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Our Ref.: EFB 9/25/41/79 Pt.64

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27 June 2002

See Distribution List

Dear Sir,

The 72nd Meeting of the Environmental Impact Assessment Subcommittee
EIA on Permanent Aviation Fuel Facility
Questions from Miss Alex Yau

I enclose a list of questions raised by Miss Alex Yau, a Member of the EIA Subcommittee, on the captioned EIA report which is to be discussed at the upcoming meeting on 8 July 2002.

I would be grateful if you could provide us with the response to her questions, in the attached format, by 2 July 2002 so that Members could peruse well before the meeting.

Yours sincerely,

(Ms. Cora So)
for Secretary,
EIA Subcommittee

Advisory Council on the Environment

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DEP

(Attn. : Mr. S C Ho)

2591 0558 - Q2a

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(Attn. : Mr. Martin Putnam)

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(Attn. : Ms. Helen Cochrane)

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EIA Report on Permanent Aviation Fuel Facility
Questions raised by Miss Alex Yau

Q1: Construction Period

Please advise the specific schedule for the construction, particularly for the marine percussive piling. Worryingly section 7.8.2.17 notes that, "the construction period would be going on several years later" – yet in section 7.8.2.12, it is recommended that percussive piling activities should avoid the calving period (of April to August each year).

A1:

Q2a: Maintenance Dredging

Would EPD please confirm, or otherwise, if the [maintenance] dredging of the access channel for the aviation fuel receiving facility at Sha Chau (section 7.6.6.2) would be a designated project under the EIA Ordinance. If not, would the proponent please advise how the impacts of the dredging, especially on Chinese White Dolphins and the artificial reefs deployed within the Sha Chau & Lung Kwu Chau Marine Park, would be addressed and properly mitigated?

A2a:

Q2b: Meanwhile please note that I am still unconvinced of the need for using the Sha Chau AFRF as back-up, and I consider it much desirable to avoid the impacts of maintenance dredging (albeit that at a frequency of once every four years). Should the Administration decide to grant leave for the use of Sha Chau facility as back-up, then the proponent should undertake appropriate mitigations, such as continued funding support for the management of the Marine Park.

A2b:

Q3a: Bubble Jacket

Please would the proponent advise how much noise attenuation the bubble curtain (used in 1996 for the construction of the AFRF) had achieved, and whether the then observed adverse reactions of the dolphins (doubled swim speeds during percussive piling, section 7.6.5.7) occurred during unmitigated or attenuated pile driving activities.

A3a:

Q3b: Section 7.2.2 states that, "construction of the pipeline and PAFF berthing jetty will not be approved unless it can be demonstrated that no unacceptable environmental impacts will result to the dolphins". As such, would the proponent please provide substantiating evidence demonstrating that the Chinese White Dolphins will not be adversely impacted by [underwater] noise levels of 152-162 dB within 300 to 500 metres of the pile driving activities (section 7.8.2.5).

A3b:

Q4a: Dredging Impacts

Please would the proponent advise if the cumulative impacts of the dredging for the pipeline and the proposed dredging of the Tonnggu Channel have been assessed. If so what are the results of the assessment? If not, please explain why the cumulative impacts have not been assessed?

A4a:

Q4b: Section 7.8.2.8 recommends a dolphin exclusion zone of 250m radius around the dredger for the laying of 400 m of pipeline within the Sha Chau & Lung Kwai Chau Marine Park. Please would the proponent explain why no similar mitigations are proposed to the laying of over 4 km of pipeline from Tuen Mun Area 38 to the boundary of the Marine Park - noting that the area around the PAFF is "relatively highly utilized" (a relative density index of ~22-23 dolphins per kilometer square, compared to 8.7-17 in each kilometer squares off Sha Chau, section 7.6.5.8)?

A4b:

Q5a: Dolphin Monitoring

The recommended pre- and post-construction dolphin monitoring would only be 28 days prior to construction activities, and 28 days after cessation of construction (section 7.8.2.18). However as noted above, construction will take place over several years, and dolphin distribution shows seasonal variation (section 7.4.8.4). In addition, influx of individual dolphins following temporary avoidance of construction activities seemed to have occurred only after some months to years (section 7.7.3.4). As such would the proponent please explain why 28 days pre- and post-construction monitoring is considered adequate?

A5a:

Q5b: Further it is recommended that suspension of works is to be triggered by "significant increase in dolphin mortality immediately following the beginning of construction work" (section 7.11.2) - although apparently no dolphin mortality monitoring programme has been proposed. Since outright death is highly unlikely (unless for catastrophic events) and chance stranding underestimates mortality, would the proponent please explain why the trigger level is considered adequate for protection of the Chinese White Dolphin populations.

A5b:

-END-

Fax Message

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International Consultants

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Ref: SVJ/HJC/90821.330/F293 Page: 1 of 5
To: ACE Date: 2nd July 2001
Attention: Ms Petula Poon Fax No: 2136 3321
Copy to: AAHK (Attn: Mr Martin Putnam) - 2183 6620 Your Ref:
AAHK (Attn: Mr Amin Ebrahim) - 2824 2786
AAHK (Attn: Mr Bill Roberts) - 2949 9896
EPD (Attn: Mr S C Ho) - 2591 0558
From: Steve Jones
Subject: **Contract M811**
Environmental Assessment Services for
Permanent Aviation Fuel Facility
Comments from ACE Members

Further to your letter of the 27th June 2002, referencdd EFB 9/25/41/79 Pt.64, attaching some comments from a member of the ACE EIA Subcommittee, please find attached our response to comments table for your distribution to members. Please call the undersigned should you require anything further.

Regards


Steve Jones
Director



Comments

Advisory Council on the Environment, Ref. EFB 9/25/41/79 Pt.64 dated 27 June 2002

I enclose a list of questions raised by Miss Alex Yau, a Member of the EIA Subcommittee, on the captioned EIA report which is to be discussed at the upcoming meeting on 8 July 2002.

1 Construction Period

Please advise the specific schedule for the construction, particularly for the marine percussive piling. Worryingly section 7.8.2.17 notes that, "the construction period would be going on several years later" - yet in section 7.8.2.12, it is recommended that percussive piling activities should avoid the calving period (of April to August each year).

The percussive piling is scheduled to last for about 120 days although note that only about 60 days are required for actual piling work. Please note that this is substantially shorter than would be required for bored piling (duration of approximately nine months) which owing to construction constraints is not feasible in these waters. Also, please note that Section 7.8.2.17 relates to the fact that there will be a gap between the EIA report completion and the commencement of construction.

Please note that the reference to construction taking place several years later refers to the need for a review of data immediately prior to construction activity (to provide up to date information on dolphin distribution patterns) rather than relying solely on the dolphin distribution data available presently (i.e., early 2002). Whenever percussive piling took place, it would still need to avoid the sensitive peak calving season of April to June irrespective of the year piling is implemented.

2a Maintenance Dredging

Would EPD please confirm, or otherwise, if the [maintenance] dredging of the access channel for the aviation fuel receiving facility at Sha Chau (section 7.6.6.2) would be a designated project under the EIA Ordinance. If not, would the proponent please advise how the impacts of the dredging, especially on Chinese White Dolphins and the artificial reefs deployed within the Sha Chau & Lung Kwu Chau Marine Park, would be addressed and properly mitigated?

EPD To respond

Responses

Comments

- 2b Meanwhile please note that I am still unconvinced of the need for using the Sha Chau AFRF as back-up, and I consider it much desirable to avoid the impacts of maintenance dredging (albeit that at a frequency of once every four years). Should the Administration decides to grant leave for the use of Sha Chau facility as back-up, then the proponent should undertake appropriate mitigations, such as continued funding support for the management of the Marine Park.

Responses

Airport requires adequate supply of aviation fuel. This was realised way back when AFRF at Sha Chau was gazetted and therefore the Gazette Notice 1294 of 13 April 1995 states that the AFRF at Sha Chau must revert to the emergency back up when PAFF is operational. There are back ups for all facilities at the airport because of its strategic importance of the airport to the well being of Hong Kong. The AFRF is required as an emergency backup for the PAFF and the maintenance dredging of the access channel to the fuel facility is outside the scope of this project and will continue irrespective of the PAFF location. Under the existing arrangement with the Government, Airport Authority has been funding and is committed to funding the management and operation of the Sha Chau and Lung Kwu Chau Marine Park until PAFF is operational, which currently runs at about HK\$5 million a year, and after that Government will be responsible for its funding and administration. Nevertheless, being a responsible corporate citizen, the Airport Authority is willing to continue the funding for few more years provided the funding was reasonable. To this end, the Airport Authority has initiated discussions with AFCD on the way forward and we are still awaiting a concrete proposal from Government.

Bubble Jacket

- 3a Please would the proponent advise how much noise attenuation the bubble curtain (used in 1996 for the construction of the AFRF) had achieved, and whether the ten observed adverse reactions of the dolphins (doubled swim speeds during percussive piling, section 7.6.5.7) occurred during unmitigated or attenuated pile driving activities.

The bubble curtain used for the AFRF in 1996 achieved a reduction in noise of 3-5 dB (at least). It should be noted that the same noise level reduction must be achieved for the PAFF. Although increased swim speeds were recorded even during the use of the curtain, it should be noted that these levels of noise thus achieved have been shown to have no long term impacts on dolphins, based on the extensive monitoring conducted for the AFRF. Since the curtain did strongly reduce ambient noise levels and hence the overall noise impact, the short term effect on swim speeds of dolphins was considered as an acceptable residual impact.

Comments

3b Section 7.2.2 states that, "construction of the pipeline and PAFF berthing jetty will not be approved unless it can be demonstrated that no unacceptable environmental impacts will result to the dolphins". As such, would the proponent please provide substantiating evidence demonstrating that the Chinese White Dolphins will not be adversely impacted by [underwater] noise levels of 152-162 dB within 300 to 500 metres of the pile driving activities (section 7.8.2.5).

4a Dredging Impacts

Please would the proponent advise if the cumulative impacts of the dredging for the pipeline and the proposed dredging of the Tonggu Channel have been assessed. If so what are the results of the assessment? If not, please explain why the cumulative impacts have not been assessed?

Responses

The levels of noise attenuation proposed for the PAFF were based on the extensive studies conducted during the AFRF construction that showed the only short-term effects associated with piling were increased swim speeds. Note that dolphins still approached the area even during piling (to within 300m) and there was no significant impact on abundance, degree of change in direction or surfacing. Provided that the noise mitigation measures (together with the other extensive mitigation tools are implemented as presented in Section 7.8.2) no adverse impacts are predicted to dolphins (Jefferson, pers. comm.).

The programming for the implementation of the Tonggu Channel is unclear and as such this project is not considered to be committed works at this time. In addition, the water quality modelling has predicted that the plumes that would be generated by the PAFF pipeline dredging are unlikely to spread as far as the proposed alignment of the Tonggu Channel because the latter is some distance away. The dredging works for the PAFF pipeline are estimated to be on-going for a very short period of about 1 month and given this and the distance factor, the potential for any overlap in the projects is unlikely. In addition the direction of the tidal currents in both areas is approximately North-South and as such, even if dredging were to be concurrent, there would be no intermingling of silt plumes. Notwithstanding, the EIA has determined that the water quality impacts are not significant and that the Water Quality Objective will be complied with at all times. No cumulative impacts are predicted for other projects on-going concurrently in the closer study area and this conclusion has been backed up by a wealth of monitoring data. As such we would conclude that none should be expected with the dredging of the Tonggu Channel should this occur at the same time.

Comments

4b Section 7.8.2.8 recommends a dolphin exclusion zone of 250m radius around the dredger for the laying of 400 m of pipeline within the Sha Chau & Lung Kyu Chau Marine Park. Please would the proponent explain why no similar mitigations are proposed to the laying of over 4 km of pipeline from Tuen Mun Area 38 to the boundary of the marine Park – noting that the area around the PAFF is “relatively highly utilized” (a relative density index of ~22-23 dolphins per kilometer square, compared to 8.7-17 in each kilometer squares off Sha Chau, section 7.6.5.8)?

5a Dolphin Monitoring

The recommended pre- and post-construction dolphin monitoring would only be 28 days prior to construction activities, and 28 days after cessation of construction (section 7.8.2.18). However as noted above, construction will take place over several years, and dolphin distribution shows seasonal variation (section 7.4.8.4). In addition, influx of individual dolphins following temporary avoidance of construction activities seemed to have occurred only after some months to years (section 7.7.3.4). As such would the proponent please explain why 28 days pre- and post-construction monitoring is considered adequate?

Further it is recommended that suspension of works is to be triggered by “significant increase in dolphin mortality immediately following the beginning of construction work” (section 7.1.1.2) – although apparently no dolphin mortality monitoring programme has been proposed. Since outright death is highly unlikely (unless for catastrophic events) and chance stranding underestimates mortality, would the proponent please explain why the trigger level is considered adequate for protection of the Chinese White Dolphin populations.

Responses

Please note the response above on the lack of evidence that dredging has any impact on dolphins. The dolphin exclusion around the dredger was not considered absolutely necessary (Jefferson, pers. comm) and was only recommended for the Marine Park as the park was designated largely to protect the dolphin population inhabiting this location. As such, it was considered necessary to be highly conservative in our approach to minimising disturbance to dolphins within the Marine Park boundary.

Please note that the dolphin monitoring of 28-days is only recommended for piling activity that will take place over only 60 days and our proposal for monitoring is based on experience gained from work on the AFRF (Jefferson, pers. comm.). Although 28-d post construction monitoring is required, should abundance patterns be significantly different to pre-construction (after taking into consideration the seasonal patterns of abundance) then a further 28-d of monitoring will be required. Please note that a specification will be written at the detailed design stage covering the aforementioned points.

Suspension of works is required should the necropsies provide evidence of acoustic injury. Although this is highly unlikely, these further measures, additional to the suite of mitigation measures presented in Section 7.8.2 are recommended as further checks on the efficacy of the mitigation measures in place and thereby afford further protection to the dolphin population.

