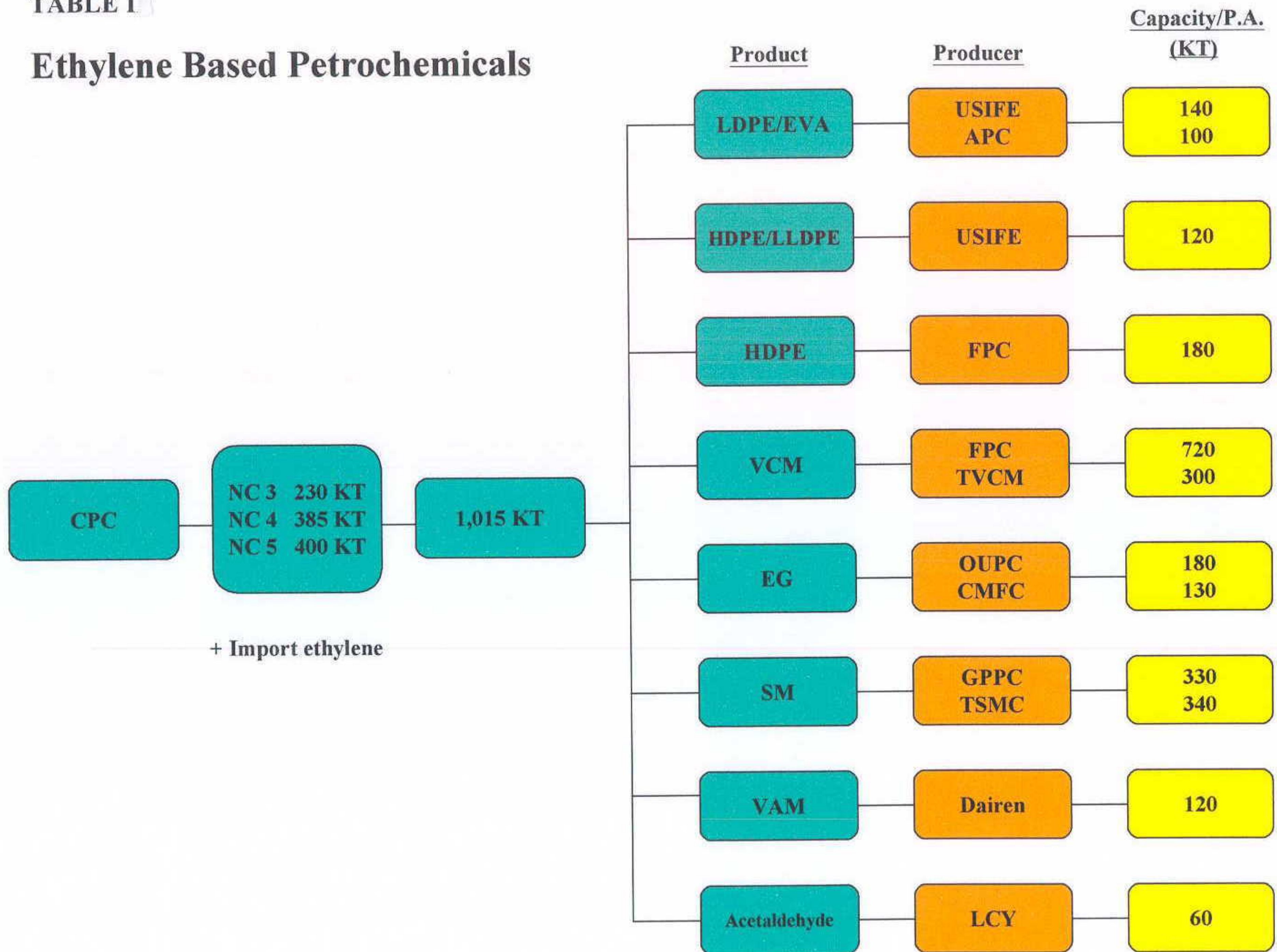


TABLE II
C₃, C₄ And Other Petrochemicals

	<u>Product</u>	<u>Producer</u>	<u>Capacity / KT</u>
CPC NC3, NC4, NC5	Propylene 625.3 KT	PP	TPP Yung Chia 350 300
	Propylene from Refinery	AN	CPDC 190
		PPG	Lyondell 40
		IPA / Acetone / MIBK	LCY 60 / 30 / 20
		Acrylic acid / Esters	FPC 50 75
		Phenol / Acetone	TPCC 100 61
		SBR	TSRC Chi Mei 100 60
		BR	TSRC Chi Mei 52 50
		TPE	TSRC, etc. 280
	Butadiene	ABS	Chi Mei/GPPC, etc. 1310
		NBR	Nantex 24
		SBR Latex	Croslene / Shin Foong / Nantex 38 / 38 / 24
	Butadiene Refinery	MIBE	TASCO 250
		MEK	TASCO 60
	Bottom Oil	Carbon Black	CSRC 100

