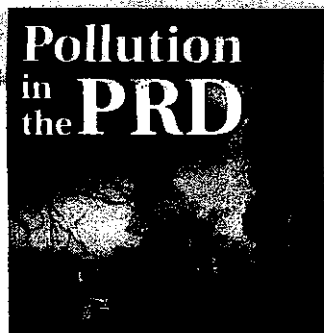


Where the smell is nothing like roses



The clouds of toxic smog that hang over the Pearl River Delta and Hong Kong are no secret, but where exactly do they come from and how bad are they? *Post* reporter Cheung Chi-fai and photographer Robert Ng went to the heart of the delta's industrial zones to find out for our three-part investigation starting today

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Yuelisha village in Nanhai (南海) could easily be the place the song *Where Have all the Flowers Gone?* was written about.

It used to be surrounded by beautiful rose farms. But many have gone since the Guicheng power plant was built next to the village more than a decade ago.

Black smoke and dust from the plant killed the flowers and pollution made the soil increasingly unsuitable for growing flowers.

The village, with a few hundred residents, is sandwiched between the power plant and a nearby aluminium smelter operated by a Hong Kong-listed company.

"There are tiny black particles falling on the farms from time to time and it makes us choke," said 60-year-old villager Wu Runshui (吴润水). "At night we have to close all the windows for a good sleep."

The medium-sized, oil-fired Guicheng plant has 12 generating units of unknown capacity.

Smokestacks have been raised so the pollutants can be pushed further away from the farmland.

But a month ago, the plant was identified by the Guangdong Environmental Protection Bureau as

one of the worst 33 polluters in the province and told to make improvements.

It is understood the plant has been ordered, along with a group of smaller power plants, to close by 2007 under a provincial plan to shut less efficient plants to improve air quality.

Villagers said the plant was to have been closed years ago but the plan was delayed indefinitely.

"It should have gone but nothing happened," Mr Wu said.

"We heard the plant management knew some powerful people

and successfully preserved the plant."

Last year, Guangdong cited the province's rising power production as the main cause of the region's deteriorating air quality, a view echoed by Hong Kong's environment officials.

Extra generating facilities were installed last year to raise capacity by 1,350MW, allowing for a 17 per cent increase in electricity generated to 188 billion kWh, the province's environmental quality report revealed.

Some smaller plants, which

should be shut down under existing regulations, are said to be operating secretly to meet demand.

"These small local plants are highly flexible and operate in response to market demand when there is a power shortage," a mainland source said.

Another source said some smaller plants had switched to heavy oil with higher sulfur content amid higher prices.

"The high oil price has forced them to use poor quality fuel, which causes much more air pollution," he said.

In the first of our three-part investigation into the region's pollution, *Cheung Chi-fai* searches for its source

Smog all around, but who's to blame?

PRIME CULPRITS SMOKE AWAY ON BOTH SIDES OF THE BORDER, IGNORING A SOLUTION

Two of the region's big air polluters are located 50km apart, emitting at least 140,000 tonnes of sulfur dioxide last year.

The Shajiao Power Plant is situated in Humen, Dongguan, northwest of Hong Kong. It is the province's biggest coal-fired generation plant, supplying electricity to thousands of factories and millions of residents.

Last year the 4,000MW plant emitted about 90,000 tonnes of sulfur dioxide (SO₂), or approximately 9 per cent of the 1 million tonnes produced in the province.

The amount is 80 per cent higher than that from CLP Power's coal-fired Castle Peak and

gas-driven Black Point plants, which have a combined capacity of 6,000MW.

CLP Power, the biggest single polluter in Hong Kong, generated about 51,000 tonnes of SO₂ and 38,200 tonnes of nitrogen oxides last year, with the combined total up by 90 per cent from 2002.

The rise was attributed to increasing reliance on coal to meet power demand from Guangdong and to the shrinking supply of gas from reserves in Hainan.





The increasing emissions come amid deteriorating air quality last year, although, overall, emissions have been on a downward trend for a decade. According to the

Environmental Protection Department, all Hong Kong power plant emissions fell from 320,000 tonnes in 1992 to 105,000 tonnes in 2002.

A common feature of the Shajiao and CLP coal-fired plants is that neither is fitted with flue-gas desulfurisation devices, which are said to cut SO₂ emissions by up to 70 per cent. The 3,420MW Hongkong Electric coal-fired plant on Lamma Island, which does not publish its emission figures, fitted such a device in the mid-1990s.

About 77 per cent of Hong Kong's electricity generation capacity is from coal-burning.