Confirmed Minutes of the 72nd Meeting of the Environmental Impact Assessment Subcommittee of the Advisory Council on the Environment held on 8 July 2002 at 4:00pm

Present:

Professor LAM Kin-che, JP (Chairman)
Mr. Otto POON (Deputy Chairman)
Mr. Barrie COOK
Professor Anthony HEDLEY, BBS, JP
Mr. Peter Y C LEE, SBSst.J
Mr. LIN Chaa-ming
Mrs. Mei NG
Dr. NG Cho-nam
Miss Alex YAU
Miss Petula POON (Secretary)

Absent with Apology:

Dr. HO Kin-chung

In Attendance:

Mr. K.S CHAN	Acting Assistant Director (Environmental Assessment & Noise), Environmental Protection Department (EPD)
Mr. C C LAY	Assistant Director (Conservation), Fisheries and Conservation Department (AFCD)

In Attendance for Agenda Item 1:

Mr. B S CHOW	General Manager, Aviation Logistics, Airport Authority (AA)
Mr. Amin EBRAHIM	Group Manager, Aviation Logistics, AA
Mr. Bill ROBERYTS	Civil Engineering Manager, AA
Mr. Martin PUTNAM	Assistant Environmental Manager, AA
Ms Agnes LIU	Communication Officer
Mr. Steve V Jones	Director, Mouchel Asia, Ltd (MAL)
Ms Helen COCHRANE	Associate Director, MAL
Dr. Shaun Nicholson	Senior Environmental Scientist, MAL
Mr. Simon Hui	Principal Environmental Protection Officer (Environmental Assessment & Audit), EPD

Agenda Item 4 : Permanent Aviation Fuel Facility
(ACE Paper 12/2002)

9. A Member pointed out that the selected routing of the submarine pipeline would intrude into a marine park in the region and strictly speaking did not comply with the precautionary principle of environmental impact assessment that avoidance should come before mitigation. However, since the selected option would cause less environmental impact compared with other alternative options, it was accepted on its own merits. The project should not be taken as a precedent and other projects should still follow the principle of avoidance first, to be followed by mitigation and compensation.

10. In response to the Chairman's enquiry, Mr. C C Lay confirmed that the project had been submitted to the Country and Marine Parks Board and had obtained the latter's endorsement.

11. In response to a Member's comments on the effectiveness and reliability of visual monitoring of dolphin, Mr. C C Lay said that according to experience, visual monitoring was a very effective method to ensure that no dolphin would appear within the dolphin exclusion zone. There would be trials on using spot acoustic monitoring for three days in the first week of piling so as to confirm the effectiveness of visual monitoring.

12. A Member said that he had no specific comments on the project which in his view was a result of compromise and as such would never be totally satisfactory. The area where the tank farm was located was an area devoted to industrial development. As far as risk was concerned, he views was that if the existing facilities worked satisfactorily, it would give some indication about the operation of the future facility.

13. In response to a Member's comments on protecting dolphins, Mr. C C Lay said that according to long term monitoring, there was no indication that the number of dolphins were decreasing nor were there signs that the dolphin population was moving westbound. The number of dolphin at the Pearl River estuary was estimated to be more than 1,000. The dolphins had clearly adapted to the operation of the existing facilities.

14. In reply to a Member's enquiry, Mr. C C Lay informed the meeting that according to information available, the Mainland authority had designated the core area of the dolphin sanctuary at East Sha Chau area as a nature reserve/dolphin sanctuary at a provincial level and was in the process of upgrading it to a national level. (The project proponent joined the meeting at this juncture.)

15. The Chairman welcomed the project proponent team and invited Mr. Chow to brief the meeting on the EIA report.

The operation of the existing facilities

16. In response to the Chairman's enquiry, Mr. Amin Ebrahim said that the existing facilities operated smoothly. There had been no leakage at all during the operation of the facility in the past five years. As for impact on marine ecology, Mr. Martin Putnam said that the dolphin-monitoring programme undertaken before, during and after the construction phase of the Aviation Fuel Receiving Facilities (AFRF) showed that dolphin abundance had returned to pre-construction levels. It indicated that any impacts on the dolphins were short-term.

17. A Member enquired about the possibility of minor dripping of fuel during discharge of aviation fuel from vessels. Mr. Bill Roberts explained that although dripping at the discharge

connection could occur, there were catch-trays put underneath the connection between the vessel and the jetty to collect dripping and prevent fuel from falling into the sea. Mr. B S Chow added that the smaller number of vessel movements involved in the operation of the new facility would minimize the frequency of such incidents.

Methods used for selecting and evaluating the alignment of pipelines

18. A Member asked about the weighting given to risk, fishery assessment, cumulative impacts, etc. apart from seabed configuration in selecting and evaluating the routing of the pipelines.

19. Mr. Steve Jones explained that they had to avoid routing the pipelines through areas which were not feasible, i.e. a route through the contaminated mud pits at East Sha Chau (northern corridor) and a route around the north-east of the airport where there were a number of cables in the seabed (eastern corridor). Placing a pipeline in those locations was undesirable in environmental and engineering terms. Furthermore, in areas where there were already submarine electric cables, the co-existence of fuel pipelines and electrical cables would induce natural corrosion of pipelines thus posing environmental risk. After eliminating eastern and northern corridors, the western corridor was the only area found to be feasible for locating the pipelines. Two pipeline options in the western corridor were assessed in terms of risk and operational effects. The present option was selected because of, inter alia, the smaller quantity of dredging required and a lesser impact on dolphins.

20. Ms. Helen Crochrane supplemented that weighting had been adopted for evaluating potential PAFF sites but not for assessing the routing of the pipelines. The assessment of the latter was a strict comparison between the perceived impacts of the two pipeline options on dolphins using, for example, Tom Jefferson's index system. Mr. Amin Ebrahim added that the initial selection of the pipeline corridors was qualitative but the two options for the pipelines in the western corridor were assessed by means of a quantitative approach.

Efficacy of the bubble jacket

21. A Member remained to be convinced that the bubble jacket which was subject to test would adequately protect dolphins that frequented the project site

22. Dr. Shaun Nicholson explained that the proposed bubble jacket was based on the bubble curtain used during construction of the AFRF but had been modified to overcome problems posed by deep water and stronger currents present near Tuen Mun Area 38. The commitment in the EIA was that the bubble jacket would provide the same, if not better, noise attenuation to that provided by the AFRF bubble curtain. It would aim to achieve at least a 3-5 dB reduction in noise. The design of the bubble jacket would be undertaken at the detailed design stage.

23. In reply to the Chairman's enquiry, Mr. Amin Ebrahim said that bubble jacket or bubble curtain had not been used elsewhere in reducing under water noise. But the experts they had contacted, including dolphin acoustic experts, were optimistic that the bubble jacket would achieve the specified noise attenuation.

24. A Member was concerned about the impact of underwater noise on dolphin behaviour and asked whether there had been long term monitoring on the behaviour of dolphins after the construction period of the AFRF project. Mr. Steve Jones said that the consultants had conducted two six months monitoring for the AFRF project but there was no long term monitoring by AA after the facilities had started operation. However, AFCD, with Tom Jefferson's involvement had continued the long-term dolphin research effort since the

construction of the AFRF.

Effect of piling noise on dolphin food source

25. A Member pointed out that underwater noise affected not only dolphins but also the food source for dolphins.

26. On the effect of piling noise on dolphin food sources (e.g. fish), Mr. Steve Jones explained that the consultants had taken that into account in the AFRF project as well as the present EIA. Dr. Nicholson pointed out that dolphins also fed on other kinds of marine life such as squid, and neither squid nor fish were as adversely affected by noise impacts as dolphins. The fact that there was no long-term impact on dolphin abundance arising from the AFRF project showed that the effect of piling noise on dolphin food sources had been negligible and short term. Otherwise the dolphins would not have returned.

27. Mr. Steve Jones said that the bubble jacket was likely to achieve substantial improvement over the bubble curtain. When the bubble jacket under development, was confirmed to be successful, it could become a standard in Hong Kong in underwater noise attenuation.

Alternative piling methods

28. On alternative piling methods, Mr. Bill Roberts pointed out that bored piling was a feasible alternative but using it for the construction of the jetty would take a much longer time from an engineering point of view and might not be preferable over percussive piling in terms of overall environmental impact. To allow the boring equipment to operate, a casing must first be percussively driven into the seabed. In addition, to socket the pile into bed rock would require the use of a chisel which also produced percussive noise impacts. The longer construction period would extend the duration of potential ecological impacts and make it very difficult to avoid the peak calving season.

29. Mr. Martin Putnam reminded the Subcommittee that the AFRF project had also utilised percussive piling and, before deciding on it, a panel of dolphin experts had been consulted, including an expert on underwater acoustics. They agreed that the benefits of a shorter construction period making use of percussive piling outweighed the disbenefits of additional noise impacts, which could be reduced by mitigation measures.

30. A Member asked whether a more stringent standard in noise attenuation could be set since the bubble jacket would provide the same, if not better, noise attenuation to that provided by the AFRF bubble curtain.

31. Mr. Steve Jones said that they had considered the issue but eventually could not decide what targets they should aim for. Since the detailed design of the bubble jacket would be subject to test, it would not be appropriate to set a more stringent noise target than that specified in the EIA report.

32. Mr. Amin Ebrahim undertook to try to achieve a better level of noise attenuation than 3-5 dB and would submit the results of the noise attenuation test to the Subcommittee for information before piling started.

33. In reply to a Member's enquiry, Mr. Steve Jones said that the target of 3-5 dB must be achievable.

Acoustic decoupling

34. A Member pointed out that the barge on which the piling equipment was installed might act as an amplifier for the piling noise. Mr. Steve Jones explained that to address the problem, the contractor would insulate the steel frames, generators and all other noisy equipment on the barge so that they were acoustically decoupled. Specific decoupling measures would be worked out in the detailed design stage. Mr. Bill Roberts added that the contractor had already started to consider ways of decoupling by introducing an acoustic barrier on the lifting equipment for the piling hammer.

Sediment plume modeling

35. A Member expressed concern about the accuracy of the sediment plume modeling of the project having regard to the fish kill in Ma Wan in connection with the Penny's Bay project.

36. Mr. Steve Jones explained that they have reviewed the water quality modeling for the Penny's Bay project and considered that the results were reasonably accurate. The accuracy of modeling depended largely on the grid size. With the advance in computing power, a finer grid size had been used for modeling in the PAFF EIA. The present modeling would be more accurate than that for the Penny's Bay project. Furthermore, the current movements at Sha Chau area were much less complex than in the Ma Wan area and hence the uncertainty would be less.

Water quality monitoring points

37. A Member expressed concern about the adequacy and the distribution of water quality monitoring points for environmental monitoring and auditing purposes. In response, Ms Helen Crochrane explained that based on the result of the sediment plume modeling which showed that the water quality would be within the water quality objectives, no monitoring was in fact required. However, since the project was within a marine park, the proposed monitoring points would target the dredging in the marine park but not along the entire alignment of the pipelines. Also bearing in mind that the dredging work within the marine park would last for only a few days, the proposed number of monitoring points would be sufficient.

38. A Member commented that the proposition of monitoring the dredging along the section of the pipeline within the marine park but not the rest of the pipeline was unscientific. As far as the protection of dolphin was concerned, one would accept that either the dredging would not have impact on the dolphin and therefore no monitoring was required or that dredging along the whole section of the pipeline should be monitored. Thus, to allay Members' concerns, Mr. Amin Ebrahim made a commitment that the project proponent would put in more water quality monitoring points along the pipeline route.

Operational safety during typhoon

39. In response to a Member's enquiry about the operational safety of the facility during a typhoon, Mr. Bill Roberts explained that at or before typhoon signal no. 3 was hoisted, tankers would go offshore and would not stay at berth. Hence, there would be no question of a tanker incident during a typhoon.

Environment Management System

40. A Member suggested the project proponent adopting an environmental management system to ensure that the mitigation measures were implemented. Mr. Steve Jones informed

the meeting that contractual obligations required the contractor as well as the operator of the facility to put in place an environmental management system to ensure that the proposed measures in the EIA report, including the testing of the bubble jacket, would be implemented.

41. Mr. Martin Putnam added that the construction contractor of the project had been certified under ISO 14001. The project would fall under that certification.

42. A Member expressed concern about the impact of mud dredging and possible contamination on fishery resources. He also asked whether there would be compensation for affected fishermen. Mr. Amin Ebrahim clarified that the project consultant had worked on a number of projects in the same area and were highly familiar with the level of sediments contamination in the area that would be affected by the pipelines. The sediments to be disturbed by the project were not contaminated. As for the contaminated mud pits at East Sha Chau, a risk assessment on the contaminated mud pits on dolphins and fishery resources had already been undertaken under a different project and the result was that there was no significant risk on fishery resources. The PAFF EIA fisheries assessment had made the same conclusion.

43. Mr. Steve Jones added that the fish culture zone at Ma Wan was quite far away from the project. It was unlikely that the project would have any impact on the Ma Wan fish culture zone.

44. Mr. Amin Ebrahim informed the meeting that the project would be gazetted under the Foreshore and Seabed Ordinance around October 2002. Affected fishermen could lodge objections within two months after the gazette. According to the Ordinance, the project proponent, not the Government, would be required to compensate the affected fishermen if necessary. The compensation would be arranged through AFCD. Mr. Bill Roberts added that the fishermen would be notified through the Marine Department when dredging took place.

Cumulative impacts

45. The Chairman referred to public comments on cumulative impacts of the project and sought clarification from the project proponent. Mr. Amin Ebrahim informed the meeting that the Submarine Cable Landing installation project between Tuen Mun and the airport had already been completed. Ms Helen Crochrane added that the three reclamation projects in conjunction with the widening of Castle Peak Road would be completed before 2003 whilst the dredging of the present project would not start until 2004. Also, the New Contaminated Mud Marine Disposal Facility at Airport East/East Sha Chau Area would not start until 2006. The conclusion was that an issue of cumulative impacts did not exist.

Fuel spillage from the tank farm

46. In response to public concern about the risk of fuel spillage from the tank farm, Mr. Steve Jones indicated that the tank farm would be bunded so that any fuel spillage would not go outside the tank farm boundary on land.

Site for the PAFF

47. In response to the question about the siting of the PAFF at the airport, Mr. Bill Roberts explained that vessels carrying aviation fuel to the jetty would require certain depth of the seawater. The airport was not suitable for locating the jetty because of the shallow water there. Height restriction at the Airport also made it impossible to accommodate vessels at the

jetty.

Extension of the period to avoid full calving season 48. A Member enquired about the possibility of extending the non-piling period to avoid a longer calving season (April to August) than just the peak calving season (April to June). In response, Mr. Amin Ebrahim pointed out that though actual piling lasted for only 60 days, a lot of preparation work was required before piling. Extension of the period to August would reduce the working time to only seven months and would affect the piling work. Nonetheless, he agreed to consider the proposal when the works programme was better defined.

Conclusion

49. After further discussion, the Subcommittee concluded that it would recommend the EIA report to the Council for endorsement with the following proposed 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 5dB

- a. In addition, the results of the bubble jacket noise attenuation trial and test should be reported to the EIA Subcommittee before piling commences; and
- 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.

Fisheries resource assessment

50. As a separate issue outside the purview of the project, a Member requested the Airport Authority to consider conducting a fisheries resource assessment on areas near the project site. In response, Mr. Amin Ebrahim said that the matter had not been raised previously and therefore he could not provide an immediate response. Nonetheless, he agreed to consider the request and provide a response later.