TABLE III

**AROMATICS AND THEIR DOWNSTREAM
BASED ON CPC'S FEEDSTOCKS**

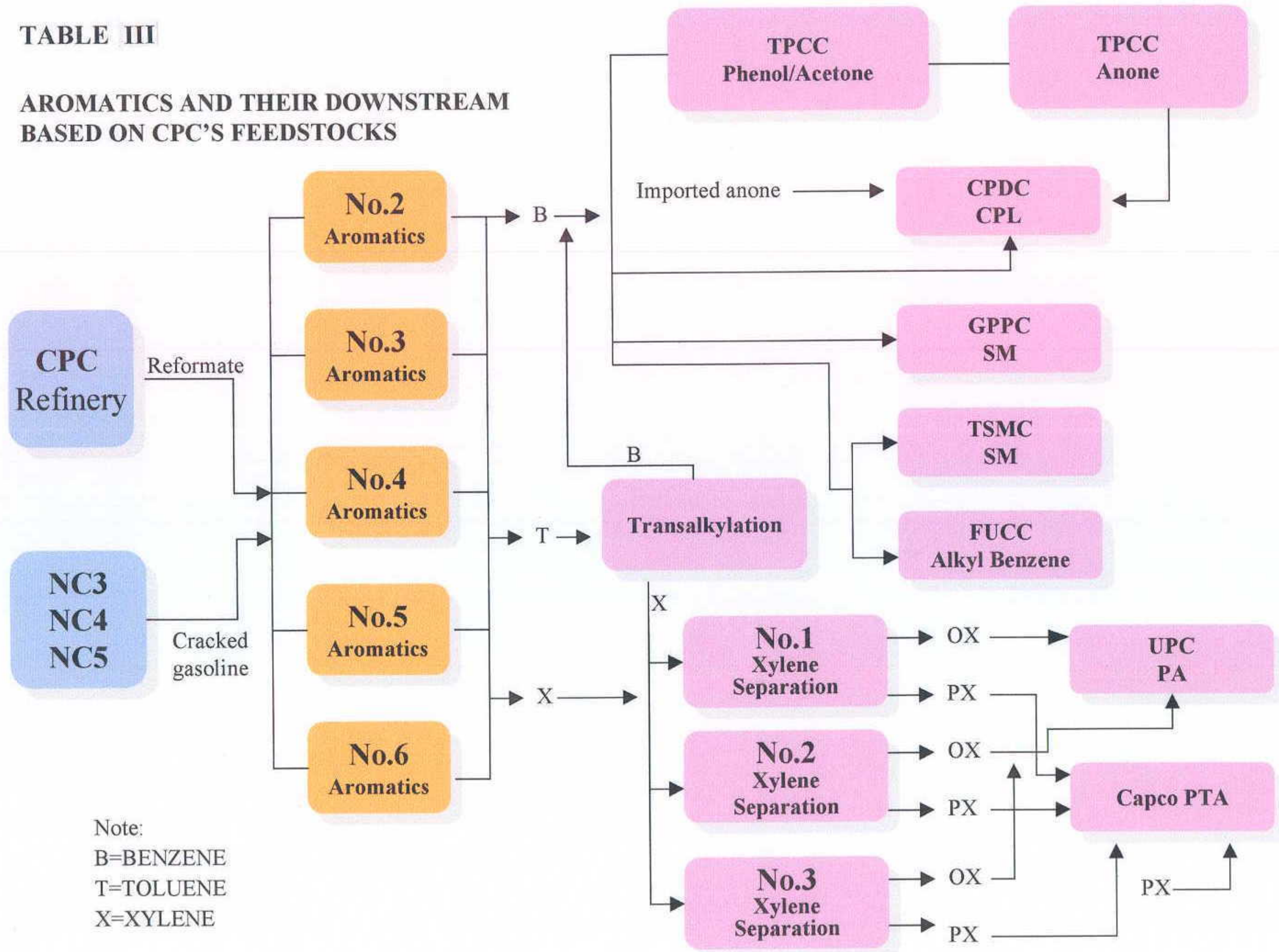


TABLE IV

**CONFIGURATION OF FPG NO. 