MAJOR POLLUTANTS IN THE DELTA

Pollution source	Current numbers	Key pollutants (% of total in 1997)	Tonnes produced in 1997 (HK's share by %)
 Power plants	PRD: 45 (1997) HK: 3	Sulfur dioxide (45)	268,000 (9)
		Nitrogen oxide (34)	192,000 (10)
 Vehicles	PRD: 2.3-5 million (2003) HK: 520,000 (2003)	VOCs (54)	252,000 (3)
		Nitrogen oxide (30)	170,000 (9)
 Factories	PRD: Not available, but at least 50,000 HK-owned HK: Up to 15,000	Respirable suspended particulates (60)	155,000 (minor)
		Sulfur dioxide (39)	232,000 (1)
 Products containing volatile organic compounds (VOCs)	PRD & HK: Thousands of paint and domestic products	VOCs (23)	107,000 (6)

Sources: Environmental Protection Department Study of Air Quality in the Pearl River Delta Region, Transport Department, Census and Statistics Department and InvestHK

SCMP Graphic

Sitting in a Shenzhen traffic jam on a bad air day, surrounded by buses and vans belching smoke, it might seem simple to pinpoint the source of the smog through which buildings just a block away are barely visible.

But, the experts say, it is not so simple.

In fact, the suspended respirable particulates – scientific jargon for the tiny bits of soot and other matter that are a key ingredient of smog – you are inhaling may have been generated days or weeks earlier and many kilometres away.

Amid the debate on the reasons for Hong Kong's deteriorating air quality there is one factor most people agree on: discovering the source is notoriously difficult.

"The problem is that air pollution has no boundary. It is just like we are all living inside a glass box and the pollutants are accumulating over our heads and eventually intermingling without possible traces of their origins," said Ho Kin-chung, of the Open University's environment programme.

According to another scientist, the Pearl River Estuary may be a vast pollution sink, where pollutants from around the delta gather before spreading across the region.

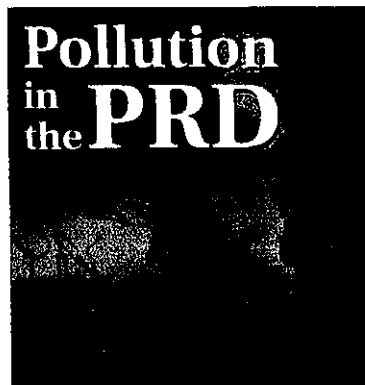
According to Guangdong reports, pollutant concentrations rose between 13 and 17 per cent in the province last year, while sulfur dioxide emissions passed the 1 million tonne mark for the first time.

By the mainland's relatively relaxed standards, the number of poor air-quality days increased last year from 35 to 41 in Guangzhou, two to 15 in Shenzhen and 17 to 34 in Foshan.

The rise has coincided with its surging economic growth, which last year reported a 13.6 per cent rise in gross domestic product and 21 per cent in industrial production – the highest in eight years.

The good news, however, is that if Guangdong ever gets its air quality act together, it will not have to contend with foul air drifting in from other parts of the mainland.

Unlike other regions such as the



rival Yangtze River Delta, where breakneck development has battered the environment, the province is hemmed in by mountains.

These mountain ranges – which once inspired the old proverb, "the mountains are high and the emperor is far away" – mean that, while its citizens choke on their own filth, they are probably not choking on anyone else's.

That is little comfort to Hong Kong, which continues to experience severe air pollution despite reducing emissions by 48 per cent from 1992 to 2002, the most recent year covered by an air quality study in the delta region.

The report showed that Guangdong's and Hong Kong's share of the emissions were roughly in line with population – 87 per cent to 13 per cent – but in area, Hong Kong, little more than a two-hundredths of Guangdong's size, spewed out much more.

The report also gauged the emission levels of various key polluting sectors and found power genera-

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tion was the main culprit, particularly in sulfur dioxide and nitrogen dioxide.

However, critics said the report failed to explain how the bulk of pollutants from both sides contribute to poor regional air quality.

One smog ingredient, ground-level ozone, is formed by a photochemical reaction between primary pollutants such as nitrogen dioxide and volatile organic compounds in strong sunlight.

Scientists say this secondary pollution can move across the border after its formation or is formed locally from key constituent pollutants.

"The situation varies differently depending on weather conditions and the amount of pollutants in the air," said Alexis Lau Kai-hon, assistant professor at the University of Science and Technology.

Excess ozone was to blame when the air pollution index at Tung Chung hit a record 201 in the mid-afternoon on September 14. On that occasion the gaseous pollutant was believed to have drifted directly from the delta region.

Professor Lau said the Pearl River estuary could be a giant sink where pollutants gathered over the centre of the river mouth, intermingling before spreading further.

"Unlike the usual perception that pollutants are directly blown from the mainland, the dynamics are three-dimensional rather than two-dimensional," he said.

Pollutants in the region including those from Hong Kong tended to rise vertically first and then drift into the river estuary where cooler temperatures might lead them to fall and gather.

This was graphically illustrated on November 3 last year when pollutants, mainly airborne particles, were captured in a satellite image spreading from the estuary, causing one of Hong Kong's most extreme air pollution days.

Edward Chan Yue-fai, of Greenpeace, said cross-boundary pollution was too often blamed for Hong Kong's air woes, with the city's contribution to it being shrugged off.