**EIA Subcommittee Secretariat
July 2002**



10/F, Citibank Tower, 3 Garden Road, Central, Hong Kong
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(ACE-EIA Paper 12/2002)

For Advice

Environmental Impact Assessment Ordinance (Cap. 499)
Environmental Impact Assessment Report
Application No.-EIA-077/2002

Permanent Aviation Fuel Facility

Purpose

1. This paper presents the key findings and recommendations of the Environmental Impact Assessment (EIA) Report for the Permanent Aviation Fuel Facility submitted under section 6(2) of the Environmental Impact Assessment Ordinance (EIAO). Comments from the public and ACE will be taken into account by the Director of Environmental Protection when he makes his 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.

Need for the Project

3. At present aviation fuel is delivered to the Hong Kong International Airport via an existing temporary Aviation Fuel Receiving Facility (AFRF) sited off Sha Chau. This facility does not have the capacity to meet the forecast demand for aviation fuel during the operational lifetime of the airport. The proposed project will replace the existing facility with a permanent one at a preferred location which has been subject to a site selection study, the findings of which has been presented to ACE members in December 2001.

Description of the Project

4. The proposed project will consist of the following elements:
- An aviation fuel tank farm of maximum 12 tanks with ultimate capacity of 420,000m³, to be located at Tuen Mun Area 38
 - a jetty with two berths, which will accommodate vessels up to 80,000 dwt;
 - 500mm diameter twin submarine pipeline about 4.8 km long from the tank farm to the facility at Sha Chau;
 - on site operation facility including office

The location of the facility and the submarine pipeline are shown in Figure 1

5. Two elements of the Project, namely the fuel tank farm and the twin submarine pipeline constitute Designated Projects under Item L.4, Item B.1 and Item H.2 of Schedule 2 of the Environmental Impact Assessment Ordinance: i.e:

- L.4: A storage, transfer and trans-shipment of oil facility with a storage capacity of not less than 1,000 tons*
- B.1: An Airport (including its runway and the development and activities related to aircraft maintenance, repair, fueling and fuel storage, engine testing or air cargo handling)*
- H.2: A submarine gas pipeline or submarine oil pipeline.*

Characteristic of the Selected Option

6. The tank farm would be located at a site in Tuen Mun Area 38, which is in a heavily industrialised setting. The nearest residential development is over 2km away and the use of this site will avoid the need for land reclamation thus minimizing the potential impact that could arise from reclamation on residents, the marine water quality and ecosystem in the vicinity.

7. Aviation fuel would be transported to the airport via the twin submarine pipeline to the existing facility at Sha Chau and then to the Hong Kong International Airport via the existing pipeline. The alignment of the twin pipeline is the shortest amongst all the options considered and it would run mainly across the existing Urmston Road navigation channel, which has been previously subject to maintenance dredging. By adopting such an alignment, the impact on marine water quality and ecology would be reduced. Hence it constitutes the most environmentally preferred alignment amongst all other options studied.

Specific Environmental Aspects to Highlight

8. The major environmental issues identified for the Project are: marine ecology, water quality, fuel spills and hazard to life:

Water Quality and Marine Ecology

9. The project will involve dredging, pipelaying and backfilling in open waters. Water quality modeling demonstrates that sediment released to the water column is likely to settle rapidly and no adverse residual impacts would be expected. The study area is frequented by Chinese White Dolphins. This species is very mobile and would likely to avoid areas subjected to general water quality and marine traffic disturbance. The study recommended a set of mitigation measures including the use of a bubble jacket for the underwater piling for construction of the jetty, decoupling of noisy activities on the barge with the piling works, setting up of dolphin exclusion zone during piling and dredging works to avoid disturbance to the dolphins. With such mitigation measures in place, change to the dolphin population within the study area as a result of implementing this project is not expected.

Fuel Spills

10. From the experience of operating the existing temporary facility with the associated pipeline to the Airport, there was no record on any fuel spills. For the proposed facility, mitigation measures including containment of all fuel tanks in a bunded area, installation of shut off valves within the wider site storm drainage system, provision of leak detection system for the pipeline, installation of automatic shut-off system will be provided to minimize the risk of fuel spillages. Also a spill response plan would be put in place before the commissioning of the facility. With all the mitigation measures in place, the fuel spill impacts would be kept to a minimum and no adverse residual impacts are predicted.

Hazard to Life

11. A consequential risk analysis has been carried out to assess quantitatively societal risks and individual risks to life associated with predicted worst-case events. The EIA concluded that risk from hazards at the tank farm, jetty, marine approach and rupture of the submarine pipeline all lie within the acceptable range with mitigation measures in place, including the use of tugs, use of pilots aboard every vessel, restricting the velocity of the vessel approaching the jetty, and provision of stop-valve at the stormwater system at the tank farm.

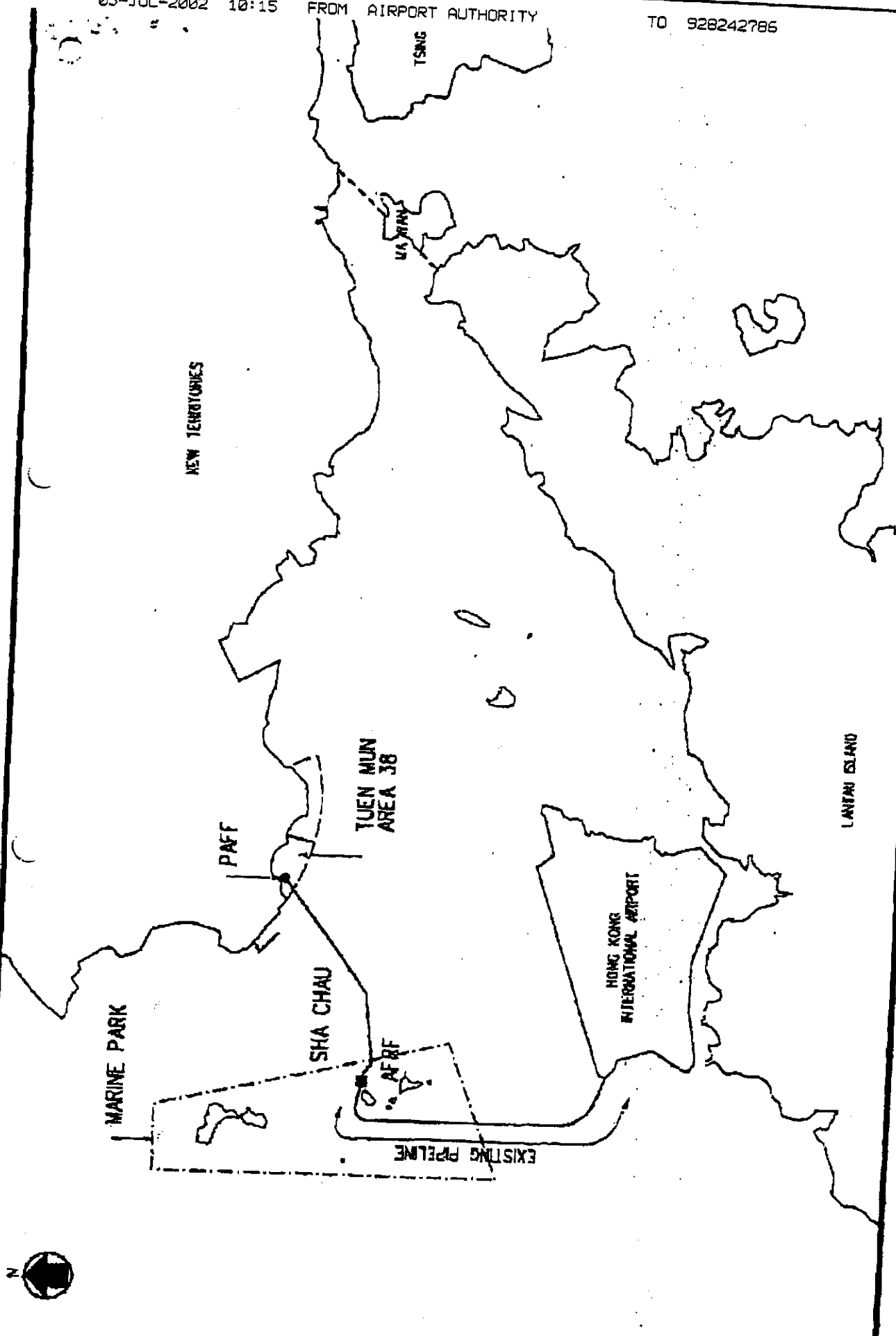
Environmental Monitoring and Audit (EM&A)

12. An EM&A programme has been proposed in the EM&A Manual submitted together with the EIA report and included a detailed Implementation Schedule. For those elements of the project that are Designated Projects, the EM&A requirements will be enforced as Environmental Permit conditions.

Comments received so far from the Public during the Public Inspection Period

13. AA has made the EIA report, the EM&A Manual and the Executive Summary available for the public to comment under the EIAO on 14 June 2002. Members will be briefed on any comments received from the public at the meeting.

**Environmental Assessment and Noise Division
Environmental Protection Department
June 2002**



Location of the Permanent Aviation Fuel Facility and the Associated Submarine Pipeline

Figure

Comments

Comment 1

We are against the proposal of developing a permanent aviation fuel facility (PAFF) at Tuen Mun Area 38 because of the following reasons:

According to the Planning Statement, the site for PAFF is very close to the Castle Peak Power Station and a river trade terminal. In case of accidents or terrorist attacks, there will be a great impact on the nearby facilities and even an indirect impact on people's livelihood. If there is fuel leakage, the high bund can still contain the fuel within the site. But if there is strong wind, the residents of Butterfly Beach and Lung Kwu Tan nearby will definitely be affected.

Responses

A risk assessment was carried out for the PAFF tank farm. This is given in Chapter 10 of the EIA Report. The results, with the mitigation measures in place, show that there are no impacts on neighbouring land users in the unlikely event that an incident occurred at the tank farm, because:

- ◆ Fires (whether originating from a terrorist attack or other event) would not extend on land beyond the tank farm site boundary.
- ◆ The shielding effect of the dense black smoke generated by an aviation fuel fire means that the impact of such a fire does not extend beyond a few metres from a fire.

Thus, because there are no impacts on land beyond the site boundary, workers at the Castle Peak Power Station and/or the River Trade Terminal will not be at risk from the proposed PAFF. The particular references in the EIA Report regarding the above are 10.6.2.24, 10.9.2 and 10.9.3.

Comments

Responses

A comprehensive risk assessment of all aspects of the PAFF has been undertaken. In respect of the tank farm, the EIA has shown that the hazards associated with tank fires and bund fires would not extend beyond the site boundary (See section 10.9.2) and would not affect workers in the adjacent facilities. Only in the rare event of the fire followed by bund overtopping would the hazard extend into the sea due to discharge of fuel through the stormwater drain. Table 10.28 shows that the frequency of such an event is very low and that the effect distance would only be 42m, meaning that the impacted area would be confined to within a short distance of the site and would not affect the residents of Butterfly Beach and Lung Kwu Tan. In addition, should the fuel be ignited, it would likely burn out in a very short period of time (10.6.3.4). In all cases, risks have shown to be low and acceptable (Figure 10.7, 10.8)

The landscaping measures can only be used to beautify the tanks. They do not have much shielding effect if there are accidents or explosions.

It is true that landscaping measures do not have any shielding effect other than visual shielding. However, since there are no impacts to workers outside the tank farm as described above, with or without landscaping, there is no requirement for additional shielding.

Comments

A considerable investment is needed in laying the proposed twin submarine pipeline with a diameter of 500mm. In case of fuel leakage resulted from seabed accidents or whatever, are there any safety measures or emergency equipment to handle the situation?

Responses

The twin submarine pipelines are buried in the seabed to depths of 6.5 metres as it traverses under the busy Urmston Road Marine traffic channel and no less than 3 metres in shallow, less trafficked waters (3.4.2). The pipeline is protected at all points by layers of sandfill and rock armour specifically designed to cover the possibility of anchors being dragged over the pipeline. The likelihood of leakage from such a pipeline is, from worldwide historical information, an extremely unlikely event. However, in the most unlikely event that, by some means, a leak occurred, the following sequence of events is immediately triggered: -

- ◆ The flow of fuel is shut down.
- ◆ Preset Procedures for containment and clean up are implemented.

In any event the aviation fuel disperses rapidly, disappearing completely within a short period.

We clearly understand that the Hong Kong International Airport is very important to the economy of Hong Kong but we do not see in what way this is related to the development of a PAFF at Tuen Mun. Would it be more cost effective to have a PAFF near the airport so that it is not necessary to lay the submarine pipeline?

There is no possibility of locating the PAFF near the airport; the reasons are given in Section 2.1.1.10 of the EIA Report.

This letter serves as a formal written objection to the proposal of developing a PAFF at Tuen Mun. We hope that your department can consider another site for the facility.

Comment 2

??? would like to lodge an objection to the above-captioned designated project under EIAO for the following reasons :

Comments

1. The EIA report of this project has not addressed the cumulative environmental impacts, regarding especially ecology and fisheries, together with other projects such as
 - ◆ Submarine Cable Landing Installation at Tuen Mun for HGC Optical Fibre Submarine Cable System between Tuen Mun and Chek Lap Kok.
 - ◆ Contract No. HY/99/18 Castle Peak Road Improvement between Sha Tseng and Ka Loon Tsuen, Tsuen Wan : Construction of Reclamation and Associated Seawall at Tsing Lung Tau
 - ◆ New Contaminated Mud Marine Disposal Facility at Airport East/East Sha Chau Area

Responses

In respect of the 3 projects identified it can be confirmed that the Submarine Cable Landing installation project at Tuen Mun had been completed and the three reclamation projects associated with the widening of Castle Peak Road near the alignment of the pipelines would be completed before the end of 2003 whilst the dredging of the PAFF would not start until 2004. Also, the New Contaminated Mud Marine Disposal Facility at Airport East/East Sha Chau Area was not programmed to start until 2006 (6.9.5). As such no cumulative impacts with these projects will occur.

2. Although the report recommends to follow Maritime Oil Spill Response Plan in case of oil spills, full assessment of the adverse environmental impacts of oil dispersants or other substances used for treatment of oil spill should be conducted. Such substances may be even more toxic than the spilled petroleum.

While reference is to be made to the Maritime Oil Spill Response Plan, the Franchisee will be required to prepare a PAFF specific response plan. The existing response plan in place for the AFRF does not allow the use of dispersants and it is the intention that this requirement would be put into the PAFF plan. The EIA recommends the use of absorbent material only (6.7.2.2) and in addition, it is a requirement of the design phase EM&A, that the emergency spill response plans be audited by an independent body prior to construction to ensure that such recommendations have been taken into account.

