

More than two years ago Kai Tak Airport was de-commissioned following the opening of Chep Lak Kok Airport. Kai Tak operated as a high volume international airport for more than 50 years. This means its soils are likely to be heavily contaminated by such toxic substances as are associated with the usual operations of an airport, such as gasoline, lubricating oils, kerosene and cleaning solvents. This Quarterly's main article considers aspects of remediating contaminated sites, with particular reference to decontaminating Kai Tak for future use as a high-density residential and commercial community.

The Editors

CONTENTS

Page

Feature: ARE HONG KONG'S
SAFE? 1
HONG KONG BRIEFING 4
HONGKONG DISNEYLAND UPDATE5
ADVISORY COUNCIL ON THE ENVIRONMENT (ACE)6
TOWN PLANNING8
REGIONAL & INTERNATIONAL9
PROSECUTION STATISTICS 12

CONTAMINATED LAND SITES SAFE? Environmentally responsible disposal of industrial and domestic waste is a problem that all economies, developed and developing, face. However, developed economies also have an ongoing problem of how to clean-up

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land sites which in less enlightened days were heavily contaminated by the release of toxic wastes, either unintentionally or intentionally. [That, of course, may also be a problem for developing countries which do not or cannot afford to implement safeguard measures that modern technology has devised to minimise soil contamination from toxic wastes]. Perhaps the best known example of a western country's attempts to tackle this problem is the United States' Superfund (as it is colloquially known) which has been in place for more than 10 years but has had limited success.

The importance of environmentally responsible waste disposal in Hong Kong is now well recognised by government authorities and the community at large. The *Environmental Protection Department* reports that Hong Kong generates more than 42,000 tonnes of general and construction waste each day. Until recently, disposal of this waste was achieved by simply dumping at sea or using construction waste for reclamation (which still occurs), but since the mid 1990's Hong Kong has constructed three major land-fill sites which are now used to receive most of the non-recycled waste. [see, 1999, Environment Hong Kong p.170].

But is there a toxic legacy we have inherited from Hong Kong's past practices in disposing of its toxic wastes, such as chemical waste? Incredible as it should now seem, until the establishment of the Chemical Waste Treatment Centre on Tsing Yi in 1993, the bulk of Hong Kong's chemical waste was discharged in untreated form into Victoria Harbour. Some undoubtedly was also dumped on land, such as at remote sites in the New Territories. The size of the problem is illustrated by the fact that in 1998 the Tsing Yi Centre treated approximately 400,000 tonnes of chemical waste.

It is obvious that Victoria Harbor is heavily polluted and, if it were to be returned to a healthy state would require a massive investment in remedial programmes. There is no indication that the government is now considering or would ever commit to the level of investment needed. Contamination of land sites is a more pressing issue, if only because land is such a precious resource that any that is available and is not set aside and fiercely protected for conservation/country park purposes is likely to be used eventually for a human activity of one kind or another. The most obvious example of such a site is the disused Kai Tak Airport. Kai Tak covers more than 280 hectares. In Hong Kong terms, that is a massive and extraordinarily valuable development site. There is no doubt that it will be developed to its fullest capacity.

Since the airport was decommissioned, government agencies have been engaged in decontaminating Kai Tak in preparation for development. The Kowloon Development Office (a section of the Territory Development Department (TDD)) has proposed development of a substantial part of Kai Tak, together with certain surrounding areas to be reclaimed or set aside, as the "new development area" under

the revised South East Kowloon Development Scheme. The new development area will cover approximately 540 hectares, including:

- (i) 280 hectares comprising the decommissioned airport apron and runway;
- (ii) approximately 80 hectares to be reclaimed in Kowloon bay;
- (iii) approximately 80 hectares to be reclaimed in the Kai Tak Approach Channel and Kwun Tong Typhoon Shelter; and
- (iv) setting aside approximately 100 hectares of other

surrounding areas, eg a proposed new typhoon shelter.

It is accepted by all concerned that decades of use as an airport means that the land comprising Kai Tak will to some extent be contaminated by toxic substances commonly used in association with operating an airport. The principal sources of toxic contamination are underground fuel tanks and various cocktails of chemical solvents used by airline operators in repairing and cleaning aircraft.

Experience in the United States illustrates (as U.S. experience does in so many environmental situations) the complexities involved in remediating a toxically contaminated site to the level that it is fit for human habitation.

Recently, the U.S. Army was forced to withdraw a claim that for a cost of US\$6M it could clean up adequately a former military base (Presidio, California) to a level that it would be fit to be used as a national park (not to be inhabited on a full time basis). The Army had to admit that it would require more than US\$100M to effect the clean-up. Indeed, the Army was also forced to admit that even with its vast resources and expertise it was unlikely to be able to

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clean-up the side in the time-frame proposed. It therefore reached a compromise with the proposed national park board whereby it is paying the board US\$100M to organise the remedial work.

In another situation, the McClelland Air Force Base (Sacramento, California) was sued by surrounding land owners complaining of severe illnesses caused by contaminated underground water supplied. The contamination was traced to numerous fuel tank leakages and surface chemical solvent run-off from the Base. The Air Force is facing tens of millions of dollars in damages claims.

The infamous *Love Canal* residential development provides an even more sobering example for Hong Kong in terms of proposed large-scale residential development at Kai Tak. In the 1890s William T. Love began constructing a canal for bulk-transport purposes near Niagara Falls, New York state. He ran out of money and did not complete the project. The canal was left as a large hole in the ground until the 1930's when various companies began dumping chemical waste

> into the unfinished canal. In 1942 a large chemical company purchased the canal and from that year until 1953 it disposed of a huge amount of hazardous waste by dumping it into the canal. The waste was "treated" by covering it with over-burden.

