ENVIRONMENT AND HERITAGE SERVICE

GUIDANCE FOR PROCESSES PRESCRIBED FOR AIR POLLUTION CONTROL BY THE CHIEF INDUSTRIAL POLLUTION INSPECTOR

CHIEF INSPECTOR'S GUIDANCE TO INSPECTORS (PART B PROCESSES)

GAS ODOURISING PROCESSES

B PROCESS GUIDANCE NOTE - GNB 1/1 VERSION 1

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1. INTRODUCTION

This Note is issued by the Chief Industrial Pollution Inspector as one of a series providing guidance for processes prescribed for Air Pollution Control (APC) by the Chief Inspector in Regulations made under the Industrial Pollution Control (Northern Ireland) Order 1997.

A further series of Notes is produced by the Department of the Environment (NI) for those processes prescribed for air pollution control and subject to regulation by the District Councils.

This Note provides a guide on standards and techniques to Inspectors in their assessment of an application for, or variation of, an APC authorisation under the Order.

This Note will also be of interest to operators of such processes, however it should be understood that whether an authorisation is granted, and on what conditions, will depend on the particular circumstances of each application. Parameters such as individual process characteristics and site location may influence the nature of the conditions that are included in an authorisation.

A key objective of the legislation is to ensure that, in carrying on a prescribed process, the best available techniques not entailing excessive cost (BATNEEC) will be used -

(i) for preventing the release of prescribed substances into the air or, where that is not practicable by such means, for reducing the release of such substances to a minimum and for rendering harmless any such substances which are so released; and

(ii) for rendering harmless any other substances which might cause harm if released into the air.

This Note comprises guidance in relation to new and existing processes and is based on an assessment of best available techniques as qualified by the requirement not to entail excessive cost. (The definition and meaning of BATNEEC is contained in the Industrial Pollution Control Part A and B processes “A Practical Guide”.)

The guidance contained in this Note is based on the current state of knowledge and understanding of these processes, their potential impact on the environment, and the available control techniques at the time of publication. The guidance will be updated regularly, (as a minimum the Note will be reviewed at not more than four yearly intervals from the date of publication), to reflect changes in knowledge and understanding. It will not always be possible to revise the Notes quickly enough to keep in absolute step with rapid changes. It is therefore recommended that operators and their advisors check with the Inspectorate as to whether there have been any changes before relying on this Note for the purpose of making an application or taking other significant action under the Order.

2. PROCESS DEFINITION

2.1 This Notes applies to processes in which in which natural gas or liquefied petroleum gas (LPG) are odorised as described in Schedule 1 - Section 1.1 Part B of the Industrial Pollution Control (Prescribed Processes and Substances) Regulations (Northern Ireland) 1998.

2.2 In the context of this Note "process" comprises the whole process including the treating, handling and storage of any materials used in the process as well as products and wastes produced by the process.

3. GENERAL REQUIREMENTS

3.1 New processes must comply with the standards of this Note immediately.

3.2 It should be the aim to bring existing processes up to current standards whenever the opportunity arises. Account should be taken of the plant's technical characteristics; its rate of utilisation and the length of its remaining life; the nature and amount of polluting emissions from it and the desirability of not entailing excessive costs for the plant concerned.

3.3 As part of the first application for authorisation of existing processes, those areas of the process that require upgrading to achieve the standards of this Note should be identified, and the possible techniques which are to be employed indicated. Under normal circumstances, a detailed programme for upgrading, including timetable, should be submitted with the application.

4. RELEASES INTO AIR

4.1 In normal operation there should be no release of odorant.

4.2 During charging of odorant and prior to major maintenance, releases should not give rise to any odour outside the site boundary of the works where the process is carried on, as perceived by the Inspectorate.

5. RELEASE ROUTES

Possible release routes in the event of mishaps are as follows:-

- odorant off-loading operations;
- flushing procedures after off-loading;

- storage tank relief valve venting;
- leaks from odorant dosing pumps; and
- decontamination procedures in the event of plant breakdown or prior to scheduled plant maintenance.

6. TECHNIQUES FOR RELEASE MINIMISATION

6.1 Introduction

The techniques selected need to include releases from raw materials reception/storage, internal transportation, processing.

The process should be designed and operated in such a way that the substances released have the minimum impact on the environment. As a general principle the Inspectorate should be looking for evidence of the prevention, minimisation and rendering harmless of all releases of prescribed substances, and the rendering harmless of all other releases in the application, and requiring this in the authorisation.

