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**for information**

**Report to the Advisory Council  
on the Environment on Mitigation Measures  
Related to the Aviation Fuel Receiving Facility at Sha Chau  
November 1995**

**1. Introduction**

In September, the Provisional Airport Authority submitted an Interim Report on Mitigation Measures related to the Aviation Fuel Receiving Facility at Sha Chau. Included with that submission were Dr Bernd Würsig's responses to peer review comments on his paper "Potential Effects of a Proposed Aviation Fuel Receiving Facility at Sha Chau on the Health and Survivability of the Indopacific Humpbacked (Chinese White) Dolphin, Sousa Chinensis, in Waters North of Lantau Island, Hong Kong Territory". It is planned that Dr Würsig will be in attendance at the 20 November ACE session and available to answer members questions.

**2. Update on Dr Thomas Jefferson's Work**

As members are aware, the PAA and Ocean Park Conservation Foundation have cooperated to bring international cetacean expert Dr Thomas Jefferson to Hong Kong to assist in on-going dolphin research and management programmes. Since his arrival in Hong Kong Dr Jefferson has :-

- Coordinated with the Swire Marine Institute researchers on their on-going dolphin work.
- Worked with the AFRF franchisee and contractor on the details of the required dolphin monitoring programme.
- Worked with the AFRF franchisee and contractor to ensure that methodologies for reducing AFRF construction noise impacts are properly developed
- Met with the Marine Mammal Conservation Working Group
- Reviewed Hong Kong's existing Marine Mammal stranding network and worked with AFD on improving reporting procedures
- Developed a working outline for a dolphin education course to be presented to AFRF construction personnel
- Initiated scientific boat based dolphin surveys in waters around the Brothers Islands.

Dr Jefferson will be present on 20 November to provide members with additional details on his work efforts and to answer members questions.

3. Other Mitigation Measures

The Authority continues to make progress in implementing the mitigation measures outlined in the AFRF-EIA as well as the associated reports prepared by Dr Würsig. The attached tables provide implementation details on the specific mitigation measures recommended in these reports. Dr Jefferson and the AFRF construction team are actively engaged in the development of noise mitigation measures as well as monitoring protocols. The Authority looks forward to briefing members on 20 November in more detail on the implementation of the various mitigation measures.

Provisional Airport Authority  
November 1995

**Aviation Fuel Receiving Facility at Sha Chau**  
**Construction Phase Environmental Mitigation Measures (as proposed in EIA)**

<b>EIA Reference</b>	<b>Recommended Mitigation Measure</b>	<b>Responsibility</b>	<b>Implementation Status</b>
	<b><i>Construction of the Turning Basin and Access Fairway</i></b>		
Sec. 4.1.13 p. 54-55	The Contractor will be required to minimise adverse impacts on water quality resulting from dredging and dumping operations to within acceptable levels as defined by the WPCO.	Franchisee/ Contractor	The Contractor is aware of this requirement and will incorporate practical means for minimising impacts. This will include the use of closed grab dredgers as recommended in the EIA.
Sec. 4.1.13 p. 54-55	Low impact dredging techniques are recommended.	Franchisee/ Contractor	The EIA-recommended closed grab method of dredging has been adopted.
Sec. 4.1.13 p. 55	The licensee will formulate his design and construction and operation methods with pollution avoidance measures in mind, and provide specification in the tender submission.	PAA/Franchisee/ Contractor	The Franchisee and Contractor will abide by the mitigation measures as proposed in the EIA, where practicable.
Sec. 4.1.13 p. 55-56	The successful Tenderer would be required to undertake a detailed sediment quality assessment in a sediment quality report. This must be submitted to DEP at least three months prior to contract tendering, or the commencement of dredging, whichever is earliest.	PAA/Franchisee	Done. Material was classified as Class A (uncontaminated).
Sec. 4.1.13 p. 56-58	Dredged material to be disposed of at a gazetted marine disposal ground.	PAA/Franchisee/ Contractor	An application has been made to Gov't for a dumping licence.
Sec. 4.1.13 p. 58	Track record of the contractor and vessel operators to be investigated prior to awarding work.	PAA/Franchisee	A reputable Contractor has been selected who is fully committed to implementing mitigation measures wherever practical. They are working closely with Dr Jefferson on developing noise mitigation measures and will attend an environmental awareness course prior to start of works.
	<b><i>Pre-commissioning and Commissioning of Pipeline</i></b>		
Sec. 4.1.15 p. 59	Proper disposal of testing and cleansing waters removed from the pipeline.	Franchisee/ Contractor	Proper testing and disposal procedures will be implemented.