6
NAPHTHA CRACKER COMPLEX**

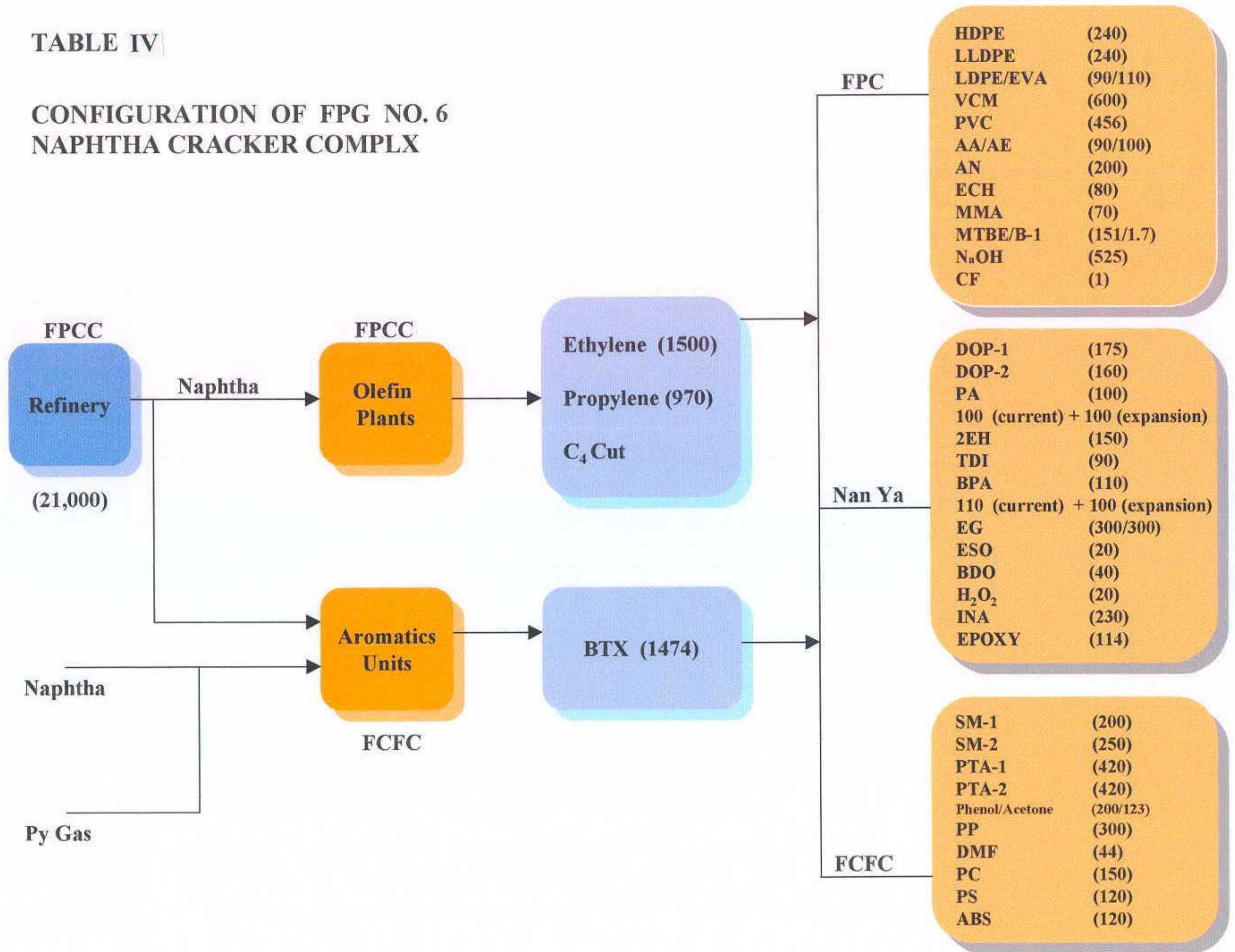


TABLE V

**Aromatics Downstreams of
FPG Petrochemical Complex**

Unit : MT/Y

