



Australian Super Hornet
Air Quality Monitoring Plan
Version 1.0

AMENDMENT CERTIFICATE

It is certified that the amendments promulgated in the list below have been incorporated in this version of the Air Quality Monitoring Plan.

Version	Date	Comments
1.0	09 Oct 12	Submitted to DSEWPaC for approval

Proposals for amendment to this document are to be forwarded to SADFO Amberley.

ENDORSEMENT / APPROVAL

Endorsed



N. K. ANDREWS
Director Estate and Facilities Services
Defence Support - Queensland

20 September 2012

Approved



T. INNES
Air Commodore
Senior ADF Officer
RAAF Base Amberley

09 ⁰⁹ September 2012

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BACKGROUND

1. In March 2007 the Australian Government announced the acquisition of 24 F/A-18F Super Hornets to replace the F-111 capability at Royal Australian Air Force (RAAF) Base Amberley. As part of the introduction of the Super Hornet, Air Force conducted a staged environmental assessment process. The key element of this process was a Public Environment Report (PER), completed in accordance with the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The PER addressed potential environmental impacts as a result of Australian Super Hornet flying operations at RAAF Base Amberley.
2. The PER was completed in December 2009. In March 2010, after considering the PER, the then Minister for Environment, Water, Heritage and the Arts (the Environment Minister) approved Super Hornet flying operations at RAAF Base Amberley subject to ten conditions. Condition 4 requires Air Force to submit an Air Quality Monitoring Plan for approval by the Minister for Sustainability, Environment, Water, Population and Communities (SEWPaC).
3. A copy of the Final PER can be found at:

<http://www.airforce.gov.au/Aircraft/FlyingOperations.aspx>

Purpose of the Plan

4. The purpose of this Air Quality Monitoring Plan is to outline how Defence will comply with Condition 4 of the Environment Minister's approval of Super Hornet flying operations at RAAF Base Amberley.

Scope

5. The scope of this Plan is defined by Condition 4 of the EPBC Act approval (EPBC Reference: 2008/4410). The requirements of Condition 4, and how this plan addresses them, are provided at Annex A. This plan describes how Defence will:
 - a. monitor air quality using a sensitive receiver(s) in close proximity to, or on, RAAF Base Amberley;
 - b. validate a process for the accuracy of Super Hornet air quality impacts modelled in the PER;
 - c. determine the sources of pollutants, in cooperation with the relevant State authorities, and facilitate potential mitigation measures, in the event that the measured air quality values exceed relevant air quality objectives;
 - d. make available the results of rain tank water quality testing conducted in accordance with the PER;
 - e. Identify and implement appropriate measures to mitigate rainwater quality contamination in the event that contamination is found to occur as a result of Super Hornet operations.

6. This Plan is one of four required by the Environment Minister as a condition of approval for Super Hornet flying operations at RAAF Base Amberley. The three other plans are:

- a. **Australian Super Hornet Noise Management Plan (Condition 1).** This plan describes:
 - (1) planned Super Hornet flying operations from RAAF Base Amberley, including the number and timing of aircraft movements and design of flight paths and flight procedures to reduce aircraft noise effects;
 - (2) how Super Hornet flying operations that do not conform to planned operations will be managed;
 - (3) how the RAAF will address potential impacts from aircraft noise to non-work related activities on the Base;
 - (4) a communications strategy; and
 - (5) the review and update for the document.
- b. **Australian Super Hornet Noise Monitoring and Complaint Handling Strategy (Condition 2).** This strategy describes:
 - (1) how Air Force will monitor Super Hornet flights and aircraft noise;
 - (2) how Air Force will compare actual measured Super Hornet noise levels with those predicted in the PER;
 - (3) how Air Force will compare actual flight paths and procedures with those described in the Australian Super Hornet Noise Management Plan;
 - (4) protocols to receive, record, report and respond to noise enquiries about Super Hornet flying operations;
 - (5) a consultation and communication program that seeks to engage local people and groups about Air Force flying operations at RAAF Base Amberley, including aircraft noise issues;
 - (6) how the strategy and resultant reports will be made available to the public; and
 - (7) the review and update for the document.
- c. **Australian Super Hornet Noise Mitigation and Complaint Resolution Strategy (Condition 3).** This Strategy establishes an appropriately qualified independent noise complaint mechanism to:
 - (1) consider complaints regarding noise generated by the Australian Super Hornet flying operations not resolved through the Australian Super Hornet Noise Monitoring and Complaints Handling Strategy;

- (2) assess complaints for compliance with the Australian Super Hornet Noise Management Plan;
- (3) conduct an independent review of noise complaint handling undertaken in accordance with the Australian Super Hornet Noise Monitoring and Complaints Handling Strategy; and
- (4) make recommendations and identify measures to the person taking the action to resolve complaints.

