A GUIDANCE NOTE ON THE BEST PRACTICABLE MEANS

FOR

ORGANIC CHEMICAL WORKS

(BULK STORAGE OF ORGANIC LIQUIDS)

BPM 25/2 (95)

Environmental Protection Department
Air Policy Group

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1. INTRODUCTION

1.1 This Note is one of a series issued by the Environmental Protection Department to provide guidance on air pollution management for processes specified under Part IV of the Air Pollution Control Ordinance (the Ordinance). It also serves as a guide for the assessment of an application for Specified Process licence under the Ordinance.

1.2 It should be understood that this Note sets out the basic requirements for the applicant to provide and maintain the best practicable means for the prevention of emission of air pollutants. The applicant should recognize that whether a licence is granted or refused, and on what conditions, will depend on all the circumstances of an individual application besides the requirements set out in this Note. The Authority may devise specific requirements for individual facility carrying out the specified process.

1.3 This Note covers the bulk storage of organic liquids, including liquid fuel, in tanks having an installed capacity *(individual)* exceeding 100 m^3, which comes within the specified process "Organic Chemical Works" described in Schedule 1 to the Ordinance as:

"Works, not being a chemical process described in any other specified process, of the following kinds in which-

(a) the installed capacity exceeds 100 tonnes per annum (expressed as the total organic chemical products), and in which-

(i) any organic chemicals, including organic intermediate products, pesticides, fertilisers, and specialty chemicals, are manufactured in any organic chemical process; or

(ii) any organic solvent or mixture of solvents is recovered by any thermal process; or

(b) any organic liquids, including liquid fuel, are stored in tanks having an installed capacity exceeding 100m^3."

2. EMISSION LIMITS

2.1 All emissions to air, other than steam or water vapour, shall be colourless, free from persistent mist or fume, and free from droplets.

2.2 Emissions from the specified process and associated processes covered by this Note shall not:

(a) exceed the concentration limit / control requirement set out in Annex I.

(b) appear to be as dark as or darker than Shade 1 on the Ringelmann Chart when compared in the appropriate manner with the Ringelmann Chart or an approved device.

3. FUEL RESTRICTION

3.1 All fuels to be used shall comply with the Air Pollution Control (Fuel Restriction) Regulations in force.

4. CONTROL OF EMISSIONS

General Requirements

4.1 Appropriate air pollution control measures shall be used and good housekeeping should be followed in order to minimize air pollutant emissions into the atmosphere.

Ambient Air Quality

4.2 An acceptable ambient air quality shall be maintained at or beyond the plant boundary. In particular, the following limits measured at ambient conditions should not be exceeded at or beyond the plant boundary:

Benzene : 185 $\mu g/m^3$ (one-hour average)

Odour : 2 odour units

(Note: An odour unit is the measuring unit of odour level and is analogous to pollutant concentration. In this context, the odour level is defined as the ratio of the volume which the sample would occupy when diluted with air to the odour threshold, to the volume of the sample. In other words, one odour unit is the concentration of the odorant which just induces an odour sensation.)

Transfer, Handling and Storage of Volatile Organic Liquids

4.3 The requirements listed in this Section apply to the transfer, handling and storage of the following organic liquids:

(a) any organic liquid, including liquid fuel, having a flash point below 23^oC; and

(b) any organic liquid which is artificially heated above its flash point for transfer, handling or storage.

4.4 For transferring, handling and storing the aforesaid organic liquids, the following control measures shall be implemented:

(a) Transfer and handling

(i) During the filling of a road tanker with organic liquids from a storage tank, the vented vapour shall be passed to a vapour control system before being discharged to the atmosphere. To satisfy this requirement, the use of the technology of "Bottom Loading" is recommended.

(ii) Adequate means such as a high level detector, liquid shutoff device or other appropriate device shall be provided to avoid spills while filling road tankers with organic liquids.

(iii) Suitable seals shall be provided in transfer pumps, valves and couplers to avoid leakages for transferring and handling organic liquids.

(b) Storage

(i) A storage tank with a capacity greater than 1,000 m^3 shall be equipped with a floating roof *(see[1])*, unless it is installed before 1993 and is not required under the Building (Oil Storage Installations) Regulations to install a floating roof.

(ii) For a storage tank with a capacity greater than 1,000 m^3 which is not equipped with a floating roof *(see[1])*, a vapour control system shall be provided to minimize vapour loss from the tank.