	<i>Construction EM&amp;A</i>		
Sec. 4.1.16 p. 59	PAA water quality monitoring and audit required during AFRF construction.	PAA	Proposed monitoring programme has been submitted to EPD for review.

EIA Reference	Recommended Mitigation Measure	Responsibility	Implementation Status
	<b><i>Construction Waste Management</i></b>		
Sec. 4.3.5 p. 73	Comprehensive waste management procedures and appropriate staff environmental training to ensure that waste arising during the construction works do not enter surrounding waters.	PAA/Franchisee/ Contractor	The PAA (including Dr. Thomas Jefferson) will conduct a site induction course and outline all environmental requirements. The Contractor will submit a written environmental management plan including a waste management plan prior to start of works. PAA will conduct regular audits of construction site waste management practices.
Sec. 4.3.5 p. 74	Sewage storage or initial treatment facilities will be necessary on the works vessels.	Franchisee/ Contractor	The Contractor will exercise a zero discharge policy throughout the AFRF Construction. Wastes will be contained and disposed of at a suitable site.
Sec. 4.3.6 p. 74	During facility construction and pipeline installation, a waste monitoring programme to be implemented to ensure that all wastes are collected, handled, stored and disposed off-site in accordance with EPD regulations and requirements. This will be incorporated into the ongoing PAA Site Audit programme.	PAA/Franchisee/ Contractor	See response above for Sec. 4.3.5 p. 73 and Sec. 4.3.5 p. 74.
Sec. 4.3.8 p. 75	Waste management practices on works vessels and barges should be defined.	Franchisee/ Contractor	The Franchisee's Contractor will provide written procedures prior to start of works.
	<b><i>Construction Impacts on Marine Ecology</i></b>		
Sec. 4.4.7 p. 98	A detailed ecological study should be carried out, in parallel with the facility design, to provide seasonal data and properly assess the importance of the area as the nursery and spawning ground for penaeid shrimps, fish and the Chinese King Crab.	PAA	These studies have been ongoing since January 1995 and the results reported to AFD.
Sec. 4.4.7 p.98 / Sec. 4.4.7 p. 99	Based on the findings of the ecological study, appropriate mitigation measures should be developed at the detailed design stage, so that potential impacts on reproduction of these sensitive species can be avoided/minimised wherever practicable.	Franchisee	Studies have confirmed use of closed grab clamshell dredgers and the need to investigate further the practical use of silt curtains.

Sec. 4.4.7 p. 99	Low impact dredging techniques recommended.	Franchisee/ Contractor	The EIA-recommended closed grab method of dredging has been adopted.
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EIA Reference	Recommended Mitigation Measure	Responsibility	Implementation Status
Sec. 4.4.7 p. 99	The use of silt curtains during dredging activity should be investigated to assess their practicality.	Franchisee/ Contractor	See response to sec. 4.4.7 p.99 above.
Sec. 4.4.7 p. 99	Dolphin monitoring programme during construction works.	Franchisee/ Contractor	The dolphin monitoring programme is currently being developed in concert with Dr. Thomas Jefferson and will be implemented 1-month prior to the start of construction.
Sec. 4.4.7 p. 99	Observation of waste management procedures to be strictly enforced and monitored.	PAA	PAA will conduct regular audits of construction waste management practices.
Sec. 4.4.7 p. 100	Piled structure for AFRF preferred over blockwork structure.	PAA/Franchisee	Pile structure is the adopted design.
Sec. 4.4.7 p. 100	In-situ bored piling method preferred over percussive piling.	PAA/Franchisee/ Contractor	Based on the recommendation of a four member panel of cetacean experts chaired by Dr. Würsig, percussive piling is the preferred piling method. However, the cetacean experts recommended that noise mitigation measures be investigated and, if practical, be adopted during construction. Dr Jefferson is now actively working with the Franchisee and contractor on the implementation of practical mitigation measures.
Sec. 4.4.7 p. 100	Selection of submarine pipeline route: to be constructed to the west of Sha Chau and so as to avoid adverse impact on the East Sha Chau CMPs.	PAA/Franchisee	This is the adopted route.