SUMMARY OF LIKELY SUPER HORNET AIR QUALITY IMPACTS FROM THE PUBLIC ENVIRONMENT REPORT

7. The PER described the existing air environment by reviewing air quality data collected by the Queensland Department of Environment and Resource Management (DERM) at their Flinders View air quality monitoring station. Air quality is generally good with concentrations of NO₂, SO₂, ozone and PM₁₀ below the ambient air quality goals in the Queensland Environment Protection Policy (Air) [EPP(Air)]. The PER highlighted the key findings of a DERM investigation (1997) regarding regional air dispersion patterns in south-east Queensland:

- a. During summer, sea breezes carry pollutants from Brisbane towards Ipswich in the afternoon and these emissions can stagnate west of Ipswich in the evening. In the morning these pollutants are transported back towards Brisbane.
- b. During winter, pollutants from Brisbane travel south-west to Ipswich in the evening and return to Brisbane the following morning.

8. This regional air dispersion pattern significantly influences the air quality in the Ipswich area, including RAAF Base Amberley.

9. The potential air impacts of Super Hornet at RAAF Base Amberley were assessed by estimating emissions for a worst case hour of operations and modelling these emissions to predict the concentrations at modelled locations. The worst case intensive hour modelling used for Super Hornet operations at RAAF Base Amberley was 14 aircraft taking-off in one hour.

10. The PER concluded that the potential for air quality impacts from Super Hornet operations are very small. Local air quality is more likely to be influenced by other sources, including regional air dispersion. The predicted concentrations from Super Hornet operations were higher than for F-111 operations because more aircraft can potentially take off each hour. The methodology used for the assessment was considered conservative, and it was concluded that there is a low risk of new air quality impacts from Super Hornet operations at RAAF Base Amberley.

11. Given the minimal predicted air quality impacts of Super Hornet flying operations at Amberley, no specific impact mitigation measures were proposed.

PUBLIC CONSULTATION - ISSUES RAISED AND DEFENCE RESPONSES

12. As part of the public consultation process for the Draft PER, concerns were raised about the air quality impacts of Super Hornet flying operations in relation to the effects on water quality in rainwater tanks.

13. One submission highlighted that fuel dumping and additional flight movements may have impacts on water quality. It was noted that residents to the south, west and north of RAAF Base Amberley only have access to rainwater tanks as a source of drinking water and dams for watering livestock.

14. Defence responded that the Super Hornet aircraft is capable of releasing fuel during flight in order to reduce the weight of the aircraft for a safe landing. This is only done in emergency situations and in accordance with strict procedures. Fuel dumping is completed no lower than 6,000 ft (1,820m) above ground level, preferably over the sea. Fuel jettisoned at these heights vaporises almost immediately and disperses into the air.

15. Another submission expressed concerns about impacts on water quality in rainwater tanks and proposed a testing regime on selected properties to provide an assurance that before and after effects on water quality will not be negative.

16. Defence responded that potential impacts to water quality in rainwater tanks from military aircraft operations have been studied previously, for example at RAAF Base Williamstown. At Williamstown, water samples were taken from 20 tanks near flight paths and three control samples away from the area. These samples were tested for hydrocarbons (essentially kerosene) present in fuel, metals and formaldehyde. Evidence from Williamstown suggest that there needs to be careful consideration of the indicators/markers used in the testing/monitoring as some indicators do not have a direct correlation with other possible contaminants. All of the sampled water was within guidelines for suitability for drinking. No petroleum hydrocarbons were detected, suggesting that there is no detectable contamination of rainwater tank water from hydrocarbons present in aircraft fuel and exhaust emissions. Metals, at low concentrations, were found in some samples, but there was no correlation between their presence and aircraft flight paths.