Comments

3. Regarding Appendix A(iv) – *Qualitative Environmental Assessment of Alternative Sites*, the weighting factors and the marks given seem to be arbitrary. Such methodology was criticized as biased and not scientific by some green groups in the case of proposed Lantau North-South Road Link. Although this methodology is used only for assessing environmental performance of different site options in this project, it should not be encouraged to be used in EIA process.

Comment 3

Objections

1. This EIA report is but a pile of rubbish because it is only an assessment of Area 38 with no regard to the impact of the facility on the environment and the ecology.
2. Area 38 is situated in the southwest of Butterfly Bay. The prevailing wind in most of the year is from the southwest. The unpleasant smell from the oil farm will directly affect more than 100,000 residents of the Butterfly Bay area.

Responses

While in some cases professional judgement is applied to the weighting and marking system, this process is undertaken by environmental professionals with extensive experience of environmental assessment in Hong Kong. In accordance with standard procedure, the comparative assessment of alternatives is undertaken at a broader level of detail and this process is undertaken before the main EIA under the EIAO, which is project-specific. Notwithstanding, the selection of Tuen Mun Area 38 on this basis is so convincing that even if the weightings are changed as sensitivity tests, this site is still preferred (see scores in Table A32 and A33 of Appendix A(iv)).

The EIA has been undertaken in accordance with the EIAO Technical Memorandum and has assessed impacts in the study areas defined by the EIA Brief and included any assessment of impacts associated with the facilities at Tuen Mun Area 38 as well as the pipeline to Sha Chau.

A full odour assessment has been undertaken and based upon the worst case modelling of the ultimate case in 2040, the predicted odour concentrations are very low, even at the site boundary and well within the standard of 5 odour units (see Section 4.6.3 of EIA and Figure 4.4 to 4.7). The odour threshold for aviation fuel is equivalent to 2 odour units and the values in Table 4.5 of the EIA show that odour at the boundary of the site will be an order of magnitude lower than this. As such, there will be no impact on residents in Tuen Mun or Lung Kwu Tan village, 2-3 km away.

Comments

3. The oil farm will be situated near the China Light Power Station. In case of accident, Butterfly Bay residents and the facilities nearby, such as the River Trade Terminal, the steel mill and the laundry facility of Hospital Authority, will be affected. It will also affect the provision of electricity by China Light, thus causing electricity supply problem in Kowloon and the New Territories.

Responses

In respect of the tank farm, the EIA has shown that the hazards associated with tank fires and bund fires would not extend to neighbouring sites (See section 10.9.2). Only in the event of a fire in conjunction with bund overtopping could the hazard extend into the sea via discharge of fuel through the stormwater drain. Table 10.28 shows that the frequency of such an event is very low (less than once in a million years) and that the effect distance would only be 42m meaning that the impacted area would be confined to within a short distance of the site and would not affect the adjacent land uses, including the power station. Thus, the integrity of the power supply will not be affected by the PAFF.

Potential effects on the marine population within this area have been assessed (10.6.2.18) and it is shown that all risks are in the acceptable region of the HK Risk Guidelines (Figures 10.7 and 10.8).

4. The waters near Area 38 are frequented by Chinese White Dolphins. Works in the area will disturb dirty particles in the seabed which in turn may cause death to the dolphins.

There have been numerous studies in the north-western waters which have provided a wealth of evidence that the material to be dredged is not contaminated. (See section 6.2.5 and specifically 6.2.5.13 of the EIA Report). Notwithstanding, modelling of the generation of silt plume while dredging have shown that suspended solids will be within the water quality objectives (see 6.4.6.17 and 6.4.6.22) and that dredging activities will not cause significant impacts to the Chinese White Dolphins (see 7.6.5.9).

Comments

5. The beaches of Butterfly Bay and adjacent bays will be further polluted.

Responses

The effects on Butterfly Beach have been assessed as part of the EIA. In respect of dredging activities, full compliance with the water quality objectives has been predicted at all times (see Section 6.4.6.1.7 and 6.4.6.2.2 and Appendix E). As such, no significant impacts will occur at Butterfly Beach as a result of the construction of the PAFF. In respect of a fuel spill, the only scenario which has the potential to affect Butterfly Beach is the worst case scenario of a tanker rupture at the jetty in a dry season high mid-ebb tide (see Figures 4.3 to 4.6 in Appendix F). Notwithstanding the extremely low probability of such an event occurring and the fact that, even if the spill was left uncontrolled, the fuel would have disappeared from the area of the beach within approximately 7 hours, the EIA has identified Butterfly Beach as a sensitive receiver for specific inclusion in the Spill Response Plan (see 11.4.4) and as such the beach would be protected before any effects could occur.

6. It was mentioned in the EIA report that the injury rate was low in oil farm incidents in other countries. However, it was not mentioned whether there were residents in the vicinity. The cases quoted, therefore, cannot be accepted.

The key aspect of the review of historical tank farms is that they demonstrate that major fires in fuel storage facilities are very rare events and did not include a major bund fire. In respect of the fatalities off-site, the proposed PAFF does not have residents nearby, with the closest being 2-3km away. The view from residential areas is also screened by the intervening topography. As fires at storage facilities are usually confined to a small area (impacts from thermal radiation levels only extend some 3m outside the area of the fuel on fire – see Section 10.6.1.2.) the off-site population will not be affected. The examples used demonstrate this.

7. The number of oil tanks in the oil farm at Area 38 will be increased from four to twelve. The increase will aggravate its harm to the lives of residents of Butterfly Bay area.

The hazard assessment has assessed the risks associated with both the 4 tank and ultimate 12 tank scenarios and in both cases, all risks are acceptable (see Figure 10.7 and 10.8). Once again, there are no risks to Tuen Mun residents including those at the Butterfly Bay area.

Comments**Suggestions**

If the Permanent Aviation Fuel Facility is developed at Area 38, the pipelines will run through Sha Chau to the aviation fuel facility at the airport and Sha Chau will become a back-up oil farm.

1. It is suggested to expand the present fuel facility at Sha Chau to meet aviation needs in the future. This will cost less than building another one at a new site.
2. It is suggested to build the permanent oil farm at Sha Lo Wan instead of Tuen Mun Area 38, so that over 100,000 residents of Butterfly Bay at Tuen Mun will not be affected. Sha Lo Wan is near to the airport and scarcely populated.

Comment 4

1. Strong objection to the construction of a Permanent Aviation Fuel Facility at Tuen Mun Area 38.
2. It is because the construction will affect the ecology of the environment, cause air pollution and have serious impact on the endangered Chinese White Dolphins.

Responses

There is no possibility of expanding the Sha Chau facility as shown in the EIA Report under Section 2.1.1.2.

There is no possibility of locating the PAFF at Sha Lo Wan for reasons given in Section 2.1.1.10 and 11 of the EIA Report.

In addition, please note that residents of Butterfly Bay, Tuen Mun are at a distance of 3km from the proposed PAFF and accordingly there is no impact (risk or visual) to residents.

Air quality modelling during both the construction and operational phases has been undertaken (Chapter 4). During the construction phase, predicted dust levels can be controlled to within acceptable levels, with mitigation, at even the closest sensitive receivers (see Table 4.4). Fugitive emission during the operational phase will be minimal and odour modelling has shown that only very low concentrations, which are well within the odour threshold for aviation fuel and odour standards, would occur (see Table 4.5). Refer to Comment 3, item 4 on the Impacts on Chinese White Dolphins.

Comments

3. Butterfly Bay, the only bay in Tuen Mun where swimming is possible, will be polluted even more seriously.
4. Hundreds of thousands of residents of Tuen Mun will feel their lives jeopardised.

Responses

See response to Comment 3, item 5.

The risk assessment has concluded that impacts will not extend to neighbouring industrial areas and will be contained within the site (10.9.3) and that risks associated with the PAFF are low and within the acceptable region of the HK Risk Guidelines (see Section 10.7.3.1 and 10.7.3.4)

Comment 5a

The following comments are submitted by ??? on the EIA Report (hereinafter referred to 'the Report') of the proposed PAFF project (hereinafter referred to 'the Facility') in accordance with the invitation for comments by the Public. These are grouped into five categories, namely, marine traffic risk, oil spill and control, fire risk, emergency response and coordination, and utility services in the neighbourhood.

1. **Overall**

While ??? considers that the recommended control measures are reasonably sound, it is very important that these measures are properly incorporated in the final design, and, implemented in the operational phase. Therefore it is prudent that the Environmental Permit issued should encompass the commitments made in the EIA Report.

The mitigation recommendations of the EIA will be incorporated into the Environmental Permit. In addition, the EIA has recommended comprehensive Environmental Monitoring and Audit (refer to Chapter 15 and the EM&A Manual which is a separate document) for the project, covering the design, construction and implementation of the project. The EM&A includes a design phase audit to ensure that control measures recommended in the EIA are properly integrated into the design.

Comments2. Marine Traffic Risk

The operation of CAPCO (a joint venture between CLP Power and Exxon Mobil Energy)'s Castle Peak Power Station is essential to the supply of electricity in Hong Kong and the primary fuel, coal, is delivered by sea. Vessels carrying coal, of cargo size of up to 140,000 tonnes, are required to run through the Ma Wan Channel in Hong Kong waters before berthing at the jetty of the Castle Peak Power Station. Therefore, traffic congestion in the Ma Wan Channel should be avoided and sea traffic safety be maintained at a high level. In case of emergency situation, e.g. spill and grounding of jet fuel tanker, remediation response needs to be undertaken promptly and effectively. It is preferable that the EIA addresses these issues and recommends safeguard measures.

It would be appreciated if the project proponent could elaborate the likely effects of the following and assess their potential implication on the marine traffic in the region, where appropriate

- The location of the shelter port for the jet fuel tanker during typhoons and extreme weather conditions.
- The navigation route of jet fuel tanker in Hong Kong waters before arrival at the Facility.

Responses

The impact of incidents involving spills from and grounding of aviation fuel tankers has been addressed in the Marine Traffic Impact Assessment (MTIA) and mitigation measure have been proposed therein. The MTIA (which has been accepted by MD) recommends, in particular, that a formal fairway scheme for HKSAR Western waters is prepared, for implementation after 2006. In addition, operational procedures (refer to Section 10.6.2.20) will be put in place to provide prompt responses in the case of incidents. Such procedures will consider the needs of neighbouring industries. In addition, the frequency of movement of aviation fuel vessels (refer to Section 3.5.1) in the Ma Wan Channel will reduce considerably upon implementation of the PAFF because aviation fuel vessels berthing at the PAFF will be larger than those which use the existing facility at Sha Chau (5000 dwt). By 2005 fuel would be received at a frequency of 3 times per day at Sha Chau, some five times more frequent than vessels to the PAFF.

In response to queries requesting elaboration on the potential implications of marine traffic in the area: -

- 3, in line with standard practice.
- Aviation fuel tankers will put to sea upon the hoisting of Typhoon Signal No. 3, in line with standard practice.
- Aviation fuel tankers arrive in Hong Kong via the East Lamma Channel and then follow the Ma Wan Channel and Urmston Road before arrival at the PAFF jetty.

Comments

- The risk of mooring failure of the jet fuel tanker from the Facility's jetty that may lead to damage to the other jetties in the neighborhood as a result of a drifting vessel.
- The likely impact on the port development in Tuen Mun of the additional traffic to the Facility and, hence marine traffic risk in nearby waterways.

Responses

The risk of mooring failure is reduced by the departure of tankers upon hoisting Typhoon Signal No. T3. In addition, the design of the mooring facilities will be to international standards (OCIMF Guidelines). The risk of mooring failure is thus low. Nevertheless, of the hazards considered in the EIA risk assessment (Chapter 10) striking (Striking involves a drifting vessel (which probably lost control while in the channel) impacting the aviation fuel tanker while it is berthed) and impact (Impact is defined as a vessel running into a dock wall or a jetty) events take into account mooring failures and their consequences. The consequence of a mooring failure resulting in damage to other jetties will be exactly the same as a striking or impact event, both have been considered in the hazard assessment. In particular, see Sections 10.4.5.7 and 10.4.5.8 of the EIA.

The impact of the PAFF will actually reduce the frequency of traffic movement in the Tuen Mun area because the aviation fuel vessels to the PAFF will be significantly larger than those to the existing facility at Sha Chau. (See Section 3.5.1 and refer also to response to comment 5a – item 2). Vessel movements will be five times less frequent when the PAFF is operational.

3. Oil Spill & Control at Sea

Comments

- In the event of grounding of and collision with a jet fuel tanker, heavy oil and lube oil would also be spilled from the tanker body in addition to aviation fuel. The marine impacts of such an incident should be assessed.

Responses

In the event of an incident involving a tanker, the dominant quantity of material being spilled would be the aviation fuel. While other materials would also be spilled the quantities are expected to be minor in comparison. Other oils spilled would also float on the surface and mix with the aviation fuel. As such fuels are heavier than aviation fuel, they would not evaporate as quickly but would still be subject to wind and wave action and previous studies in Hong Kong have shown that evaporation is still substantial (11.2.4). The spills of other oils would also be controlled by the Spill Response Plan in conjunction with the aviation fuel. Given the smaller quantities and the emergency clean-up, environmental impacts from other heavier oils would not be expected to be different from that of aviation fuel.

- In various sections of the Report (e.g. Paragraph 6.12, 11.3.2.5), it is mentioned that oil slick as a result of spill of aviation fuel could spread to an area along the coastline including ??? Castle Peak and Black Point Power Stations. There are concerns that the impacts of such an occurrence on our cooling water intake systems will affect our generating units. As a safeguard, it is prudent that the oil-spill control measures at the jetty of the PAFF, on the barge and along the sub-sea pipe should be effective.

The cooling water intakes for the Castle Peak and Black Point power stations abstract water from just above the seabed, from a depth of about 16 to 18m and about 4m to 5m below sea level respectively. As aviation fuel will float on the surface of the sea, and both intake systems purposely have a low intake velocity, any fuel will not affect the abstraction system or the generating units. Notwithstanding, the Spill Response Plan will define measures to contain and control any spills.

4. Fire Risk

To allow better understanding of the potential fire risk associated with overfilling, it would be appreciated if the project proponent could elaborate.

Comments

- the essential safety features of the tank gauging, alarm and control systems in light of the high tank structure.