Releases from the process may require a combination of several abatement techniques and the careful control of the process route taken in order to deal with the releases. The applicant should review all the options that are available and demonstrate that the combination of primary process and selected abatement equipment represents BATNEEC.

6.2 Techniques

6.2.1 Design Controls

6.2.1.1 A plant may consist of a bulk storage tank, smaller feed tanks, pumps and associated valves and pipework. The plant should be designed for ease of maintenance, be protected from possible impact damage and welded connections should be used whenever possible.

6.2.1.2 The plant should be designed to enable transfer using gravity between the tanks and the measuring pumps. There should be the minimum possible number of off-takes/pipe connections to the storage tanks at a level below the normal liquid content level of the tank. Such off-takes should receive additional protection from impact and valves should be placed in these lines as close to the tank as practicable. The high vapour pressure of the odorant makes the use of suction pumps to move the odorant difficult as they tend to vapour lock.

6.2.1.3 The tank should be fitted with pressure monitoring devices and alarms. A measuring system should be installed to monitor the level of the contents of the tank.

6.2.1.4 The tank and the system should be designed to be compatible with the expected usage of odorant.

6.2.1.5 A hard wired high level alarm should be fitted to the bulk storage tank.

6.2.1.6 For smaller installations, pre-filled containers may be used for storage and returned to the manufacturer for re-use.

6.2.1.7 An inert or natural gas blanket should be provided to minimise the possibility of a flammable mixture existing in the vapour space above the liquid.

6.2.1.8 Odorant pumps should be of a design that minimises the possibility of leakage. Hydraulically operated diaphragm pumps are recommended. The piston which transfers the drive from the motor to the pump should be sealed in a unit with a sight glass. Leaks of either hydraulic oil or odorant past any seal would be evident to the operator. Double diaphragm pumps with a pressure detection system between the two diaphragms to detect possible leaks in the diaphragms should be used.

When pumps are stripped down for maintenance, consideration should be given to renewing the PTFE diaphragms.

6.2.1.9 Compressed air or nitrogen, wherever available should be used to drive odorant pumps in preference to natural gas. Where natural gas is used a small emission of methane may arise when the pumps are in use. Wherever practicable, the methane should either be re-used elsewhere in the plant or abated, for example, by means of a catalytic burner. A BATNEEC case should be made where it is proposed neither to re-use nor abate the methane emissions.

6.2.1.10 All valves, flanges and fittings should be designed to operate to a very high standard of seal. The operating position of all valves, (i.e., open or closed), should be clearly distinguishable. Self sealing couplings should be used on flexible off-loading lines.

6.2.1.11 Displaced vapour from the storage tank should be burnt at a flare or incinerator or otherwise treated to minimise the potential for odour.

6.2.2 **Operational Controls**

The works management should ensure that a written system of work is provided covering all activities where odorant is transferred or equipment is opened up.

6.2.2.1 **Commissioning**

Before the system is filled with odorant or recommissioned after maintenance the unit should be thoroughly leak tested.

6.2.2.2 **Prior to Off-loading/Delivery**

6.2.2.2.1 The storage tank should be checked to ensure there is sufficient capacity to receive the delivery. Delivery tankers, where used, should be specifically designed to handle odorant chemicals.

6.2.2.2.2 Spillage trays, absorbent and decontamination chemicals and equipment should be available at the tanker unloading bay.

6.2.2.2.3 Interceptor pits and bunding should be checked to ensure that water has been removed and drain valves closed.

6.2.2.2.4 The flare system or other vent gas treatment system should be commissioned.

6.2.2.2.5 A trained operator should supervise the off-loading operation for the entire delivery period.

6.2.2.3 **During Delivery**

During off-loading/delivery, the system must be closely monitored and the operation stopped in the event of a fault condition.

Displaced gas should be flared or otherwise treated to eliminate odours.

6.2.2.4 **Completion of Delivery**

6.2.2.4.1 The off-loading lines/pipework should be purged or flushed to minimise the potential for odours. Purge gas should be treated and flushings collected for appropriate disposal.

