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Your reference: ~~XXXXXXXX~~

To All Chief Officers

14 June 1989

Dear Chief Officer

DEAR CHIEF OFFICER LETTER 5/1989

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Yours faithfully

Reginald Doyle

SIR REGINALD DOYLE
Her Majesty's Chief Inspector of Fire Services

FIRE PRECAUTIONS AT LPG CYLINDER STORES: HSE GUIDANCE AGAINST THE USE OF PORTABLE PUMPS AS MONITORS BY FIRE BRIGADES

The Health and Safety Executive have recently provided guidance to their inspectors on the use of portable pumps on monitors by fire brigades at LPG stores. The Guidance, a copy of which is at Annex A, relates to a decision by an Industrial Tribunal supporting HSE's view that it was reasonably practicable to insist upon the provision of two monitors at the site in question.

2. The company concerned had suggested that a cheaper but just as effective method of providing a fixed water jet might be to use light portable pumps which are carried on fire appliances, but connected to fire hydrants rather than to static water supplies. The occupiers had based their case on the existence of a brigade training note explaining a method of using standard fire brigade equipment as an alternative to monitors.

3. It was represented to the Tribunal that the existence of a training note on improvisations using existing equipment did not imply that this was a normally acceptable alternative system and that there was, in any case, no standardisation of light portable pumps and branch pipes in fire brigades. The Tribunal agreed.

4. As occupiers of LPG storage sites will approach fire brigades for advice it is important that brigades should be aware of the current HSE guidance and give advice which is consistent with it. The relevant guidance is contained in HSE Guidance Note CS4, an extract from which is at Annex B. The Tribunal's decision is, of course, consistent with the guidance note.

File reference: FEP/88 49/82/1

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Health & Safety Executive

TD/7/T/2/88

(Distribution E (FIREX))

TECHNOLOGY DIVISION MINUTE

FIRE PROTECTION AT LPG CYLINDER STORES

USE OF PORTABLE PUMPS AS WATER MONITORS BY FIRE BRIGADES

Introduction

1. This minute provides Inspectors with details on the adaptation and use of light portable pumps for the fire protection of LPG cylinders.

2. Inspectors will be aware of the decision of the Industrial Tribunal held on 6 October 1986 in which an appeal by Felbridge Garage Ltd, East Grinstead, concerning the requirement to provide two water monitors at their LPG store, was dismissed. Details of this have been issued in FI Note 1987/1.

3. Amongst the grounds for appeal against providing water monitors, Calor Gas, who represented Felbridge, suggested that "a cheaper, but just as effective method of providing a fixed jet of water might be to use light portable pumps which are carried on Fire Brigade appliances, but connected to fire hydrants rather than to static water". This suggestion was supported by the presentation of a Training note of the Kent Fire Brigade which gave details of the methods for adapting such pumps. The Tribunal did not think that an evaluation of this alternative solution was within its competence and supported the original proposal for requiring water monitors. Furthermore the alternative was rejected by the Fire Officer who gave evidence on behalf of HSE. (A copy of the training note is attached)*.

Performance of Light Portable Pumps (LPP's)

4. Further information received from the Merseyside Fire Brigade suggested that these pumps are not carried on all fire appliances, neither would the fittings necessarily be available to adapt the pump in the manner described. Normally fire appliances have on board high capacity pumps, LPP's will normally be carried on appliances attending incidents in rural areas. Here the primary functions of the pump will be to a) boost the water pressure from a hydrant which could be several hundred metres away or b) to utilise secondary water supplies from natural sources - ponds, rivers, canals etc..

5. In addition the Fire Brigade briefly demonstrated the water deliveries from a typical ground water monitor (which they had available as part of national trials) fitted with a variable jet/spray nozzle and an AWG fixed branch pipe of similar design to that in the training note.

Test 1 comprised an Angus Fire Armour LPP (model 1200 super) with single inlet and two outlet hose connections fitted to the ground monitor (model Franks Fog Major rated at 1200 litres/min). The Station hydrant pressure of 2.5 bar was boosted by the pump to 5 bar outlet via two hoses to the monitor. With the nozzle on jet setting the water jet was projected about 10 to 15m. On fog setting a spray pattern (5(left) x 5(right) x 5(high) metres) was projected over a similar distance.

In Test 2 an AWG fixed branch pipe was fitted on the outlet of the monitor. The resultant jet was projected about 6 to 10m with a negligible spray pattern due to overspray.

