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ACE-EIA Paper 3/2007

For Advice

Environmental Impact Assessment Ordinance (Cap. 499)
Environmental Impact Assessment Report
Permanent Aviation Fuel Facility for Hong Kong International Airport

Purpose

This paper presents the key findings and recommendations of the Environmental Impact Assessment (EIA) report for the Permanent Aviation Fuel Facility (PAFF) for Hong Kong International Airport (hereafter known as the Project), submitted under section 6(2) of the Environmental Impact Assessment Ordinance (EIAO). The applicant, Airport Authority Hong Kong (AA), and its consultants will make a presentation at the meeting. Comments from the public and the Advisory Council on the Environment (ACE) will be taken into account by the Director of Environmental Protection (DEP) when she makes the decision on the approval of EIA report under the EIAO.

Advice Sought

2. Members' views are sought on the findings and recommendations of the EIA report.

Background on the Previous Consultation and Judicial Review

3. An EIA report for the Project was discussed at the 72nd meeting of the EIA Subcommittee of the ACE on 8 July 2002 and endorsed by the ACE on 29 July 2002 with the following conditions:

- (a) measures should be taken to reduce the underwater piling noise as much as possible and in any case noise should be reduced by 3 to 5 dB. In addition, the results of the bubble jacket noise attenuation trial and test should be reported to the EIA Subcommittee before piling commences; (The results of trial and test were reported to EIA Subcommittee in 2005 (ACE-EIA Paper 2/2005 refers). The underwater piling works have been completed.)

- (b) the piling and related equipment installed on the piling barge should be acoustically decoupled such that the underwater noise emitted from the hull of the barge would not be higher than that from the percussive piling itself; and
- (c) there should be additional water quality monitoring points during the dredging phase.

4. The EIA report was approved by the Director of Environmental Protection (DEP) and an Environmental Permit (EP) granted under the EIAO to construct and operate the Project in August 2002. Subsequently, Shui Wing Steel Limited lodged a Judicial Review (JR) in November 2002 against the DEP's decisions. Both the Court of First Instance and the Court of Appeal dismissed the JR and the Appeal in September 2003 and March 2005 respectively.

5. On 17 July 2006, the Court of Final Appeal (CFA) overturned the decision of the Court of Appeal and set aside the judgment of the Court of First Instance and in lieu thereof ordered that the two decisions made by the DEP under the EIAO in August 2002 to approve the EIA report and to grant the EP for the Project be quashed. Some of the findings of the CFA Judgment are :

- (a) The methodology adopted for making the quantitative risk assessment (QRA) only in respect of a 10% loss of fuel was inconsistent with the requirements of the risk guidelines (paragraph 66 of judgment). For the catastrophic instantaneous 100% loss scenario, it would have been necessary not only to assess the frequency of occurrence of the scenario but also – and perhaps primarily – to assess the number of fatalities that might be caused if the scenario occurred (paragraph 68 of judgment); and
- (b) According to paragraph 93 of the CFA Judgment, *“it is reasonable to assume that the insertion of an adequate QRA in the existing EIA report would not involve “going back to square one”..... Issues other than the QRA for "all hazardous scenarios" have already been addressed, comments have been obtained and evaluated. If, when the required QRA is made, it appears that there is no unacceptable risk to human life, a new approval and environmental permit should follow in little more than the periods specified in the Ordinance.....”*.

A copy of the judgment of the CFA is enclosed herewith for Members' reference.

6. Following the handing down of the judgment of the CFA, AA submitted a revised EIA report based on the same EIA study brief on 22 December 2006, applying for approval under the EIAO.

7. It should be noted that there is no major change to the key findings and recommendations in the current EIA report from the one endorsed by the ACE in July 2002 except for the inclusion of the quantitative risk assessment on the 100% instantaneous scenario as ruled by the CFA.

Need for the Project

8. Aviation fuel is currently delivered to the Hong Kong International Airport via an existing temporary Aviation Fuel Receiving Facility (AFRF) sited off Sha Chau and located within the Sha Chau and Lung Kwu Chau Marine Park. The temporary AFRF does not have adequate capacity to meet the forecasted demand of aviation fuel during operational lifetime of the airport. The Project is to replace the existing temporary AFRF with a permanent facility such that, upon commissioning, the existing temporary AFRF will be used for emergency backup purpose only.

Description of the Project

9. The Project is to construct and operate a PAFF which will consist of the following major elements :

- ♦ An aviation fuel tank farm located at Tuen Mun Area 38 which is zoned for special industrial use. The tank farm will have 8 tanks with gross capacity of about 264,000m³ initially and 12 tanks with gross capacity of about 388,000m³ ultimately;
- ♦ A jetty with two berths which can accommodate vessels up to 80,000 dwt;
- ♦ A twin submarine pipelines with diameter of 500mm and length of about 4.8km connecting the tank farm at Tuen Mun and the temporary AFRF at Sha Chau; and
- ♦ Miscellaneous on-site operational facilities such as offices.

10. Location of the Project, including the tank farm, jetty and submarine pipelines, etc., is shown in **Figure 1**.

11. The Project is classified as a designated project under Items H.2 and L.4, Part I, Schedule 2 of the EIAO, i.e.

H.2 : A submarine gas pipeline or submarine oil pipeline; and

L.4 : A storage, transfer and trans-shipment of oil facility with a storage capacity of not less than 1,000 tonnes.

12. The Project was subject to a site search study for a period of more than 10 years. In December 2001, AA presented the findings to ACE concluding that Tuen Mun Area 38 was a preferred site for developing the Project.

13. The aviation fuel tank farm is recommended to be located in Tuen Mun Area 38, which is in an industrialised setting. The nearest residential area is over 2km away. The use of the site in Tuen Mun Area 38 will avoid the need for land reclamation and thus minimise the potential impact that may be arisen from reclamation on residents, marine water quality and ecosystem in the vicinity.

14. Aviation fuel is recommended to be transported to the airport via a new submarine pipelines to the existing temporary AFRF at Sha Chau and then to the airport via the existing pipeline. Compared with the option using a new pipeline transporting aviation fuel directly from the tank farm to the airport, the recommended new submarine pipeline option will be shorter. The alignment of the new submarine pipelines will run mainly across the existing Urmston Road navigation channel which has been subject to maintenance dredging occasionally. By adopting the recommended pipeline option, the impact on marine water quality and ecology will be reduced. It is thus considered as an environmentally preferred pipeline option.

Specific Environmental Aspects to Highlight

15. The key environmental issues identified for the Project are hazard to life, marine ecology, water quality and accidental fuel spillage.

Hazard to Life

16. The Project is not classified as a Potentially Hazardous Installation according to the Hong Kong Planning Standards and Guidelines. It will only store aviation fuel, the flash point of which is 38 °C, and under atmospheric pressure. Under normal conditions, flammable vapour will not be generated. According to the EIA report, the Project is expected at the low end of the spectrum of risks presented by hazardous installations world-wide.

17. Quantitative risk assessment has been carried out on all the identified potential hazardous scenarios associated with marine transport, jetty transfer, tank farm storage and pipeline transfer of aviation fuel. The potential hazardous scenarios identified and quantitatively assessed in the EIA report include, amongst others, the scenario of instantaneous release of 100% of the tank content which was the subject of challenge in the Judicial Review mentioned in paragraph 5 above. The EIA concludes that the hazard to human life associated with the Project meets with the Risk Guidelines, including both

individual risk and societal risk stipulated in the Annex 4 of the Technical Memorandum on EIA Process (TM) at both initial and ultimate phases of operation. The societal risk associated with any and all events of the Project including, amongst other events, the event due to instantaneous release of 100% of the tank content falls totally within the acceptable region of the FN chart stipulated in the Annex 4 of the TM.

18. Operation of the Project will reduce marine transport risk at the Ma Wan Channel due to the use of larger sized vessels and hence the reduced number of aviation fuel vessel movements in the Ma Wan Channel. The vessels movements will be reduced from about 1,100 to about 200 per year. The Project will be designed, constructed and operated to meet both local and international standards and guidelines. A number of safety safeguard measures such as the following will be incorporated in the design for implementation :

- ♦ marine traffic management measures like the use of double hulled vessels, use of tug boat and pilotage and use of berthing aid system, etc.;
- ♦ containment systems like surrounding bunding and security walls, etc.;
- ♦ drainage systems to prevent seepage of aviation fuel to ground and release of aviation fuel to sea, etc.;
- ♦ detection and shutdown systems to detect leakage and overflow, etc. and to trigger emergency shutdown if necessary;
- ♦ protective measures to protect the jetty and sub-sea pipeline; and
- ♦ fire fighting systems and facilities, etc.

Furthermore, on-site and off-site Emergency Response Plans will be developed and tested regularly and an Environmental Management System (EMS) including, amongst others, regular inspection and audit will be developed and implemented for the Project.

Water Quality, Marine Ecology and Accidental Fuel Spillage

19. To lay the submarine pipelines, the Project will require dredging and backfilling during construction in open waters where Chinese White Dolphins (CWDs) have been sighted. Water quality modeling in the EIA reveals that the suspended sediment elevation due to dredging and backfilling will not cause unacceptable impact at the nearby water and ecological sensitive receivers. The EIA recommends a number of mitigation measures such as avoidance of dredging from March to August which is the CWD calving season, avoidance of dredging at nighttime except in the Urmston Road Channel and the setting up of CWD exclusion zone during dredging to protect the CWDs. Besides, to protect the Sha Chau and Lung Kwu Chau Marine Park, the EIA recommends mitigation measures such as prohibiting the use of Trailer Suction Hopper Dredger and marine anchors in the marine park and proper scheduling of pipeline dredging works in the marine park to tie in with the maintenance dredging works currently required by the AFRF at Sha Chau.

20. With the recommended mitigation measures in place, no unacceptable impact on CWDs is expected. Post-construction CWD abundance monitoring will be conducted to verify the assessment.

21. During operation of the Project, no unacceptable water quality and marine ecological impacts are expected. The experience of operating the existing temporary AFRF at Sha Chau also indicates that there was no occurrence of any fuel spillage since its operation in 1998. Furthermore, as mentioned in paragraph 18 above, there are a number of measures such as containment systems, drainage systems, leakage/overflowing detection system, emergency shutdown system and pipeline protective measures incorporated in the Project to avoid or minimize major accidental fuel spillage. Spill Response Plan will also be developed and tested regularly. With all these measures in place, water quality and marine ecological impacts in unlikely case of major accidental fuel spillage will be minimized and no adverse impact is expected.

Environmental Monitoring and Audit (EM&A)

22. The EIA report includes an EM&A Manual which recommends EM&A programme for both construction and operation phases of the Project. Design audit, operational EMS and regular operational inspections will be implemented to prevent hazard to human life, fuel spillage risk and land contamination. Water quality monitoring will be conducted during dredging works and CWD abundance monitoring will be conducted after completion of construction works.

Public Consultation

23. As noted in the EIA report (Table 1.1), the applicant has conducted a number of communication and consultation activities with the public/stakeholders for the Project since 2001.

24. The EIA report, EM&A Manual and Executive Summary are available for the public to comment under the EIAO starting from 23 February 2007 for 30 days. Members will be briefed on any comments received from the public at the meeting.

February 2007

Environmental Assessment Division

Environmental Protection Department

**IN THE COURT OF FINAL APPEAL OF THE
HONG KONG SPECIAL ADMINISTRATIVE REGION**

**FINAL APPEAL NO. 28 OF 2005 (CIVIL)
(ON APPEAL FROM CACV NO. 350 OF 2003)**

Between :

SHIU WING STEEL LIMITED

**Appellant
(Applicant)**

- and -

DIRECTOR OF ENVIRONMENTAL PROTECTION

**Respondent
(Respondent)**

AIRPORT AUTHORITY OF HONG KONG

**Interested Party
(Interested Party)**

Court :

Mr Justice Bokhary PJ, Mr Justice Chan PJ,
Mr Justice Ribeiro PJ, Mr Justice Mortimer NPJ
and Sir Gerard Brennan NPJ

Dates of Hearing :

12 to 16 June 2006

Date of Judgment :

17 July 2006

J U D G M E N T

The Court :

1. This is an appeal from a judgment of the Court of Appeal dismissing an appeal to that Court from a decision of Burrell J in the Court of First Instance. Burrell J dismissed a challenge by the appellant, Shiu Wing Steel Limited (“SWS”), to two decisions made by the respondent (“the Director”) in purported exercise of his powers under the Environmental Impact Assessment Ordinance, Cap. 499 (“the Ordinance”).

2. The Hong Kong Airport Authority (“HKAA”) proposed to construct a permanent air fuel farm (“PAFF”) for the storage of aviation fuel at a site known as Tuen Mun Area 38. The PAFF fell within the definition of a “designated project” in Part 1 of Schedule 2 of the Ordinance. It is an offence to construct a designated project without an environmental permit (ss 9(1) and 26(1)) so it was necessary for HKAA to undertake the process which the Ordinance prescribes in order to obtain an environmental permit.

3. SWS operates a steel mill on a site adjacent to the site proposed for the PAFF. Within the steel mill, extremely hot processes are carried out and hot steel is stored. SWS was concerned about the construction of a fuel farm so close to the mill and about the possibility of fuel spilling out of the PAFF and into the mill where a conflagration would be a great danger to life and property. These proceedings focus on the risk of such a spillage occurring.