17. Although the previous study found no relationship between aircraft overflight and quality of water in rainwater tanks, Defence recognises the concerns of the community around RAAF Base Amberley. To address these concerns, in 2009, Defence undertook water quality testing of selected rainwater tanks. This was achieved through collection of water samples from rainwater tanks near current flight paths and control samples from areas away from the area.

18. Defence will repeat the tests in 2012 or 2013, following the arrival of all 24 Super Hornets. The second round of testing will allow assessment of any impact as a result of the introduction of the Super Hornet.

19. Water sampling is to be completed within a one week period preferably during dry-weather conditions. Water samples will be analysed for the following constituents based on likely emissions from aircraft: does this include fuel as well as exhaust fractions.

- a. Metals (Arsenic, Beryllium, Cadmium, Chromium, Nickel, Lead, Zinc);

- b. Formaldehyde;
- c. Total Petroleum Hydrocarbons (C10-C36); and
- d. Polycyclic Aromatic Hydrocarbons (phenanthrene, fluoranthene, pyrene, anthracene, benzo(a)pyrene, benzo(a)fluoranthene, chrysene, anthanthrene and naphthalene).

20. Results are to be assessed against Australian Drinking Water Guidelines (National Health and Medical Research Council and Agricultural and Resource Management Council of Australian and New Zealand, 2011) and will form the baseline for comparison of water quality results following introduction of the Super Hornet fleet.

AIR QUALITY MONITORING

Requirement 1: Monitor air quality near a sensitive receiver in close proximity to or on RAAF Base Amberley

21. Defence will establish an air monitoring station(s) near a sensitive receiver in close proximity to or on RAAF Base Amberley to monitor air quality. The PER identified seventeen locations as potentially sensitive to air quality impacts from Super Hornet flying operations.

22. Defence will engage the services of a consultant with suitable expertise to undertake the air quality monitoring and reporting activity. The consultant will be selected based on task appreciation, methodology, relevant experience and value for money. The consultant will determine the optimal location for a monitoring station based on relevant siting criteria including, but not limited to:

- a. proximity to aircraft takeoff flight paths;
- b. domestic and residential emitters (principally traffic),
- c. prevailing winds;
- d. access to services (electricity and telecommunications);
- e. landholder consent; and
- f. arrangements to secure the monitoring equipment.

23. The air quality objectives goals for this Air Quality Monitoring Plan are taken from the PER. They are the relevant air quality objectives specified in the Queensland *Environment Protection (Air) Policy 2008* [EPP (Air)], as shown in Table 1. The EPP (Air) air quality objectives are consistent with the National Environment Protection Measure (NEPM) for Ambient Air Quality standards released by the National Environment Protection Council (NEPC, 2003).

Pollutant	Air Quality Objective		Averaging Period	Allowable Exceedances
Carbon monoxide (CO)	11,000 ug/m ³	9 ppm	8 hours	None
Nitrogen dioxide (NO ₂)	250 ug/m ³	0.12 ppm	1 hour	1 day per year
	62 ug/m ³	0.3 ppm	1 year	None
Sulphur dioxide (SO ₂)	570 ug/m ³	0.2 ppm	1 hour	None
	230 ug/m ³	0.08 ppm	24 hours	None
	57 ug/m ³	0.02 ppm	1 year	None
Formaldehyde	54 ug/m ³	0.04 ppm	24 hours	None
Ozone (O ₃)	210 ug/m ³	0.10 ppm	1 hour	1 day per year
	160 ug/m ³	0.08 ppm	4 hours	1 day per year
Particulate matter (PM ₁₀)	50 ug/m ³	-	24 hours	5 days per year
Particulate matter (PM _{2.5})	25 ug/m ³	-	24 hours	None
	8 ug/m ³	-	1 year	None

Table 1: Relevant Air Quality Objectives from EPP(Air)

Requirement 2: A process for validation of the accuracy of Super Hornet air quality impacts modelled in the PER of the action

24. Consultants will be engaged by Defence to collect, evaluate and report the air quality data collected from the air quality monitoring station. The results will be the production of an Air Quality Monitoring Report which is planned to be published annually, during testing periods. The report will evaluate the accuracy of the predictions about Super Hornet air quality impacts as modelled in the PER. The report will also compare the measured air quality data to the air quality objectives identified above in Table 1.

