Confirmed Minutes of the 141st Meeting of the Advisory Council on the Environment held on 19 April 2007 at 2:30 pm

Present:

Prof LAM Kin-che, SBS, JP (Chairman)
Prof WONG Yuk-shan, BBS, JP (Deputy Chairman)
Dr Dorothy CHAN, BBS
Mr James GRAHAM
Ms Betty HO
Prof Howard HUANG
Prof Paul LAM
Mr Edwin LAU
Dr MAN Chi-sum, JP
Dr NG Cho-nam, BBS
Mr TSANG Kam-lam
Mr Eddie WONG
Mr Simon WONG
Dr YAU Wing-kwong
Mr Carlson K S CHAN (Secretary)

Absent with Apologies:

Ms Goretti LAU
Prof POON Chi-sun
Mr Markus SHAW
Prof WONG Tze-wai

In Attendance:

Ms Anissa WONG, JP	Permanent Secretary for the Environment, Transport and Works (Environment)
Mr C C LAY	Assistant Director (Conservation), Agriculture, Fisheries and Conservation Department (AFCD)
Mr P Y TAM	Assistant Director/Technical Services, Planning Department
Ms Monica KO	Principal Information Officer, Environmental Protection Department (EPD)
Ms Josephine CHEUNG	Chief Executive Officer (CBD), EPD
Miss Sarah NG	Executive Officer (CBD), EPD

In Attendance for Agenda Item 3 :

Mr Elvis AU	Assistant Director (Environmental Assessment), EPD
Mr Simon HUI	Principal Environmental Protection Officer (Regional Assessment), EPD
Dr John WRIGLEY	Senior Environmental Protection Officer (Regional Assessment)5. EPD
Mr Fletch CHAN	Assistant Secretary for Economic Development & Labour (Economic Development) A3, Economic Development and Labour Bureau
Dr Shane LO	Senior Divisional Officer (Dangerous Goods Division), Fire Services Department (FSD)
Mr LEUNG Kwok-kin	Assistant Divisional Officer (Dangerous Goods Division), FSD
Mr CHAN Wai-kay	Senior Station Officer (Dangerous Goods Division), FSD
Mr TAI Kei-wai	Assistant Divisional Officer (Planning Group), FSD
Mr Joseph SHAM	Senior Marine Conservation Officer, AFCD
Dr Ivan CHAN	Marine Conservation Officer, AFCD
Mr Tony LI	Senior Marine Officer/Planning and Development (3), Marine Department
Mr WONG Hung Hei	Marine Officer/Planning and Development(3), Marine Department

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Action

Agenda Item 1 : Confirmation of the Draft Minutes of the 140th Meeting held on 12 March 2007

The draft minutes were confirmed subject to the amendment proposed by a Member to delete the phrase "or shut down the thermal power plants" in line 3 of paragraph 22.

Agenda Item 2 : Matters Arising from the Minutes of the 140th Meeting held on 12 March 2007

Para. 58 and 59 – Opening up of meetings to the public

2. The Chairman said that at the last meeting, the Council agreed to open up –

(a) Presentation Session and Question-and-Answer Session of a discussion item on EIA report at the EIA Subcommittee meeting requiring the attendance of the project proponent team; and

(b) Presentation Session and Question-and-Answer Session of a discussion item of the ACE meeting when the ACE discussed the report submitted by the EIA Subcommittee on EIA report requiring the attendance of the project proponent team.

To implement the open meetings, the Secretariat had tried to explore suitable venues to accommodate the observers. In view of physical constraints and security reasons, it was proposed to install a telecasting system for the conference room to enable the proceedings of the open sessions to be broadcasted simultaneously on television monitors in the Public Viewing Room on the same floor. The room could accommodate about 25 observers. Installation works would take about four months. Members agreed the proposed arrangement.

