

Pollution Prevention: Private, commercial and military airfields.

The following notes are intended to give broad guidance on the potential for pollution at airfields and its prevention.

1. INTRODUCTION

In many respects airfields can be viewed as an area where a number of industrial type processes take place. As such, many of the methods for preventing pollution are similar to those recommended to the industrial and commercial sector. The principal exceptions are runway and aircraft de-icing during the winter months and the large volumes of aviation fuel used, especially at larger sites.

The use of chemical deicers on hard surfaces during the winter months will cause an increase in the runoff pollution load. In the case of airports with a significant number of traffic movements, effluent treatment measures such as storage and aeration of contaminated runoff may be required. Where possible potentially highly contaminated drainage areas such as runways, taxiways and aircraft stands should be separately drained from areas less prone to contamination. Diversion to the foul sewer of the 'first flush' of surface water likely to contain elevated levels of contaminants from these areas may be possible if adequate facilities exist and approval is given.

Because of the large area of impermeable surface at airfields, some form of flow balancing lagoon is often installed. Such lagoons should be protected from oil contamination by the installation of oil traps and removal equipment. These lagoons can facilitate treatment either passively, by means settlement, or actively, for example by the use of aeration equipment for the reduction of BOD.

Consideration must always be given to the potential effect pollution can have on surface water and groundwater. Reference to the quality of the receiving water and to the Agency's groundwater protection policy (Reference 1) must be made when carrying out a pollution prevention assessment.

2. DISCHARGE CONSENTS

- a. Discharges to the water environment will be regulated by a formal discharge consent under the terms of the Water Resources Act, 1991 (WRA). Such consents may contain numeric or descriptive conditions. Discharges to soakaways may also require consent. Military establishments used to be subject to Crown Immunity but this was removed under the Environment Act 1995 as from the 1st April 1996.
- b. Difficulties can arise where discharges are made to public surface water sewers. In these circumstances, the imposition of a WRA consent on the sewerage undertaker may be appropriate.
- c. All discharges of trade effluent require authorisation by the appropriate sewerage undertaker and may be subject to the terms and conditions of a trade effluent consent. Where reference is made to disposal to sewer this is always subject to such approval.

3. OIL STORAGE AND HANDLING

Aviation fuel oil is stored in above or below ground storage vessels, generally in bulk. Delivery to the aircraft may occur either by bulk tanker or bowser or, in the case of most large airports, by hydrant systems connecting fuel storage depots sited at remote parts of the airport to stand pipes situated below ground with access via manhole chambers. These systems operate under continuous high pressure (150-170 psi) and spillages or leaks during refuelling or as a result of pipeline failure can result in a significant loss of product. It is therefore essential that leakage or loss detection systems be incorporated in such pipelines.

Above ground storage facilities should be adequately bunded. Drainage from fuel storage areas and depots should be passed through an oil separator prior to discharge. Detailed guidelines covering above ground oil storage tanks (Reference 2), oil separators (Reference 3) and fuelling activities (Reference 4) are available from the Agency.

Underground fuel storage should preferably be contained in double skinned storage vessels and should be subject to a regular inspection programme. Single skinned tanks must be regularly tested for corrosion. Underground pipelines should, where possible, be laid in ducting which will allow regular inspection. In any case, routine pressure (crack) testing should be incorporated as part of a planned maintenance regime. Remote monitoring, automatic leak detection and audio/visual alarms should be considered. Underground pipelines and storage tanks may not be acceptable in areas of high groundwater vulnerability (see Reference 1).

4. DEICING

De-icers are used to prevent the formation of ice and to remove ice, frost or snow from vulnerable hard surfaces and aircraft to enable the safe movement of aircraft, vehicles and pedestrians.

Conventional de-icers such as granular salt cannot be applied to runways or aircraft because of their corrosive nature and alternative materials such as prilled urea or glycols or calcium magnesium acetate are substituted. De-icers may also contain dewetting and thickening agents to increase the effectiveness of the operation. The fluid concentration will be increased as the ambient temperature drops. Records should be kept by airport authorities and individual users of de-icer consumption.

Many independent carriers at commercial sites will carry out the de-icing of their own aircraft. This activity normally occurs just before take-off and may involve up to 1000 litres of solution to deice one large aircraft. The use of vacuum equipment to remove excess fluid from the hardstanding around the aircraft may be beneficial, as this will reduce the polluting load entering the drainage system. Fluid remaining on the aircraft will normally be deposited on the runway during take off.

Runway and taxiway de-icing can occur at any time as conditions dictate, and becomes increasingly probable as temperatures fall below 4°C. De-icing chemicals are normally dispensed by specialist vehicles. Storage facilities are either 200 litre drums, bulk containers or fixed sites. Mixing and heating facilities may be prior to loading of spraying vehicle or as part of the equipment. The bunding of tank and drum storage will be required.

Most airlines have de-icing procedures and usage documentation, with the operation being carried out by company personnel or contracted out.

Details of the de-icing agents and their use will normally be taken into account by the Agency when considering discharge consents. The Agency should be notified of the type and quantity

of de-icer used on a regular basis, which will depend on local circumstances and may be daily, weekly or monthly.