> Subsequently the Niagara Falls Board of Education acquired the land and constructed on it a play-ground and elementary school, with the rest of the land being developed for residential purposes. By the 1970s there had been so many coincidental complaints of severe health

problems experienced by people living in the Love Canal community that state agencies began conducting tests on the soil. These tests, and many subsequent tests on people living in the Love Canal community, confirmed that the soil was heavily contaminated by the toxic waste that had been dumped there over the years.

Numerous court battles have since taken place and the Love Canal story is not yet at an end. Millions of dollars have been paid out to inhabitants as compensation, but still the controversy continues. A further State Health Department comprehensive study of the effects of past soil contamination is to be carried out. It is to be the most detailed and in-depth study yet undertaken. Although people continue to live in the community (now called Black Creek Village) there remains serious doubts as to whether the area is safe for habitation, notwithstanding that in 1989 the previous chemical company owner undertook extensive clean-up work after being ordered to do so by a U.S. court.

Love Canal was the catalyst for the passing of America's *Superfund* legislation (*Comprehensive Emergency Response, Compensation and Liability Act*) on 11th December, 1980. This law imposed taxes on the chemical and petroleum

industries in order to provide funds for a newly created Federal authority which had a mandate to identify and clean-up toxically contaminated land sites throughout America. In the years since, billions of dollars have been collected and credited to the Superfund Each programme. year the Environmental Protection Agency spends about \$1.4 billion addressing potential threats to human health and environment. This is in addition to private expenditure on voluntary or remedial court-ordered work. However, the general consensus is that Superfund has made little real improvement to health threats posed by hazardous waste sites spread throughout the country. [Superfund will be considered further in a future edition of the *Quarterly*]

It is unlikely that the sub-soil of Kai Tak would be contaminated to anything like the extent of Love Canal. Nevertheless, airport sites and the like have been targeted in the U S as major of contamination. sources The Environmental Protection Authority has established a separate agency to deal with contamination from underground storage tanks - the Office of Underground Storage Tanks (OUST) - which advises government agencies and private contractors on effective methods of achieving remediation of sites contaminated from underground facilities.

In 1998 the TDD applied for an environmental permit under the Environmental Impact Assessment decommission Ordinance to а "designated project", namely Kai Tak Airport. The permit was granted on 21st September 1998. It is interesting to consider the conditions on which the permit was granted with respect to remediation work the developers were required to undertake. In particular, the permit included a "Summary of Remediation Objectives" together with directives as to how the soil was to be decontaminated. We shall not attempt to outline all of the objectives or other pertinent aspects of the permit, but the decontamination directives are especially relevant here. Special Condition 2.3 requires TDD (or subsequent permit holders who are granted a permit under Section 12 of the Environmental Impact Assessment *Ordinance*) to carry out pilot tests on the effectiveness of the method of soil decontamination known as Soil Vapour Extraction/Air Sparging (SVE/AS) system. The results of the pilot tests were then to be referred to a subcommittee of the Advisory Council on the Environment. Subsequently, after addressing ACE's concerns, TDD was required to submit a detailed clean-up programme to the director of EPD.

The SVE/AS system involves applying a vacuum to the contaminated soil matrix by means of extraction wells which creates a negative pressure gradient that causes movement of vapours towards these wells. The volatile constituents in the vapour are then readily removed from the subsurface through the extraction wells, and after treatment as necessary, discharged into the atmosphere or possibly re-injected into the ground.

For designated "Hot Spot" areas the clean-up method was directed to be excavation of the contaminated soil and treatment by biopile if the SVE/AS was demonstrated to be unsatisfactory. We do not have at the time of writing details of the pilot study results or comments/submissions (if any) from ACE or the submissions made by TDD to the Director.

The SVE/AS system has been critised by OUST on a number of grounds, such as:

- it is difficult to achieve higher than 90% removal of contaminants
- the system is of questionable effectiveness in soils of low permeability, or stratified soils
- use of the system may cause air pollution
- the system is generally ineffective in water saturated soils or in cleaning-up ground water

The Kai Tak site contains saturated sub-soils or sediment. For example, in a subsequent environmental permit granted to TDD to proceed with the design and construction of infrastructure at Kai Tak on the North Apron area, one of the conditions (3.3.3.4(viii)) was that TDD had to identify, analyse and quantify all existing and future water and sediment pollution sources. TDD was also required (3.3.3.4(ii)) to characterise

water and sediment quality, based on existing information or site surveys/tests "as appropriate". OUST also advises that the SVE(AS

OUST also advises that the SVE/AS system is not appropriate for soils where ground water is within three feet of the surface or where the contaminants in question include diesel fuels, heating oils, kerosene and lubricating oils, which are less susceptible to removal by the method than are the lighter and more volatile petroleum products, such as gasoline.

The biopile method involves complete excavation and removal of the contaminated soil to an area where it is dried and treated by biopile measures, which are detailed together with air and other pollution minimisation requirements, in conditions 2.15-2.19 of TDD's first environmental permit.

It remains to be seen (and perhaps discussed in the Quarterly) how and how successfully TDD has achieved decontamination of its Kai Tak site. OUST appears to maintain a view that, generally speaking, only complete excavation and removal of contaminated soils is likely to be effective in all circumstances. However. newer decontamination methods, such as SVE/AS, do have their place if the right conditions and circumstances exist, OUST concedes: [see How to Evaluate Alternative Cleaning *Technologies* for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers (EPA 510-B-95-007)].

Certainly those who are in charge of developing Kai Tak should avoid what occurred to a school authority in California recently when persisting contaminants were discovered in the soil at the site of a half constructed high school. The result was that work on the million US\$173 project was immediately stopped and extensive environmental investigations commenced. [see Toxic Clean Up at School Site Questioned, Daily News (Los Angles) 21/11/98].

The school site was formerly an oil field. Many of the contaminants found there were the same as those likely to exist in Kai Tak's soil.

HONG KONG Briefing

World Environment Day

Hong Kong, Guangzhou, Macau, Shenzhen and Zhuhai joined to celebrate World Environment Day, June 5, which is a United Nations designated annual event.