3. The Chairman said that to ensure the smooth proceedings of the meetings after opening up to the public, the Secretariat had prepared two sets of guidelines setting out the rules that members of the public had to observe when attending the open sessions as well as the general proceedings governing the operation of the open sessions. The guidelines were tabled for Members' comments. Members might give their comments to the Secretariat after the meeting.

4. The Chairman said that some Members suggested at the last meeting to upload the agendas and papers onto the ACE's website prior to the meeting. This arrangement was necessary to tie in with the opening up of meetings to let the public know the agenda items in advance for prior registration. He suggested and Members agreed that starting from the next meeting, the Secretariat would upload the agendas and papers (except confidential items) of the full Council and Subcommittees onto the website after issuing to Members (usually about five days before the meeting) so that Members should have received the documents before they were in the public domain.

Action

Agenda Item 3 : Report on the 97th Environmental Impact Assessment Meeting ***(ACE Paper 10/2007)***

Internal Discussion Session

5. The Chairman said that at the 97th meeting of the Environmental Impact Assessment (EIA) Subcommittee held on 19 March 2007, the EIA Subcommittee considered the EIA report on Permanent Aviation Fuel Facility (PAFF) for Hong Kong International Airport. The Subcommittee examined the EIA report and recommended that the outstanding issue of hazard assessment associated with the tank farm be further discussed by the full Council. Since then, the project proponent had provided additional information which was set out in Annex C to the paper. To facilitate further consideration of the EIA report, the Council had invited the project proponent team and representatives from relevant Government departments to attend the meeting.

6. A Member declared that his company had some business dealings with the Airport Authority Hong Kong (AA), the project proponent, and Shiu Wing Steel Limited (SWS), which had provided comments on the EIA report. The Chairman suggested and Members agreed that the Member could stay and continue to take part in the discussion in view of his relatively indirect relationship with the two parties.

7. Before discussing the item, the Chairman informed Members that SWS had sent a letter to him on 13 April 2007 requesting for making a presentation to the EIA Subcommittee in respect of their written comments on the EIA report. He had declined the request on the ground that the ACE was an advisory body and Members tendered their advice to the Government independently. It was neither the practice of ACE nor EIA Subcommittee to receive deputations at the meetings. The letter from SWS and reply letter from the Council were tabled for Members' information.

8. The Chairman informed Members that SWS had sent an email on 16 April 2007 direct to all Members expressing their views on the EIA report. He had requested the Secretariat to pass the email to the project proponent for attention. The project proponent provided a response to SWS's comments which had been circulated to Members for reference before the meeting. A set of comments from SWS (which was a response to the project proponent's response to their email on 16 April 2007) was received just before the meeting

started. The set of comments from SWS was tabled for Members' reference. Separately, an erratum on some information in Part 2 to Annex C of the paper submitted by the project proponent was tabled for Members' information.

9. The Chairman informed Members that public comments received by the Environmental Protection Department (EPD) after the Subcommittee meeting had been circulated to all Members for reference before the meeting. A large number of the public comments were in the format of standard letters or emails. Separately, three sets of public comments directly addressed to the Council had also been circulated to all Members for reference before the meeting. He highlighted that all information received by the Council, including those from SWS, had been circulated or tabled for Members' reference.

10. The Chairman of the EIA Subcommittee reported the gist of discussion and recommendation of the EIA Subcommittee. He highlighted that the set of comments from SWS directly addressed to the Council was received on the date of the Subcommittee meeting on 19 March 2007 and therefore had to be tabled at the meeting for Members' reference. It was an extraordinary arrangement that the meeting set aside some time for Members to go through the comments in view of the length of the document.

11. Upon the Chairman's enquiry, Members confirmed that other than the outstanding issue of hazard assessment associated with the tank farm, there were no other issues on the EIA report that they would like to further discuss.

(The project proponent team joined the meeting at this juncture.)