4. Stock JA, who delivered the principal judgment of the majority in the Court of Appeal, described the proposed layout of the PAFF and the risk with which SWS was concerned. He said :

“17. Under the scheme put to the Director, the proposed tank farm will contain a number of storage tanks each 40 metres in diameter and 29 metres high, and each with a storage capacity of 35000 cubic metres. There will be constructed a bund wall ten metres or so from the tank nearest SWS’s

property boundary fence at a height of 4.6 metres to the bund floor. Beyond the bund wall are site roads raised to about 2.6 meters with respect to the bund floor so that the bund wall will act as a retaining wall. According to the EIA report, from which this description is broadly drawn, 'potential for failure of the bund wall due to momentum surge will be limited.' Beyond the site road was proposed a security wall to 'act as a secondary containment in the event of overtopping of the bund. The roads around the tank bund will be provided with storm water drains, which will collect any liquid overtopping the bund.' Then there is to be a further area beyond the fence which will include a drainage ditch and it is intended to plant trees within this area.

18. It is momentum surge resulting in overtopping of the bund that so worries SWS, for any flow of fuel onto the mill's site carries with it the obvious danger of a conflagration at the mill with resulting risk to the lives of those working there. A scenario which would cause such a surge and overtopping would be what has been referred to in this appeal, as well as in the court below, as a catastrophic tank failure, meaning an instantaneous, or almost instantaneous, loss of the entire contents of a tank such as to result in significant overtopping of the bund."

5. HKAA prepared an Environmental Impact Assessment report ("the EIA report") and submitted it for the approval of the Director of Environmental Protection ("the Director") on 3 May 2002. It was made available for public comment on 14 June 2002. On 2 August 2002 the Director approved the EIA report and, on the application of HKAA, issued an environmental permit for the construction and operation of the PAFF on 28 August 2002 subject to conditions including a condition that HKAA should ensure that the project "is designed, constructed and operated in accordance with the information and all recommendations described in the approved EIA report".

6. On 1 November 2002 SWS applied for leave to commence proceedings for the judicial review of the Director's decision to approve the EIA report and his decision to issue the environmental permit. Leave was granted on 13 November 2002. The issues which were raised in the following litigation require an examination in some detail of the provisions of the Ordinance. Although the Ordinance follows a broad pattern of similar

legislation in other jurisdictions, it contains provisions which are unique to Hong Kong.

The Ordinance

7. The purpose of the Ordinance, as declared in its long title, is “to provide for assessing the impact on the environment of certain projects and proposals, for protecting the environment and for incidental matters.” The purpose so declared governs the interpretation of the Ordinance (*Medical Council of Hong Kong v. Chow Siu Shek* (2000) 3 HKCFAR 144 at 152-154; *Town Planning Board v. Society for the Protection of the Harbour Ltd* (2004) 7 HKCFAR 1 at 13-14).

8. The process leading to the issuing of an environmental permit commences with the submission by an applicant of a project profile which must comply with the “technical memorandum” (“TM”) issued by the Secretary for the Environment, Transport and Works (s.5(2)(b)) and which must be advertised in Chinese and English daily newspapers circulating in Hong Kong: s.5(2)(c). Section 16 authorizes the Secretary to issue a technical memorandum “setting out principles, procedures, guidelines, requirements and criteria for, *inter alia* :

- “ (a) the technical content of a project profile;
- (b) the technical content of an environmental impact assessment study brief or environmental impact assessment report;
- (c) deciding whether a designated project is environmentally acceptable;
- (d) deciding whether an environmental impact assessment report meets the requirements of the environmental impact assessment study brief;
- ...
- (i) the issue of environmental permits;
- (j) the imposition of environmental monitoring and audit requirements for designated projects as conditions in environmental permits.”

The Secretary had issued a TM “on Environmental Impact Assessment Process” which was published in the Gazette of 16 May 1997. A TM is published in the Gazette and laid on the table of the Legislative Council

which is empowered to repeal the memorandum if it sees fit: ss 16(5) and (6). The Ordinance specifically provides, however, that the TM is not subordinate legislation: s.16(12). Nevertheless, s.16(4) provides that :

“The Director shall be guided by all applicable technical memorandums when deciding on matters under sections 5, 6, 8, 10, 12, 13 and 14.”

9. The HKAA submitted a project profile to the Director, advertised the profile as the Ordinance prescribed and applied to the Director for the issue of an Environmental Impact Assessment Study Brief pursuant to s.5(1)(a) of the Ordinance. That is the next step in the process. The Director issued an environmental impact assessment study brief on 30 May 2001 (“the SB”).

10. When the Director issues a study brief, the Ordinance (s.6(1)) then requires an applicant to prepare an EIA report :

“in accordance with-

- (a) the requirements of the environmental impact assessment study brief;
- and
- (b) the technical memorandum applicable to the assessment.”

11. In due course, HKAA prepared an EIA report and, on 3 May 2002, delivered it to the Director “for approval” as prescribed by s.6(2). Section 6(3) directs that, within 60 days of receiving an EIA report, the Director is to decide if the assessment :

- “(a) meets the requirements of the environmental impact assessment study brief and technical memorandum; or
- (b) does not meet the requirements of the environmental impact assessment study brief and technical memorandum.”

If, within 60 days of the Director’s receipt of an EIA report, he does not give an applicant notice in writing that the report does not meet the requirements of the environmental impact assessment study brief and technical memorandum, the Director is taken to have decided that the report did meet those requirements: s.6(5). In the present case, the Director decided that the EIA report did meet the requirements of the SB and the TM. By letter dated

11 June 2002, the Director informed HKAA that the EIA report was suitable for public inspection. This was in accordance with s.6(4) which provides :

“(4) If the Director decides that the environmental impact assessment report meets the requirements of the brief and the technical memorandum, he shall advise the applicant when the report must be exhibited for public inspection, whether the advertisement is to contain any specific material and whether a submission to the Advisory Council on the Environment or its subcommittee is required.”

12. After the Director advises an applicant to publish the EIA report for public comment and for comment by the Advisory Council on the Environment (“ACE”), the applicant publishes the EIA report and advertises its availability for public inspection: s.7(1) and (2). The EIA report was available for public inspection between 14 June and 14 July 2002. Thirteen sets of comments were received, including comments by SWS. The comments received were also made available to the EIA Sub-committee of the ACE which endorsed the EIA report with recommendation for conditions. No challenge was made at that time to the Director’s decision under s.6(3) that the EIA report met the requirements of the SB and the TM.

13. The next step in the process is prescribed by s.8(3) of the Ordinance which provides :

“The Director shall, within 30 days of-

- (a) the expiry of the public inspection period;
- (b) the receipt of comments from the Advisory Council on the Environment; or
- (c) the receipt of information under subsection (1),

whichever is the later, approve, approve with conditions or reject an environmental impact assessment report for the designated project.”

If, but only if, public comments on the EIA report are submitted to the Director, he may ask an applicant for further information he requires to decide whether to approve the report: s.8(1) and (2). The Director approved HKAA’s EIA report and advised the HKAA by letter dated 2 August 2002 that the EIA report as exhibited was approved with conditions. That is the first decision which SWS challenged in the proceedings before Burrell J.

14. After approval was received, the Director placed the report upon the register in compliance with s.8(5). Once a report is placed on the register, the way is open for an applicant to apply for an environmental permit for the project. Section 10 of the Ordinance section provides :

- “(1) A person who wishes to have constructed, construct or operate a designated project ... shall-
 - (a) apply to the Director for an environmental permit in the form approved by the Director; and
 - (b) refer to an environmental impact assessment report on the register in the application for an environmental permit; or
 - (c) ... or
 - (d) ... and
 - (e) pay the prescribed application fee.
- (2) In granting or refusing an environmental permit, the Director shall have regard to-
 - (a) the approved environmental impact assessment report on the register;
 - (b) the attainment and maintenance of an acceptable environmental quality;
 - (c) whether the environmental impact caused or experienced by the designated project is or is likely to be prejudicial to the health or well being of people, flora, fauna or ecosystems;
 - (d) any relevant technical memorandum;
 - (e) any environmental impact assessment report approved under this Ordinance or any conditions in an approval; and
 - (f) the comments, if any, submitted to him under section 7 on the report.
- (3) ...
- (4) ...
- (5) The Director may issue an environmental permit subject to the conditions, if any, as the Director thinks fit and specifies in the permit.”

15. HKAA submitted an application for an environmental permit. On 28 August 2002, the Director granted HKAA the environmental permit subject to conditions. That is the second decision which SWS challenged in the proceedings before Burrell J.

16. SWS submitted that although the Director had decided under s.6(3) that the EIA report met the requirements of the SB and TM, the EIA report did not meet those requirements and on that account could not lawfully be approved under s.8(3) nor could it be the approved report to be

regarded by the Director in deciding whether to grant an environmental permit under s.10(3). The grounds of the challenge to both decisions were amended at a directions hearing before Burrell J on 23 July 2003 after the parties had obtained and filed a number of reports by experts. SWS, relying on a report which it had obtained from the Health and Safety Laboratory (“HSL”), an agency of the UK Health and Safety Executive, advanced the grounds, *inter alia*, that :

“39.1 The hazard assessment for the proposed PAFF (the ‘Hazard Assessment’) is fundamentally flawed because it fails to identify and assess the risk associated with a catastrophic failure of one of the aviation fuel storage tanks, i.e. instantaneous loss of 100% of the tank contents ...

39.2 The Hazard Assessment fails to comply with the requirements of the EIA Study Brief because it does not identify all hazardous scenarios, in particular the catastrophic tank failure scenario.

...

39.7 The EIA report fails to identify the catastrophic tank failure scenario as aforesaid and therefore fails to demonstrate that the risks attendant thereon have been reduced ALARP.”

In this Court, the challenge by SWS has been confined to what is in substance one ground, namely, the EIA report did not contain a quantitative risk assessment (“QRA” – a term to be examined presently) which embraced the scenario of a catastrophic failure of a fuel storage tank with an instantaneous or almost instantaneous loss of a 100% of the tank’s contents.

Effect of the s.6(3) decision

17. The time limitations on actions to be taken by the Director and the default provisions which are engaged if the time limitations are not observed are designed to ensure promptness and finality in the process for seeking environmental permits. Mr Benjamin Yu SC who appeared with Mr Anthony Ismail for the Director submitted that, as these provisions reveal that one of the purposes of the Ordinance is the efficient disposition of

applications under the Ordinance, s.6(3) should be construed as investing the Director's decision under that subsection with finality so that his function under s.8(3) did not involve him in revisiting the question whether the EIA report met the requirements of the SB and TM. On this argument, s.6(3) is the critical, if not sole, source of power for deciding whether the EIA report meets the requirements of the SB and TM. It was submitted that, as the decision under s.6(3) has not been challenged by judicial review, the EIA report must be taken conclusively to have met those requirements. On that view, the challenge to the approval decision under s.8(3) and the consequential decision to issue the environmental permit under s.10(3) would fail.

18. The interrelation of ss 6 and 8 is not without difficulty but the key to the relationship is s.6(2) which specifies the purpose of delivering an EIA report to the Director to be "for approval". The power of approval is conferred only by s.8. A decision made under s.6(3) that an EIA report meets the requirements of a SB and TM leads immediately to the advertising and publication of the report but, for the purposes of approval under s.8(3), it is provisional only and may either be changed, usually in the light of public or ACE comments (with a possible rejection of the report), or be affirmed by and subsumed into the decision to approve the report.

19. Approval is a pivotal point in the process. Approval of an EIA report, and the consequential placement by the Director of the EIA report on the register, fixes the entirety of the information which an applicant provides relating to the construction of a project, the applicant's assessment of the impact of the project on the environment and the measures which the applicant proposes to take for the protection of the environment. These issues are the issues prescribed by a TM and an SB and they are the issues which the Director is bound to regard in determining whether to grant an

environmental permit for the project. The critical step which brings information and proposals on these issues into the s.10 process is the decision to approve the EIA report under s.8(3). As s.6(3) makes clear the legislative intention that an EIA report must meet the requirements of a SB and TM, it would be contrary to the Director's duty to approve a report that did not meet the requirements of the applicable SB and TM. The power to approve an EIA report can be exercised only in respect of a report that meets those requirements. Section 4.5.1(a) and (d) of the TM make approval of an EIA report conditional on its meeting the requirements of the SB and the environmental principles and criteria in the TM. As the decision under s.8(3) can be made only after the period of public exhibition of the report and only after consideration of any comments submitted by the public or by the ACE, a decision to approve an EIA report must be the final decision that the report meets the requirements of the applicable SB and TM. A final decision under s.8(3) that an EIA report be approved subsumes the earlier decision under s.6(3) that the report meets the requirements of the SB and TM.

20. The consequences of the two decisions are different. The s.6(3) decision leads to the process of public consultation and submission to the ACE; the s.8(3) decision opens the gate to the issue of an environmental permit. The question of compliance with the TM and SB is the same but the final and only decision relevant to the issue of the environmental permit is the decision under s.8(3).