Various celebrating activities were organised by the Environmental Campaign Committee (ECC) and the Environmental Protection Department, with support from public transport companies in Hong Kong:

- Ride Green Day commuters were asked to take cleaner forms of transport, e.g. car pools, trams and trains;
- Carnivals free respiratory health checks were provided by the Hong Kong Tuberculosis, Chest and Heart Diseases Association, and a limerick contest for students;
- Trial of Alternative Fuel Light Buses – a trial of light buses ran on less-polluting fuels; ten light buses ran on liquefied petroleum gas and five on electric.

The ECC has been organising World Environment Day activities for ten years, but this is the first year to have joint efforts in the region. The Assistant Director of Environmental Protection, Mr CW Tse, said the joint efforts of the five cities would help to raise awareness about regional air pollution, in which pollutants from Hong Kong, Guangzhou, Macau, Shenhen and Zhuhai were mixing together and creating smog, and to achieve a good quality of air for all these cities.

[ECCO Monthly Bulletin, June 2000]

Incentives for setting up LPG Filling Facilities

The Executive Council approved the Government's proposals to put out to tender petrol filling station (PFS) sites upon expiry of their leases, to remove tender restrictions for PFS sites, and to provide incentives for operators of existing PFSs to retrofit their stations with liquefied petroleum gas (LPG) filling facilities.

The requirements of special importer's licences for hydrocarbon oils or

evidence of a guaranteed supply of oil products from a licensed supplier for the present PFS sites will be removed. The present practice that new leases may be granted to existing lessees of PFS sites on payment of a premium is also discontinued.

Concerning the speculative tenderers entering into the fuel market upon removal of the present tender restrictions for PFS sites, the Government will require the successful tenderer to operate a PFS on the site within a stipulated period of time under the lease, and breach of this clause may lead to re-entry of the site by Government.

All PFS sites under a 21-year PFS lease will be tendered out upon expiry of their lease term. However, the new policy to tender out PFS sites will not apply immediately to certain existing PFSs which are suitable for retrofitting of LPG filling facilities. Operators of such PFSs will be offered lease extensions at nominal premium under an incentive package. The offer of the incentive package is subject to the operators' undertaking to provide a specified number of LPG dispensers by a date specified by the Government, and to provide uninterrupted supply of LPG at the PFSs concerned. Additional land adjacent to the relevant PFSs will be granted at nominal premium if it is necessary to facilitate the LPG installations.

The incentive package is to encourage more LPG filling points to be set up to supplement the programme of building LPG filling stations in meeting the demand from 18,000 LPG taxis. The Government's target is to provide adequate LPG filling capacity for all LPG taxis by the end of 2001. [http://www.info.gov.hk/efb/press/index

.html, 11 July 2000]

Indoor Air Quality (IAQ)

Our indoor environment may contain a lot of air pollutants. Major pollutants in Hong Kong are carbon dioxide and biological contaminants from people, pets and plants, radon form building materials, volatile organic compounds from consumer products such as cosmetics and pesticide, formaldehyde from pressed wood products and environmental tobacco smoke from smoking. In long term, exposure to these indoor air pollutants at high levels may impair lung function, cause respiratory disease, and enhance the probability of contracting cancer.

Although statutory provisions deal with some aspects of indoor air quality, such as establishing basic ventilation requirements and specifying designated "no smoking areas", there is no specific legislation on minimum indoor air quality standards in Hong Kong. The current responsibility for indoor air quality is spread over a number of government departments.

Having commissioned a consultancy study on "Indoor Air Pollution in Offices and Public Places" which was completed towards the end of 1997, the Government is proposing to implement an indoor air quality management programme. The programme will be implemented in phases along the following lines for the better coordination of the various activities related to indoor air quality:

- Launch a public education and publicity campaign to promote public awareness of indoor air quality;
- Set up an IAQ information centre to disseminate information and reference materials related to indoor air quality;
- Adopt a set of 3-level indoor air quality objectives as a common benchmark for evaluating and assessing indoor air quality;
- Publish a set of Guidance Notes for the better management of indoor air quality in offices and public places;
- Develop a voluntary indoor air quality certification system and invite owners and management of premises including the government buildings to participate in the scheme; and
- Conduct a comprehensive review of the effectiveness of the voluntary indoor air quality management programme three years after its implementation to determine if more stringent measures are required.

(ECCO Monthly Bulletin, April 2000)

Environmental Impact Assessment - A Hong Kong Perspective

"The Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) processes in Hong Kong have become important planning and decision making tools for all large-scale developments. They help us to move towards sustainability impact assessment for policy formulation." said

Mrs Lily Yam, the Secretary for the Environment and Food, in her speech given at the International Association for Impact Assessment Conference 2000,. She gave the following as examples of the beneficial impact of EIA process:

- New Airport and related projects a long stretch of valuable natural coastline have been saved from reclamation for the airport island;
- Mirs Bay it is one of the most pristine, valuable marine ecosystems left in Hong Kong and has been saved from destruction by the abandonment of a project which proposed the excavation of 400 million cubic meters of fill material from Mirs Bay to the east of Hong Kong;
- West Rail the EIA process has resulted in the adoption of a stateof-the-art noise design for the rail project, offering protection to over half a million residents; a 100 year old park was also saved from destruction by changing the alignment for a railway extension in Tsim Sha Tsui, Kowloon.

Mrs Yam believes that there is still room for improvement. More effort is needed to raise the generally low level of involvement by the local community in the process. SEA was introduced to overcome a weakness in the EIA system that the community is consulted only on environmental impacts of a particular project.