EIA Reference	Recommended Mitigation Measure	Responsibility	Implementation Status
Sec. 4.4.7 p. 100-101	<p>In order to minimise noise disturbance, all AFRF construction activities should be considered, wherever practicable, such that:</p> <ul style="list-style-type: none"> <li>• they are as short in duration as possible</li> <li>• work effort is regular</li> <li>• activities are continuous, without short breaks or unpredictable outbursts at random intervals</li> <li>• activity should cease for a period of 4 to 6 hours each day</li> <li>• use of quiet construction vessels and plant wherever practicable</li> <li>• scheduling of construction works during wet season period</li> <li>• vessel movements should be minimised</li> </ul>	Franchisee/ Contractor	The Contractor is committed to working with Dr Tom Jefferson to minimise noise impacts wherever practical.
	<b><i>Spill Response</i></b>		
Sec. 6.3.8 p. 172	A spill response plan (SRP) will be an important component of the detailed design phase of the facility. An SRP and spill response resources should be in place before the commissioning of the facility.	Franchisee	This will be done.
Sec. 6.3.8 p. 172	Further studies to forecast the extent of potential fuel spills during the operation of the AFRF are considered necessary and should be conducted prior to commissioning.	Franchisee	The Franchisee is committed to doing this.



EIA Reference	Recommended Mitigation Measure	Responsibility	Implementation Status
	<b><i>Construction Phase Dolphin Monitoring</i></b>		
	<b><i>(1) Baseline Monitoring</i></b>		
Sec. 7.4 p. 180	Requirements for <i>Sousa</i> monitoring to be finalised with AFD.	PAA/Franchisee/ Contractor	The land based and boat based monitoring procedures have been developed in concert with Dr. Jefferson. It is Dr. Jefferson's view that air surveys are not required as part of the AFRF construction monitoring programme. However, limited air surveys may be included as part of Dr. Jefferson's overview survey of North Lantau waters. He will concentrate his surveys on the Brothers and Sha Lo Wan areas.
Sec. 7.4 p. 180-182	One month <i>Sousa</i> monitoring programme in the vicinity of the AFRF at Sha Chau one month prior to the commencement of construction to establish baseline <i>Sousa</i> numbers.	Franchisee/ Contractor	Agreed. This will be implemented under the guidance of Dr. Jefferson and Dr. Würsig.
	<b><i>(2) Construction Stage Impact Monitoring</i></b>		
Sec. 7.5 p. 182	Monitoring programme to be continued throughout the first month of facility construction or via a continuous monitoring programme of land and boat surveys conducted on a fortnightly basis and thereafter throughout the duration of the facility construction works, at a tentative frequency of every three months, if practicable.	Franchisee/ Contractor	See comment on Section 7.4 above.
Sec. 7.5 p. 182	All sightings in the vicinity of the AFRF to be recorded on <i>Sousa</i> Sighting Forms.	All Parties	Agreed.

**Aviation Fuel Receiving Facility at Sha Chau**  
**Operational Phase Environmental Mitigation Measures (as proposed in EIA)**