21. Of course, if no comments are received during the public consultation period, the Director may have no reason to reconsider his decision under s.6(3) and would have to show some reason if he were minded to do so. But the decision under s.6(3) is necessarily provisional; the decision to approve under s.8(3) is the final decision about meeting the requirements of the SB and TM. Mr Yu SC sought to support a contrary

argument by reference to some observations by the Environmental Impact Assessment Appeal Board in *Kowloon-Canton Railway Corporation v. Director of Environmental Protection* (No.2 of 2000, 30 July 2001). At p.27 of its judgment, the Board noted that “[t]he Section 6(3) decision demands care because if the Director decides that the report meets the requirements [of the SB and TM], he should not revisit this decision at the approval stage”. The context of this observation shows, however, that the Board was doing no more than insisting on care in the making of the s.6(3) decision. They pointed out that error in that decision results in a waste of time and money in the process of public consultation and submission to the ACE, and that must be so since approval cannot be given to a report that does not meet the requirements of the SB and TM. In context the Board’s observation accepts that the s.6(3) decision is provisional and it is precisely for this reason that care must be taken lest the final decision under s.8(3) should show the s.6(3) decision to be wrong.

22. In the present case, the s.6(3) decision was subsumed into the s.8(3) decision to approve the EIA report and the EIA report as approved provided the content of one of the conditions attached to the environmental permit under s.10. If the s.8(3) decision is quashed, there is no approved EIA report on the register and thus there is no EIA report to which the Director might have regard in exercising his powers under s.10(3). It is therefore necessary to consider the principal issue which has been addressed in the Courts below, namely, whether the EIA report in truth meets the requirements of the SB and the TM.

The interpretation and effect of the TM and the SB

23. Although the TM and the SB are not legislative instruments, they are expressed to impose duties and to prescribe procedures. To ascertain whether an EIA report meets their requirements, their provisions must be

properly understood. The TM and the SB are both technical instruments, to be understood as an expert risk assessor, properly understanding the legal requirements they create, would understand them. The TM and the SB define the scope of the power under s.8(3) and condition the exercise of that power, even though the meaning of those documents may have to be ascertained without employing the rules of statutory interpretation. The Director's opinion as to what the TM and SB require is not sufficient to establish a lawful exercise of the power of approval under s.8(3); s.6(1) makes what the TM and SB in fact require and the EIA report's meeting of those requirements the relevant criterion. As the scope of the s.8(3) power depends on, *inter alia*, a correct definition of what the TM and SB require, it is a question of law for the court if the Director's decision is being judicially reviewed. In *R v. Director of Passenger Rail Franchising, ex parte Save Our Railways* ([1996] CCH Commercial Law Cases 589) the status of an instruction and guidance issued by a minister to a franchising director under the Railways Act 1993 (UK) was considered. Sir Thomas Bingham MR (as he then was), speaking for the Court of Appeal observed (at p.601) that, although the instruction and guidance was not subordinate legislation and although it had to be read in a "practical down-to-earth way", the document circumscribed the franchising director's statutory duty. He added :

"... Thus the objectives, instructions and guidance define and circumscribe the franchising director's statutory duty. The court accordingly cannot, in case of dispute, abdicate its responsibility to give the document its proper meaning. It means what it means, not what anyone – franchising director, Secretary of State or member of the public – would like it to mean."

24. In *Belize Alliance of Conservation Non-Governmental Organizations v. The Department of the Environment* [2004] Env. L.R. 38, 761 at 767, Lord Hoffmann speaking for a majority of the Judicial Committee of the Privy Council noted that a common feature of legislation covering environmental control was the distinction they made between the procedure to be followed and the merits of the decision :

“... The former is laid down by statute and is binding upon the decision-making authority. The latter is entirely within the competence of that authority ...”

25. In the present case, the Court must find the meaning of the relevant provisions of the TM and the SB and the procedure they prescribe in order to determine the scope of the Director’s power to approve the EIA report. Only in that way can the Court determine whether the power was validly exercised or whether the purported approval fell outside the scope of the power. In interpreting the TM and the SB, the Ordinance’s purpose of protecting the environment must inform the meaning attributed to the instruments created under the Ordinance’s authority.

Ascertaining the meaning of the TM and SB

26. Mr Yu SC, drew attention to the provisions of s.16(4) which characterize the TM as a guide for the Director in the exercise of his powers under, *inter alia*, ss 6 and 8. He submits that a guide is not the same as a direction and that the repository of a power may depart from a guide but not from a direction. That distinction was drawn by Woolf LJ (as he then was) in *R v. Secretary of State for Social Services, ex parte Stitt* (Lexis copy 21 February 1990; on appeal 3 July 1990 CO/1026/89). There may be good reason for departing from a guide in particular circumstances but the repository of a power is not at liberty to ignore, depart from or qualify the content of the provisions without cogent reasons: *R (on the application of Munjaz) v. Ashworth Hospital Authority* [2005] UKHL 58 at paras 5, 21, 68 and 69. None was advanced which might justify any departure by the Director from the provisions of the TM and SB in this case. In any event, the Director does not accept that he has in any way failed to apply the requirements of the SB and the TM in making his decisions under s.6(3) and s.8(3).

27. If there should be any doubt about the correctness of the Director's approach to his duties under s.6(3) or s.8(3), however, Mr Yu SC invokes the dictum of Lord Slynn of Hadley in *R v. Ministry of Defence, ex parte Walker* [2000] 1 WLR 806 at 813A. There a soldier who had been wounded in Bosnia sought compensation under a scheme for compensation for military personnel. Challenging a refusal of compensation, he pointed to a provision in the Convention on the Safety of United Nations and Associated Personnel in support of a submission that the Ministry had misunderstood the scheme. Lord Slynn held that the Convention did not affect the scheme but he added (at p.813) :

“ If I had come to the view that this phrase was imprecise enough for several meanings to be adopted, then I would not accept that the minister's interpretation of it was such as to be 'so aberrant that it cannot be classed as rational' (*Reg. v. Monopolies and Mergers Commission, Ex parte South Yorkshire Transport Ltd.* [1993] 1 W.L.R. 23, 32_H, *per* Lord Mustill).”

If the provisions of s.6(3) and s.8(3) were ambiguous as to what was needed in an EIA report to meet the requirements of a SB and TM, the Director was – on this argument – entitled to adopt the interpretation he had placed on those sections provided his interpretation was rational. Lord Slynn's observation was obiter and, in any event, its citation of Lord Mustill's speech did not accord with the principle which Lord Mustill had expressed. Lord Mustill had distinguished between the court's function of construing the language of a statute which affects legal rights and duties and the application of the court's construction to the facts and circumstances. In the *South Yorkshire Transport* case, Lord Mustill said in reference to a statute [1993] 1 WLR 23 at 32H :

“... The fact that it is quite hard to discover the meaning of [a] section makes no difference. It does have a correct meaning, and one meaning alone; and once this is ascertained a correct application of it to the facts of the case will always yield the same answer. If the commission has reached a different answer it is wrong, and the court can and must intervene.

... Once the criterion for a judgment has been properly understood, the fact that it was formerly part of a range of possible criteria from which it

was difficult to choose and on which opinions might legitimately differ becomes a matter of history. The judgment now proceeds unequivocally on the basis of the criterion as ascertained. So far, no room for controversy. But this clear-cut approach cannot be applied to every case, for the criterion so established may itself be so imprecise that different decision-makers, each acting rationally, might reach differing conclusions when applying it to the facts of a given case. In such a case the court is entitled to substitute its own opinion for that of the person to whom the decision has been entrusted only if the decision is so aberrant that it cannot be classed as rational: *Edwards v. Bairstow* [1956] A.C. 14.”

28. When the court construes language which affects legal rights and duties, it is constrained to arrive at a single meaning to define those rights and duties. That meaning may apply to one or more sets of facts (*R (on the Application of Goodman) v. London Borough of Lewisham* [2003] EWCA Civ 140 para.8) but there can be only one meaning of the language so construed. In *R v. Financial Ombudsman, ex parte Norwich & Peterborough BS* [2003] 1 All ER (Comm) 65 at paras 69-71, Ouseley J said in reference to the Banking Code :

“The code ... is a material consideration for the Ombudsman to take into account. If he misinterprets it, he will have failed to take it into account. It has one meaning. Although people may reasonably differ as to that meaning, it is for the courts to decide what that one meaning is because it is for the courts to decide whether a material consideration has been ignored. The code cannot have as many meanings as reasonable people might attribute to it, all of which have to be considered. The code is to be applied by banks and other deposit-taking institutions; their compliance officers and customers cannot all say that their differing interpretations are right because reasonable ...”

Lord Slynn’s dictum was cited without comment by this Court in *Ng Siu Tung v. Director of Immigration* (2002) 5 HKCFAR 1 at paras 195-196, but the distinction between meaning and application of meaning was not being drawn in that case; there the Court was concerned to discover the scope of a legitimate expectation. Here the distinction is critical because the question whether the EIA report met the requirements of the SB and the TM depends on the meaning to be attributed to the TM and SB.

The criterion for approval

29. It is not a question whether the Director acted reasonably in attributing a given meaning to the TM and SB. The question the Director had to answer under s.6(3) had to be answered objectively. Equally, the condition on which the EIA report could have been lawfully approved had to be objectively determined. The lawfulness of the approval was not dependent on the Director's opinion if that opinion was objectively in error. If the EIA report in fact met the requirements of the SB and the TM, the Director's decision to approve the report is valid; if the EIA report did not in fact meet those requirements, the Director had no power to approve the report. It is immaterial whether the Director thought that the requirements were met. And, as the limits of the Director's power are a matter of law, it is for the Court to determine the meaning and scope of those requirements.

30. If the Director, in approving an EIA report, is found to have misunderstood the requirements of the SB and the TM, his misunderstanding may suggest error in his decision that the requirements have been met (cf. *Henderson Real Estate Agency Ltd v. Lo Chai Wan* (PC) [1997] HKLRD 258 at 267 although in that case and in *South Somerset District Council and Secretary of State for the Environment* [1993] 1 PLR 80 the misunderstanding of the governing guidelines was itself the ground of invalidity). But the question of the EIA report's meeting the requirements of the SB and TM is for the Court to determine. It is a question of construction, albeit the TM and the SB are to be construed not as legislative instruments but as they would be understood by an expert risk assessor. In other words, the court determines what the TM and the SB require but technical evidence may be needed to show that an EIA report meets or does not meet the requirements so determined. It is one thing to acknowledge that satisfaction of the requirements or proof of satisfaction calls for expertise; it is another to allow the Director or an expert risk assessor to define for himself or herself the

requirements to be satisfied. The definition of the legal effect of the TM and the SB is necessarily a matter of law but it is necessary to appreciate any special or technical meaning which experts may attribute to particular terms.

The requirements of the SB and the TM

31. SWS submits that the EIA report failed to meet the requirements of the SB and the TM because it did not contain a QRA in respect of all hazardous risk scenarios associated with the tank farm storage of aviation fuel which may cause fatalities and, in particular, the scenario of a catastrophic instantaneous 100% loss of fuel causing a surge of fuel to overtop the bund and flow into SWS mill with resulting loss of life and property. The scenario was referred to in the EIA report but the QRA contained in that report did not embrace that scenario. In para.20 of his judgment, Stock JA described a QRA as follows :

“As I understand it, and putting the matter broadly, a QRA involves, after the identification of the hazard, an analysis reduced to mathematical terms, of frequency of an occurrence and a modelling of the consequences of that occurrence. A qualitative analysis does not differ in its objective but its analysis and expression is more judgmental though it is not purely a judgmental matter.”

32. As the argument on appeal developed, it appeared that there was a significant difference between the parties in their understanding of what was required to complete a QRA. To resolve that difference, it is necessary to examine a number of the clauses of both the TM and the SB.

33. Section 4.1.1 of the TM defines the general content to be contained in an EIA report :

“An EIA report shall comprise a document or series of documents providing a detailed assessment *in quantitative terms*, wherever possible, and in qualitative terms of the likely environmental impacts and environmental benefits of the project. The requirements for the EIA report shall be set out in accordance with this technical memorandum. The EIA report shall be produced in accordance with the EIA study brief issued by the Director to the applicant.”

It is clear that the objectives and scope of an EIA report are to be specific to the project (s.4.2.1) adequately addressing all the issues set out in the SB (s.4.2.2). In s.4.3.1 the TM sets out the general principles which the Director must use in evaluating the assessment methodologies adopted in an EIA report.

34. Annexes 4 to 10 of the TM prescribe the criteria for evaluating the different categories of impact which a project might have on the environment: air quality, noise, water pollution, waste management, the ecology, fisheries, visual and landscape, cultural heritage and, relevant to the present case, hazard to human life. Section 4.3.1(c) provides :

“(c) Impact Evaluation: an evaluation of the anticipated changes and effects shall be made with respect to the criteria described in Annexes 4 to 10 inclusive, and in quantitative terms as far as possible ...”

Annex 4 is the annex dealing with hazard to life.

35. Section 12.1 of the TM identifies certain factors which are relevant to the need for a Hazard Assessment (“HA”) and provides that the Director shall consider the need for a HA and its technical requirements. (The Director’s duty is “subject to the advice of the authorities stated in Annex 22” but that annex specifies the Director himself to be the relevant authority.)

36. Section 12.1 directs that the Risk Guidelines to be applied in relation to hazard to life are set out in Annex 4 and Figure 1. Clause 2.1 of Annex 4 provides that “[t]he criterion for hazard to human life is to meet the Risk Guidelines, as shown in Figure 1”.