6. Although these tests were by no means comprehensive they showed the superior performance of the water monitor, in terms of delivery rate, projection and spray pattern. A further consideration, quite apart from the availability of the hardware or performance will be the time delay introduced by any attempts to adapt the LPP. This will be much longer than the time it would take to connect hoses to ground monitors available on site.

(For information the cost of the monitor tested above was about £260).

Conclusions

7. The decision of the Tribunal was clear in its support for HSE's view that it was reasonably practicable to insist upon the requirement to provide two water monitors at the site in question. This is entirely consistent with the minimum standards for fire protection given in CS4 in particular paragraph 142 for new premises storing in excess of 25 tonnes of LPG.

8. Furthermore it is considered unlikely that any court or tribunal would uphold the view that commercial companies need not provide relatively inexpensive water monitors on the basis that the local Fire Brigade crew could adapt other equipment for that purpose and in all circumstances; particularly if that equipment was necessary to provide fire fighting jets to back up fire protection arrangements in hand at the time of arrival at a fire.

9. This view is further supported in correspondence received from the County Fire Officer of West Sussex. To put the training note into context the system devised by the Kent Fire Brigade was intended as part of a fireman's training in being able to adapt equipment that is to hand for purposes other than for which it was originally intended. Other examples would be adaptation of extending ladders to make step ladders or use of fire hose to construct rescue slings.

10. The Home Office Fire Services Inspectorate have been consulted and support the content of this minute. They have also confirmed that there is no standardisation of light portable pumps and branch pipes used by Local Authority Fire Brigades (see para 4). In addition they are considering the issue of similar guidance to Fire Brigades on this matter.

ADVICE TO INSPECTORS

11. The use of portable pumps in place of water monitors will not be considered an acceptable alternative for primary fire protection equipment. Portable pumps may well be used to provide additional back up in an emergency, but

their effectiveness is unlikely to match that which can be provided by a properly designed water monitor. The prime function of an LPP will be to boost the supply water pressure to fire fighting equipment not for use as a standby monitor.

12. No further instructions will be issued on this matter:

Inspectors should continue to follow the requirements for fire protection given in CS4.

3.3.1 The LPP is got to work in accordance with Drill WrT 1 as set out in the Fire Service Drill Book.

3.3.2 All other steps are as detailed in paragraphs 3.2.3 to 3.2.8.

Copies: 1 per Station
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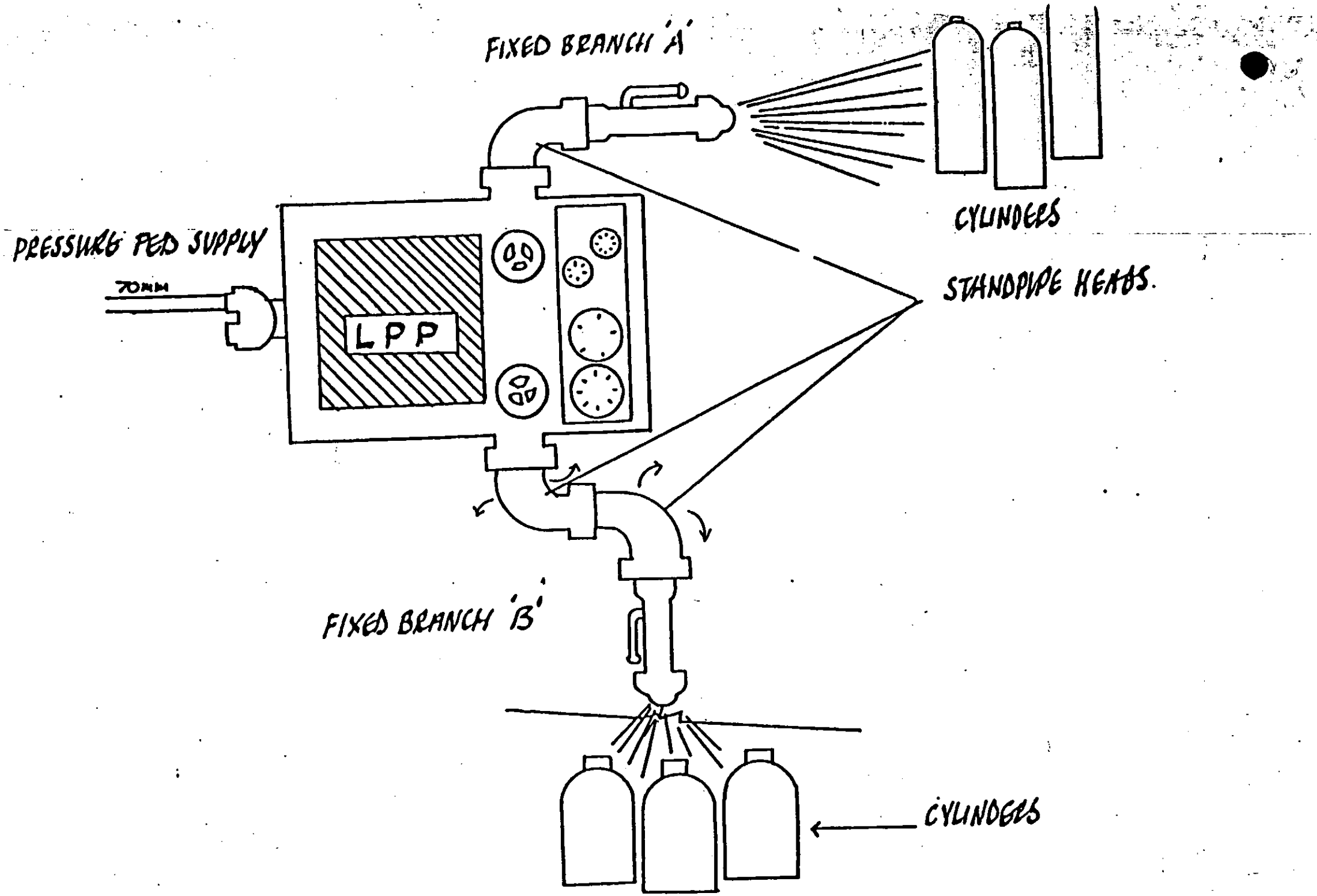
FIXED BRANCH 'A'
CYLINDERS
PRESSURE FED SUPPLY
70MM
LPP
STANDPIPE HEADS.
FIXED BRANCH 'B'
CYLINDERS