6.2.2.4.2 All lines used for the delivery should be isolated and blanked/slip- plated.

6.2.2.5 **Decontamination of Equipment**

6.2.2.5.1 The system should be emptied of any odorant liquid.

6.2.2.5.2 The system should be flushed with methanol or other suitable material. The flushing agent should either be passed into the gas stream in the case of odorising natural gas for transmission, or collected in sealed containers for appropriate disposal.

6.2.2.5.3 Prior to maintenance/inspection of the plant the system should be decontaminated to prevent any emissions to air.

6.2.3 **Dispersion from Chimneys or Vents**

6.2.3.1 The applicants will need to satisfy the Inspectorate that an appropriate assessment of vent and chimney heights has been made to provide adequate dispersion of prescribed substances, and other substances that might cause harm, which cannot be prevented and may be released. Some guidance is given in Technical Guidance Note D1 (ISBN 0-11-752794-7).

6.2.3.2 It may be necessary for dispersion modelling to be carried out which takes into account local meteorological data, local structures and topography, as well as other local releases, (for example, sites with any large volume emission, significant non-combustion sources or multiple release points and sites where there are sensitive receptors nearby).

6.2.3.3 Applicants should provide clear information on the parameters used and the assumptions made in their assessment, especially when using dispersion models. The assessment of background concentrations of pollutants will be particularly relevant. Statutory air quality standards and other recognised criteria should be taken into account.

6.2.3.4 Process upsets or equipment failure giving rise to abnormally high release levels over short periods should be assessed. Even if a very low probability of occurrence can be demonstrated by the applicant, a value for the chimney or vent height should nevertheless be set to avoid any serious damage to health in such circumstances.

6.2.3.5 The Operator should have procedures in place to reduce load or shut-down plant in the event of inadequate dispersion conditions.

6.2.3.6 Chimneys or process vents should be designed to provide efflux velocities that meet the requirements for stack aerodynamic downwash as described in Technical Guidance Note D1. Care should be taken to avoid generating positive pressure zones within the chimney unless the chimney wall is impervious or lined. Where a wet method of arrestment is used, the linear velocity within the arrestment equipment should not exceed 9 m/sec, to avoid entrainment of droplets.

6.2.3.7 Chimney flues, process vents and all ductwork should be leakproof. Chimney flues and ductwork leading to the chimney should be adequately insulated to minimise the cooling of waste gases and prevent liquid condensation on internal surfaces. Chimney flues and ductwork should be regularly cleaned to prevent accumulation of material.

6.2.3.8 Chimney or process vents should not be fitted with any restriction at the final opening, (for example, a plate, cap or cowl), where it is necessary to achieve dispersion of the residual pollutants except for a cone to meet the efflux velocity requirements of par. 6.2.3.6. The discharge should be vertically upwards.

6.2.4 **General Operations**

6.2.4.1 Effective control of emissions requires the maintenance and proper use of equipment as well as prudent supervision of process operations. Effective preventive maintenance should be employed on all plant and the equipment concerned with the control of emissions to the air. Essential spares and consumables should be held or available at short notice.

6.2.4.2 Any malfunction or breakdown leading to abnormal emissions should be dealt with promptly and process operations adjusted until normal operations can be restored. The Inspectorate should be informed without delay. All such malfunctions should be recorded in a log book, retained by the operator for a minimum of 4 years and available for examination by the Inspectorate.

6.2.4.3 Staff at all levels should receive the necessary formal training and instruction in their duties relating to control of the process and emissions to air. Particular emphasis should be given to training for start-up, shut down and abnormal conditions.

6.2.4.4 A high standard of housekeeping should be maintained.

7. COMPLIANCE MONITORING PROGRAMME

7.1 Plant design should be such that there are no releases in normal operation and therefore continuous monitoring should not normally be required.

7.2 Visual and olfactory assessment should be made regularly to ensure that the plant area around the tanks, valves and pumps is free from leaks liable to cause a nuisance odour. A record should be kept of such assessments in the log book. Remedial action should be taken immediately in the case of adverse observations and the cause of the release and action taken should be recorded in the log book. A sensitive detector should be used to precisely locate any leak detected by smell.

7.3 The need for sampling facilities on chimneys or ducts should be discussed with the Inspectorate.

7.4 **Environmental Monitoring**

Depending on the local circumstances the Inspectorate may require the works to monitor the effects of their operation on the surrounding neighbourhood by means of atmospheric sampling or other measurements. Such monitoring would be of a scope and frequency sufficient only to establish the level of any local environmental impact.