Presentation Session

12. Mr B S Chow briefed Members on the background and scope of the EIA report. He highlighted that safety was of paramount importance to aviation industry and the AA was totally committed to safety. Hong Kong economy would suffer if the PAFF was not available timely. Dr Neil Ketchell briefed Members on the additional information provided after the Subcommittee meeting, including a comparison of assumptions and basis of hazard assessment in the EIA report and the comments submitted by SWS's consultant Health and Safety Laboratory (HSL) to the ACE and EPD. He further gave a detailed account of the safety measures to be adopted for the PAFF and characteristics of

the aviation fuel Jet A1.

Question-and-Answer Session

13. The Chairman said that while the Council noted the need for AA to ensure a stable supply of aviation fuel for the airport in Hong Kong, the Council's role was to consider whether the EIA report was environmentally acceptable.

14. A Member said that the major concern of the hazard assessment associated with the tank farm was the catastrophic instantaneous 100% loss scenario (100% loss scenario). He enquired whether there would be a breakeven point in which tank failure would not cause spillage of fuel onto the SWS site. Dr Neil Ketchell explained that the off-site risk would involve a release of fuel from the tank which was sufficiently large and rapid to generate a large flow beyond the PAFF site boundary. The 100% loss scenario would be the maximum possible loss of fuel. The off-site impacts would depend on how far the fuel would flow outside the boundary. The lesser the fuel in the tank, the shorter the distance the fuel would flow. It should be noted that the 100% loss scenario experiment conducted was a highly hypothetic and pessimistic case assuming the unzipping of the tank on the side facing SWS site and the tank stayed fixed in place. In reality, if unzipping really occurred, the tank would move backward under the law of physics and thus the directional flow would be much reduced. Moreover, the spillage would not immediately meet the ignition sources as there was a considerable distance between the tank wall and ignition sources in SWS site. It was highly questionable whether any kind of possible tank failure would cause a flow that was sufficient to encounter the ignition sources due to the furnace and flash welding in the SWS site. Nonetheless, under this highly hypothetical and pessimistic scenario, predictions showed that for the flow to remain within the PAFF site boundary completely, the contents of the tank would be about 60%.

15. A Member enquired whether there would be any mitigation measure, such as raising the bund wall height, to avoid over spillage onto the SWS site. Dr Neil Ketchell explained that it was very difficult to raise the bund wall height to absolutely guarantee that all the flow would be contained within the site boundary without raising the bund wall as high as the tank. The bund wall had to be self-supporting and had to resist not only static pressure but also the dynamic pressure from the flow. It was impracticable to build such a

high bund wall as a large earth bank would be required which would occupy extensive land space extending to the road outside the site boundary. Regarding mitigation measures, they had proposed in the revised EIA report to change the outer security fence to a second impervious security bund wall and the originally proposed bund wall would be partly sunken below ground with a wave wall to enhance its capability to protect against a liquid surge. The total capacity of the tank farm was also reduced. As there were already four layers of bund walls (versus the standard requirement of a single bund wall and a site boundary fence), an additional bund wall would not add much benefit in terms of mitigation and cost-benefit analysis. He pointed out that the assessment had been conducted for both the initial phase of eight tanks and the final phase with four additional tanks nearer the SWS site. Under the initial phase, tank failure would not cause serious spillage to SWS site.

16. Mr Amin Ebrahim added that analysis results showed that to contain the spills within the site, the bund wall had to be about 12 m high requiring large earth banks to stand the surge of outflow under the hypothetical situation of 100% loss scenario. The Chairman asked whether it would be technically feasible but considered not cost-effective to increase the bund wall height. Mr Ebrahim explained that the bund wall would occupy a large area around the tank farm encroaching the area outside the site boundary.