5. ASSOCIATED SERVICES

a. Freight Handling

The carriage of freight by air is increasingly common, involving the temporary storage of freight in warehouses on the periphery of the airport site.

The risk of pollution of surface water drainage system is high especially during loading and off loading. In view of the polluting nature of some of the materials in transit e.g. pesticides, it is essential that the handling companies, commonly tenants, are well regulated by the airport authority and are familiar with notification procedures if an incident likely to cause contamination of the drainage system occurs. The installation of shut-off valves at key points in the drainage system should be considered. Spillages contaminated materials should be removed, where possible, to a secure storage area or licensed waste handling facilities pending off-site disposal.

b. Aircraft Maintenance and Servicing

A wide range of chemicals are utilised to service and maintain aircraft. Substances of particular concern are oils, chlorinated solvents and metal plating solutions. This maintenance will normally take place in covered sites or hangars and internal drainage, if installed, should not connect to the surface water drainage system. The operator should take the normal precautions with regard to the storage and handling of chemicals and ensure adequate procedures are in place and equipment, such as spill kits, is available. In the event of a spill the airport authority must be informed without delay.

Routine servicing, such as lubrication, and washing is often carried out on the aircraft stand. Where possible aircraft washing should be carried out in a designated area with washwater recycling facilities or discharge to the foul sewer or a sealed tank.

c. Car parking

Car parks and other long term vehicle parking areas will require the installation of oil separation facilities if no other controls exist and may require a discharge consent if drained separately from the airport drainage. Guidelines on Oil Separators are available from the Agency. (PPG3 -Reference 4)

d. Contractors on site

Water pollution from airfields is often the result of civil engineering work being carried out on site. The operator should ensure that contractors are fully aware of their obligation to prevent water pollution and ensure adequate safeguards and working practice are employed. A guidance note on the prevention of pollution from construction sites is available (PPG5 - Reference 5). A training programme may be required to explain the statutory obligation and importance of water pollution prevention.

6. EFFLUENT AND SEWAGE DISPOSAL

Most major airports are connected to the public sewerage system. However, the size and layout of terminals and other facilities may necessitate the installation of on-site pumping stations. Such stations should be equipped with an alarm system to notify the appropriate personnel in the event of pump failure or blockage in order that any sewage overflow is prevented.

Where spillage from a trade effluent treatment plant could enter the surface water drainage system or underground waters the plant must be bunded and an alarm system may be appropriate. Sewage treatment plants should be adequately designed and properly maintained and where there is a risk of damage to the treatment process from accidental spillages or excess wet weather flows flow balancing may be necessary. Discharges from sewage treatment plants and any sewer overflows or emergency discharge points will require consent under the Water Resources Act, 1991.

7. FIRE SERVICES

Permanently stationed fire crews will be required to undertake regular exercises involving the burning of fuel or inflammable gas and the use of fire fighting foam. A designated site should be made available and drainage directed to the foul sewer or alternatively a holding tank for subsequent disposal. The location of the site should be agreed with the Agency.

It is desirable that the fire service, who would normally attend any spillages, are familiar with the drainage system, appreciate the pollution risks and are trained and equipped for spillage containment.

8. GROUND MAINTENANCE

Effective weed control is required to maintain fire breaks, to clear sight lines and regulate the growth of inter-runway grass. Various mechanisms will be employed, including the application of herbicides, to achieve weed reduction or removal. In some circumstances fertilisers may be applied to encourage the growth of selected vegetation.

Consideration of the potential for pollution from such chemicals and safe methods of working should be adopted. The storage of pesticides should preferably be in accordance with BASIS requirements. Reference should be made to the Groundwater Protection Policy (Reference 1) and uses of the receiving waters before adopting a weed control or fertiliser application programme. A guidance note on pesticides (PPG9-Reference 6) is available.

9. EMERGENCY PROCEDURES

The airport or base should have an emergency plan and procedures in place to deal with large scale pollution incidents or fires. These should include a comprehensive site drainage and services plan, which should be accessible at all times and descriptions of the operation of isolating valves and other pollution control equipment. The names of airport or base Environmental Advisors, contractors and other key staff should be made available to the Agency, along with telephone numbers for use in an emergency. This information must be kept up to date and regular staff training, including exercises carried out. Detailed advice will be found in the Agency's guidance PPG18 - Reference 7.

Refuelling spillages are normally treated with emulsifiers or similar dispersants after the bulk of the fuel has been hosed down. However, vacuum techniques should be used if possible. As an alternative, oil absorbents should be considered in all locations where the discharge passes to surface water drainage systems, as emulsified oil is highly polluting and may emulsify any oil already trapped in oil collection devices.

10. REFERENCES

1. Policy and Practice for the Protection of Groundwater : Environment Agency
ISBN 0-11-310145-7 Available from The Stationery Office
2. PPG2: Above Ground Oil Storage Tanks
3. PPG3: The Use and Design of Oil Separators in Surface Water Drainage Systems
4. PPG7: Fuelling Stations - Construction and Operation
5. PPG6: Working at Demolition & Construction Sites
6. PPG9: Pesticides
7. PPG18: Managing fire water and major spillages

The above Pollution Prevention Guidelines (PPGs) are available free from Agency offices or Website www.environment-agency.gov.uk/business