<b>EIA Reference</b>	<b>Recommended Mitigation Measure</b>	<b>Responsibility</b>	<b>Implementation Status</b>
	<b><i>Operational Impacts on Water Quality and Water Movements Impacts</i></b>		
Sec. 5.1.5 p. 107-108	Solid and liquid wastes should be handled, stored and disposed of in accordance with waste management practices defined by the Tenderer, and EPD regulations and requirements.	Franchisee	Agreed
Sec. 5.1.5 p. 108	Discharge of oil from vessels into the sea is forbidden and dedicated vessels should contain solid and liquid waste storage tank facilities.	Franchisee	Agreed
Sec. 5.1.5 p. 108	Dedicated fuel shuttle vessels to be used at the facility and to be single propeller vessels with a "Schilling" rudder and bow thrusters.	Franchisee	Highly manoeuvrable vessels will be employed.
Sec. 5.1.5 p. 108	Restrictions on vessel speed to be imposed on the approach to the facility.	Franchisee	Subject to Marine Department approval.
Sec. 5.1.5 p. 108	Low impact dredging techniques recommended for maintenance dredging activity.	Franchisee	Agreed
Sec. 5.1.5 p. 109	The Tenderer's detailed design should identify rapid, non-toxic spill response technologies to be implemented on the facility.	Franchisee	Agreed
Sec. 5.3.4 p. 116	The recommended waste disposal requirements for the AFRF should be incorporated into the Comprehensive Environmental Management Plan to be developed for the entire new airport operation.	PAA/Franchisee	Agreed
	<b><i>Operational Impacts on Marine Ecology</i></b>		
Sec. 5.4.3 p. 123	Further ecological studies as detailed.	Franchisee	Agreed and ongoing
Sec. 5.4.3 p. 123	Operational phase solid and liquid waste generation control measures.	Franchisee	Agreed
Sec. 5.4.3 p. 123	The use of larger dedicated fuel vessels is preferable to minimise the number of daily trips and hence minimise sediment resuspension, noise and physical harm potential.	Franchisee	This will be taken into account in the selection of the vessel by the Supplier.
Sec. 5.4.3 p. 124	Vessel crew training to minimise impact on dolphins.	Franchisee	Agreed
	<b><i>Operational Stage Dolphin Monitoring</i></b>		
Sec. 7.6 p. 184	The <i>Sousa</i> monitoring programme should be continued during the operation of the AFRF at a tentative frequency of every six months.	Franchisee	Agreed

**Dolphin - Conservation Measures and Studies - Sha Chau**  
(As Proposed in Reports Prepared by Dr. Bernd Würsig)

Reference	Recommended Mitigation Measures	Responsibility	Implementation Status
<sup>1</sup> para. I A	piled structure	PAA/Franchisee	Done. Pile structure is the adopted design.
<sup>1</sup> para. I B	boring or percussive	PAA/Franchisee/ Contractor	Based on the recommendation of a four member panel of cetacean experts chaired by Dr. Würsig, percussive piling is the preferred piling method. This was largely due to the shorter construction programme. However, the cetacean experts recommended that noise mitigation measures be investigated and, if practical, be adopted during construction.
<sup>1</sup> para. I C	vessel screw or associated noise of tankers and other support vessels < 300 Hz	PAA/ Vessel Supplier	Vessel design to be implemented through the Suppliers' Agreement
<sup>1</sup> para. I D	propelling shrouding to reduce noises	PAA/Vessel Supplier	Vessel design to be implemented through the Suppliers' Agreement
<sup>1</sup> para. I E	solid and liquid waste contaminants	PAA/Franchisee/ Contractor/ Vessel Supplier	to be implemented by AFRF designer; and the Franchisee and contractor during construction and operation
<sup>1</sup> para. I F	training for AFRF and boat personnel	PAA/Franchisee/ Dr. Jefferson/ Contractor	to be implemented by the PAA and Dr. Jefferson. Contractor personnel will attend site induction and training class, on environmental issues and environmentally friendly construction practices.
<sup>1</sup> para. I G	daily time out	Franchisee/ Contractor	to be implemented by the franchisee during construction and operation
<sup>1</sup> para. I H	artificial reef	AFD	Finance Committee approved the necessary funding. AFD will undertake the implementation of artificial reefs in phases; initially on an experimental basis.
<sup>1</sup> para. I I	Periodic review of newly analysed data by "Dolphin Management Plan Committee" (i.e. the MMCWG as referred in para III A)	PAA/AFD	PAA will submit all monitoring data to Dr Jefferson for review and evaluation. Copies of the data and Dr Jefferson's evaluation will be provided to the AFD who will submit to the MMCWG as appropriate

**Note:**

<sup>1</sup> References are to the report "Health and Survivability of the Indopacific Humpbacked (Chinese White) Dolphin, *Sousa chinensis*: Recommended Mitigation and Research Needs Relative to a Proposed Aviation Fuel Receiving Facility at Sha Chau, Northwest Hong Kong".