"The fact that IAIA 2000 is being held in Hong Kong attests to the important role that we can and are determined to play in the international effort to protect and improve our natural assets and common heritage." Mrs Yam added. SEA has been conducted for major new towns and development plans, such as Tseung Kwan O New Town, since 1988 with far reaching benefits. The SEA report for the Territorial Development Strategy Review in 1996 contributed to a decision to establish a Council on Sustainable Development. The SEA report completed last year for the Third Comprehensive Transport Study in HK resulted in an inormed and vigorous debate on the sustainability of our transport policies and led to community acceptance of the need to give greater emphasis to railway.

Referring to sustainable development, Mrs Yam pointed to the remarkable contribution of the EIA and SEA processes to policy formulation. The two processes have instilled "ownership" of environmental responsibilities of project proponents in both the public and private sectors. Community involvement and informed public debate on the planning and development process were encouraged. Environmental considerations were integrated into major decisions on social and economic development, and reliable information and objective analysis were provided for decision makers.

She suggested that, having accumulated considerable experience and expertise in impact assessment over the past two decades, Hong Kong is at the forefront in this field.

(http://www.info.gov.hk/efb/press/2006 2000.html)

HONG KONG DISNEYLAND UPDATE

HAM wins contract for Hong Kong Disneyland

Dredging and marine contractors HAM, of Rotterdam, have been awarded the contract for the land reclamation component of the Hong Kong Disneyland project. The work will involve a partial reclamation of Penny's Bay, Lantau Island.

To undertake the contract, Ham will participate in a joint venture with H.K. Construction (Holdings) Ltd. 40 million cubic metres of clay soil will be removed from the location, after which trailing suction hopper dredgers will deploy 65 million cubic metres of sand at the site. Soil improvement techniques that will speed up the consolidation process will be applied on a large scale. HAM will obtain sand from designated borrow areas at sea. The contract also involves the construction of two kilometres of coastal protection works and the building of the access road to the future Disneyland theme park.

During the peak period of the work, Ham will be operating some eight trailing suction hopper dredgers on the site.

[*www.hamdredging.nl/news*, 21 August 2000]

Environmental dredging: HAM is a leader

For many years, HAM, dredging and marine contractors based in the Netherlands, have been involved in cleaning the environment by removing polluted soils and storing them in special purpose-built deposit sites. HAM has specialised in environmental dredging and has developed various techniques and specialised equipment for this work, such as the visor grabbucket, silt curtains, slope cleaners and the auger dredger-HAM 291.

A recent example of such a project in which HAM was involved was the Lake Ketelmeer sanitation project phase I, in the Nederlands. The lake is located at the mouth of the river IJssel. which is a branch of the river Rhine. Due to industrial development in the Ruhr area in Germany, thousands of tonnes of heavy polluted silt have been deposited on the bottom of the 3,800 hectares lake. To clean-up the most seriously polluted 2,800 hectares, the government of the Netherlands decided to construct a very large special depot, capable of storing up to 20 million cubic metres of silt, two thirds of which will be removed from the bottom of Lake Ketelmeer.

HAM was one of the contractors in charge of the construction of the depot and the sanitation dredging. The project involves:

- 2 million cubic metres silt dredging for sanitation purposes
- dredging of 3.5 million cubic metres clay and peat

- dredging 14 million cubic metres of sand
- providing 230,000 square metres bottom and shore protection
- deploying with 200,000 tonnes of quarry stone

[www.hamdredging.com/expertise/envi ronmental-dredging.htm]

[Note: HAM's environmentally responsible dredging skills will certainly be needed as it has been estimated that the Penny Bay reclamation will require removal of at least 80,000 cubic metres of toxic mud: [SCMP 16 May 2000]

Penny's Bay reclamation: Stage 1

Maunsell Environmental Management Consultants Limited (MEMCL) has completed an environmental monitoring and audit report for the contractors engaged to carry out the reclamation of Penny's Bay.

The purpose of this report is to establish baseline levels for air, noise and water quality which will be used as the basis for environmental impact and compliance monitoring during construction. The report presents the monitoring locations, equipment specifications, relevant dates and results for air quality, noise and water quality measurements taken over the baseline period, namely between 1April and May 2000.

The main components of the Penny's Bay works are:

- construction of an access road and water supply facility from the existing Yam O Interchange to China Light and Power's power station at Penny's Bay;
- dredging and reclamation to form approximately 200 hectares of land;
- construction of approximately 1,800 metres of permanent seawall; and
- construction of approximately 1,200 metres of seawall extension under a future contract

The report prepared by MEMCL identified no major activities influencing air quality, noise levels and water quality during the baseline monitoring. One major factor which might have affected the results was the bad weather and rainstorm during the initial weeks of the monitoring. [Baseline Monitoring Report, Rev. 3]

Disneyland rail line study

The MTR has pledged to carry out an environmental impact study of its proposed \$2.3 billion rail link to Disneyland. The link to Penny's Bay will provide a 3.5 minute ride on a 3.5km single-track system, connecting to a new Yam O station on the Tung Chung line. Construction will not begin until the end of 2002 and is expected to take more than 2 years. [*SCMP*, 22 July 2000]

Rules set for Disney "aura"

Aircraft will be prohibited from flying at an altitude lower than 1,220 metres over Penny's Bay under new regulations to be gazetted in May. This will create a no-fly zone in order to maintain 'an aura of fantasy' at the future Disneyland site, officials said. A plan for a no-anchorage zone to prevent boats stopping for the nightly fireworks display will also be gazetted. [SCMP, 18 May 2000]

ADVISORY COUNCIL ON THE ENVIRONMENT (ACE)

Reportofthe52ndEnvironmentalImpactAssessmentSubcommitteeMeeting (ACE Paper 15/2000)

Kowloon-Canton Railway Corporation (KCRC) East Rail Extension - Hung Hom to Tsim Sha Tsui (ACE EIA Paper 2/2000)

The project is scheduled to start in late 2000 for completion by 2004. It will provide a direct rail link from the New Territories into the heart of the Kowloon Peninsula and a second interchange at Tsim Sha Tsui with the Mass Transit Railway (MTR) to relieve the increasing passenger demanded in Kowloon Tong.