17. In reply to a Member's enquiry about the size of the tanks and properties of Jet A1, Dr Neil Ketchell said that the largest tank would be 43.5 m in diameter and 24.7 m high. Regarding the properties of Jet A1, the density was about 840 kg/m^3, the viscosity was about 1.4×10^{-3} kg/m/s (which was close to that of water) and the vapour pressure was about 100 Pascal. Regarding the safety factor of steel material for the tanks, the answer was not simple, but the full 23.5 m fuel level would give a loading of 2 bars at the base of a tank. There were also additional requirements for the material properties of the steel to ensure structural strength.

18. In reply to a Member's enquiry about the safety level of Jet A1, Dr Shane Lo explained that there were seven classes of fuel according to the Institute of Petroleum's classification of crude oil and petroleum products which was mainly based on the flash point of the fuel with reference to the handling temperature. The classification included Class 0, Class I, Class II(1), Class II(2), Class III(1), Class III(2) and unclassified. Jet A1 was classified as Class II(1) fuel which had a lower risk level than Class I fuel such as petrol.

19. A Member considered that the static pressure of Jet A1 in the tank was not too high. It was important that the design of the steel should be able to withhold the pressure of 80 to 150 psi. He suggested that thicker steel could be used for the three tanks facing SWS site to minimize the possibility of zipping up a tank.

20. Mr Amin Ebrahim said that the Quantitative Risk Assessment (QRA) results showed that the risk level was well within the acceptable region. Mitigation measures would only come into play when the risk level was in the "As Low As Reasonably Acceptable" (ALARP) region. Upon the Chairman's enquiry, Mr Ebrahim said that the tank wall would be as thick as one inch at the bottom with a staggered arrangement up the top. Dr Neil Ketchell explained that a standard tank shell consisted of a number of curved plates with welded joints staggered like a brick wall to avoid a weakness at one welded joint causing a continuous weak joint. A Member considered that the thickness of the tank, i.e. one inch, would be sufficient to prevent unzipping problems.

21. A Member considered that it would be crucial to consider the major sources of discrepancy between the assessment results of the EIA report and that of HSL's report. Dr Neil Ketchell explained that in assessing the failure frequency per tank-year, they had identified different types of tank release, including –

(i) catastrophic failures for generic tanks;
(ii) 100% instantaneous failures for generic tanks; and
(iii) 100% instantaneous failure of a PAFF tank containing Jet A1 in Hong Kong.

The EIA assessment was based on relevant historical incident data. Under type (ii) situation, the EIA assessment was based on 11 potentially relevant instantaneous failure incidents in 2.4 million tank population over a 30-year period. He highlighted that out of the 11 incidents, only four were identified as genuine instantaneous failure loss cases and two of them happened as early as 1924 and 1957 but they were still included in the computation. The failure frequency per tank-year was assessed to be 1.5×10^{-7}. Under type (iii) situation, the basis was that none of the incidents under type (ii) situation was applicable to the PAFF tanks in Hong Kong. It also involved a judgement on the chance of having a 100% instantaneous failure incident occuring with a cause applicable to the PAFF tanks. Instead of assuming a probability of not being applicable, the EIA had assumed that some of the events had been potentially applicable. A 30% chance was assumed which was considered not

an optimistic assumption as there was no real evidence to support a mechanism which could generate a 100% loss scenario for the PAFF tanks. The failure frequency per tank-year was assessed to be 5×10^{-9}.

22. A Member said that the assessment under type (ii) situation was based on some historical data. However, the assessment under type (iii) situation might involve some degrees of uncertainties. He considered that it might be more prudent, in view of the uncertainties, to have a figure in the order of 10^{-7} under type (iii) situation. Dr Neil Ketchell explained that the assessment involved a generic approach and a specific approach. It was important to note that none of the causes of the 11 incidents under the generic approach was applicable to the specific case of PAFF tanks in Hong Kong. The common causes included low temperature embrittlement, explosion in head space and seismic failure in high seismic risk area. Upon the Member's enquiry, Dr Ketchell confirmed that even if the figure of 10^{-7} was used for the specific approach under type (iii) situation, the risk level was still well within the acceptable region.