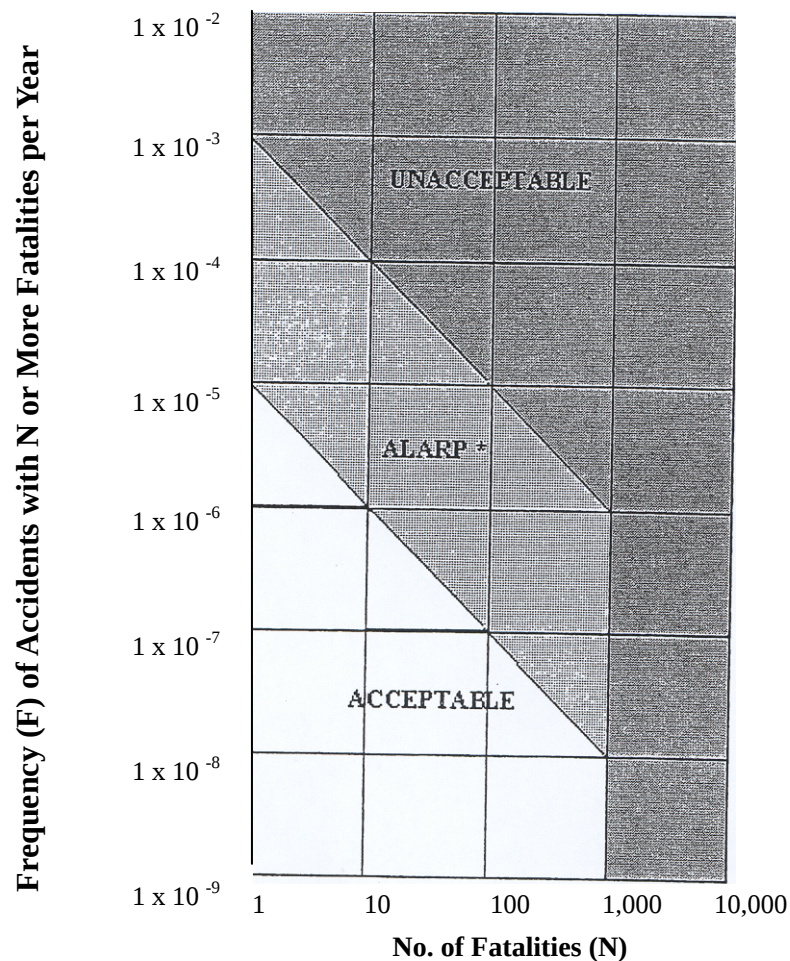
“Figure 1 : RISK GUIDELINES

1. INDIVIDUAL RISK GUIDELINE FOR ACCEPTABLE RISK LEVELS

Maximum level of off site individual risk should not exceed 1 in

100000 per year, i.e. 1×10^{-5} / year

2. SOCIETAL RISK GUIDELINES FOR ACCEPTABLE RISK LEVELS



* ALARP means As Low As Reasonably Practicable. Risk within ALARP Region Should Be Mitigated To As Low As Reasonably Practicable.”

The differing views in the Court of Appeal

37. In the present case, SWS points to what it submits is a particular and important requirement of the SB, namely, to provide a QRA of a scenario associated with the PAFF which involved a risk to life, namely a catastrophic tank failure involving an instantaneous or almost instantaneous loss of the entire contents of a tank resulting in a surge of fuel that would significantly overtop the bund and flow on to the steel mill’s site where it would be ignited with resultant risk to life.

38. The EIA report discounted the possibility of the catastrophic instantaneous 100% loss scenario (paras 10.5.2.5 to 10.5.2.8) :

“Atmospheric Storage Tank Failures

10.5.2.5 Davies et al. cite the following reasons for catastrophic releases from storage vessels after inspection of incidents recorded on the MHIDAS database (Major Hazardous Incidents Database):

- brittle failure of primary containment, sometimes caused by rapid changes in ambient temperature;
- failure of tank seams due to fire impingement;
- failure of the tank during the initial filling process;
- boilover of tank contents ...; and
- acts of vandalism or sabotage.

10.5.2.6 Of the above, brittle failure due to rapid changes in ambient temperature is not expected in Hong Kong. Rapid changes in temperature of contents are also not expected, as aviation fuel received will be at ambient temperature. Failure of the tank due to overfilling could occur but an independent high level shutdown system is provided to prevent overfilling. Boilover of tank contents is not relevant in the case of aviation fuel.

10.5.2.7 Other causes of tank failure are weld or material defect, corrosion, settlement, and fire due to ignition of tank vent by lightning. Stringent quality control measures will be adopted during procurement of plate material and during construction and therefore failure due to weld or material defect are not expected at the PAFF facility. Corrosion will be monitored during the operational phase and therefore failure due to corrosion is not expected at the PAFF facility. Settlement of tank foundation will be monitored during construction as well as during initial operations. Although the site is located on reclaimed land, the reclamation was carried out some years ago and therefore general settlement of the site is not expected.

10.5.2.8 The tank vapour space could be in the flammable range due to vent opening to atmosphere and therefore ignition of tank vent due to lightning could result in a tank fire and subsequent failure at the roof to shell connection (API 650 tanks are provided with a weak roof to shell connection which will fail preferentially to any other joint). Such failures could also occur in the event of fire impingement to relieve excess vapours. It may be assumed that in the event of roof failure, the top most plate of the shell connecting to the roof may also fail resulting in spill onto bund. Each plate is about 3m high which is about 10% of the tank

height. The catastrophic failure of the tank is therefore assumed to result in a release of 10% of tank contents (ie about 3,900m³) on to the bund. Aircraft crash is the only conceivable incident that can result in more than 10% of tank contents but this can be discounted, as the proposed site does not lie near to the flight path.” (Emphasis added).

39. On 25 April 2002, shortly before the EIA report was submitted to the Director, representatives of the Director and HKAA met and discussed whether a QRA of the catastrophic instantaneous 100% loss scenario was required to be included in the EIA report. At that meeting Mr Gillon, an Engineer from the firm which had designed and was to construct the tanks, spoke of the strict design criteria (API 650) that were incorporated into the proposed PAFF. The Director’s officers took the view that the catastrophic instantaneous 100% loss scenario was not a credible scenario and that no quantitative risk assessment was required in relation to that scenario. Accordingly, although a QRA was included in relation to a 10% loss of fuel, no QRA was included in relation to a catastrophic instantaneous 100% loss scenario. It is the absence of such a QRA which has enlivened the present litigation.

40. The Director’s and HKAA’s justification for the absence of any QRA in relation to a catastrophic instantaneous loss scenario was stated by Stock JA in the Court of Appeal :

“31. The thread of the justification advanced is clear enough. It is that the TM and the study brief, when properly read, do not require a QRA in relation to every conceivable risk which, generally speaking, might attend the storage of aviation fuel. What, rather, is required is the identification of risks identified *relevant to, applicable to*, this project, that is to say risks predicted by experts as foreseeable on the basis of the facts presented, not by fuel farms wherever in the world they may be and regardless of their individual characteristics, but by the particular project planned and under study and review. It is only then that a QRA is required to determine the likely impact upon an occurrence of the predicted event. That QRA will then show whether that predicted possible risk is or is not an acceptable one, according to the criteria prescribed by Annex 4. That is what happened in this case. The 10% risk was an applicable or a predicted relevant risk, and a QRA was conducted to assess the impact of such an event, and the risk

was determined to be one that fell within the acceptable range. To conduct a QRA in respect of a 100% scenario would, it is said, have been an exercise in artificiality, directed at scenarios in general and not at the scenario which the EIA report was required to address.”

Stock JA noted the Appellant’s criticism of that justification (para.37) :

“It has been argued that the answer to this line of thinking is that a 100% failure was identified in the EIA report as a hazardous scenario and, having been identified, there is by reason of section 3.3.10.1 and 3.3.10.2 of the study brief a requirement for a QRA. Apart from the fact that I think this is to misread that part of the study brief, one has to be realistic about the nature of the identification of the hazard in the EIA report. In my judgment, it was identified not as a predicted or applicable scenario, or as one to be expected or to be anticipated in this particular case, but merely as a scenario that, generally speaking, might occur with fuel tanks. Since it was not identified as a scenario applicable to this project, or put conversely, since it was assessed to be a scenario not applicable to this project, step 2 of the steps which it is said the study brief required did not apply for such a scenario. Whether the assessment was correct and should have been accepted by the Director was a quite different question, and is not a matter of construction. This is important, for one sees from the HSL report itself that what is truly attacked there is the failure to *identify* (step 1) a 100% failure as a hazard scenario relevant to this project, rather than the failure, having made such an identification, to carry out a QRA. The criticism is that the hazard assessment is ‘... fundamentally flawed because it fails to *identify* and assess the risk associated with a catastrophic failure of one of the aviation fuel storage tanks...; “and that” The hazard assessment fails to comply with the requirements of the EIA study brief because it does not *identify* all hazardous scenarios, in particular the catastrophic tank failure scenario.’ ... Yet the issue formulated by the appellant ... is the failure to carry out a QRA on identified scenarios; a failure to follow step 2 ... of the steps that are said to be prescribed by the study brief.”

Ma CJHC raised in argument the scenario of a Martian attack and it was agreed that scenarios which were “fanciful” did not have to be addressed (para.147). But Stone J in dissent did not regard the catastrophic instantaneous 100% loss scenario as fanciful. He said (paras 83 and 84) :

“This is a far cry from the ‘Martian’ example. The 100% loss scenario could occur, and in fact the EIA report itself refers to previous incidents where it has occurred. Admittedly, as Mr Fleming accepted, the 100% loss scenario may be low frequency, but it cannot sensibly be characterized as ‘incredible’ where possible causes include terrorism, sabotage, air crash, lightning, subsidence (given that the PAFF will be constructed on reclaimed land) or, for that matter, accident during the construction of the second phase of tanks.”

(The “second phase of tanks” refers to the proposal to increase the number of

tanks from year to year from an initial 4 to a maximum of 12). His Lordship then referred to a report which SWS had obtained from the HSL which was produced to Burrell J but which his Lordship declined to admit in evidence but which he allowed to be tendered *de bene esse*. Stone J said :

“The HSL report – which in the circumstances and development of this case in my view the learned judge was in error in ruling inadmissible – itself assesses the 100% loss scenario as credible, and in fact it is HSL’s view that it is ‘axiomatic’ that such scenario is considered for this sort of analysis. Moreover the HKAA’s expert, AEA, recognized that the possibility of bund overtopping in instances of catastrophic failure could not completely be eliminated, and that incidents other than aircraft crash resulting in 100% loss of tank contents were conceivable.”

41. Mr Yu SC for the Director submits that the view of the majority is correct and that the dismissal of the scenario of catastrophic instantaneous 100% loss was correct in principle and in accordance with the methodology which had been adopted in Hong Kong. Mr Nigel Pleming QC who appeared with Ms Roxanne Ismail for SWS submits that the majority view mistakes the nature of a QRA.

The characteristics of a QRA

42. Mr Yu SC submits that cl.3.3.10.1 of the SB calls for a project-specific QRA and that the QRA contained in the EIA report satisfies that requirement. It is said that the material contained in the EIA report and the evidence relating to the engineering design of the PAFF demonstrated that the only credible hazardous scenario associated with the storage of aviation fuel on the PAFF which was a risk to life was the 10% loss scenario in respect of which a QRA had been included in the EIA report. The evidence of Mr Gillon, the engineer charged with the design of the tanks, showed that a tank failure producing a catastrophic instantaneous 100% loss scenario was “incredible” and it was for that reason that the Director had agreed that no QRA was needed for that scenario. It was immaterial, on this argument, that a catastrophic instantaneous 100% loss scenario had eventuated in other fuel

farms which were of different design or contained fuel of a kind different from the JA-1 fuel that would be contained in the PAFF. A “generic” QRA, taking scenarios from the history of other fuel farms differently constructed or containing different fuels, was incompatible with the project-specific QRA required by cl.3.3.10.1. Mr Yu SC therefore supported the approach of the majority of the Court of Appeal in restricting the identification of scenarios to those which are “predicted” or “expected” or “anticipated”. In that way, it was said, a QRA is kept in conformity with the requirement of para.(i) of cl.3.3.10.1 of the SB that the scenarios to be identified and assessed be “associated with” the tank farm storage of aviation fuel in the instant project, i.e. the PAFF. Other scenarios, it was said, were either not “associated with” the PAFF or were so negligible that, as a matter of substance rather than form, they should be omitted.

43. Mr Fleming QC agreed that the QRA called for by cl.3.3.10.1 was project specific but submitted that a QRA of necessity commenced with an historic examination of the genus of fuel farms and it was from that history that relevant scenarios had to be extracted. Then the whole range of those scenarios had to be assessed, taking into consideration the specific circumstances of the instant project. It is only by quantifying the possible occurrences of the likely and the unlikely, the expected and the unexpected, the credible and the seemingly incredible, and taking account of the consequences which those scenarios might produce that it is possible to give a meaningful QRA of the hazardous scenarios of a project. The difference in understanding of what is needed to perform a QRA is at the heart of the conflict of opinion in this case.

44. In the Court of Appeal, in answer to question seeking a description of the methodology of making a QRA, Mr Fleming QC gave the following written response. He repeated that submission in this Court :

“1. Frequency estimation:

Estimate the frequency of each identified hazardous scenario as follows:

- (a) Examine historical data for the frequency of occurrence of the identified scenario;
- (b) Select the data that is the most appropriate to the project;
- (c) Make such adjustments to the data as necessary to reflect the project-specific circumstances; and
- (d) Determine the frequency of the identified scenario.