On waste disposal arrangements: though the bulk of the waste material would have to be disposed of off-site (due to the restricted site area) and transported through the central part of Tsim Sha Tsui, the shortest possible routing will be adopted to reduce the potential environmental impact.

On landscape impact: a contractor with the best available expertise and skills would be employed for transplanting trees. Native species will be accorded priority in the planting programme.

On construction noise impact: full enclosure of the construction site will not be possible, due to the need to provide access for fire engines to adjacent high rise buildings.

The Subcommittee recommended the report be endorsed, with the following conditions:-

- (a) Continuous noise monitoring equipment, at locations to be decided in consultation with the EPD, be set up by the project proponent.
- (b) Results generated by the continuous noise monitoring equipment to be made available contemporaneously to the public through the proponent website.
- (c) Immediate remedial action to be taken in the event noise levels exceed the worst case scenario predicted in the EIA report.
- (d) A monitoring programme of the results of vegetation transplanting to be carried out; and
- (e) A total of 1,500 trees to be planted on completion of the project.

Air Pollution Control (Vehicle Design Standards) (Emission) (Amendment) Regulation 2000 and Air Pollution Control (Motor Vehicle Fuel) (Amendment) Regulation 2000 and Euro III Emission Standards for New Motor Vehicles and Associated Motor Fuel Requirements (ACE Paper 17/2000)

The Air Pollution Control (Vehicle Design Standards) (Emission) stipulates Regulation emission standards for different classes of vehicles. The requirements for motor fuel are stipulated in the Air Pollution (Motor Vehicle Control Fuel) Regulation. It is proposed that the specifications for unleaded petrol and motor diesel in the Regulation will be upgraded to those currently applied by the European Union to support the introduction of Euro III emission standards. Major changes to fuel specifications will include the introduction of limits on vapour pressure and some fuel components for unleaded petrol, and the lowering of maximum sulphur content for motor vehicle diesel from 0.05% to 0.035% by weight.

Reportofthe53rdEnvironmentalImpactAssess-mentSubcommitteeMeeting(ACE Paper 19/2000)

Tuen Mun Sewerage - Eastern Coastal Sewerage Extension (ACE EIA Paper 5/2000)

The Tuen Mun Sewerage Master Plan (TMSMP) Study completed in September 1993 identified a number of unsewered village clusters within the Tuen Mun Master Plan study area. The lack of proper sewage treatment in the area results in adverse water quality impacts on surrounding watercourses. Eastern The proposed Coastal Sewerage Extension will improve the situation and provide sewage collection and disposal for some of the unsewered villages.

Director of The Environmental Protection (DEP) considers that the EIA report meets the requirements of the EIA Study Brief and the Technical Environmental Memorandum on Impact Assessment Process. Drainage Services Department (DSD), the project proponent, has been requested to initiate public consultation in accordance with the requirements under the EIA Ordinance. Comments from the ACE and the public will be taken into consideration before DEP makes the final decision regarding the approval of the EIA report.

Environmental Impact Assessment Report on Shenzhen River Regulation Project Stage III (ACE Paper 19A/2000)

Land access to China from Hong Kong is via the Man Kam To boundary control point, and to Shenzhen through the busy commercial area of the Lo Wu district. Transportation of excavated material generated by this project will cause an unacceptable impact on the

already congested cross-boundary traffic in Man Kam To and Lo Wu. The relevant border control authorities on the Hong Kong side (i.e. the Police, Immigration and Customs) have strongly objected to the proposal to export excavated material through Man Kam To, as frequent passage of lorries through the border control area will cause unacceptable control and security problems. Marine transportation is therefore the only feasible solution for off-site disposal. Unfortunately, the existing river within the Stage III site does not offer suitable marine access, and the improved river will have only limited capacity for marine transportation because of the constraints imposed by the small headroom of the bridges at Lo Wu, which would allow any one way passage of small barges.

The Shenzhen River Regulation Project Stage III is an unusual project located in the border area, with very limited marine access for transportation of excavated materials. In order to resolve the construction difficulties and the programme constraints, the use of Nam Hang Middle Valley for the disposal of surplus excavated materials is essential. With the EIA report recommended mitigation measures and the restoration plan fully implemented, the impact of disposal of material in the Nam Hang Middle Valley can be mitigated to within an acceptable level.

Comprehensive Control of Vehicle Emissions (ACE Paper 20/2000)

Phasing out diesel taxis and light buses

Since January this year, the government has put out to tender five large sites for exclusive use at LPG refilling stations. The tender terms do not require any land premium. A formula to cap the price at which LPG would be sold is required. The successful bidder have set a price for LPG that will cut the operating costs for a taxi by about \$45,000 each year. This, together with the cheaper price of LPG taxis, creates a strong incentive for most taxi operators to switch to LPG as early as possible.

A preparatory committee comprising representatives from relevant

government bureaux and departments, the light bus trade and academics with relevant expertise, has also been established to work out arrangements for the trial of alternative light buses, *Enforcement against smoky vehicles* The Secretary for Environment and Food has increased the fixed penalty for smoky vehicle offences to \$1,000.

- Promoting proper maintenance and eco-driving technique Since August 1999, the Environmental Protection Department, in collaboration with the Vocational Training Council and the Hong Kong Productivity Council, has provided training sessions for 750 vehicle mechanics on proper engine repair with a view to reducing smoke emissions. Discussion sessions and workshops with the transport trade and vehicle mechanics were also held to promote understanding of the dynamometer smoke test.
- Emission requirements for newly registered vehicles and auto diesel

The European Union will introduce the Euro III emission standards for newly registered motor vehicles in January 2001. To support this, the maximum permitted sulphur content in auto diesel will be reduced from 0.05% to 0.035%. A Euro III standard vehicle with the lower sulphur diesel with emit about 38% less particles and 20% less hydrocarbon and nitrogen oxides than the equivalent Euro II model.