23. Dr John Wrigley noted that a sensitivity analysis of societal risk was given in Figure 10.13 of the EIA report. Dr Neil Ketchell explained that the sensitivity level at the bottom level of risk assessment would not make any difference to the overall risk which was dominated by other types of risks. The 100% loss scenario was not a dominant risk for the PAFF case.

24. A Member asked whether there was any incident out of the 11 instantaneous failure cases that involved a head space explosion for Jet A1. Dr Neil Ketchell said that none of the 11 incidents involved Jet A1 and none involved a head space explosion which was relevant to a fuel below its flash point. The head space explosion incidents mainly involved petrol or fuel with similar properties.

25. A Member asked whether there was any catastrophic tank failure incident involving aviation fuel. Dr Neil Ketchell said that he was not aware of any 100% instantaneous failure incident involving Jet A1. There had been some failure cases, such as corrosion at the tank bases resulting in some releases. He pointed out that aviation fuel included not only Jet A1 but also Jet B which was relatively a more flammable type of fuel.

26. A Member considered that it would be reasonable to assess the

impact of 100% loss scenario of at least one tank as a single incident would cause hazard to life, given that there would be 12 tanks in the PAFF tank farm in the final phase. Dr Neil Ketchell explained that physical modelling was conducted for one tank nearest to the SWS boundary. The overall modelling was based on the most critical case, but included unzipping of the tank in different directions with equivalent levels of flow. The hazard assessment included all 12 tanks and ignition sources in SWS site and EcoPark.

27. A Member said that she noted that the EIA report had assumed that the world tank population was about four times of the tank population in the US while the HSL report seemed to assume the tank population by taking into account the tanks comparable in size to that of PAFF. She considered that if the tank population was substantially reduced, the risk level would be substantially increased and could reach the ALARP region. Dr Neil Ketchell explained that there was a general consensus on the tank population estimated by the American Petroleum Institute and the US Environmental Protection Agency on which the EIA was based. There could always be arguments on the proportion of tanks to be included for assessment. Nonetheless, they considered that the number of tanks excluded by the HSL assessment was rather large which amounted to over 90% of the tank population. Some of the tank failure incidents considered were outside the US, in particular one of the world's most catastrophic instantaneous tank failure incidents occurred at Umm Said in the Middle East, so a tank population outside the US should be included in the assessment. It was reasonable to make a cautious estimation of the worldwide tank population rather than relying only on the US tank population. He highlighted that another cautious figure adopted was a 30-year period of experience and incidents back to 1924 and 1957 were included. The technology of tank containment design had in fact improved quite significantly over the years.

28. A Member said that under some modern standards, an individual bund was required for each tank. Dr Neil Ketchell explained that there was a recommended storage capacity within an individual bund under the international practice for oil installation. In the case of PAFF, while the storage capacity would exceed the recommended level, the proposal of installing one collective bund for six tanks was considered acceptable by the Fire Services Department (FSD). It was important to note the impact of different types of bunds. By putting multiple tanks within an individual bund, the bund would have greater capacity and improved safety level for certain incidents, including the 100% loss

scenario. It would depend on the merit of each case on whether to put one tank or multiple tanks within an individual bund.

29. In reply to a Member's enquiry about the distance between the tank farm and SWS site, Dr Neil Ketchell explained that under the initial phase, the distance between the nearest tank wall and SWS's fence would be 115 m and that between the nearest tank wall and SWS's building would be 135 m. The furnaces would be further away. Under the final phase, the distances would be 61 m and 81 m respectively. The same set of data was provided at the EIA Subcommittee meeting. In reply to another Member's enquiry, Mr Amin Ebrahim said that the area between the bund wall and the security wall would be used as a road for fire fighting and emergency vehicle access purposes.