The above technique can be applied to the project as a whole or its individual components, the frequency of the latter then being combined to determine the overall project frequency.

[Note that the starting point in the above methodology is the examination of generic data, reflecting a range of potential causes for the scenario. It is therefore not necessary (as is suggested) for the Project Proponent’s risk assessor to re-invent the wheel and evaluate the frequency of each individual cause. The risk assessor’s role is to use his expert judgment to adjust the frequency (up or down) according to the project-specific circumstances].

2. Consequence evaluation:

Evaluate the consequence of each identified scenario as follows:

- (a) Apply such models as are appropriate (eg fire models, gas dispersion models) to determine the probability of fatality as a function of distance; and
- (b) Determine the number of people affected and hence the number of fatalities.

3. Risk evaluation:

Evaluate the risk of death as follows:

- (a) Determine *individual risk* by combining the information on frequency and probability of fatality, and summing for all identified scenarios; and
- (b) Determine *societal risk* by combining the information on frequency and numbers of fatalities, and summing for all identified scenarios.”

45. This is a broad definition of a “generic” QRA, taking basic data

from similar projects, and adjusting the data to take account of the elements of the particular project, thus making the QRA project-specific. Mr Fleming QC rejected the notion that it was impossible or meaningless to attribute a frequency to a scenario that is unlikely to occur and cited a report which HKAA obtained from AEA Technology (a UK company) in which the authors accepted that a best estimate could be made for a catastrophic instantaneous tank failure frequency. The authors commented :

“There is a significant range of uncertainty in the available estimates of catastrophic (instantaneous) tank failure frequency (see Appendix 2). Table 10.9 of the EIA report provides figures, available in the literature, ranging from 2×10^{-7} (based on Davies) to 1×10^{-5} per tank year (once per 5 million years to once per 100,000 years on average). In AEAT’s opinion, this reasonably reflects current understanding.”

46. Mr Fleming QC cited this paragraph not because he accepted the figures therein contained but in order to support his submission that the QRA required is a generic QRA. The difference between a generic QRA and a QRA limited to scenarios “predicted” or “expected or anticipated” in the particular project is that the former QRA identifies scenarios which, if they eventuated, might cause a loss of life even though the causes of those scenarios are not and cannot be foreseen at the time; the latter QRA does not. In the Court of Appeal only the scenarios that could be “predicted” or “expected or anticipated” were judged to be “credible” or “applicable” to the PAFF.

Inadequacy of a non-generic QRA

47. In support of his principal argument, Mr Yu SC submitted that the dismissal of the catastrophic instantaneous 100% loss scenario as incredible was in accordance with the approach that risk assessors, to whom the TM and SB are addressed, take in the making of a risk assessment report. The submission drew on a passage in the Safety Report Assessment Guide, a United Kingdom document, which advanced the concept of proportionality in

making a risk assessment. Ma CJHC thought that “some degree of proportionality ought to be borne in mind” in exercising the judgment needed to assess risk. The Safety Report Assessment Guide states that “Proportionality will influence the type and level of analysis detail that Assessors might expect to underpin the various demonstrations of the safety report”. The Guide referred to Qualitative risk assessment, Semi-quantitative risk assessment and Quantitative risk assessment as three increasing levels of assessment, and gave the following advice :

“... as proportionality increases from a low level to the highest level, the form of risk assessment is likely to change from qualitative, through semi-quantitative to quantitative risk assessment. It is important for Assessors to realize that QRA does not mean that a detailed and full numerical analysis resulting in iso-risk contours and F/N societal risk curves is needed.”

If hazard to human life is in “the highest level”, however, a quantitative risk assessment of any scenario producing fatalities might be required. In any event, the provisions governing the assessment of hazardous risks under the TM and the SB are different from the UK provisions. Under s.12.1 and Annex 4 of the TM, a full numerical analysis of hazardous risks is required. In a briefing note for public comment on the PAFF, the Director observed that :

“... The 1000 fatality limit featured in HK societal risk guideline was incorporated to address local circumstances of high population density and this is the most stringent risk guideline in the world.”

48. Mr Yu SC submitted that, even if hazardous scenarios other than the 10% loss scenario had occurred in other fuel farms, the principle of proportionality would permit a risk assessor from refraining from taking those scenarios into account when they could reasonably be dismissed as incredible. That proposition assumes that the cause of the excluded scenario is known and an assessment is made that that cause will not credibly arise in the life of the particular project. If the cause of a scenario is not known, so the argument runs, it is impossible to know if it is a relevant scenario in the

instant case. But an assessment of that kind says nothing about the possibility of the scenario occurring if the unknown cause of an earlier known scenario were to arise or if a similar scenario were to be caused by a presently unforeseen and unexpected cause.

49. Scenarios which cause fatalities can occur and have occurred when the causes of those scenarios have been unknown or have been neither foreseen nor foreseeable when the project was constructed. The proposition that the only scenarios which ought to be identified under para.(i) are scenarios with a known cause that could credibly arise in the life of the particular project precludes any quantitative assessment of scenarios which are a hazard to life and which might occur, being caused in some other way. The consequence of this approach is that the risk that a scenario which is shown to have occurred in other fuel farms might occur in the PAFF is not quantified. A like scenario, caused by an unknown or an unforeseen and unexpected cause, is assumed never to occur at any time throughout the operating period of the project. That assumption seems at odds with human experience and thus not conducive to the purpose of protecting the environment. Mr Yu SC's submission conflates a scenario – the phenomenon that presents the hazard to life – with its cause.

50. The relevant scenario in the present case is a catastrophic instantaneous 100% loss of fuel which might overtop the bund and flow into SWS's steel mill. It is immaterial to the identification of such a scenario for the purposes of para.(i) that some possible causes of such a phenomenon are known and are assessed to be incredible if the scenario has occurred in similar projects. The likelihood or the unlikelihood of some other cause producing the scenario can and should be assessed as part of the exercise of making a QRA.

The critical importance of Annex 4

51. The criteria described in Figure 1 of Annex 4 call for a mathematical assessment to allow an evaluation of risk to human life posed by a given project. The two co-ordinates of Figure 1 of Annex 4 necessitate an assessment not only of the risk of occurrence of a hazardous scenario but also of the loss of human life should the scenario occur. It may be that the risk of occurrence is extremely low for a given scenario but the loss of human life if it occurs would be very high. Both factors affect the assessment as measured against the criteria in Figure 1.

52. Thus, if a given scenario is assessed to have a fatality of 1000, Figure 1 shows that a frequency of 1 in 1,000,000,000 per annum is unacceptable. Such a frequency would not be “predicted” or “expected or anticipated”. Those concepts would confine a QRA not merely to what is foreseen or, at most, foreseeable but rather to what is foreseen to be a significant possibility.

53. The specific and mathematical expression of accident frequency in Figure 1 shows that, for the purpose of assessing the risk to human life, a QRA cannot be limited to risks that can be predicted, expected or anticipated. The concern about risk to human life is dealt with in a manner that distinguishes that concern from other environmental concerns. Whatever methodology is adopted in relation to hazard to human life, it must provide the full range of statistics that will allow the criteria expressed in Figure 1 to be applied. Annex 4 does not prescribe the required methodology but the criteria it expresses can be applied only if the methodology employed in making a QRA throws up the frequency statistics of scenarios “which may cause fatalities” in the instant project whatever the historic causes of those scenarios may have been. The historical data must be adjusted, however, to take account of the specific features of the instant project.

54. In the courts below, the critical importance of Annex 4 and the central significance of Figure 1 in moulding the methodology for assessing the hazards to human life seem not to have been fully recognized. To ascertain whether the criterion for hazard to human life has been met, values must be assigned to the factors which constitute the co-ordinates of the graph in Figure 1 and which allow the risk parameters of Figure 1 to be assessed.

55. In the SB, the Director directed the making of a HA, specifying the requirements in cl.3.3.10.1. That contains the principal requirement which, SWS alleges, was not met by the EIA report. That clause reads :

“The risk to the life, including the workers of nearby plants, due to marine transport, jetty transfer, tank farm storage and pipeline transfer of aviation fuel shall be assessed. The Applicant shall follow the criteria for evaluating hazard to life as stated in Annexes 4 and 22 of the TM in conducting hazard assessment and include the following in the assessment:

- (i) identification of all hazardous scenarios associated with the marine transport, jetty transfer, tank farm storage and pipeline transfer of aviation fuel, which may cause fatalities;
- (ii) execution of a Quantitative Risk Assessment expressing population risks in both individual and societal term;
- (iii) comparison of individual and societal risks with the Criteria for Evaluating Hazard to Life stipulated in Annex 4 of the TM; and
- (iv) identification and assessment of practicable and cost effective risk mitigation measures as appropriate.”

56. The QRA required by step (ii) provides the mathematical values which can then be employed in step (iii) to determine whether the project meets the Risk Guidelines specified in Figure 1.

The test for identifying scenarios for the purposes of cl.3.3.10.1

57. The terms “predicted”, “expected” and “anticipated” were not adopted by Ma CJHC and Stock JA merely as appropriate descriptions of what their Lordships thought would be an appropriate standard to apply.

The terms appear in provisions of the TM containing directions about the assessment of risk and the methodologies that might be employed in the assessment [see ss 4.2.1(h); 4.3.1(a), (b)(v) and (vi), (c); 4.3.3(a); 4.4.2(c)]. These are general provisions, however, and they must be understood in the light of the criteria prescribed by Annex 4, Figure 1. Thus s.4.3.1(c) requires that the assessment methodology employed in assessing hazards to human life should be capable of :

“Impact Evaluation: an evaluation of the anticipated changes and effects shall be made with respect to the criteria described in Annexes 4 ...”

Once it appears from Figure 1 that extremely rare risks of impacts must be taken into account if a significant number of fatalities might result, the methodology employed must be capable of “predicting” environmental changes and effects which are “anticipated” as mere possibilities, albeit possibilities with serious consequences to human life if they should eventuate. The TM, being understood as a technical document, should not be construed as though “predicted” or “expected” or “anticipated” are limiting descriptions of the only impacts which are to be assessed when risk to human life is in question. These terms in the SB are properly to be understood as descriptive of the impacts of scenarios which present a hazard to human life and which the history of projects of the same genus as the instant project have shown to occur.

58. Mr Yu SC did not adopt the terms used by the majority of the Court of Appeal as the preferred criterion for excluding scenarios from the exercise of making of a QRA for the purposes of Annex 4. Rather, he advanced the technical expertise of the risk assessor as the lodestar for identifying the scenarios under cl.3.3.10.1(i) of the SB: if the risk assessor, in the exercise of an expert judgment, excluded a scenario, the scenario should not be taken into account in the making of a QRA. That submission cannot be accepted. No doubt a risk assessor must perform the function of

identifying the relevant scenarios under para.(i) of cl.3.3.10.1 but the question whether the assessor has identified all hazardous scenarios “associated with the ... tank farm storage of aviation fuel” required by that paragraph is not answered by pointing to what the assessor has done. A judgment does have to be exercised but it must be exercised in respect of historical scenarios which, if they were to occur, “may cause fatalities”. Assessment of the frequency of such scenarios is a matter of judgment but that judgment is made under para.(ii) of cl.3.3.10.1 once the hazardous scenarios are identified under para.(i) of that clause.

59. Mr Yu SC supported the exclusion of the catastrophic instantaneous 100% loss scenario in the present case on a further ground. He submitted that the principle of proportionality entitles an expert, even after identifying a scenario that might cause fatalities under para.(i) of cl.3.3.10.1, to form a judgment that it is unnecessary to make a QRA under para.(ii). The test for determining whether to make a QRA was not articulated except to say that it is “a matter of judgment by the risk assessor or whoever is looking over the shoulder of the risk assessor”. The language of cl.3.3.10.1 simply does not support such an interpretation. Proportionality cannot filter the requirement of making (or “executing”) a QRA which embraces all the hazardous scenarios identified under para.(i). A risk assessor who identifies a scenario for the purposes of para.(i) is given no discretion to make a QRA from which that scenario is excluded. All members of the Court of Appeal agree that, once a scenario is identified for the purposes of para.(i) of cl.3.3.10.1 of the SB, the QRA required by para.(ii) must take that scenario into account. The purpose of the QRA is not only to quantify risk for the information of the public, the ACE and the Director but also to enable the risk to be assessed against the criteria contained in Annex 4, Figure 1.

The argument on past methodology

60. Mr Yu SC submitted that the exclusion of the catastrophic instantaneous 100% loss scenario from the scenario that was identified under para.(i) of cl.3.3.10.1 of the SB and quantifiably assessed under para.(ii) was in accordance with the methodology that had been adopted for Hong Kong projects having similar issues and was expressly authorized by s.4.4.2(c) of the TM. The provisions of s.4.4.2 of the TM deal with the review of the quality of an EIA report. One of the factors to be taken into account is :

“... whether the assessment methodologies adopted in the EIA report are consistent with the methodologies set out in Annexes 12 to 19 inclusive and with the general principles laid down in Section 4.3, and whether the evaluation of the predicted impacts are consistent with the criteria listed in Annexes 4 to 10 inclusive. Where specific methodologies are not listed in the annexes or where the methodologies for certain issues can only be established on a case-by-case basis, the Director will assess whether the proposed methodologies are consistent with the methodologies adopted for Hong Kong projects having similar issues or with methodologies accepted by recognised national/international organizations.”