11/11/95

Reference	Major considerations to Allow the AFRF to Proceed	Responsibility	Implementation Status
<sup>1</sup> para. II A	AFRF to be temporary	PAA	PAA have targeted for an approximate 3-year primary operation period; the facility will then be used for emergency back-up only.
<sup>1</sup> para. II B	Marine sanctuary	AFD/PAA	Finance Committee approved the funding for AFD to designate, manage and enforce a marine sanctuary in the Sha Chau/Lung Kwu Chau area. PAA agreed to fund the recurrent costs for the operational life-time of the proposed AFRF at Sha Chau. Detailed proposal now being considered by the Marine Mammal Conservation Working Group. (See response to para. III A)

Reference	Summary of Focused Studies	Responsibility	Implementation Status
<sup>1</sup> para. III A	(1) develop dolphin management plan (2) formation of Dolphin Management Plan Committee (3) retain senior research biologist (marine mammal) to co-ordinate proposed programme of research	AFD	(1) and (2) A Marine Mammal Conservation Working Group (MMCWG) under the Marine Parks Committee of the Country and Marine Parks Board has been established by AFD to advise government on the management of the proposed marine sanctinary and in developing other conservation and mangement plan for the dolphin. (3) Consideration and preparations are underway to appoint an experienced Post-Doc level cetacean expert to advise the MMCWG and the government on the conservation of the dolphins in Hong Kong and to co-ordinate proposed programme of research as set out in paragraphs IIH and IVA - IVF subject to availability of funding.
<sup>1</sup> para. III B <sup>1</sup> para. III C <sup>1</sup> para. III D	land based Sha Chau Dolphin Monitoring Study boat based Sha Chau Dolphin Monitoring Study air surveys	PAA/AFD/ Franchisee	The land based and boat based monitoring procedures have been developed in concert with Dr. Jefferson. It is Dr. Jefferson's view that air surveys are not required as part of the AFRF construction monitoring programme. However, limited air surveys may be included as part of Dr. Jefferson's overview survey of North Lantau waters. He will concentrate his surveys on waters near The Brothers, and Sha Lo Wan.

<sup>1</sup> para. III E	photo-recognition studies outside H.K. waters	AFD/SWIMS	SWIMS Dolphin Research Team (DRT) to continue their work in HK waters; to expand the studies in waters outside HK waters is being considered by DRT subject to liaison with researchers in China and obtaining permission from appropriate authority in China.
<sup>1</sup> para. III F	water quality and benthic survey monitoring of the environment around Sha Chau as recommended in ERM's AFRF EIA study	PAA	Monthly benthic surveys commenced in January, 1995 and are on-going.
<sup>1</sup> para. III G	artificial reef	AFD	Finance Committee have approved the necessary funding. AFD will undertake the implementation of artificial reefs in phases.
<sup>1</sup> para. III H	radio-tracking	PAA/AFD	It is Dr. Jefferson's view that capturing animals for radio-tracking studies has the potential for serious harm to individual dolphins. As a result he does not feel that radio-tracking should be included in the AFRF construction monitoring programme. However, once more is known about the local population Dr. Jefferson feels that radio-tracking may play a role in a larger territory-wide analysis of dolphin movements.

Reference	General Studies and Procedures	Responsibility	Implementation Status
<sup>1</sup> para. IV A	population range, size and trends of dolphin in and around HK waters	AFD	See response to para. III A.
<sup>1</sup> para. IV B	genetic analysis	AFD/SWIMS/Mr. Stephen Leatherwood	Additional funding has been approved for DRT to undertake the work with assistance from Mr. Stephen Leatherwood. The appointment of a cetacean expert as proposed in para. IIIA will help co-ordinate the work.
<sup>1</sup> para. IV C	habitat requirements of dolphins in Hong Kong and elsewhere	AFD/SWIMS	See response to para. III A.
<sup>1</sup> para. IV D	dolphins' reaction to development	PAA/AFD	Dolphin monitoring programme for AFRF at Sha Chau should serve to provide useful data. Data will be received by Dr. Jefferson and Dr. Würsig and will be submitted to the AFD.
<sup>1</sup> para. IV E	health status of Indo Pacific Humpbacked Dolphins	AFD/SWIMS	See response to para. III A.
<sup>1</sup> para. IV F	age and reproductive studies	AFD/SWIMS	See response to para. III A.