30. A Member said that while there were overseas cases that fuel tanks were located near to industrial operations with hot works, it should be noted that the furnaces in SWS site were not under shelter. Any over spillage of fuel onto the furnaces would affect the workers directly. Dr Neil Ketchell explained that it was common that different types of hot works were placed near to fuel storage, including open furnaces, welding and grinding operations. It had been assumed in the EIA report that Jet A1 would be expected to ignite if the fuel reached the furnaces or flash welding region of SWS site. In the event that the fuel was ignited, it would be doubtful whether the fatalities would occur in the area covered by Jet A1 in view of the slow speed of the flame spread and the speed of the liquid flow. However, for assessment purpose, it had been assumed that a fire would be generated in the entire area covered by Jet A1 and anybody caught within the area would be a fatality. This explained how the high fatality rate in the EIA report was generated. He highlighted that, in his experience, the PAFF was one of the lowest risk fuel storage facilities in the world based on the nature of fuel stored, nature of tank containment and safety distances. Even based on the pessimistic assumptions of the HSL report which they did not agree, the risk level would only be at the low end of the ALARP region.

31. A Member enquired about the impacts of lightning strikes on the tanks. Dr Neil Ketchell explained that if the head space of a tank was in the flammable range, lightning strikes might ignite the fuel especially for tank vents and ignition was also common for vents on drains. Ignition from lightning strikes was also more of an issue for floating roof tanks due to the presence of flammable vapour at the electrical discontinuity between the tank wall and roof.

The PAFF tanks had a continuous metal surface which would help protect against ignition due to lightning strikes. In view of the properties of Jet A1, the risk level associated with lightning strikes would be extremely low. Mr B S Chow added that the occurrence of lightning strikes in the airport region was relatively more frequent than other parts in Lantau but there had not been any such incident in the existing tank farm.

32. A Member asked whether there would be any build-up of flammable vapour for the storage tanks under the solar heating of up to 70 ℃ in addition to the steady pressure of the fuel. Dr Neil Ketchell explained that the PAFF storage tanks would comply with the API-650 standard. Even when the tank roof was heated to about 70 ℃ under the sunlight, there would not be risk problems. Any vapour condensed under the roof would be evaporated but the bulk vapour pressure would be controlled by the bulk liquid surface temperature. The effect of the sunlight would not be long enough to increase the temperature of the liquid fuel inside such a large tank to a very high temperature. For the sidewall of the tank, only the temperature of the tank wall above the liquid level would be raised to a high temperature. It would not be possible to heat the tank wall below the liquid level to high temperature because it was in contact with the liquid fuel which was a huge heat sink. This was illustrated in the Buncefield incident where the top of those affected tanks were seriously distorted during the fire while the part below the liquid level was not much affected. The laws of physics helped in this case. Mr Amin Ebrahim added that they monitored the temperature of the existing airport tanks closely and the records of the existing tanks showed that they were normally a couple of degrees below the ambient temperature.

33. In reply to a Member's enquiry about the ignition of Jet A1 in an engine, Dr Neil Ketchell said that the minimum flash point of Jet A1 was 38℃. In order to ignite Jet A1, it was necessary to raise the temperature inside the engine to over 38 ℃ or to provide intense heating to raise the fuel temperature and an ignition source. The heating and ignition of Jet A1 were usually the secondary incident in tank farm fire incidents after a major fire caused by other fuels such as petrol.

34. A Member asked about the impacts of the use of larger sized vessels on other ships in the area and on the seabed. Mr Amin Ebrahim said that there were mainly three jetties in the area. A detailed marine impact assessment had been conducted, including a primary simulation of operational

impacts caused by berthing, for which the impacts were considered acceptable. Regarding the impacts on the seabed, he confirmed that there would not be additional dredging works required as the water depth was sufficient for the larger sized vessels.