Mr Yu SC submits that the dismissal of a scenario attributable to an incredible cause is “consistent with methodologies adopted for Hong Kong projects having similar issues” and that the Director was therefore lawfully entitled to accept the EIA report in which that methodology had been employed in making the QRA. Mr Yu SC points out that no specific methodology was listed in Annexes 12 to 19 of the TM and he submits that the Director was authorized by s.4.4.2(c) to accept what had been done in Hong Kong as an appropriate methodology. To establish what had been done in Hong Kong, Mr Yu SC referred to two passages in evidence. Mr Hui Yat Ming, the Principal Environmental Protection Officer of the Environmental Protection Department, deposed in his second affirmation :

“The general practice of Hong Kong’s Hazard Assessment (‘HA’) under the EIAO does not require quantification of risks that have already been eliminated or reduced to insignificant levels (either in absolute or relative terms) by good engineering design. The Risk Guidelines provided in Annex 4 of the TM do not require an ALARP assessment when risk is very low and already in the ‘Acceptable’ region in Figure 1 of the Annex.”

Mr Hui is, of course, speaking of the practice in Hong Kong. He does not challenge the methodology of identifying hazardous scenarios and making a QRA of those scenarios. He simply notes the practice of omitting from the study those hazardous scenarios which, it is expected, will prove to have been “eliminated or reduced by good engineering design” and scenarios which, if a QRA were made, would show the risk to be in the “Acceptable” region of societal risk in Figure 1. Mr Venkatesh Sourirajan, who had been responsible for preparing the hazard to life assessments in the EIA report, deposed as follows :

“A quantitative assessment of catastrophic failure resulting from external events, such as natural hazards and aircraft crash, is not usually undertaken in risk assessments for facilities such as the PAFF, unless those events are considered to be a particular concern (for example, where a facility lies in the flight path). This approach is consistent with the methodology adopted in Hong Kong for oil storage installations in Tsing Yi. This issue was discussed with the EPD in the early discussions on the methodologies to be adopted in the EIA report.”

61. This approach to the making of the QRA precludes a full mathematical evaluation of all the scenarios which might cause fatalities. Yet s.4.3.1(b)(vi) requires the methodology adopted to make a QRA for the purposes of a hazard assessment to be capable of :

“... predicting the likely nature, extent and magnitude of the anticipated changes and effects such that an evaluation, in quantitative terms as far as possible, can be made with respect to the criteria described in Annexes 4 to 10 inclusive.”

Having regard to the criteria in Figure 1 of Annex 4, the relevant “anticipated changes and effects” must be taken to embrace the changes which any of the historic scenarios might produce and the effects on human life which those changes are assessed to produce if the particular scenario occurred. If such a QRA is made, the methodology must permit an evaluation to be made of the “predicted impacts” to determine whether they are “consistent with the criteria listed in Annex 4”.

62. The practice of not identifying extremely unlikely scenarios even though they might cause many fatalities is not consistent with the requirements of a methodology that can be accepted in relation to hazards to human life. The practice of omitting scenarios as described by Mr Hui and Mr Sourirajan appears to deny the public, the ACE and ultimately the Director any quantitative assessment of the risks of the omitted scenarios. And Mr Hui's opinion of the requirements of Annex 4 is clearly mistaken as one cannot determine that a risk is in the "acceptable" range of Figure 1 until a QRA is made. Stone J pointed out that :

"... it would frustrate the purpose of the Ordinance and the entire EIA regime in Hong Kong if the Director could decide to vary the process of assessment in a manner not provided for in the Ordinance, the technical memorandum or the study brief, and in a manner which would not involve public consultation or public accountability."

The protection afforded by s.4.4.2 and s.4.5.2

63. Mr Yu SC invoked the provisions of s.4.4.2 and s.4.5.2 of the TM in support of the Director's decision to approve the EIA report. These provisions appear under the heading "The review of the EIA report" which prescribes the steps to be taken in the review. The first step is in s.4.4.1 :

"Compliance with the Study Brief and Technical Memorandum: The coverage and approaches adopted in the EIA report shall be reviewed against the EIA study brief and the guidelines in this technical memorandum."

That step defines the general purpose of the review. Section 4.4.2 then opens with the following sentences :

"Quality of the EIA Report: The quality of the EIA report shall be reviewed having regard to the guidelines in Annex 20 and in Section 4.3. The report shall be considered as adequate if there are no omissions or deficiencies identified which may affect the results and conclusions of the assessment ..."

Section 4.5.2 reads as follows :

"In case the report requires certain amendments but such amendments will not affect the validity of the assessment and the overall results and conclusions of the report, the Director may approve the report with conditions."

These provisions were said to authorize the Director's decision under s.8(3).

64. Annex 20 mentioned in s.4.4.2 contains a lengthy check list of guidelines for the review of an EIA report. Some of the items in the list are clearly important (for example, "2.2 Are the nature and status of project decision(s), for which the EIA study is undertaken, clearly indicated?"); other express mere desiderata (for example, "10.2 Have technical jargons been avoided as far as possible in the executive summary?"). Clearly some "omissions or deficiencies" in relation to Annex 20 would fall within the protection of these provisions. But Mr Yu SC relies on these provisions to protect the validity of the Director's decision if his other submissions are not accepted. The overall protection of s.4.4.2 is qualified, however, by its insistence that "[i]n particular, the following factors shall be considered" followed by, *inter alia*, para.(c) which requires a methodology "consistent with the criteria listed in Annexes 4 to 10 inclusive" and para.(d) which asks :

"... whether the identification and descriptions of the potential environmental impacts in the EIA report are complete and whether all applicable criteria in Annexes 4 to 10 inclusive have been considered."

For the reasons earlier stated, consideration of the potential environmental impacts of a project cannot be complete if the methodology adopted for their prediction omits the consequences of possible scenarios which may cause fatalities unless the causes of the scenarios are expected or anticipated. The omission of the consequences of other scenarios is an omission or deficiency that may affect the results and conclusions of the assessment in the EIA report and thus falls outside the protection of s.4.4.2.

65. The Director sought to avoid this result by relying on the second affirmation of Dr Wrigley, the Senior Environmental Protection Officer of the Environmental Protection Department, who said :

"... According to the experience that I and my team have, it would not have made any difference to the risk assessment whether one attempts to set out

some sort of quantitative assessment.”

In the absence of any quantification of the number of fatalities that might be caused if the catastrophic instantaneous 100% loss scenario were to occur, this statement cannot be accepted. Rather, it illustrates the departmental view, erroneous in our judgment, that a QRA need not be made if the scenario is deemed incredible by reason of the discounting of causes that can be foreseen. If, in the absence of an adequate QRA, the EIA report reveals an omission or deficiency that may affect the results or conclusions of the assessment, the report cannot be approved in reliance on s.4.5.2.

66. Accepting the submission by Mr Fleming QC that the methodology adopted by the Director for making the QRA only in respect of a 10% loss of fuel was inconsistent with the requirements of Annex 4, the next question is whether the catastrophic instantaneous 100% loss scenario was or ought to have been identified in the EIA report.

Identification of the catastrophic instantaneous 100% loss scenario

67. Mr Sourirajan described the QRA process that was followed in preparing the EIA report by his employer, Environmental Resources Management (“ERM”). He deposed :

- “20. ERM identified all hazardous scenarios that might lead to fatalities in Section 10.4 of the EIA Report, as required in the study brief.
- 21. Catastrophic tank failure involving release of the whole of a tank’s contents is identified as a hazardous scenario and discussed in paragraphs 10.4.2.20 through 10.4.2.22.
- 22. Paragraph 10.4.2.23 of the EIA Report groups together all hazards relating to the tank farm not identified in the earlier parts of Section 10 of the EIA Report, including landslide, subsidence, typhoon, earthquake and aircraft crash. We grouped together generically in this way, in line with common practice, the natural hazards and man-made external events that could give rise to hazardous scenarios.

Frequency of hazardous scenarios

23. In determining the frequencies used in the EIA Report, ERM adopted cautious best estimates, based where possible on relevant literature, as identified in the EIA Report.
24. ERM included frequencies for catastrophic failure involving instantaneous loss of 100% of a tank's contents in paragraph 10.5.2.10 and Table 10.9 of the EIA Report. The frequencies equate approximately to a catastrophic failure occurring once in 150,000 years (this may be compared, for example, with the frequency used for a tank top fire, which equates approximately to a tank top fire occurring once every 300 years).

(Mr Sourirajan subsequently corrected para.24 explaining that para.10.5.2.10 of the EIA report modelled fire frequency for only 10% release of tank contents)

...

31. When the EIA Report was being prepared, careful consideration was given to the treatment of a catastrophic failure of a fuel tank leading to instantaneous or near instantaneous loss of 100% of the tank's contents.

...

33. On 25th April 2002 a meeting was held with representatives of the EPD to discuss the modelling of the quantity of tank contents released, extent of overtopping and the extent of spread of aviation fuel. Representatives from the Airport Authority as well as the Airport Authority's design consultants, Leighton Contractors (Asia) Limited ('Leighton'), also attended this meeting.
34. At the meeting, Mr Brian Gillon of Leighton explained the modern design features of the PAFF. The meeting then discussed the typical failure modes, such as material and weld defects, and foundation failures, and whether the failure modes would apply or could be considered as eliminated by the design. As a result of the discussions, it was concluded at the meeting that catastrophic failure involving an instantaneous release of 100% of the contents of one tank would be extremely unlikely to occur for the PAFF tanks and therefore that this scenario need not be considered quantitatively in the risk assessment.
35. It was agreed that a more realistic scenario would involve 10% of a tank's contents being released."

Table 10.9 of the EIA report stated the sources of the historical information of

catastrophic 100% loss of fuel from atmospheric surface tanks and the failure frequency expressed in terms of tank-years. Moreover, ERM had consulted the Major Hazardous Incidents Database and had there found records of incidents of catastrophic releases from storage vessels. In this respect, ERM followed the methodology for making a generic QRA. The procedure was summarized in para.10.5.1.3 of the EIA report :

“The approach to frequency analysis is based on the application of historical data worldwide for similar systems modified suitably to reflect local factors. Previous studies carried out for the proposed facility have also been reviewed to ensure consistency of approach and data.”

But when the ERM team under Mr Sourirajan came to consider the treatment of the catastrophic instantaneous 100% loss scenario, they did not think a QRA was necessary. Hence the decision expressed in para.10.5.2.8 of the EIA report not to make a QRA in respect of any scenario other than the 10% loss scenario (ante, para.38). The report noted that the only “outcome scenario (for the event overtopping the bund) which has an impact offsite” was the 10% loss scenario and its impact was on the sea, not in the SWS mill.

68. What the EIA report shows is that the catastrophic instantaneous 100% loss scenario was identified by the ERM team but the decision was taken not to make a QRA. Had such a QRA been undertaken, it would have been necessary not only to assess the frequency of occurrence of the scenario but also – and perhaps primarily – to assess the number of fatalities that might be caused if the scenario occurred. No assessment of fatalities, specifically no assessment of fatalities in the SWS mill, was made. The frequency of a catastrophic instantaneous 100% loss scenario that might cause such fatalities was not assessed on a basis consistent with Annex 4.

69. In the Court of First Instance, Burrell J proceeded on the footing that the catastrophic instantaneous 100% loss scenario had been identified for the purposes of cl.3.3.10.1. After noting that the HSL report asserted that

the EIA report had not identified that scenario and that SWS had acknowledged that assertion to be inaccurate, his Lordship said :

“The EIA report did identify the 100% instantaneous loss scenario and it did assess it.”

That must have been common ground before the Court of First Instance for his Lordship expressed the issues he had to determine on this aspect of the case only in terms of the absence of a QRA under para.(ii) :

- “(2) Whether the Director acted lawfully in approving the EIA report and allowing the project proponent not to carry out a quantitative risk assessment on instantaneous release of 100% of a tank content?
- (3) Whether the Director acted reasonably in the public law sense in approving the EIA report and allowing the project proponent not to carry out a quantitative risk assessment on instantaneous release of 100% of a tank content?”

The reasons why SWS failed in the Courts below

70. SWS failed before Burrell J because his Lordship held that para.(ii) of cl.3.3.10.1 did not require a QRA for all hazardous scenarios that had been identified. “It is sufficient” he held, “to execute a QRA for all those scenarios which, in the Director’s judgment, need to be addressed and assessed.” His Lordship did not think that “a strict compliance with the letter of the TM and SB was required”. For reasons earlier advanced, that decision was in our view erroneous. This approach was not endorsed by the Court of Appeal.

71. In the Court of Appeal, the issue was differently defined. Neither Ma CJHC nor Stock JA questioned that the catastrophic instantaneous 100% loss scenario was identified in the sense that its occurrence had been recognized in the history of atmospheric fuel farms but Ma CJHC held that that scenario was not credible or applicable and Stock JA held that that scenario had not been identified “as a predicted or applicable scenario or as one to be expected or anticipated in this particular case, but merely as a scenario that, generally speaking, might occur with fuel tanks”. With the

general concurrence of Ma CJHC, Stock JA had seen the issue to be whether the scenario was “associated with” the particular fuel farm. That issue was to be resolved by asking whether the scenario was expected or predicted or applicable to that project, and as that question was answered in the negative, his Lordship did not regard the scenario as “identified” for the purposes of para.(i) of cl.3.3.10.1. Accordingly, the Director’s decisions were upheld.