Responses

The following points outline various features (refer to 10.3.2) in the design to prevent over filling and damage if over filling occurs

1. The tanks hold aviation fuel with a density of 840 kg per M3 however the tanks are tested with water density 1000kg per M3 therefore the tanks are protected from rupture in the case of overfilling. In addition, there are safety factors built into the design process which reduce the risks of failure to the high standards set by international practice.
2. The tanks are fitted with gauges which, automatically report to the SCADA and alarm at preset levels.
3. The tanks are also fitted with separate High level and High High Level gauges, of which the latter will automatically activate the tank inlet valves and prevent over filling, in addition to causing an alarm on the SCADA.
4. The tanks are also fitted with external visual tank gauges independent of the SCADA for operators to view.
5. In the unlikely event of a spillage due to overtopping, any spill would be retained within the bunded area surrounding the tanks. All equipment in the bunded areas is design for use in hazardous areas, thus reducing the possibility of ignition. Additionally, the drainage system from the bunded area is normally closed to prevent unwanted discharges into the external drainage system.

The tanks vent to the atmosphere with vents on the roof. The vents are sized to ensure that no over pressurisation of the tank occurs and, by virtue of their location on the top of the relatively tall tanks, the vented vapour quickly disperses and will not be noticeable at ground level.

- the measures in the design of the fuel tank including tank roof in minimizing vapor venting and accumulation
- See response above

Comments

- It is essential that the fire protection system complies with recognised standards. In this connection, it would be appreciated if the project proponent confirms the standard with which the fire protection system complies.

Responses

The fire services will comply with the requirements of the Hong Kong Fire Service Department (refer to 10.3.2.13) and will be based on

1. the Institute of Petroleum Hazardous Areas Guidelines
2. the National Fire Protection Association Codes

The fire protection to the tanks will consist of

1. base foam injection to the tank on fire, to extinguish the fire
 2. water spray cooling to adjacent tanks and platforms
 3. a street hydrant system to provide additional fire fighting water
 4. the fire water pumps with 100% standby capacity in case of failure of any of the pumps
 5. in case of power failure, a standby generator capable of supplying all fire fighting equipment will be provided
- the Fire Service Department will have the ability to boost the water supply for fire fighting with sea water, using their fireboat moored at either the jetty or the seawall at TMA 38

5. Emergency Response – Logistic Arrangement and Coordination

It is recommended that notification to the various major industrial neighbors be arranged by the Facility operators should there be any emergency situations, e.g. fire and spill, etc. It is also recommended that some degrees of emergency response coordination be set up with the neighbors in light of the close proximity and the fact that they share some common utilities. Elaboration of these arrangements in the Report would be appreciated.

The needs of the various major industrial neighbours will be considered, and incorporated, in all contingency planning and procedures (refer to 10.6.2.20). These will be prepared in the detailed design stage of development of the PAFF.

Comments**6. Impacts to Other Utilities**

- There are 18 pieces of 132kV underground cables running from ??? Castle Peak / Black Point Power Stations to Tuen Mun outside the new site. These are essential outlet circuits of ??? Castle Peak / Black Point Power Stations supplying electricity to Tuen Mun and Lantau areas, including Chek Lap Kok Airport. The EIA report should mention the risk to utility services like the above and the precautionary measures to be taken during the planning, construction and operational stages.

Responses

There is no risk to cables located outside the PAFF area. The hazard assessment (Chapter 10) assesses the risk posed by the tank farm operations (marine, jetty, submarine pipeline etc) to offsite populations (both on land and sea). The contractor is fully aware of all underground installations and will take the necessary precautions during construction and operation of the facility.

Further the possibility of stray currents have to be taken into account by the specialist designers of the cathodic protection system which will protect the tanks and pipes. The HV currents are AC in nature and though have to be considered, are less of a concern than DC current. Cathodic protection will be addressed in the, detailed design stage.

- The proposed route of the fuel pipeline Option 2 will cross-over our existing 11kV submarine cable connecting between Chek Lap Kok Airport and Sha Chau / Lung Kwu Chau. If this Option is chosen, we will need the pipe installer to demonstrate that ??? submarine cable will not be affected during both the installation stage and subsequent future operation of the pipeline.

Option 2 has not been selected by the EIA. Option 1 is preferred (Section 2.2) and has been recommended. Notwithstanding, the contractor has a responsibility to investigate such matters and thus is fully aware of all submarine installations and will take the necessary precautions during construction and operation of the pipeline, so as to not disturb on-going operations of other facilities.

Comment 6

Comments

I refer to the fax dated 18 June from Tuen Mun District Office in relation to the development of a Permanent Aviation Fuel Facility (PAFF). The proposed site of PAFF is very close to Lung Kwu Tan Village, Tsing Shan Tsuen, Yeung Siu Hang Village and Kau Hui Tsuen. As the government has been developing polluting industries and facilities in Tuen Mun West, the area has become a centre of offensive trades. As a result, the residents of Tuen Mun are under immense psychological pressure. Now the government intends to set up big oil tanks and various oil farm facilities in Tuen Mun Area 38 with no regard to the feelings of the Tuen Mun residents. This will, no doubt, further spoil the image of Tuen Mun. This facility will not only damage the natural environment of the area, but also jeopardize the safety of the villagers nearby because it is not 100% safe. Based on the reasons above and the opinions of the villagers of the area after further consultation, we think it is not appropriate to develop the PAFF of HKIA at Tuen Mun Area 38. We therefore write to express our objection. It is hoped that you will reflect our views to the departments concerned and look for another site for the facility.

Comment 7

In November 2001, the Airport Authority, Hong Kong, (AAHK) consulted the Tuen Mun District Council (TMDC) in regard to the proposed Permanent Aviation Fuel Facility (PAFF) in Tuen Mun Area 38. The Council was of the opinion that the location was not a suitable site for the PAFF. Members of the Council objected strongly and unanimously to the construction of the PAFF at Tuen Mun Area 38 by AAHK.

Responses

A full comprehensive risk assessment of all aspects of the PAFF has been undertaken (Chapter 10). In respect of the tank farm, the EIA has shown that the land based hazards associated with tank fires and bund fires would not extend beyond the site boundary (See section 10.9.2) and would not affect residents who are 2-3km away. Table 10.28 shows that the frequency of the worse case event is very low (less than once in a million years), and would not affect the adjacent land uses. In addition, in the unlikely event that the fuel was ignited, risks are shown to be low and within the acceptable region of the Hong Kong Risk Guidelines (Figure 10.7, 10.8) and this could not affect villagers who are 2-3km away from the area.

Comments

TMDC later learnt that AAHK had submitted the "Application for Permission under Section 16 of the Town Planning Ordinance (Cap. 131)" and the "Environmental Impact Assessment Report on the Permanent Aviation Fuel Facility" (EIA Report) to the Town Planning Board and Environmental Protection Department (EPD) respectively in June this year. With regard to these submissions, TMDC discussed on the proposal of AAHK again at the meeting on 2 July. After discussion, the Council still held that the site was not suitable for the development of PAFF in terms of safety, environment protection and planning, and land use. All in all, TMDC regarded the permanent aviation fuel storage facility as highly dangerous and should be far away from residential areas. It should be built on industrial and commercial land, using oil pipes to transfer oil to the airport. The Council believes, with today's technology, it is feasible to build the pier and the storage facility at different locations. Tuen Mun Area 38 is a site with great potential for development. The establishment of a fuel storage facility will seriously affect the planning development of the land in the vicinity. The piece of land should be reserved for more cost-effective developments, so that investments of the government on the infrastructure of the area will not be in vain. Besides, the water quality, marine ecology and fishing operations should be protected and highly respected. The Council has agreed to set up a working group to follow up the matter.

Responses

In respect of the question of whether the tanks can be located remotely from the jetty, the EIA report section 2.1.1.4 provides reasons as to why the tank farm and jetty must be close to each other.

The EIA report has been undertaken in accordance with the EIAO TM and has assessed impacts including those of safety, water quality and ecology in the study areas defined by the EIA Brief, and considers that development of the PAFF is compatible with the surrounding industries.

Comments

At the meeting of the working group held on 7 July, members of the Council had a thorough discussion on the EIA Report submitted by AAHK. It was found that the report did not include a full assessment of the impacts of the proposed PAFF on the environment which include the impacts on the residents, industries and commerce nearby. For example, the Council learnt that during the assessment process, the consultant did not contact the industrial facilities nearby to understand the compatibility of their operations with the PAFF. Besides, a lot of core problems are not mentioned in the report, such as the buffer zone required between the PAFF and the residential area, the evacuation plan in case of accident and the feasibility and effectiveness of the "dolphin area". Neither could it ensure that the dolphins would not be disturbed. TMDC is of the opinion that EPD should postpone the approving of the EIA Report submitted by AAHK for the following reasons:

1. Impacts on the commercial activities in the vicinity and the safety of residents nearby
TMDC regarded the PAFF as highly dangerous and should be far away from residential areas. It should be built on industrial and commercial land, using oil pipes to transfer oil to the airport. With today's technology, it is feasible to build the pier and the storage facility at different locations. Landscaping cannot remove the actual and potential risks of the fuel storage facility or the anxiety of the residents.

Responses

The hazards associated with the PAFF have been fully assessed (Chapter 10) and the results show that not only is the probability of an event occurring very low, the risk to life is negligible and within acceptable region of the HK Risk Guidelines (Figure 10.7 and 10.8). Tuen Mun Area 38 is zoned on the Draft Tuen Mun OZP as 'OU' (Special Industries Area) and land is reserved for industry which includes uses such as the PAFF. The surrounding land use is also industrial in nature and as such the PAFF would be compatible with these uses (see Section 8.6.1 and 8.6.2).

The quality of the fuel is vital and in order to maintain fuel quality and avoid as far as possible any correspondence to safety, the tank farm must be adjacent to the jetty. Reasons are provided in Section 2.1.1.4

Comments

(i)

Potential risks

The proposed PAFF is adjacent to Shui Wing Steel Mill and close to Castle Peak Power Station and Green Island Cement Plant. The operations of those plants will generate high temperature and workers in the plants are numerous. It will be highly dangerous to store a large quantity of fuel in the vicinity. The Council knows that the neighbouring facilities, including Shui Wing Steel Mill, also object to the development of the PAFF at the proposed site.

(ii)

Impact on the water quality and marine ecology

In the opinion of the Council, the facility will seriously affect the marine ecology of Area 38. The Council also has queries on the feasibility and effectiveness of the creation of a white dolphin area and other measures for the protection of marine ecology.

Responses

A comprehensive risk assessment of all aspects of the PAFF has been undertaken (Chapter 10). In respect of the tank farm, the EIA has shown that the hazards associated with tank fires and bund fires would not extend beyond the site boundary (See section 10.9.2) and would not affect workers in the adjacent facilities. Table 10.28 shows that the frequency of the worst case is very low (less than once in a million years), and would not affect the adjacent land uses. In addition, should the fuel be ignited, risks are shown to be low and within the acceptable region of the Hong Kong Risk Guidelines (Figure 10.7, 10.8).

The extensive ecological and water quality assessment (Chapter 6 and 7) has not predicted any adverse impact following mitigation to either sensitive ecological or water quality at Area 38. Tuen Mun Area 38 is composed of an artificial substrate (reclamation) and waters directly adjacent where the proposed jetty will be located is not considered to be highly utilised by dolphins (Figure 2.5 refers); the benthic habitat and benthos is similar to other locations both in the Northwestern waters (and other locations in HK); and, fisheries are not particularly productive (Section 12.3 and Table 12.1 refers). The piles used to form the jetty provide hard-substrate habitat likely to enhance the soft-bottom mud characteristic of these waters. The mitigation measures, including the dolphin exclusion zone, have been recommended by one of Hong Kong's leading dolphin specialists, largely based on past experience with the AFRF, and have been proven to work.

Comments(iii) Other sites

In the opinion of the Council, AAHK has not considered other sites carefully, for example, considering developing the fuel storage facility at a site far away from residential areas and using oil pipes to transfer oil to the airport, or expanding the present facility at the airport.

Responses

The AAHK have spent nearly 10 years searching for a suitable location for the PAFF and sites all over Hong Kong have been considered. The EIA has provided a full environmental comparison of the identified possible sites (Section 2.1.3). While some of the sites considered have residents that are further away than at Tuen Mun Area 38, none of the other sites were preferred on environmental and other grounds. Notwithstanding, the closest residents are 2-3km away from TMA38 and the EIA as predicted that they will not be affected during construction (dust – Table 4.4, noise – 5.6.2) or operation (odour – Table 4.5; noise – 5.6.5; visual – 8.5.3.7; hazard – 10.9.2).

A jetty cannot be located at the airport for a variety of reasons as detailed in Section 2.1.1.10

(iv)

Impact on the fishing and commercial industries nearby

The proposed site is currently zoned as a “Special Industries Area”. In the opinion of the Council, if a large oil farm is allowed to develop at the site, there will be serious impacts on the environment and the use of land in the vicinity. They include the impact on the land development of the area, such as the expansion of Shui Wing Steel Mill and the development of logistics industries etc. The fishing industry will also be affected by water pollution caused by the facility.

The PAFF facility is compatible with the surrounding land uses. While a land use assessment was not required by the EIA Study Brief, a full assessment of the potential effects on the environment have been undertaken. In respect of the tank farm, the EIA has concluded that impacts during construction and operation would be within acceptable levels and would not affect the adjacent land uses (dust – Table 4.4, odour – Table 4.5, hazard – 10.9.2, visual – 8.11.4.1).

The water quality modelling of dredging activities has assessed both the use of a grab dredger and a trailer suction hopper dredger. Based upon the worst case activities associated with the trailer suction hopper dredger, predicted water quality impacts from suspended solids are within the Water Quality Objectives (section 6.4.6.4 and 6.4.6.17). In addition, the dredging will take place for a maximum of about a month and thus the disturbance to the seabed will be short-term only. A fisheries assessment has also been undertaken and the impacts of the dredging assessed (12.6.2). The conclusion of the assessment is that effects will be short-term and minimal and will not affect fishing operations (12.6.2.7).

Comments

In the view of TMDC, the consultant hired by AAHK did not make sufficient assessment on the risks to the residents in Tuen Mun. Neither did it consider an evacuation plan in the case of an accident. In view of this, TMDC is planning to hire a consultant firm to make an independent environmental assessment on the feasibility of the proposal. It is now looking for a consultant to make the assessment. Based on the reasons above, TMDC hopes that EPD will postpone the approving of the EIA Report of AAHK.

Comment 8

This association, formed by a group of fishermen, is very concerned about the livelihood of fishermen and the operation of fishing vessels in Hong Kong. We are now writing to object to the Airport Authority's proposal of developing a permanent aviation fuel facility (PAFF) at Tuen Mun Area 38.