35. A Member enquired about the assessment of the insurance market regarding the risk of the tank farm having regard to its location and proximity to hot works. Mr Amin Ebrahim said that the current insurance policy covered the aviation fuel system of the airport as a whole including the fuel suppliers, airlines, operators and AA. They had learnt from the insurance market that insurance for the PAFF would be similar and there would not be additional premium for the insurance due to the construction of the PAFF in proximity to hot works. The Member said that his concern was not about the PAFF as there were safety benchmarks for the airport. He was more concerned about the potential impacts of SWS on the risk level of the airport which would be reflected in the insurance market.

36. A Member enquired about the number of fire incidents in the current and previous sites of the aviation fuel farm and SWS. Dr Shane Lo undertook to provide the information after the meeting. Mr Amin Ebrahim said that the AA monitored the aviation fuel tank farm very closely and there was no fire incident in the farm since opening of the airport.

(Post-meeting note: FSD advised that there were no real fire incidents, but some Unwanted Alarms (Automatic Fire Alarm), during the period from 1 June 2000 to 30 April 2007 in the sites of the aviation fuel farm and SWS.)

37. A Member said that there were risk assessment reports from experts of project proponent as well as those from SWS. He wondered whether there would be a third party's assessment of both reports. Dr Neil Ketchell said that there were quite a large number of risk assessment reports on the PAFF, including the first EIA report by Environmental Resources Management, assessment reports by Shell Global Solution and ESR Technology (previously named as AEA Technology) during the judicial review process, assessment report by Mott Connell commissioned by the AA and Tuen Mun District Council, and the current revised EIA report by ESR Technology. All these assessment reports concluded that the risk level was extremely low and within the acceptable level. In addition, an assessment was conducted by SWS's consultant HSL. He considered that there was a general consensus of the risk

assessment among most of the studies conducted.

(The project proponent team left the meeting at this juncture.)

Internal Discussion Session

38. The Chairman said that most of the issues in the EIA report had been addressed in the EIA Subcommittee and Members agreed that the outstanding issue was hazard assessment associated with the tank farm. The EIA report was a revised EIA report and not a fresh submission. Based on the CFA judgment, a QRA should be undertaken regarding the catastrophic instantaneous 100% loss scenario. Given the background, the key considerations were –

(a) Had the QRA on catastrophic instantaneous 100% loss scenario, which was specially requested by the CFA in its judgment, been properly undertaken and set out in the EIA report?

(b) Were the findings of the QRA reasonable and acceptable taking into account of the assumptions adopted and the basis of its assessment?

(c) Would it be reasonable and acceptable to agree that the risk level should fall within the acceptable region?

(d) Should additional mitigation measures be required?

39. On consideration (a), Members agreed that the QRA on the catastrophic instantaneous 100% loss scenario had been properly undertaken and set out in the EIA report. On consideration (b), the Chairman said that Members were provided not only with information and findings of the QRA from the project proponent but also those from SWS. Members noted the difference in the assessment results which were mainly due to differences in the assumptions and basis of assessment, one of which was the assumptions on tank population and incidents of catastrophic instantaneous 100% loss scenario.

40. A Member said that based on the assumptions and basis of the assessments provided by the two parties, he would agree more with the findings in the EIA report. Based on the HSL assessment, the failure frequency per tank-year would be the same under different types of tank release, including (i)

catastrophic failures of generic tanks, (ii) 100% instantaneous failure for generic tanks, and (iii) 100% instantaneous failure of a PAFF tank containing Jet A1 in Hong Kong. He considered the assessment not realistic. Jet A1 was classified as a Class II(1) fuel which was much safer than Class I fuel. In the situation of Hong Kong, the two common reasons causing the 100% loss scenario were not applicable as low temperature embrittlement would not happen in Hong Kong and Hong Kong was not located in the active seismic zone. Regarding the cause of head space explosion, the project proponent team had confirmed that there was no incident of head space explosion involving Jet A1. In assessing the specific case of PAFF tanks in Hong Kong, it was reasonable to come up with a much smaller figure on failure frequency. He was satisfied with the assumptions adopted and basis of assessment in the EIA report.