72. There is really little difference between the approach taken in the Courts below. If the Director was of the opinion that a scenario was not predicted or expected or anticipated for the instant project, that was sufficient to deny the scenario identification under para.(i) of cl.3.3.10.1 (Court of Appeal) or to justify its exclusion from a QRA under para.(ii) (Burrell J). The approach of the Court of Appeal cannot be supported once it is appreciated that a QRA, in order to satisfy the exigencies of Annex 4, must be both generic and project-specific, that the methodology searches for the relevant scenarios in the history of projects of the same genus – and thus identifies scenarios for the purposes of para.(i) – then quantifies risk by reference to that history and the specific features of the instant project – the QRA for the purposes of para.(ii). The approach of Burrell J cannot be supported because it does not accord with the “requirement to evaluate the risks (of an identified scenario) with the Annex 4 criterion”, as Stone J held.

73. It follows that the appeal must be allowed and, unless the Director’s decisions under ss 8(3) and 10 are saved by an exercise of a discretion to refuse relief, those decisions must be quashed. The quashing of the decision under s.8(3) necessarily destroys the validity of the decision under s.6(3) and the process undertaken by HKAA is stalled at the stage where it is obliged to deliver to the Director an EIA report that meets the requirements of the SB and the TM.

74. Ms Gladys Li SC, who appeared with Mr Thomas Lee for HKAA as an interested party, submitted that no new EIA report could now be delivered to meet the requirements of the SB as the period of validity of the SB had expired. This submission was based on cl.4.1 of the SB which reads :

“This EIA study brief is valid for 24 months after the date of issue. If the EIA study does not commence within this period, the Applicant shall apply to the Director for a fresh EIA study brief before commencement of the EIA study.”

75. The clause requires “commencement of the EIA study” within 24 months but not completion of the study. A revision of the present EIA report is not precluded by cl.4.1. Further, if (as might be expected) a revised EIA report is produced, the Director’s decisions thereon will be facilitated by his earlier consideration of issues raised by the present EIA report and the public and ACE comments thereon. Delays in completing the process should not be significantly longer than the periods prescribed by the Ordinance.

The Exercise of Discretion

76. This leaves the question of discretion. Mr Yu SC for the Director and Ms Li SC for the HKAA invite this Court, if it would otherwise allow an appeal against Burrell J’s order, to exercise the discretion vested in the Court of First Instance to refuse the relief sought.

Delay in commencing proceedings

77. The jurisdiction to judicially review an administrative decision is exercised to apply the rule of law to the exercise of administrative power (*Attorney-General (NSW) v. Quin* (1990) 170 CLR 1 at 35). When the repository of a power fails to comply with the conditions which govern its exercise, it is the function and duty of the court to quash the purported

exercise of the power unless there are substantial grounds warranting the refusal of relief, but the grounds on which relief might be refused when the court finds an excess of power are “very narrow” as Lord Bingham of Cornhill held in *Berkeley v. Environment Secretary* [2001] 2 AC 603 at 608. The quashing order which SWS seeks in the present case is an order of the kind which was granted by the Court of King’s Bench by issue of the writ of certiorari. The Court always asserted a discretion to refuse relief by way of certiorari in the case of delay (see, for example, *The Queen v. Sheward* (1881) 9 QBD 741). The Director and HKAA raise delay as the principal ground for refusing relief in the present case.

78. In comparatively recent times, the discretion which the courts of Hong Kong possessed under the common law (High Court Ordinance, Cap. 4, s.12(2)) has been modified by Ordinance and by Rules of Court. Similar modification had occurred in England. The ground of delay attracts the application of s.21K(6) of the High Court Ordinance :

“Where the Court of First Instance considers that there has been undue delay in making an application for judicial review, the Court may refuse to grant –

- (a) leave for the making of the application; or
- (b) any relief sought on the application,

if it considers that the granting of the relief sought would be likely to cause substantial hardship to, or substantially prejudice the rights of, any person or would be detrimental to good administration.”

Delay also invites attention to O.53 r.4(1) of the High Court Rules :

“An application for leave to apply for judicial review shall be made promptly and in any event within three months from the date when grounds for the application first arose unless the Court considers there is good reason for extending the period within which the application shall be made.”

These provisions reflect those in s.31(6) and (7) of the Supreme Court Act 1981 (UK) and in O.53 r.4(3) of the former Rules of the Supreme Court (UK). The relationship between these provisions caused some difficulty which was

resolved in *R v. Dairy Tribunal, Ex parte Caswell* [1990] 2 AC 738 at p.747B where Lord Goff of Chieveley, approving *R v. Stratford-on-Avon DC, Ex parte Jackson* [1985] 1 WLR 1319 said :

“... when an application for leave to apply is not made promptly and in any event within three months, the court may refuse leave on the ground of delay unless it considers that there is good reason for extending the period; but, even if it considers that there is such good reason, it may still refuse leave (or, where leave has been granted, substantive relief) if in its opinion the granting of the relief sought would be likely to cause hardship or prejudice (as specified in section 31(6)) or would be detrimental to good administration ...”

79. It follows that refusal of relief is not warranted unless the applicant for relief fails to apply for leave “promptly and in any event within three months” or unless the court is of the opinion that the grant of relief “would be likely to cause hardship or prejudice ... or would be detrimental to good administration”. We turn to consider first whether there was any “undue delay”.

Did time run from the s.6(3) decision?

80. It is submitted that, if the EIA report was flawed, SWS ought to have challenged the Director’s decision under s.6(3) and consequently time began to run when this decision was made on 11 June 2002. As the application for leave to apply for judicial review was not made until 1 November 2002, well outside the three month period, the Director submits that delay was established. Mr Fleming QC met this submission with the argument that an application to judicially review the s.6(3) decision would have been premature. The only consequences of the s.6(3) decision were to allow the public advertisement of the EIA report followed by the public consultation period and submission of the EIA report to the ACE. The matters which would be raised by the public and ACE could not be foreseen and it was not inevitable that the Director would later approve the EIA Report and issue the environmental permit. The s.6(3) decision did not affect the

interests of SWS and the comment made by SWS on the EIA report was calculated to induce the Director not to exercise his powers under s.8(3) and s.10 in a way that would affect those interests. It was not inevitable that the Director's s.6(3) decision would lead to the granting of an environmental permit or a permit without further conditions.

81. During the period of public consultation, SWS commented on the EIA report in terms including the following :

"The consequential effect of spillage at the tank farm has not been assessed. The emission due to such spillage may produce concentration of ignitable gas. The levels of concentration and its effect due to the high temperature operation at the mill have not been addressed."

And later:

"The siting of a facility which discharges aviation fuel vapours immediately adjacent to a facility of very high temperature processes and furnace operations is unsafe. In this case, any spillage incident would be catastrophic."

The Director understood the letter to raise a concern about spillage overtopping the bund. In his reply in para.12 he says :

"In addition, the risk of ignition on the site and over-topping of bunds have both been considered in the assessment. A number of arrangements are in place to contain the spill within the PAFF tank farm area. Therefore, there is no off-site on-land risk from the events at the tank farm."

82. In substance, SWS was expressing its concern about a scenario in which fuel would escape, overtopping the bund and flowing into the mill with catastrophic consequences. This should have led the Director to require a QRA embracing that scenario. But the Director's reply echoes the EIA report and dismisses that scenario. Had the Director addressed that scenario in accordance with the TM, the SWS comment ought to have led to a rejection of the EIA report when the Director was making his decision under s.8(3). No challenge to the s.6(3) decision was needed to raise the issue. A challenge to the s.6(3) decision before the s.8(3) decision would have been

premature as the Director might have rejected the EIA report after considering SWS's comments. Therefore time did not run against SWS from the date of the s.6(3) decision which was, in any event, provisional.

83. Mr Fleming QC relied on *R (Burkett) v. Hammersmith LBC (HL(E))* [2002] 1 WLR 1593 to establish the date from which time should be taken to run. In *Burkett's* case, on 15 September 1999 a Local Planning Authority resolved to grant Planning Permission for development subject to a particular condition being satisfied. On 6 April 2000, well after a three month limitation period had expired, the applicants sought leave to apply for judicial review of the resolution. Subsequently, the condition having been complied with, on 12 May 2000 Planning Permission was granted. It was this grant which affected the applicant's rights. Lord Steyn said at 1607C :

“In law the resolution is not a juristic act giving rise to rights and obligations. It is not inevitable that it will ripen into an actual grant of planning permission. In these circumstances it would be curious if, when the actual grant of planning permission is challenged, a court could insist by retrospective judgment that the applicant ought to have moved earlier for judicial review against a preliminary decision ‘which is the real basis of his complaint’.”

Time was held to run from the date when Planning Permission was granted. By parity of reasoning, the decision which affected the rights and interests of SWS was the decision under s.10 to grant HKAA an environmental permit.

When did time cease to run?

84. SWS's application for leave was made within three months from the decision to grant the environmental permit and within three months from the decision to approve the EIA report under s.8(3). It sought leave to apply for an order of certiorari to quash both decisions. At that time, SWS had not received the HSL report on which it relied to raise the amended ground relating to the absence of a QRA. It was not until 23 July 2003 that the application for judicial review was amended to raise that ground. The

Director and HKAA submit that this is a factor enlivening the court's discretion to refuse relief. In *King v. East Ayrshire Council* [1998] SLT 1287, Lord President Rodger speaking for the court said at p.1295 :

“ It is recognised that the public interest in good administration requires that public authorities and third parties should not be kept in suspense as to the legal validity of a decision for any longer than is absolutely necessary in fairness to the person affected by it (*O'Reilly v. Mackman* [1983] 2 AC at pp 280H-281A per Lord Diplock). Here the petitioner asks us to reduce the respondents' decision on a basis which would have been open to her from the outset, but which she did not advance then, preferring instead to use a different argument to attack their decision ... the court can, of course, take account of new matters and grant different remedies from those which are originally sought. In an appropriate case that could be done even at a late stage, but in deciding whether to grant a remedy on a different basis the court must not lose sight of the wider interest in good administration which Lord Diplock describes ...”

85. In the present case, however, the amendment produced no delay. The date for the hearing of the application had been set and was two months in the future. And, although the absence of the required QRA was a new ground for relief – inserted by amendment – it was in substance a particular manifestation of the more general complaint in the original application that :

“40. ... the Report had not met the requirements of the Memorandum, in that it failed to address all reasonable hazardous scenarios, and a number of assumptions and methodologies used by the EIA were questionable.

41. ... the HKAA should have in its EIA Report when dealing with hazard to life assessment (paragraph 10 of the report), evaluated the hazard to life based on the criteria provided in Annexes 4 and 22 of the Technical Memorandum which included :

41.1 identification of all hazardous scenarios associated with the marine transport, jetty transfer, tank farm storage and pipeline transfer of aviation fuel, which may cause fatalities;

41.2 execution of a Quantitative Risk Assessment expressing population risks in both individual societal terms;

41.3 comparison of individual and societal risks with the Criteria for Evaluating Hazard to Life stipulated in Annex 4 of the Technical Memorandum; and

...”

86. The amendment merely sharpened the focus of attention on the specific respect in which the process of approval had miscarried.

87. The only relevant period of delay is therefore between the date of the grant of the environmental permit on 28 August 2002 and the making of the application for leave to apply for judicial review on 1 November 2002. The three month period prescribed by O.53 r.4(1) was not exceeded. But was the application made “promptly”? The answer depends on all the circumstances. On the one hand, there is HKAA’s interest in proceeding with the plans and work for the construction of a needed facility and the public interest in facilitating that endeavour; on the other, there is SWS’s concern that the construction of the PAFF adjacent to its mill poses a hazard to human life – a concern that was not allayed by the EIA report and was confirmed by the report which SWS first obtained from McInnis Engineering Associates Ltd.

88. The McInnis report is dated 16 October 2002. It reviewed the EIA report which it had “accessed” on 10 July 2002 before the public consultation period had expired. Had SWS sought leave to apply for judicial review before obtaining an expert opinion advancing reasonable grounds for challenging the Director’s decisions, the challenge might well have failed at the outset for want of any foundation. Although the evaluating of delay is an objective exercise, in the circumstances of this case, an allowance must be made for a reasonable time in which to obtain and digest an expert report on the complex and detailed contents of the EIA report. The time taken for producing and utilising the McInnis report is not shown to be unreasonable.

89. In these circumstances, the time which elapsed between the grant of the environment permit and the launching of proceedings warrants a finding that the application for leave to apply for judicial review was made

promptly. It follows that there has been no “undue delay” within the meaning of that term in s.21K(6) of the High Court Ordinance.

The general discretion

90. The time limitations contained in s.21K(6) and in O.53 r.4(1) do not exhaust the discretion of the Court of First Instance to refuse relief by way of judicial review. As Hobhouse LJ said in *Credit Suisse v. Allerdale B.C.* [1997] QB 306 at 355 :

“The discretion of the court in deciding whether to grant any remedy is a wide one. It can take into account many considerations, including the needs of good administration, delay, the effect on third parties, the utility of granting the relevant remedy ...