1. Danger and serious obstruction to access channel

There is now a river trade terminal at Tuen Mun Area 38. There are already many risks in this area where large container ships from the Mainland frequently go back and forth within the narrow access channel. Our fishing vessels have to pass through Urmston Road whenever they are back to Hong Kong from fishing or for replenishment. It is not rare that fishing vessels collide with the container ships, which will definitely cause damage to the small vessels. If a PAFF is developed there, the access channel will be even more congested and thus endanger the safety of fishing vessels and the lives and property of fishermen.

2. Serious damage to the marine ecology of Tuen Mun Area 38

Responses

The risks to the off-site population have been fully assessed (10.6.2.31). The emergency response plans and evacuation plans will be prepared by the Franchisee subject to the detailed design of the facility and the EIA has made recommendations that the evacuation plans take into account the off-site population (eg. 10.6.2.26 and 10.6.2.31). In addition, it is a requirement of the design phase EM&A, that the emergency spill response plans be audited by an independent body prior to construction to ensure that the recommendations of the EIA have been taken into account.

The congestion of the access channel will be eased by the construction of the PAFF because the tankers to PAFF are larger than those which berth at the existing facility at Sha Chau. Thus the frequency of aviation fuel vessel movements will be less (by a factor of 5) and the risk of collision of fishing vessels with respect to aviation fuel vessels will thus be less. The risk is further reduced because aviation fuel tankers will not transit the Ma Wan Channel or attempt to berth at the PAFF jetty in visibility less than certain specified limits.

Comments

The Government has always been very concerned about the conservation of Hong Kong's marine ecology. A marine park was assigned in Sha Chau and Lung Kwu Chau years ago as dolphin sanctuary where large-scale fishing is prohibited. Only angling with small boats is allowed. Many amateurs thus go to Sha Chau and Lung Kwu Chau for angling on small boats. The development of a P.AFF there will definitely endanger the safety of anglers, the growth of white dolphins and the view of the Marine Park.

Responses

Dredging works within the Marine Park will last for a very short duration of about 1 week (section 2.2.2.4 – 39 days for whole pipeline of 4.8 km, 400m in Marine Park) and as such any impacts will be very short-term. Notwithstanding, the water quality modelling has shown that dredging in the marine park will not cause water quality impacts above the Water Quality Objective of 9mg/L (section 6.4.6.18 to 6.4.6.22) with levels rarely exceeding 5mg/L.

The dredging effects on dolphins has been assessed (Section 7.6.5.9) and it is concluded that there is no evidence to suggest that dredging activities have adverse impacts on dolphins, especially since the Chinese White Dolphin is also acclimatised to sediment fluxes which occur naturally in the Pearl River Delta. Notwithstanding, an exclusion zone during dredging to ensure no dolphins are in the vicinity, has been proposed as a precautionary measure (7.8.2.8).

In respect of anglers, implementation of the P.AFF proposal will be beneficial to anglers as it will negate the need for the regular barge traffic into the Marine Park to deliver fuel, currently at a rate of 2 trips per day (11.1.1). In addition, the recommendation of the EIA to connect the pipeline to the existing facility at Sha Chau will also mean that vessels will not have to visit the facility once every 6 weeks (2.2.3.2) as would be required for the Option 2 pipeline.

The effects on artificial reefs have been assessed (see Figure 6.10). In respect of the suspended solids from dredging activities, compliance with the WQOs is predicted at the artificial reef sites in the marine park (6.4.6.7). Ecologically, no impacts are also predicted (7.6.6.4 and 7.6.6.5). In respect of a fuel spill, as the fuel will float on the surface, the effects on sublittoral habitats like the artificial reefs would be the same as for corals and no significant impacts are predicted (11.3.3.7).

Comments

The Agriculture, Fisheries and Conservation Department deployed an artificial reef in Sha Chau and Lung Kwu Chau years ago with the hope of conserving endangered species in Hong Kong. If a PAFF is developed there, the healthy growth of various marine organisms will definitely be affected.

To protect the lives and property of local fishing vessels and fishermen, to protect the marine ecology of Hong Kong, this association is strongly against AA's proposal of developing a PAFF at Tuen Mun Area 38. We hope that the Government will look for another site which is suitable for the facility.

Comment 9

1. One of the criteria for site selection is public recognition in the environmental issue. The proposed site is near a residential area. The development of a highly dangerous facility, such as an oil farm, near a populated area will definitely make the residents nearby feel uneasy and may even rouse public resentment.
2. The distance and relationship between the proposed site and the densely populated area, the impacts and risks the facility brings to the residents nearby in case of accident; (sic)

Responses

A comprehensive range of measures integrated into the design of the facility means that the hazards associated with such a facility have been minimised and are within the acceptable region of the HK Risk Guidelines (Figure 10.7 and 10.8). The closest residents are 2-3km away from TMA38 and the EIA has predicted that they will not be affected during construction (dust – Table 4.4, noise – 5.6.2) or operation (odour – Table 4.5; noise – 5.6.5; visual – 8.5.3.7; hazard – 10.9.2).

See response to Comment 6

Comments

3. According to the present proposal, fuel has to be pumped from the proposed site to the airport via submarine pipelines. In the event of oil spillage, there will be serious impacts on the waters near Tuen Mun and even the sea traffic to and from Tuen Mun, thus affecting the livelihood of the residents directly;

Responses

The potential sources of a spill have all been identified and the probability of such an event happening quantified (11.2.2). In all cases the likelihood of a spillage are very low, with the risk of a spillage from the pipeline being the lowest. However, worst case leak scenarios have been modelled as part of the EIA (11.3.1.17). The results of the modelling show that even if the spill is left uncontrolled, during both the wet and dry season the spill would dissipate within about 12 hours (11.3.2.11 and 11.3.2.12). Some sensitive receivers, such as the beaches in Castle Peak bay may be affected in the short term but these have been identified for inclusion in the Spill Response Plan (see 11.4.4) and as such the would be protected before any effects could occur. No land based residents would be affected by the spill.

In respect of the marine population, the risks to these have been assessed (10.6.5) and the assessment concludes that any fuel spilled from the pipeline would form small fuel/water emulsion pools on the surface (10.6.5.5) and the amount of fuel that could form a flammable vapour above the pool would be limited (10.6.5.6). Also the likelihood of the pool igniting would be very low based upon the rapid evaporation and high flashpoint (10.6.5.9). Risks to the marine population have been shown to be low and within acceptable region of the HK Risk Guidelines (10.9.4).

4. The unloading of fuel from oil tankers is a 24-hour operation. Will these operations have noise impacts on the residents? If an accident occurs during midnight, lives of residents may be seriously jeopardised.

The key noise from the tankers is the engine and not the unloading process. The frequency of vessels visiting the PAFF is very low (0.1%) in comparison to the existing and future levels of other marine traffic in the area (Table 3.1 and 5.6.5). Based upon this and the fact that the closest residents are not only 2-3km away but also largely screened by topography, noise from vessel unloading will not cause any impacts to residents, even during the nighttime. Further, even during construction, the EIA has calculated the construction noise at Butterfly Estate which demonstrates that impacts will not occur.

Comments

Responses

Comment 10

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <p>1. One of the criteria for site selection is public recognition in the environmental issue. The proposed site is near a residential area. The development of a highly dangerous facility, such as an oil farm, near a populated area will definitely make the residents nearby feel uneasy and may even rouse public resentment.</p> | <p>See response to comment 9.</p> |
| <p>2. The distance and relationship between the proposed site and the densely populated area, the impacts and risks the facility brings to the residents nearby in case of accident; (sic)</p> | <p>See response to comment 9.</p> |
| <p>3. According to the present proposal, fuel has to be pumped from the proposed site to the airport via submarine pipelines. In the event of oil spillage, there will be serious impacts on the waters near Tuen Mun and even the sea traffic to and from Tuen Mun, thus affecting the livelihood of the residents directly;</p> | <p>See response to comment 9.</p> |

Comments

Comment 11a

- 1. Introduction
- 1.1 Background

Hong Kong Airport Authority (HKAA) has submitted in June 2002 a planning application to the Town Planning Board (TPB) under Section 16 of the Town Planning Ordinance (TPO) (Cap. 131), for the development of a Permanent Aviation Fuel Facility (PAFF) for supplying aviation fuel for the Airport, as the existing facility does not have sufficient capacity. The new PAFF will replace the existing temporary Aviation Fuel Receiving Facility adjacent to Sha Chau. In future, the Sha Chau facility will be used for emergency backup purposes only.

Under the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), the proposed PAFF is classified as a designated project under Sections B.1, H.2 and L.4 of Schedule 2 of the EIAO. Hence, before obtaining an environmental permit for the PAFF, HKAA has to submit an Environmental Impact Assessment (EIA) Report based on the Study Brief issued by the Environmental Protection Department (EPD).

- 1.2 Purpose of this Report

Responses

Comments

Responses

The EIA Report is now under the 30-day public inspection period until 14 July 2002, during which public comments are invited. Through the District Council, We, ???, was informed about the PAFF application. ??? steel mill (the Mill) is located right next to the proposed PAFF. This report is prepared, without very precise technical assessment due to time constraint, to raise comments regarding the EIA Report to the Environmental Protection Department, and to look particularly at the possible interface which will be caused by the co-existence of the PAFF and the existing adjoining operations. If there is a need for detailed assessment, we are pleased to provide more information as an opinion from a third party.

- 2. Local Context
- 2.1 Location and Planning Status

Both the proposed PAFF and the Mill are located in Area 38 of Tuen Mun Planning Area, which is sited in the south-western part along the shoreline. The Green Island Cement Plant is situated in the west. Therefore, in future, the Mill will be sandwiched by the PAFF and the cement plant. Further away is the Castle Peak Power Station.

Comments

Both sites are zoned Other Specified Uses (“OU”) annotated for Special Industries Area in Tuen Mun Outline Zoning Plan (OZP) No. S/TM/16 (Figure 1 refers). According to the Explanatory Statement of the OZP, it is stated that the area is for “land-extensive and capital intensive industry as well as for other special industries”. Existing developments include a river trade terminal, a power station, a cement plant and a steel mill. In fact, early in April 1994, the area was already zoned “OU” (Special Industries Area) and it was written in the OZP No. S/TM/8 that the area was designated for land extensive and marine-oriented industry. Proposed industrial users would include chemical plants, paper processing plant and textile manufacturing plant.

2.2 Proposed PAFF in Area 38

Figure 2, which is extracted from the EIA Report, shows the PAFF and its surrounding area.

Amongst the major elements proposed in PAFF, there are a few critical ones which draw our concern, in particular to our operation.

- a jetty, 200m away off-shore, for berthing and unload aviation fuel tankers;
- a tank farm for storage of aviation fuel;
- on-site operational facilities including
- the bund wall and the containment.

Responses

Comments

Responses

3. Existing Operation of the Mill

??? began construction of the Mill at this site in 1994. Amongst other installations in the Mill, there is a reheat furnace operating at a maximum temperature of 1300°C. The heated billets exit the re-heat furnace at 1100 °C, in the form of soft metal. The billets are discharged through a series of rolling devices that lie along 210m space to reach the cooling bed, at a discharge rate of 130MT/hr. The completed steel bars are about 600C when they reach the cooling bed. After 20 minutes, the bars are cooled down to 100 °C. Apart from the reheat furnace, the operation also accommodates other hot processes, including gas cutting and welding. The entire operation is accommodated in a semi-enclosed structure with open side and roof-top ventilator utilizing natural draft to bring the heat away. Hot air is elevated and escapes from the roof top vents at about 60 °C. The furnace is located at a distance of 55m (Figure 4) from the east boundary and is equipped with a chimney of 50m high with an operating temperature at 200 °C. Other than the structure of the mill, the remaining space is mainly used as an open-storage and loading/unloading site for steel materials.

About 1/3 of the Mill area is placed with hot steel at a temperature of 200 °C ~ 1100 °C.

Please see comment against item 4.2 below

Comments

As the operation of the Mill is still expanding, ??? is planning to install an electric arc furnace ("EAF") and casting machine. The EAF will melt scrap metal at temperatures in excess of 1600 °C. The molten steel will be cast and transported to the re-heat furnace for hot rolling. To reduce energy consumption, the billets may be transported at high temperature from the casting machine to the re-heat furnace. This is a standard operation found in mini-mills all over the world. The EAF will be located to the west of the existing operation. A schematic illustration is shown on Figure 2.

The Mill is a 24 hour operation. The re-heat furnace operates full time for the whole year and will only be closed for a week for maintenance. Even when the furnace is turned off, the cooling down period will last for 5 days. At present 300 employees work in 3 shifts.

4. Potential Hazards

In view of the Mill's existing and planned facilities, ??? believes the EIA report on the proposed PAFF has not addressed adequately the impact of the PAFF on the Mill as an existing user of a high temperature operation.

The following is a concern about the potential hazards and adverse environmental impacts.

4.1 Spillage

Responses

Comments

The effects of a major spillage incident on water at both the Castle Peak Power Station in the proximity and the Mill would be catastrophic. Both facilities use seawater intakes for cool-down process, but no reference is made in the ELA Report as to how the location of the jetty, the discharge of fuel and anchoring of tankers will affect these. Besides, the impact of an oil spill on adjacent industries have not been considered in respect of the seawater intakes.

The assessed risk on the fatalities on the jetty was based on assessment on the collision of the berthing vessel. The impact of the vessel serving the Mill is not addressed. The additional maneuvering path for the berthing at ???'s pier may generate additional marine traffic and the risk associated with such has not been addressed. In addition, the off-shore jetty will be a barrier to the Urmston Road channel where river-trade vessels and ferries are cruising along the channel.

Responses

The basis of the risk assessment (Chapter 10) has been to determine the risk to life and the intake of fuel, if such were possible along with cooling water as a result of an incident, will not affect any life. It should also be noted that the intake at the steel mill draws water from a depth of between -1m and -3.5m. Thus, as any fuel spilled would form a thin film floating on the top of the water, it is unlikely (or impossible) to be taken in. Also, the fuel evaporates and dissipates rapidly and will not be present after 12-24 hours.

As regards the increased volume of marine traffic from sources other than aviation fuel tankers (the frequency of passage of aviation fuel tankers will decrease (by a factor of 5) when the PAFF becomes operational (Section 3.5.1), this has been taken into consideration both in the hazard assessment and also the MTIA (Marine Transport Impact Assessment).

The proximity of the offshore jetty to the Urmston Road marine traffic has been considered in the assessment. One of the inputs to the risk model is the location of the hazard and in this respect the location of the jetty has been considered.

Comments

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.

Responses

The consequences of a release of aviation fuel have been modelled (Chapter 10). The flash point of aviation fuel is 38 degrees C and as such does not release vapours instantly as a highly flammable liquid such as LPG would.