25. The annual Air Quality Monitoring Report will be tabled to the local community through the Amberley Consultative Working Group (ACWG), which includes representatives from Federal, State and Local governments, community leaders and interested members of the community. The annual Air Quality Monitoring Report will be made available on the RAAF Base Amberley website at:

<http://www.airforce.gov.au/bases/amberley.aspx>

26. The air quality monitoring and reporting will occur for a minimum period of 3 years. Following publication of the third annual Air Quality Monitoring Report, it is expected there will be sufficient information to determine the accuracy of the air quality impacts predicted in the PER. A failure to validate the accuracy of the air quality impacts published in the PER would warrant the air quality monitoring and reporting to continue.

Requirement 3: Should the measured air quality values exceed relevant air quality objectives, a commitment to working with the relevant State authorities to determine sources of pollutants and potential mitigation measures

27. Should the measured air quality values exceed relevant air quality objectives Defence will work with the relevant authorities to determine sources of pollutants and enact reasonable mitigation measures.

RAIN TANK WATER MONITORING

Requirement 4: An undertaking to post the results of rain tank water quality testing conducted in accordance with the PER on an appropriate website for public information

28. In 2009, prior to the introduction of Super Hornet, Defence conducted a first round of rain tank water testing. A second round of rainwater tank water quality testing is planned for 2012 or 2013.

29. A report describing the results of the rainwater tank water quality testing will be posted on the RAAF Base Amberley website (<http://www.airforce.gov.au/bases/amberley.aspx>), and the Ipswich Library, 40 South Street, Ipswich. Members of the public may also request a copy of the report by contacting the RAAF Base Amberley Air Base Command Post on (07) 5361 2888.

Requirement 5: In the event that rainwater contamination is found to occur as a result of the proposal, identification and implementation of appropriate measures to mitigate the contamination

30. If rainwater contamination is found, Defence will notify relevant authorities at the earliest opportunity, including Ipswich City Council, and Queensland Government health and environmental agencies. If the source of the contamination is determined to be Super Hornet flying operations, Defence will work with the relevant authorities to identify and implement reasonable measures to mitigate the contamination.

MAINTENANCE OF THE PLAN

Internal reviews

31. This Air Quality Monitoring Plan will be reviewed annually by Defence in the first quarter of each year. This is in addition to the independent audits suggested by the ministerial approval

32. Where a review of The Plan identifies a need for its modification, then a revised Plan will be submitted to the Environment Minister for approval. Until the new plan is approved, air quality monitoring will adhere to the most recently approved plan. Notwithstanding this, changes may be made at any time if required by law, or to assure health and safety.

External reviews

33. An independent audit of compliance with the conditions of approval is to be conducted in accordance with Condition 5 of the EPBC Act approval.

34. In accordance with the EPBC Act approval Condition 7, the Environment Minister may request specific revisions to this strategy at any time, should the Minister believe it is necessary or desirable for the better protection of the environment.

Record keeping

35. Accurate records substantiating all activities associated with the implementation of this plan must be maintained. These records must be made available upon request from DSEWPaC and may be subject to audit by DSEWPaC, or an independent auditor, or used to verify compliance with the conditions of approval.

ANNEX A—CROSS-REFERENCE TO PER CONDITIONS OF APPROVAL

Condition	Where addressed
4. The person taking the action must provide for approval by the Minister an Air Quality Monitoring Plan that includes:	
a. Monitoring air quality near a sensitive receiver in close proximity to or on RAAF Base Amberley;	Paragraphs 21 to 23
b. A process for validation of the accuracy of Super Hornet air quality impacts modelled in the Public Environment Report of the action;	Paragraphs 24 to 26
c. Should the measured air quality values exceed relevant air quality objectives, a commitment to working with the relevant State authorities to determine sources of pollutants and potential mitigation measures;	Paragraph 27
d. An undertaking to post the results of rain tank water quality testing conducted in accordance with the Public Environment Report on an appropriate website for public information;	Paragraph 28 and 29
e. In the event that rainwater contamination is found to occur as a result of the proposal, identification and implementation of appropriate measures to mitigate the contamination.	Paragraph 30
The Air Quality Monitoring Plan must be submitted for approval by 1 June 2012. The approved plan must be implemented.	