Report of the 54th Environmental Impact Assessment Subcommittee Meeting (ACE Paper 23/2000)

Tai O Sheltered Boat Anchorage (ACE EIA Paper 7/2000)

A Sheltered Boat Anchorage will revive the fishing industry at Tai O and also assist in meeting the shortfall of available typhoon shelter space in Hong Kong. Associated with that project, the former Tai O saltpans will be remodeled to accommodate future planting of around 7 ha of mangroves. This future planting, to be carried out by the Agriculture, Fisheries and Conservation Department, is intended as partial off-site mitigation for those mangroves lost as a result of the construction of Chek Lap Kok airport and associated port and airport developments on the northern shore of Lantau.

The boat anchorage will provide 8 ha. of anchorage area for about 220 small boats/fishing vessels. The scope of works comprises the construction of a 700 m long breakwater, land reclamation of 1 ha. for boat maintenance facilities and loading/unloading bay, dredging of the anchorage area/approach channels, and site formation of the former salt pans for the future mangrove planting.

The Director of Environmental Protection (DEP) considers that the EIA report meets the requirements of the EIA Study Brief and the Technical Memorandum (TM) on Environmental Impact Assessment Process. Civil Engineering Department. The project proponent, has been requested to initiate public consultation in accordance with the requirements under the EIAO.

On the design of the breakwater, the project proponent confirmed that the layout of the entire project was satisfactory to all relevant authorities. The breakwater would be located to ensure that flows from the Tai O Creek would not be embayed. Furthermore, with the dredging for the anchorage and the approach channels, the water quality modeling indicated that prescribed water quality objectives would not be exceeded and there would be adequate flushing. The design of the breakwater as a continuous rubble mound structure was acceptable with respect to water quality impact.

On the size of the sheltered boat anchorage, the proponent clarified that the maximum capacity of 220 boats for the anchorage was designed for not only accommodating existing fishing vessels but also to allow for future growth in the fishing industry in Tai O.

On the feasibility of the mangrove planting scheme, the proponent confirmed that the 50 metre buffer area proposed between the mangrove planting area and the anchorage was considered sufficient by the Agriculture, Fisheries and Conservation Department (AFCD).

RAILWAY DEVELOPMENT STRATEGY (ACE Paper 24/2000)

The 1994 Railway Development Strategy

The government formulated the first Railway Development Strategy for Hong Kong in 1994. It accorded priority to the implementation of three railway projects, namely, the KCR West Rail, the MTR Tseung Kwan O Extension and the Ma On Shan to Tai Wai Rail Link, which is to couple with an extension of the KCR East Rail from Hung Hom to Tsim Sha Tsui.

These three rail projects are now at different stages of implementation. In 1999 the government decided to proceed with the implementation of the Sheung Shui to Lok Ma Chau Spur Line for an additional rail passenger border crossing to provide some relief to Lo Wu crossing. The government also decided in late 1999 that as part and parcel of the Disney Theme Park development, the Penny's Bay Rail Link should be built and completed in time for opening of the Theme Park. Thus a total of six new railway lines are scheduled for completion between 2002 and 2005.

By reducing reliance on road-based transport, expansion of the railway network will help limit vehicle emissions by some 600 tonnes of NOX and respirable suspended particles a year.

TOWN PLANNING

Stilt houses in Tai O

The government has decided to allow owners of stilt houses in Tai O, Lantau, holding valid government land licenses to rebuild their homes which were destroyed in the fire on 2nd July 2000. About 90 stilt houses destroyed by the fire in Tai O were licensed by the Director of Lands under the Land (Miscellaneous Provisions) Ordinance. The departments concerned will have further discussions with the licencees to work out detailed arrangements. A spokesman for the Planning and Lands Bureau said on 25th July 2000 that having considered the demand from the fire victims to rebuild their stilt houses, the government had raised objection in principle no to reconstruction by the licencees in situ under the provisions of their existing licenses, which govern the use, size and height of the stilt houses. Under this arrangement, the costs of rebuilding individual stilt houses would be fully shouldered by the licencees concerned.

The spokesman emphasized that the licensing system permitted the licencees to use the government land as specified in the licence but did not confer on them land ownership or the right of testamentary disposition.

At present, the government land licences issued for the stilt houses in Tai O are renewed annually, taking into account the long-term planning and development needs for the government land concerned.

The spokesman said that under the provisions of the licences, the Director of Lands can revoke the licences by giving the licencees three months' notice. He added that the fire victims could also register with the Housing Department, which is offering speedy re-housing in the same district for eligible residents.

[www.info.gov.hk, 25 July 2000]

Small house policy

The New Territories Small House Policy (SHP) is a policy approved by the Executive Council and has been in force since December 1972. SHP is designed to allow a male indigenous villager to apply for permission to erect for himself a small house within his traditional village. Clearly, therefore, the SHP discriminates against women and, as such, violates the spirit and provisions of the national constitution and the Bill of Rights Ordinance. Therefore some critics have argued that it should be abolished.

University of Hong Kong academic, Mr. Lawrence Lai, has expressed his concern over this issue. He says that a logical way to deal with the problem would be to allow female descendants of indigenous villagers to be similarly entitled. However, in doing so, this would instantaneously double the magnitude of the problem of lack of land.

He also said that although the SHP provides a subsidy where small houses are constructed on government land at no premium, the problem of subsidy disappears when the house is resold on payment of the land premium.

Even if the argument that the policy does not involve a subsidy is not accepted, or if it is assumed that it is not inequitable for the villagers to have windfall gains, the numerical and financial scale of the SHP as it now stands is minute compared with the colossal amount of money spent on public housing.