Based upon the odour modelling undertaken for the EIA, the concentration of aviation fuel vapour at the Steel Mill is 0.28 OU (Table 4.5) which is equivalent to around 0.2 ppm. In comparison, the lower explosive limit of aviation fuel is 0.7% (Table 10.4) or 7000ppm. Based upon these figures, it can be seen that the level of gas at the steel mill would be several magnitudes below the level required for the gas to ignite, irrespective of the temperature of the operations at the steel mill.

In addition, the risk of ignition on the site and overtopping 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 offsite on land risk from the events at the tank farm.

Further the defined industry standard (IP 15 code) for a hazardous are around tanks and pumps that contain aviation fuel is 15 meters. This means that outside this defined (15m) safety distance the area is considered NON hazardous. Sparks, open fires, heaters and other high temperature processes in a defined NON hazardous area will not ignite aviation fuel vapours as they will have been dissipated to a non-hazardous vapour in air within the 15m safety distance.

4.2 Risk of Fire

Comments

In the EIA Report, several references are made to the potential emissions from both the transfer (working losses) and storage (standing storage losses) of the aviation fuel. Yet the total volume of the likely emissions is not discussed. The more important shortcoming is that the EIA Report has not made references to the fact that the Mill is sited immediately adjacent to the proposed PAFF and will engage in processes which involve very high temperatures (up to 1300 °C). 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.

Responses

See previous response

In addition, during filling of tanks, the air mixture within the tanks is expelled to atmosphere and diluted thereby. The dilution and spread of the mixture has been modelled in the EIA and it has been shown that, in the worst case, the mixture is diluted to several thousand times less than the lowest limit of flammability, at the south eastern boundary of the Shui Wing Steel mill. At this dilution the mixture cannot be ignited even by objects at high temperatures or naked flames.

[Note also that the safety distance is 60 metres for refineries which burn off gas from flare stacks. These generate high temperatures and co-exist with other refinery plant which have the potential for presence of more highly flammable vapours than those from aviation fuel.]

Therefore, in conclusion, there is no risk of fire as a result of co-location of PAFF with Shui Wing Steel mill.

Refer to Chapter 2 of the EIA Report. In 2.1.1.4, it has discussed the potential for the build up of static electricity in pipelines with an increased risk of ignition on entry to the tanks. In 2.1.1.12, it has even identified the passage of aviation fuel tankers through Ma Wan Channel as a risk but subsequently advises that better standards will be able to remove that risk. Further in 2.1.1.19, it refers to the risk of accelerated corrosion of the pipelines induced by stray electric currents, such as those produced by trains or high voltage cables. In terms of the proposed pipeline, one route is dismissed in 2.2.1.2. as it would need to pass under the HV cable with a risk of corrosion by stray currents. The proposed PAFF site is located next to both the Mill and the power station, which are generate *large amount of static electricity*. See Figure 3 for illustration of the Mill layout.

As discussed above, aviation fuel vapours are not generated easily due to its high flashpoint. Usually vapours are generated in headspaces of tanks (Section 4.6.1.4 to 4.6.1.8) and may result in tank fires, which are already considered in the assessment. Static electricity generated in adjacent sites (eg steel mill) will be localised and would not ignite the small amount of vapours generated on site in the unlikely event of a spill. Therefore this is not a source of hazard.

Comments

4.3 Undesirable Dredging

The water quality assessment in the EIA report has not addressed the dredging operation of the pipeline connecting the land base and the jetty. Whilst it may not deviate from the overall assessment, large volume of sediment may be sucked into the seawater cooling system and may cause severe damage.

Responses

A source at the jetty has been modelled (see Figure 6.10 of the EIA Report which identifies Shui Wing Steel Mill as a sensitive receiver for the modelling) and, even based upon the worst case of the operation of a trailer suction dredger, the predicted concentrations are generally within the water quality objectives of 9 mg/L, with levels in the middle and upper layers of the water column not exceeding 5 mg/L. The model does show a one-off, short-lived peak of 40 mg/L in the vicinity of the steel works intake but this was predicted for the very bottom layer of the water column. Notwithstanding the short duration of the peak, as the intake at the steel mill abstracts water from very near the surface (ranging between about –1m and –3.5m depending upon the tidal cycle), the peak in the bottom layer will not affect the abstraction system. In addition, the intake criteria for Castle Peak Power Station is 150 mg/L of suspended solids and as the steel mill has a similar system, a comparable level would be reasonable. Clearly, the worst case levels of suspended solids predicted are significantly less than the intake criteria and at levels which would not have any detrimental effect on the abstraction system at the mill. See section 6.4.6.8 of the EIA

4.4 Rock Armour

The construction of a pipeline between the PAFF and the jetty includes the use of rock armouring over the pipe. This may prove an unstable arrangement (depending upon the bottom conditions) as it may induce scouring / erosion depending upon the current. This whole arrangement may be compromised by any further dredging.

The present state of the seabed in the study area is stable. The rock armour will be flush with the seabed (see Figure 3.3 of EIA) and thus will not intrude into the marine flow and as such will not impact on local tidal flows and therefore should not result in any scour.

Comments**4.5 Adverse Impact on Ecology**

The hard substrates are considered to be of low ecological value, however, they hold hard corals of conservation interest which are subsequently dismissed as being in poor condition. Currently, there are records of protected stony corals (faviids) near Sha Chau, at a distance of 1.2km to the southeast. A distance of 1.2km is rather small once the dredging required to bury the pipeline commences. There is a possibility that protected species may be impacted. Besides, the predicted permanent loss of habit of 22.6m², as mentioned in the EIA Report, seems rather small. We question whether the entire loss of habitat has been included in the EIA Report assessment.

Responses

It is well known that hard (stony) corals are sparse in North Western waters owing to the prevailing influence of lower salinity and high turbidity from the Pearl River that severely restricts their establishment (Section 7.6.4.1). As conditions are only barely suitable for hard coral establishment, it is likely that the isolated individuals present are either adapted to prevailing conditions or at their extralimital range and recent surveys conducted in Northwester waters revealed that many corals were in poor condition suggesting that these waters are (not surprisingly) stressful to hard corals. The distance, from the location where protected stony corals (faviids) have been previously recorded to the area required to be dredged, is not small and water quality modelling (based on worst-case trailer suction hopper dredging, although note that this will not be used in the Marine Park and this location is closest to the corals) predicted that settlement rates of suspended solids would be insignificant and lower than the levels found to have deleterious effects on highly sensitive hermatypic coral communities (see Section 7.6.4.6). It is, therefore, highly unlikely that any impacts attributable to either pipeline dredging or backfilling will have a significant impact on hard coral communities.

The only permanent loss of habitat is relatively small (22.6m²) and is related to soft seabed loss to the piles used in the construction of the berthing jetty (Section 7.6.3.1 refers). The total area permanently lost is, therefore, relatively small and the habitat is of low ecological value.

Comments

The use of percussion piling and the high noise levels associated with the process will have a detrimental impact on fish populations. Damage to fish by sound is a significant construction impact and has not been considered. In 7.8.2.5 of the EIA Report, the sound levels are predicted and mitigation is discussed. The use of bubble curtains is predicted to reduce sound levels by at least 3-5dB, however at 250m this would still result in sound levels of 162dB. High levels of mortality have been found in fish exposed to 177dB, according to international research.

Responses

As noted in the fishery impact section (Chapter 12) (and, unlike cetaceans) fish do not rely heavily on acoustic information and percussive piling is not considered to represent a significant impact (see Table 12.3). Bubble curtains have been recommended for the protection of wildlife from underwater noise impacts and are considered particularly useful for mitigating impacts to noise-sensitive animals such as dolphins that use sound in echolocation and communication. The noise levels from the mitigated percussive piling (i.e., with a bubble jacket in operation) will need to reduce the noise to **at least** the levels presented in Section 7.8.2.5, and (as stated in your comment) 162dB is well below a level found to cause fish mortality. Furthermore, the further mitigation measures presented in Section 7.8.2 aimed specifically at protecting dolphins (that are highly sensitive to noise impacts), such as ramping-up of the piling hammer, will further help to protect fish as they will likely disperse/avoid noise-impacted areas. It should also be noted that the capture fisheries area located adjacent to the area to be piled (off Tuen Mun Area 38) is ranked low in terms of adult fish production (see Section 12.7.1). Noise from percussive piling is not predicted to be evident significantly above background levels, in the more productive Lung Kwu Chau and Sha Chau fishing area which are several kilometres distant. Detrimental impacts on fish populations are, therefore, not predicted.

The threshold for internal injuries to fish is around 160dB which would suggest that all fish within a 250m radius of pile driving would be exposed to potentially damaging sound levels and would result in large scale fish kills. This has occurred at other engineering projects – most recently for a major causeway project in California. In the United States adopts a level of 150dB as a safe upper limit to avoid harm to fish.

Please note the response above.

Also note that this further comment would only be applicable in cases where fish did not show avoidance behaviour. It is also noted that fish kills were not reported during piling conducted for the aviation fuel facility at Sha Chau (an area that is more productive than the waters around Area 38) and the same levels of noise (or lower) are predicted for the PAFF.

Comments

In addition, the remobilization of potentially toxic compounds following seabed disturbances should also be investigated.

4.6 The Analysis of Alternative Sites

The EIA Report has an investigation on alternative sites in its section 2. Most of the alternative sites are given a 2007-2008 deadline for completion, which are dismissed as unsuitable. The alternative sites all have their merits and drawbacks, as does Area 38. However, Area 38 has an existing steel mill where hot metal is constantly exposed which is a risky combination with the proposed PAFF. Furthermore, the water in front of Area 38 is the most heavily-populated area for the rare white dolphins.

Responses

As discussed in Section 6.2 of the report, sediments in the study area are uncontaminated. Furthermore, risk assessments conducted for both humans and dolphins in the Sha Chau area (conducted specifically for highly contaminated material disposed in the mud pits) have shown that the risk to both ecological (Indo-Pacific Humpback dolphin) and human (mostly the fishermen in this area) receptors due to consumption of seafood from these waters poses an insignificant/ negligible health risk.

Based upon the comparative assessment of the potential sites for the PAFF, Tuen Mun Area 38 was shown to be the best site both for environmental and other reasons. Tables A32 and A33 in Appendix A(iv) show that TMA38 is scores notably better than all other sites. In addition, the EIA has concluded that impacts during construction and operation would be within acceptable levels and would not affect the adjacent land uses (dust – Table 4.4, odour – Table 4.5, hazard – 10.9.2, visual - 8.11.4.1).

Any impacts to the dolphin population will largely be during the construction phase for the jetty only, impacts of which are mitigated. Indeed, the proposed PAFF provides a beneficial effect by negating the need for the regular barge traffic into the Marine Park to deliver fuel, currently at a rate of at least 2 trips per day (11.1.1). In addition, the recommendation of the EIA to connect the pipeline to the existing facility at Sha Chau will also mean that vessels will not have to visit the facility once every 6 weeks (2.2.3.2) as would be required for the Option 2 pipeline.

The critiques of other alternative sites have mentioned the effect of sewage outfalls in the proposed pipelines. However, no reference is made to the Urmston Road sewage discharge and the impact of contaminants in the cooling water discharges from the proximate power station and from the Mill.

These is no known impact arising from construction or operation of the PAFF on the sewage outfall.

Comments**5. Conclusion**

An EIA report should be written in accordance to the Technical Memorandum on Environmental Impact Assessment Process, published by the Environmental Protection Department. In its Annex 1, Project Profile for Designated Projects, has listed out a checklist for preparing a project profile. The EIA Report prepared for the PAFF, however, has ignored some of the important elements contained in the checklist. The most significant one is the negligence of the operation of the adjacent Mill, and also the power station in the proximity. *In other words, "major elements of the surrounding environment and existing and/or relevant past land use(s) on site which might affect the area" has not been sufficiently addressed.*

Comment 12d

We refer to your letter dated 18 June 2002 about the proposed Permanent Aviation Fuel Facility in Tuen Mun Area 38.

Responses

The EIA has been prepared in accordance with the TM EIAO and the surrounding environmental taking into account in the assessment of potential impacts. To this end the EIA has concluded that impacts during construction and operation would be within acceptable levels and would not affect the adjacent land uses (dust – Table 4.4, odour – Table 4.5, hazard – 10.9.2, visual - 8.11.4.1).

Comments

According to the information we received and collected, the proposed fuel facility will be connected by subsea piping from Tuen Mun to Sha Chau across Urmston Road. Currently, there is very heavy marine traffic of deep sea container vessels, river vessels and passenger ferries (estimated average of over 600 vessel trips per day) going through Urmston Road. Majority of these vessels are river trade cargo vessels and the crews of which are of low consciousness in marine discipline. We are very concerned that any marine accident involving the concerned tanker could lead to serious consequences to the environment in this area.

Responses

A Marine Traffic Impact Assessment has been conducted to address this concern. A number of mitigation measures have been specified for implementation during construction. These include:

- The Contractor shall advise the Marine Department of marine construction activity.
- The Contractor shall provide install and maintain approved temporary marker buoys, or such other marks as may be acceptable to the Marine Department, to delineate the approved works areas.
- At least two Guard boats shall be provided by the Contractor during marine activities within Urmston Road to safeguard both the Works and vessels transiting adjacent to works area.

The hazard assessment has taken into account all the vessel movements in the Urmston Road in assessing the risk of an incident and the consequences of the incidents to the surrounding population. In all cases risks are predicted to be low and acceptable.

In addition to the risk to loss of life, an environmental assessment has been undertaken based upon the spillage of fuel. The worst case spill associated with the rupture of a tanker at the jetty has been modelled. The dispersion of the spill depends upon the tide but in all cases the fuel has disappeared through evaporation and other processes within about 2 days. Based upon the short duration of any impact (notwithstanding the very low probability that it would occur at all), the fact that mobile species such as dolphins and fish would avoid the spill and the buoyant nature of the fuel which means it would not affect sublittoral species, the environmental impacts of the spill are not considered significant (Section 11.3.3).

Comments

Furthermore, in case the submerged fuel pipe were damaged by the anchors of vessels when the vessels were required to moor in the stream, say, due to engine breakdown or other emergency cases, there would be fuel leakage that could cause disasters to the marine ecology. While the waters nearby are the habitat of the various species including Chinese White Dolphins, we would be very much pleased to see that they could quietly enjoy their lives in the vicinity and would not be exposed to risk caused by construction works, fuel leakage or other accidents associated with such proposed fuel facility.

Responses

The aviation fuel pipelines are buried (Section 3.4.2) to a depth of 6.5m in the areas of heavy marine traffic usage and to no less than 3 metres in shallow areas. In addition, the pipelines are protected by sand fill and rock armour designed specifically to avoid damage to the pipeline even by the largest ship anchors if these are dragged over the pipeline. Further, the area of the pipelines will be designated as a no anchorage zone to avoid intentional anchorage in the area. The design of the pipeline therefore fully reflects the concerns with respect to protecting ecological receptors in the area.