(iii) A storage tank with a capacity greater than 100 m^3 but less than or equal to 1,000 m^3 shall be equipped with either one of the following to minimize vapour loss:

a) a floating roof *(see[1])*, or

b) a vapour control system.

(c) Vapour control system

(i) A vapour control system as mentioned in paragraph 4.4(a)(i) shall be capable of processing the organic vapour vented to it and reducing the vapour emissions to meet the emission limits stipulated in Section 2 of this Note.

(ii) A vapour control system as mentioned in paragraphs 4.4(b)(ii) and 4.4(b)(iii) shall be capable of processing the organic vapour vented to it and removing the vapour emissions to meet the emission limits stipulated in Section 2 of this Note.

(iii) Wherever practicable, a vapour control system should be designed to recover the removed vapours and return them to the plant for subsequent use.

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[1] *A floating roof should conform to the requirement of floating roof tank as set out in the Code of Practice for Oil Storage Installations (1992) issued by the Building Ordinance Office.*

Prevention of Leakage

4.5 Good engineering design and all practicable steps should be taken to prevent the leakage of organic liquid or vapour from the process or system. If leakage occurs, suitable mitigation measures and operation procedures should be enforced to minimize any resultant air pollutant emission.

4.6 Without prejudice to the generality of the above requirements, the following measures shall be implemented as the minimum requirement:

(a) The plant shall be designed, constructed and operated in a manner that there will be no leakage of organic liquid or vapour during normal plant operation.

(b) The plant operator shall implement suitable monitoring programme and procedure for detection and prevention of leakage. If any leakage is detected, the plant operator shall immediately take appropriate actions including those relating to plant repairs to minimize air pollution emissions.

Sampling and Maintenance

4.7 Good plant design and operation procedure shall be used to minimize the purge or release of any organic liquid or vapour from the process or system during:

(a) sampling of the organic liquid; and

(b) maintenance, repair or inspection of the plant.

5 OPERATION AND MAINTENANCE

5.1 Requirements include not only the provision of appliances, but the proper operation and maintenance of equipment, its supervision when in use, and the training and supervision of properly qualified staff.

5.2 Repair to equipment shall be made as soon as practicable. Specific operation and maintenance requirements should be specified for individual equipment.

5.3 Malfunctioning and breakdown of the process or air pollution control equipment which causes exceedance of the emission limits or violation of other air pollution control requirements shall be reported to the Authority within 3 working days.

6. MATERIAL RESTRICTION

6.1 Clean energy sources and fuels with proven benefits to air pollution reduction shall be used whenever possible in the relevant specified process and associated operations. The use of electricity or gaseous fuel is always recommended.

7. MONITORING REQUIREMENTS

7.1 Parameters and sampling frequency shall be determined by the Authority. However, the following parameters shall be monitored as the minimum requirement and the monitoring results shall be submitted to the Authority on a regular basis:

(a) Process monitoring

(i) monthly plant throughput of different organic liquids; and

(ii) other essential operating parameter(s) which may significantly affect the emission of air pollutants, such as the operating conditions of a vapour control system.

(b) Ambient monitoring

The ambient concentrations of the following chemicals shall be monitored on a regular basis at the plant boundary or any other locations agreed with the Authority:

(i) benzene; and

(ii) other organic vapours which may be emitted in significant amount from the process or system.

8. COMMISSIONING

8.1 Commissioning trials (to be witnessed by the Authority whenever appropriate) shall be conducted to demonstrate the performance and capability of the air pollution control measures and a report of the commissioning trial shall be submitted to the Authority within 1 month after completion of the trial.

ANNEX I CONCENTRATION LIMIT FOR EMISSION FROM ORGANIC CHEMICAL WORKS – BULK STORAGE OF ORGANIC LIQUIDS

I.1 Air pollutant emissions from the subject specified process and associated processes covered by this Note shall not exceed the concentration limit / control requirement specified below.

I.2 Emission limit / control requirement of vapour control system serving:

(a) Transfer and handling process (paragraph 4.4(a)(i))

capable of processing the organic vapour vented to it and reducing the vapour emissions to not more than 35 milligrammes per litre of liquid transferred or handled.

(b) Storage process (paragraphs 4.4(b)(ii) and 4.4(b)(iii))

capable of processing the organic vapour vented to it and removing the vapour emissions at an efficiency of not less than 95% by weight.