Mr. Lai considered that the only significant problem with the SHP was the fact of Hong Kong's shortage of land. Private land zoned for small house development is very limited and there are many other legitimate uses that compete for government land in the New Territories. Sooner or later suitable land for low-rise housing in the New Territories will be exhausted. Unless we give up the country parks, the ecological havens of wild species in Hong Kong, the future feasibility of the SHP is therefore questionable. [*SCMP*, 2 July 2000]

LTR in Siu Sai Wan

The Transport Department (TD) has agreed in principle to allow the MTRC to build a rail transport system, similar to the Light Transit Railway (LTR) in Tuen Mun and Yuen Long, connecting Siu Sai Wan to the MTR Island Line.

The TD has not set out details of the proposed new system However, it is clear that it will primarily be a light railway system which will run from Siu Sai Wan along Chai Wan Road or Wing Tai Road to Chai Wan or Heng Fa Chung MTR Stations.

In the report "Railway Development Strategy 2000" released in May this year, it was reported that the MTR Island Line will be extended to Kennedy Town and to Wanchai Exhibition Centre. The eastern Island Line was not dealt with, and so the Eastern District Board had meetings with the government officers to discuss the issue. In early August 2000, the TD advised the Eastern District Board that the TD has been discussing with the MTRC a proposal to build a rail transport system to connect Siu Sai Wan and MTR Island Line. MTRC will be responsible for building and operating the new system. The TD has also promised the District Board that it will soon be in a position to deliver a feasibility report on the proposal.

The government has given three reasons for opposing the proposal to build a Siu Sai Wan MTR sub-line:

- Private premises situated south of Chai Wan Station and Wan Tsui Estate would need to be demolished, which would involve complicated resumption procedures;
- A 1.3km tunnel would need to be built under Pottinger Peak (ie under Chinese Permanent Cemetery), the total cost of which would be approximately HK\$1 billion;
- Although there is an increase in the population of Siu Sai Wan, the increase is not sufficient to ensure profit for MTRC from a new railway servicing the town.

For these reasons, the TD prefers to build a small-scale transport railway system, ie LTR, rather than an MTR main line.

There are presently 70,000 people living in Siu Sai Wan, and the population will increase to approximately 80,000 next year, excluding people living in Yue Wan Estate and Tsui Wan Estate. There are also many people working in factories in nearby Chai Wan East.

[Ming Pao, 16 August 2000]

REGIONAL & INTERNATIONAL

Australia

Western Australia has introduced a Register of Significant Trees. The purpose of the Register is to record the location, species, dimensions and another relevant details of giant trees or trees which are significant to the ecology and history of Western Australia in some other way. The register is only the second such Register to be established in Australia. It is an adaptation of the Register of Big Trees which has been kept in the United States of America for some years now.

The Register will also include photographs and other historical information relating to the recorded trees.

[The Australian, 26 September 2000]

Aboriginal land owners in northern south Australia have declared more than two million hectares of land under their control a protected area. The Anangu Pitjantjatjara tribe has undertaken to care for the land and wildlife in the area, using traditional land management techniques, in conjunction with Federal Government scientists. The protected area includes a rich array of rare reptiles, including the great desert skink.

The total area of land declared Indigenous Protected Areas in Australia is now nearly 3 million hectares. [*The Advertiser*, 7 September 2000]

Europe

Pollution is rarely the cause of death by itself but might tip the balance for people who are already ill.

A recent study conducted by a team led by Dr Nino Kunzli, of the University of Basel in Switzerland, revealed that air pollution accounted for six per cent of all deaths in Europe. The fumes that fill streets and hang as smog over cities constitute a lethal cocktail of chemicals which hastens the deaths of thousands of elderly or vulnerable people, and damages the health of younger people by aggravating respiratory and other conditions.

The findings showed the health costs of air pollution from motor traffic were higher than those from road accidents. Although the risks for individuals were small, the general impact of air pollution was very large. The report concluded that the findings from the study should guide decisions on the assessment of environmental healthpolicy options.

[*SCMP*, 2 September 2000]

Jordan

The World Conservation Union (IUCN) congress was held in Jordan's capital, Amman, from 4th to 11th October 2000. About 2.500 representatives from 140 countries attended the meeting which debated and agreed a four-year agenda to conserve the environment and protect species and endangered fragile ecosystems.

As violence in Gaza, the West Bank and Israeli Arab towns claimed the lives of more than 60 Palestinians, delegates at the conference said spending more money to ensure the sustainability and equitable use of natural resources could help reduce conflict.

Chief scientist for the IUCN, Jeff McNeely, told the conference that all the evidence suggests that environment related conflicts and disasters will increase as the demands on the environment continue to increase and human populations put more pressure on resources. Increasing funding to protect the environment could therefore be an efficient way to reduce social instability and international conflict. Mark Halle, of the International Institute for Sustainable Development suggested that conserving the environment is an effective way of preventing conflict, and is also an extremely important factor in building peace.

Be it water in the Middle East, land distribution in Zimbabwe or fishing rights in international waters. environmental security plays an increasing role in the maintenance of political stability. By increasing funding to preserve the environment, these conflicts might be avoided, and both the human and financial impact of disasters could be diminished. [*Reuters*, 6 October 2000]

United States

Fire and ice may seem like strange bedfellows, but a growing number of scientists believe the greatest store of clean-burning fuel available to future generations may lie frozen in combustible ice crystals below the ocean floor. This resource, known as gas or methane hydrates, is thought to exist in vast deposits below the world's continental margins where organic sediments have been trapped for many millions of years by pressure and cold. Preliminary evidence suggests these reserves may dwarf reserves of oil, coal and natural gas combined.

Methane hydrates were first discovered below the Arctic permafrost by oil companies at the end of the 19th century, and it may well be in the Arctic that exploitation first becomes commercially feasible. That is because methane hydrates are formed by a combination of relatively low temperatures and high pressures, which are characteristics of the Arctic.