Extensive research has been conducted to overcome both engineering and ecological constraints in order to provide a facility that has the least impact not only to marine ecology but also specifically to the dolphins inhabiting the area (Chapter 7). In order to ensure that no harm to the dolphins is likely to be caused by the facility, the pipeline will be closed-down immediately in the highly unlikely occurrence of a leakage. It should also be noted that dolphins tend to avoid oil spills. Finally, numerous scientifically robust mitigation measures have also been implemented (in consultation with leading experts in the field of noise impact assessment to dolphins) to reduce any impacts and, in order to ensure that these mitigation measures are effective, pre and post construction monitoring of the dolphins inhabiting these waters will also be conducted.

Comments

According to the Planning Statement, the site for PAFF is very close to the Castle Peak Power Station and a river trade terminal. In case of accidents or terrorist attacks, there will be a great impact on the nearby facilities and even an indirect impact on people's livelihood. If there is fuel leakage, the high bund can still contain the fuel within the site. But if there is strong wind, the residents of Butterfly Beach and Lung Kwu Tan nearby will definitely be affected.

Hundreds of thousands of residents of Tuen Mun will feel their lives jeopardised.

I refer to the fax dated 18 June from Tuen Mun District Office in relation to the development of a Permanent Aviation Fuel Facility (PAFF). The proposed site of PAFF is very close to Lung Kwu Tan Village, Tsing Shan Tsuen, Yeung Siu Hang Village and Kau Hui Tsuen. As the government has been developing polluting industries and facilities in Tuen Mun West, the area has become a centre of offensive trades. As a result, the residents of Tuen Mun are under immense psychological pressure. Now the government intends to set up big oil tanks and various oil farm facilities in Tuen Mun Area 38 with no regard to the feelings of the Tuen Mun residents. This will, no doubt, further spoil the image of Tuen Mun. This facility will not only damage the natural environment of the area, but also jeopardize the safety of the villagers nearby because it is not 100% safe. Based on the reasons above and the opinions of the villagers of the area after further consultation, we think it is not appropriate to develop the PAFF of HKIA at Tuen Mun Area 38. We therefore write to express our objection. It is hoped that you will reflect our views to the departments concerned and look for another site for the facility.

The proposed PAFF is adjacent to Shui Wing Steel Mill and close to Castle Peak Power Station and Green Island Cement Plant. The operations of those plants will generate high temperature and workers in the plants are numerous. It will be highly dangerous to store a large quantity of fuel in the vicinity. The Council knows that the neighbouring facilities, including Shui Wing Steel Mill, also object to the development of the PAFF at the proposed site.

Responses

A risk assessment was carried out for the PAFF tank farm. This is given in Chapter 10 of the EIA Report. The results, with the mitigation measures in place, show that there are no impacts on neighbouring land users in the unlikely event that an incident occurred at the tank farm, because:

- ◆ Fires (whether originating from a terrorist attack or other event) would not extend on land beyond the tank farm site boundary.
- ◆ The shielding effect of the dense black smoke generated by an aviation fuel fire means that the impact of such a fire does not extend beyond a few metres from a fire.

Thus, because there are no impacts on land beyond the site boundary, workers at the Castle Peak Power Station and/or the River Trade Terminal will not be at risk from the proposed PAFF. The particular references in the EIA Report regarding the above are 10.6.2.24, 10.9.2 and 10.9.3.

A comprehensive risk assessment of all aspects of the PAFF has been undertaken. In respect of the tank farm, the EIA has shown that the hazards associated with tank fires and bund fires would not extend beyond the site boundary (See section 10.9.2) and would not affect workers in the adjacent facilities or residents who are 2-3 km away. Only in the rare event of the fire followed by bund overtopping would the hazard extend into the sea due to discharge of fuel through the stormwater drain. Table 10.28 shows that the frequency of such an event is very low (less than once in a million years) and that the effect distance would only be 42m, meaning that the impacted area would be confined to within a short distance of the site and would not affect the residents of Butterfly Beach and Lung Kwu Tan. In addition, should the fuel be ignited, it would likely burn out in a very short period of time (10.6.3.4). In all cases, risks have shown to be low and acceptable (Figure 10.7, 10.8)

Comments

The landscaping measures can only be used to beautify the tanks. They do not have much shielding effect if there are accidents or explosions.

The oil farm will be situated near the China Light Power Station. In case of accident, Butterfly Bay residents and the facilities nearby, such as the River Trade Terminal, the steel mill and the laundry facility of Hospital Authority, will be affected. It will also affect the provision of electricity by China Light, thus causing electricity supply problem in Kowloon and the New Territories.

Responses

It is true that landscaping measures do not have any shielding effect other than visual shielding. However, since there are no impacts to workers outside the tank farm as described above, with or without landscaping, there is no requirement for additional shielding.

In respect of the tank farm, the EIA has shown that the hazards associated with tank fires and bund fires would not extend to neighbouring sites (See section 10.9.2). Only in the event of a fire in conjunction with bund overtopping could the hazard extend into the sea via discharge of fuel through the stormwater drain. Table 10.28 shows that the frequency of such an event is very low (less than once in a million years) and that the effect distance would only be 42m meaning that the impacted area would be confined to within a short distance of the site and would not affect the adjacent land uses, including the power station. Thus, the integrity of the power supply will not be affected by the PAFF.

Potential effects on the marine population within this area have been assessed (10.6.2.18) and it is shown that all risks are in the acceptable region of the HK Risk Guidelines (Figures 10.7 and 10.8).

It was mentioned in the EIA report that the injury rate was low in oil farm incidents in other countries. However, it was not mentioned whether there were residents in the vicinity. The cases quoted, therefore, cannot be accepted.

The key aspect of the review of historical tank farms is that they demonstrate that major fires in fuel storage facilities are very rare events and did not include a major bund fire. In respect of the fatalities off-site, the proposed PAFF does not have residents nearby, with the closest being 2-3km away. The view from residential areas is also screened by the intervening topography. As fires at storage facilities are usually confined to a small area (impacts from thermal radiation levels only extend some 3m outside the area of the fuel on fire – see Section 10.6.1.2.) the off-site population will not be affected. The examples used demonstrate this.

The number of oil tanks in the oil farm at Area 38 will be increased from four to twelve. The increase will aggravate its harm to the lives of residents of Butterfly Bay area.

The hazard assessment has assessed the risks associated with both the 4 tank and ultimate 12 tank scenarios and in both cases, all risks are acceptable (see Figure 10.7 and 10.8). Once again, there are no risks to Tuen Mun residents including those at the Butterfly Bay area.

Comments

The risk of mooring failure of the jet fuel tanker from the Facility's jetty that may lead to damage to the other jetties in the neighborhood as a result of a drifting vessel.

Responses

The risk of mooring failure is reduced by the departure of tankers upon hoisting Typhoon Signal No. T3. In addition, the design of the mooring facilities will be to international standards (OCIMF Guidelines). The risk of mooring failure is thus low. Nevertheless, of the hazards considered in the EIA risk assessment (Chapter 10) striking (Striking involves a drifting vessel (which probably lost control while in the channel) impacting the aviation fuel tanker while it is berthed) and impact (Impact is defined as a vessel running into a dock wall or a jetty) events take into account mooring failures and their consequences. The consequence of a mooring failure resulting in damage to other jetties will be exactly the same as a striking or impact event, both have been considered in the hazard assessment. In particular, see Sections 10.4.5.7 and 10.4.5.8 of the EIA.

It is essential that the fire protection system complies with recognised standards. In this connection, it would be appreciated if the project proponent confirms the standard with which the fire protection system complies.

The fire services will comply with the requirements of the Hong Kong Fire Service Department (refer to 10.3.2.13) and will be based on

1. the Institute of Petroleum Hazardous Areas Guidelines
2. the National Fire Protection Association Codes

The fire protection to the tanks will consist of

1. base foam injection to the tank on fire, to extinguish the fire
2. water spray cooling to adjacent tanks and platforms
3. a street hydrant system to provide additional fire fighting water
4. the fire water pumps with 100% standby capacity in case of failure of any of the pumps
5. in case of power failure, a standby generator capable of supplying all fire fighting equipment will be provided

The Fire Service Department will have the ability to boost the water supply for fire fighting with sea water, using their fireboat moored at either the jetty or the seawall at TMA 38

Comments

It is recommended that notification to the various major industrial neighbors be arranged by the Facility operators should there be any emergency situations, e.g. fire and spill, etc. It is also recommended that some degrees of emergency response coordination be set up with the neighbors in light of the close proximity and the fact that they share some common utilities. Elaboration of these arrangements in the Report would be appreciated.

There are 18 pieces of 132kV underground cables running from ??? Castle Peak / Black Point Power Stations to Tuen Mun outside the new site. These are essential outlet circuits of ??? Castle Peak / Black Point Power Stations supplying electricity to Tuen Mun and Lantau areas, including Chek Lap Kok Airport. The EIA report should mention the risk to utility services like the above and the precautionary measures to be taken during the planning, construction and operational stages.

Responses

The needs of the various major industrial neighbours will be considered, and incorporated, in all contingency planning and procedures (refer to 10.6.2.20. These will be prepared in the detailed design stage of development of the PAFF.

There is no risk to cables located outside the PAFF area. The hazard assessment (Chapter 10) assesses the risk posed by the tank farm operations (marine, jetty, submarine pipeline etc) to offsite populations (both on land and sea). The contractor is fully aware of all underground installations and will take the necessary precautions during construction and operation of the facility.

Further the possibility of stray currents have to be taken into account during design of PAFF by the specialist designers of the cathodic protection system which will protect the tanks and pipes. The HV currents are AC in nature and though have to be considered, are less of a concern than DC current. Cathodic protection will be addressed in the detailed design stage.

TMDC regarded the PAFF as highly dangerous and should be far away from residential areas. It should be built on industrial and commercial land, using oil pipes to transfer oil to the airport. With today's technology, it is feasible to build the pier and the storage facility at different locations. Landscaping cannot remove the actual and potential risks of the fuel storage facility or the anxiety of the residents.

The hazards associated with the PAFF have been fully assessed (Chapter 10) and the results show that not only is the probability of an event occurring very low, the risk to life is negligible and within acceptable region of the HK Risk Guidelines (Figure 10.7 and 10.8). Tuen Mun Area 38 is zoned on the Draft Tuen Mun OZP as 'OU' (Special Industries Area) and land is reserved for industry which includes uses such as the PAFF. The surrounding land use is also industrial in nature and as such the PAFF would be compatible with these uses (see Section 8.6.1 and 8.6.2).

The quality of the fuel is vital and in order to maintain fuel quality and avoid as far as possible any correspondence to safety, the tank farm must be adjacent to the jetty. Reasons are provided in Section 2.1.1.4

Comments

In view of the Mill's existing and planned facilities, ??? believes the EIA report on the proposed PAFF has not addressed adequately the impact of the PAFF on the Mill as an existing user of a high temperature operation, inter alia, use of reheat furnace which operates at a temperature of 1300C and heated billets of steel which are moved around the steel mill.

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.

Responses

The defined industry standard (IP 15 code) for a hazardous area around tanks and pumps that contain aviation fuel is 15 meters. This means that outside this defined (15m) safety distance the area is considered NON hazardous. Sparks, open fires, heaters and other high temperature processes in a defined NON hazardous area will not ignite aviation fuel vapours as they will have been dissipated to a non-hazardous vapour in air within the 15m safety distance.

The consequences of a release of aviation fuel have been modelled (Chapter 10). The flash point of aviation fuel is 38 degrees C and as such does not release vapours instantly as a highly flammable liquid such as LPG would.

Based upon the odour modelling undertaken for the EIA, the concentration of aviation fuel vapour at the Steel Mill is 0.28 OU (Table 4.5) which is equivalent to around 0.2 ppm. In comparison, the lower explosive limit of aviation fuel is 0.7% (Table 10.4) or 7000ppm. Based upon these figures, it can be seen that the level of gas at the steel mill would be several magnitudes below the level required for the gas to ignite, irrespective of the temperature of the operations at the steel mill.

In addition, the risk of ignition on the site and overtopping 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 offsite on land risk from the events at the tank farm.

Comments

In the EIA Report, several references are made to the potential emissions from both the transfer (working losses) and storage (standing storage losses) of the aviation fuel. Yet the total volume of the likely emissions is not discussed. The more important shortcoming is that the EIA Report has not made references to the fact that the Mill is sited immediately adjacent to the proposed PAFF and will engage in processes which involve very high temperatures (up to 1300 °C). The siting of a facility which discharges aviation fuel vapours immediately adjacent to a facility of very high temperature processes and furnace operations in unsafe. In this case, any spillage incident would be catastrophic.

Responses

In addition, during filling of tanks, the air mixture within the tanks is expelled to atmosphere and diluted thereby. The dilution and spread of the mixture has been modelled in the EIA and it has been shown that, in the worst case, the mixture is diluted to several thousand times less than the lowest limit of flammability, at the south eastern boundary of the Shui Wing Steel mill. At this dilution the mixture cannot be ignited even by objects at high temperatures or naked flames.

[Note also that the safety distance is 60 metres for refineries which burn off gas from flare stacks. These generate high temperatures and co-exist with other refinery plant which have the potential for presence of more highly flammable vapours than those from aviation fuel.]

Therefore, in conclusion, there is no risk of fire as a result of co-location of PAFF with Shui Wing Steel mill.

Refer to Chapter 2 of the EIA Report. In 2.1.1.4, it has discussed the potential for the build up of static electricity in pipelines with an increased risk of ignition on entry to the tanks. In 2.1.1.12, it has even identified the passage of aviation fuel tankers through Ma Wan Channel as a risk but subsequently advises that better standards will be able to remove that risk. Further in 2.1.1.19, it refers to the risk of accelerated corrosion of the pipelines induced by stray electric currents, such as those produced by trains or high voltage cables. In terms of the proposed pipeline, one route is dismissed in 2.2.1.2 as it would need to pass under the HV cable with a risk of corrosion by stray currents. The proposed PAFF site is located next to both the Mill and the power station, which are generate *large amount of static electricity*. See Figure 3 for illustration of the Mill layout.

As discussed above, aviation fuel vapours are not generated easily due to its high flashpoint. Usually vapours are generated in headspaces of tanks (Section 4.6.1.4 to 4.6.1.8) and may result in tank fires, which are already considered in the assessment. Static electricity generated in adjacent sites (eg steel mill) will be localised and would not ignite the small amount of vapours generated on site in the unlikely event of a spill. Therefore this is not a source of hazard.