41. A Member agreed that it was reasonable to accept that the probability of failure frequencies would be lower under type (ii) and type (iii) situations than type (i) situation. The only point he was not too sure was whether the figure under type (iii) situation should be as low as in the order of 10^{-9}. In any case, it would not be a sufficient reason not to accept the assessment result. Even the figure under type (iii) situation was in the order of 10^{-7} to 10^{-8}, it would still be within the acceptable region. Another Member considered that the probability of failure frequencies was extremely low based on the assessments of both parties.

42. A Member considered that it would be important to take a precautionary approach as it involved hazard to life. As she was not an expert in this field and she would respect the views of other Members in considering an appropriate precautionary approach.

43. On consideration (c), Members agreed that even given the allowance for some degrees of error because of the element of uncertainty for moving from the generic approach under type (ii) situation to the specific approach under type (iii) situation, it was reasonable and acceptable to agree that the risk level should fall within the acceptable region. The risk assessment approach was in line with the requirements under the Technical Memorandum on EIA Process. Even if the HSL's assumptions were adopted, the risk level would only be marginally pushed to the low end of the ALARP region.

44. On consideration (d) regarding the requirement of mitigation

measures, a Member considered that safety of the tanks should be more related to the welding of joints rather than thickness of the steel wall. There would be specifications in the tank design and testing procedures to ensure that the standards would be met.

45. A Member said that as there had been some cases of corrosion at the tank base causing some leakage of Jet A1, he wondered whether cathodic protection would be used for the tanks to minimize or eliminate corrosion problems. Nonetheless, corrosion at the tank base would not cause 100% loss scenario. Mr Elvis Au noted that the project proponent had indicated that the tanks would be designed in line with the international standard. Another Member considered that it would be important to conduct regular inspection of the tanks to ensure safety.

46. A Member suggested that the project proponent be requested to increase the height of the landscape bund as she considered that the proposed height of 2 m was not sufficient. A higher bund wall would give a more secure feeling to the adjacent users.

47. A Member considered that the crux of the matter was whether it would be necessary to increase the bund wall height. If the Council requested the project proponent to increase the bund wall height, it would send a wrong message to the public that the risk level was not acceptable and that a higher bund wall would be required to provide the necessary protection against the risk. The Council had to be cautious in making the request.

48. Dr Shane Lo explained that while higher bund wall would have higher containment capacity, it would be necessary to strike a balance. According to the international standards, the recommended bund wall height should normally not be higher than 1.5 m. Fire safety risk might be increased by a higher bund wall as it would endanger people enclosed by the wall due to entrapped vapour, reduced natural ventilation and increased barriers for escape. In case of fuel spillage, flammable vapour could not disperse which might form a hazardous flammable atmosphere. Moreover, fire fighting and rescue operations would be affected. He informed members that prior to the CFA decision, the project proponent had submitted a proposal on bund wall design and they had requested the project proponent to submit a vapour dispersal study. Based on the study results, the recommended bund wall height was averagely 4.6 m (which was adopted by the project proponent). Bund walls higher than

this height would inadvertently increase fire safety risk.

49. In reply to the Chairman's enquiry, Mr Elvis Au said that the department was reviewing the large amount of comments and information received on the EIA report. He noted that compared to the previous EIA report, the additional measures included changing the outer security walls from wire mesh to impervious walls, equipping the bund with wave deflector to enhance its wave protection capability and adding the landscape bund of 1.5 m to 2 m high.

50. Based on the information provided, Members agreed that the EIA report should be endorsed without condition.

Agenda Item 4 : Any Other Business

Tentative items for discussion at the next meeting

51. The agenda was being compiled. Members would be informed in due course.

Agenda Item 5 : Date of Next Meeting

52. The next meeting was scheduled for 14 May 2007.

ACE Secretariat
April 2007