Charles Paull, chief scientist on a recent expedition of the Ocean Drilling Program (OPD) to explore the Blake Ridge off the Carolina coast, said that this formation alone may hold enough methane to meet U.S. natural gas needs for 105 years. Gas hydrates may make up about 5 percent of the sediment in this huge outcropping, some 2,800 feet below the surface of the Atlantic Ocean on the margins of the North American continental shelf.

Whilst research is at an early stage just compiling an inventory of hydrate formations around the world will take decades — some scientists, including officials at the U.S. Energy Department, believe large-scale commercial exploitation could begin by 2015.

Methane is by far the cleanest-burning fossil fuel when released unburned into the atmosphere, but it is also a potent greenhouse gas with far-reaching implications for global climate and the oceans themselves. There is evidence that massive naturally occurring releases of these gases in the past have contributed to abrupt changes in the Earth's climate, as well as towering tsunami waves like the one that wreaked havoc in northern Europe 8,000 years ago.

A further danger in accessing methane hydrates relates to existing undersea oil

and gas supply lines. Exploitation of the resource may raise the temperature of the surrounding sea floor and trigger a release of gases that could create huge potholes in the ocean floor, thus rupturing those lines and leading to hugely destructive undersea spills.

Whether or not this resource ever lives up to its potential as an energy source, ODP scientists believe they have little choice but to keep probing the ocean floors to learn as much as they can about the mysterious burning ice, which could prove either a boon or a bane to mankind — or both. [*Reuters*, 6 October 2000]

Japan

On 27th September 2000, the Ministry of International Trade and Industry ("MITI") and the Agency of Natural Resources and Energy announced they are conducting tests which they hope will lead to the introduction of the "save energy navigation system" for vehicles.

This system displays for a car driver petrol expense estimates which are based on the quantity of petrol being consumed during that particular journey. The purpose of the system is to call drivers' attention to energysaving driving methods.

Both government institutions will ask manufacturers of car navigation equipment to produce experimental equipment for the system. This equipment will be fixed to more than one hundred vehicles to be monitored in the initial trials. If significant energy-saving driving is achieved as a result of the experiment, the government will ask the manufacturers to build the system into their already available car navigation equipment.

Once a driver has input a petrol price, the system automatically will measure the quantity of petrol consumed and indicate the petrol expenses once every 5 or 10 minutes during the journey. The system will also provide him with estimates of the journey time and distance, total quantity of petrol consumed and the petrol consumption rate, by displaying calibrated charts. The driver can refer to weekly and monthly data as to the consumption of petrol, and so check the effectiveness of his energy-saving driving.

A similar system already exists for houses. This system shows the household's cost of electricity and gas consumption. Experiments conducted by the Save Energy Centre show that houses which had adopted the system achieved an average of 20% reduction in electricity consumption

As there are a lot of consumers who are sensitive to the petrol price, the MITI expects that drivers who have the system installed will try to minimise use of their car. The purpose of the experimental trial is to obtain comparative data by running vehicles in a variety of conditions, such as urban areas where heavy traffic jams tend to occur, and rural areas where drivers tend to step on the accelerator. Various types of vehicles will also be used in the trials.

According to the MITI, energy consumption by the transportation sector (passenger cars and trucks) accounts for a quarter of the total quantity of Japan's energy consumption. Consumption in this

sector increased 22.2% between 1990 and 1998.

The General Energy Investigation Committee (one of the advisory organs of the MITI) deals with the issue of reduction of energy consumption in the transportation sector as one of its main The Committee responsibilities. recognises that reduction in vehicle energy use also contributes to reducing the risk of the earth becoming warmer from green house gas emissions. [The Yomiuri Shimbun, 28 September 2000]

This Quarterly Report does not constitute legal advice given on any particular matter. Whilst all effort has been made to ensure completeness and accuracy at the time of publication, no responsibility is accepted for errors and omissions. Further information and enquiries in respect of this quarterly should be directed to Fred Kan & Co. or any of our following associate firms:

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	p. 2000	1 st	2 nd	3rd +	Highest
	Numbe	Offenc	Offenc	Offenc	Fine
	r	e	e	e	
	40	18	5	17	20,000
APCO	36	17	3	16	30,000
	50	22	7	21	50,000
	27	18	6	3	50,000
WPCO	45	29	5	11	60,000
	28	21	2	5	100,000
	58	16	10	32	60,000
NCO	36	14	4	18	60,000
	43	14	6	23	115,000
	-	-	-	-	-
OLPO	1	1	-	-	15,000
	-	-	-	-	-
	2	2	-	-	30,000
DASO	-	-	-	-	-
	-	-	-	-	-
	22	20	2		20,000
WDO	39	26	8	5	20,000
	22	17	2	3	10,000
	149	74	23	52	
Total	157	87	20	50	
	143	74	17	52	

Comparative Table of Environmental Convictions:	
Jul. – Sep. 2000	

July figures appear on the first line, August figures on the second and September figures on the third of each item. Source: EPD, Anti-Pollution Prosecution Figures.

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AFD	Agriculture & Fisheries Department				
APCO	Air Pollution Control Ordinance				
CFCs	Chlorofluorocarbons				
DASO	Dumping At Sea Ordinance				
EC	European Community				
EE	Estern Express				
EPCOM	Environmental Pollution Advisory				
	Committee				
EPD	Environmental Protection Department				
EXCO	Executive Council				
FEER	Far Eastern Economic Review				
HKS	Hong Kong Standard				
HKU	University of Hong Kong				
JLG	Joint Liaise Group				
LDC	Land Development Corporation				
LEGCO	Legislative Council				
LS	Legal Supplement				
NCO	Noise Control Ordinance				
NT	New Territories				
OLPO	Ozone Layer Pollution Ordinance				
PAA	Provisional Airport Authority				
PADS	Port and Airport Development Strategy				
SCMP	South China Morning Post				
SMP	Sunday Morning Post				
WDO	Waste Disposal Ordinance				
WPCO	Water Pollution Control Ordinance				

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