These factors have in their turn given rise to fundamental difficulties for the theoretical basis of administrative law as discussed ... What is the status of an ultra vires decision which the courts have declined to quash on proceedings for judicial review? In principle any such decision is to be regarded as ‘void’ and a ‘nullity.’ Yet the effect of the exercise of the court’s discretion is to allow it to stand ...”

Nevertheless, Lord Hoffmann pointed out in *Berkeley* [2001] 2 AC 603 at 616 that “[i]t is exceptional even in domestic law for a court to exercise its discretion not to quash a decision which has been found to be ultra vires.”

91. *Prima facie*, SWS is entitled to a remedy. SWS, the public, the ACE and the Director were entitled to be informed by the EIA report of the risk to human life, quantitatively assessed, arising in the construction of the PAFF adjacent to SWS mill. It should not have been approved without that information. Some exceptional reason would have to appear to justify a refusal to judicially review the Director’s decisions under s.8(3) and s.10.

92. Mr Yu SC and Ms Li SC then submit that HKAA and the general public will be prejudiced, hardship will result, and there will be detriment to good administration if the Director’s decisions are quashed. Undoubtedly, the quashing of the decisions will involve a repetition of the process at least

from the stage of submitting a new EIA report and a consequential delay in the construction and completion of a PAFF.

93. That delay cannot be measured with precision at this time, but it is reasonable to assume that the insertion of an adequate QRA in the existing EIA report would not involve “going back to square one”, a worrisome prospect raised by Ms Li SC. Issues other than the QRA for “all hazardous scenarios” have already been addressed, comments have been obtained and evaluated. If, when the required QRA is made, it appears that there is no unacceptable risk to human life, a new approval and environmental permit should follow in little more than the periods specified in the Ordinance. But if it then appears that further mitigation measures either must or ought to be taken to eliminate an unacceptable risk to human life, delay to achieve that end is a delay which must be accepted. Delay for that purpose would not warrant a refusal of relief; on the contrary, the delay would both ensure compliance with the Ordinance, TM and SB and be justified as a protection of human life. When the remedy of certiorari is sought as a means of ensuring the elimination of unacceptable risk to human life, the discretion to refuse relief must be most narrowly confined since risks to life “call for the most anxious scrutiny”: per Lord Bridge of Harwich in *Reg. v. Home Secretary, Ex parte Bugdaycay* [1987] 1 AC 514 at 531.

Airport Fuel Supply

94. The question for consideration is the effect which the making of a quashing order might have on the capacity of the Hong Kong International Airport (“HKIA”) to supply fuel on the demand of aircraft using the facility. The delay and the additional costs which have already been incurred because of the need for approvals other than the environmental permit and the time spent in litigation is not the issue. It is for this Court, exercising its discretion at this time, to determine whether a quashing order should be made.

95. Delay in construction of the PAFF is said to have dire effects on the capacity of HKIA to meet the fuel demands of aircraft in the coming years. Inability to satisfy that demand would necessitate fuel rationing with an adverse effect on international air traffic through Hong Kong and serious economic consequences for the Region. If this be so, it is surprising that when SWS, by its solicitors, suggested for the sake of expedition an appeal from the Court of First Instance direct to this Court under s.27C of the Hong Kong Court of Final Appeal Ordinance, Cap. 484, the Director did not consent and HKAA did not even respond to the suggestion. Then, after SWS by its solicitors offered to support an application to expedite the hearing before the Court of Appeal, a reply was forwarded by HKAA's solicitors after a month and only after a reminder and in terms which left it to SWS to make the application.

96. HKAA filed an affidavit by Mr A A N Ebrahim, the Assistant General Manager of the Aviation Logistics Business Unit of HKAA. That affidavit was followed by some correspondence designed to elucidate or confirm certain points. In his affidavit, Mr Ebrahim asserted that, if the environmental permit were quashed, HKIA would "not be in a position to meet the projected demand for aviation fuel in 2007 ... and in 2009."

97. The filed material shows that the permits other than the environmental permit needed for the construction of the PAFF were being obtained as late as 12 April 2005.

98. For whatever reason, Mr Ebrahim's affidavit shows that on the present timetable, the "expected completion date (of the PAFF) is October 2008." So the 2007 problem would not be affected by the quashing of the environmental permit and the 2009 problem may be resolved if the resubmission of a new EIA report is expeditious and reveals no unacceptable

risk to human life. HKAA's solicitors confirmed to SWS's solicitors that this paragraph of Mr Ebrahim's affidavit was inaccurate.

99. Perhaps the delay is not as significant as Mr Ebrahim feared when he affirmed his first affidavit. Mr Ebrahim's affidavit stated that, when a T3 typhoon signal is hoisted, deliveries of fuel to the existing Aviation Fuel Receiving Facility at Sha Chau and a proposed connection point at West Quay cease until the signal is lowered. During this time, the airport tanks continue to supply fuel as required thus depleting the quantity of stored fuel. As the throughput capacities of the Receiving Facility and of the West Quay point are limited, it may take some days to replenish an airport tank. However, an analysis of the statistics of T3 typhoons in Hong Kong revealed that there were an average of 3.3 typhoons of that severity of 24 hours average duration each year, the worst year (1999) having had 8 typhoons of an average duration of 27.5 hours. On those statistics the suspension of throughput during T3 typhoons would not result in the draining of the airport tanks. By the end of 2006, those tanks will have a storage capacity of 221,000 cubic metres from which only 15,800 cubic metres per day (the figure is assumed by way of example by Mr Ebrahim) will be withdrawn for refuelling. The tanks are replenished from the Receiving Facility with a maximum throughput capacity of 16,800 cubic metres per day and West Quay can be brought into service after a T3 typhoon with a throughput capacity of 3,000 cubic metres per day. In four or five days after a 24 hour T3 typhoon, the quantity of fuel withdrawn during the typhoon would be replenished.

100. The evidence, such as it is, is insufficient to establish that any delay in consequence of the quashing of the approval decision and the decision to grant an environmental permit will result or is likely to result in a need for fuel rationing at the HKIA.

101. No other ground has been established which would warrant a refusal of the quashing orders to which SWS is *prima facie* entitled.

102. The jurisdiction to make (or to refuse to make) a quashing order is vested in the Court of First Instance by s.21K(1)(a) of the High Court Ordinance. In that court Burrell J had said that, if he had found that a ground of judicial review had been made out, he would nevertheless have exercised his discretion to refuse to grant relief. He assigned four reasons for that view :

1. There was delay in commencing proceedings after the s.6(3) decision on 11 June 2002.
2. His Lordship's view that SWS's case was "largely technical in nature".
3. The case could have been put during the public consultation but was not.
4. The same decision would be made if the present decisions were quashed as were made in August 2002.

and thus the project "would have been allowed to continue" in the interests of the public at large and in the interests of good administration.

103. For reasons earlier stated, his Lordship was in error in holding that the challenged decisions were valid and in holding further that there was relevant delay in commencing proceedings. SWS's case, far from being merely "technical in nature" drew attention to an unquantified hazard to human life. As to the third ground, the risk of a catastrophe following a spillage of fuel had been raised by SWS in broad terms during the period of public consultation. Finally, it is impossible to say what the Director's decision will be once he considers an EIA report containing the required QRA. Thus the discretion which Burrell J might have exercised would have

miscarried and it is for this Court to determine the order which Burrell J should have made.

The Orders

104. The jurisdiction of this Court in reversing the decision of the Court of Appeal extends to any of the powers of that Court (Hong Kong Court of Final Appeal Ordinance, s.17). The jurisdiction of the Court of Appeal in hearing and determining an appeal from the Court of First Instance extends to all the authority and jurisdiction of the Court of First Instance (High Court Ordinance, s.13(4)). Thus the Order which this Court must make is the order which the Court of Appeal ought to have made and that order is the order which should have been made in the Court of First Instance.

105. Thus this Court's order is :

1. Allow the appeal by SWS against the judgment of the Court of Appeal.
2. Set aside the Order of the Court of Appeal and in lieu thereof order that :
 - (a) Allow the appeal by SWS against the judgment of the Court of First Instance.
 - (b) Set aside the judgment of the Court of First Instance and in lieu thereof order that :
 - (i) the decision of the Director of Environmental Protection made on or about 2 August 2002 approving the environmental impact assessment report submitted to the Director by HKAA in relation to a proposed Permanent Aviation Fuel Farm for HKIA under s.8(3) of the Environmental Impact Assessment Ordinance be quashed; and
 - (ii) the decision of the Director made on or about

28 August 2002 granting an environmental permit with conditions No. EP-139/2002 to the HKAA under s.10 of the Environmental Impact Assessment Ordinance be quashed.

3. Order that the Director pay the costs of Shiu Wing Steel Ltd in the Court of First Instance, in the Court of Appeal and in the Court of Final Appeal to be taxed.

(Kemal Bokhary)
Permanent Judge

(Patrick Chan)
Permanent Judge

(R.A.V. Ribeiro)
Permanent Judge

(Barry Mortimer)
Non-Permanent Judge

(Sir Gerard Brennan)
Non-Permanent Judge

Mr Nigel Pleming QC and Ms Roxanne Ismail (instructed by Messrs Simmons & Simmons) for the appellant

Mr Benjamin Yu SC and Mr Anthony Ismail (instructed by the Department of Justice) for the respondent

Ms Gladys Li SC and Mr Thomas Lee (instructed by Messrs Lovells) for the interested party

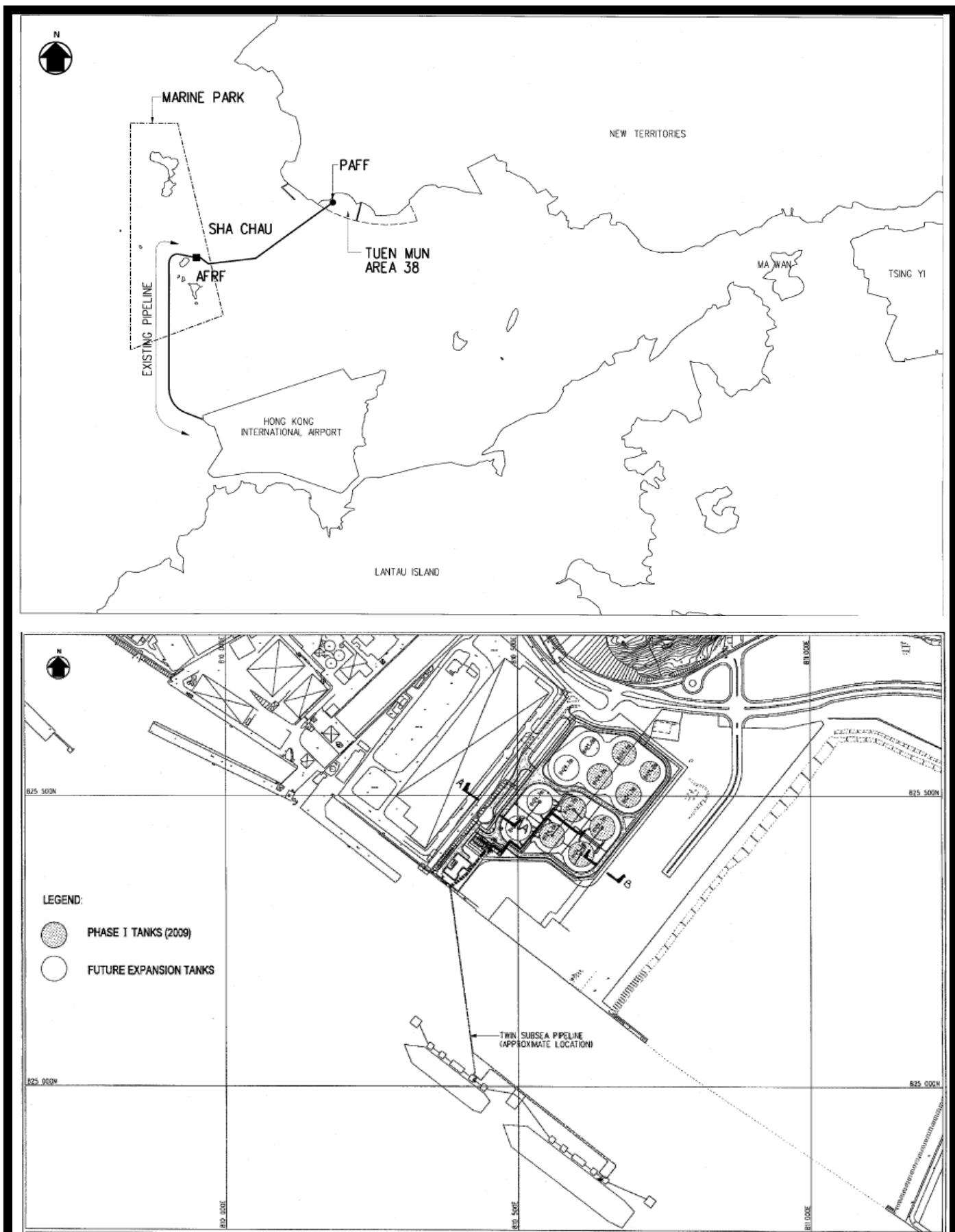


Figure 1: Project Location (Reproduced based on Figure 3.1 and Figure 3.2c in EIA Report)
Project Title: Permanent Aviation Fuel Facility for Hong Kong International Airport