Extract from HSE Guidance Note CS4 - The keeping of LPG in cylinders and similar containers.

FIRE PROTECTION

First aid fire fighting equipment

138 There should be adequate portable fire fighting equipment on the premises for general use and for fires involving LPG. Further advice on fire fighting equipment and fire precautions may be obtained from either the enforcing or the fire authority.

139 The equipment for general use should be selected and located to enable fires on the premises to be extinguished at an early stage so that they do not spread to or jeopardize the LPG containers. Fire extinguishers or hose reels or an equivalent combination of the two types of equipment may be provided. Fire extinguishers should be selected, sized, located and maintained in accordance with BS 5306: Part 3: 1985, and hose reels should be selected and installed in accordance with BS 5306: Part 1: 1976.

140 In addition sufficient fire extinguishers, suitable for an LPG fire should be provided at each LPG storage area and elsewhere where containers are kept or displayed. Extinguishers should conform to BS 5423: 1980, powder extinguishers rated at 223B (eg a capacity of 9kg) will normally be suitable. Extinguishers should be located in strategic positions adjacent to the exits, round the perimeter of the store and in safe positions on access routes between stacks eg at a junction or crossing so that they will be readily available when required. At stores of less than 400kg a single extinguisher will be sufficient. There should be at least two extinguishers for stores of up to 5000kg and at larger stores an additional extinguisher should be provided for each additional 10 000kg of LPG, or part thereof, stored.

Water supplies and other fire fighting equipment

141 For stores of between 400kg and 25 000kg LPG there should be an adequate supply of water for fire protection. This should be readily available but may be provided via the public mains, or pumped from a static tank, river, canal, etc. Hydrants and hoses with spray/jet nozzles or hose reels should be installed so that any stack of cylinders may be effectively sprayed with water.

142 For stores of 25 000kg or more LPG, adequate water supplies should be arranged with a capacity to provide at least 2300 litres/minute (500 gals/min) for 60 minutes. At least two monitors should be available for use at such sites. Water mains, hydrants, pumps, etc should be installed as necessary to ensure that the water is readily available at an appropriate pressure at all times. Special consideration should be given to the possibility that there could be a loss of power to the site and the consequences that this would have for the fire fighting arrangements provided. Connections should be provided for hoses and fixed or mobile monitors so that any stack of cylinders and the adjacent stacks can be effectively cooled with water.

143 When making the provisions for fire protection care should be taken to ensure that cylinders stored in a building or under roofed areas can be effectively sprayed with water. In some cases fixed water sprays or sprinklers may be appropriate, see also paragraphs 68 and 100.

144 Vehicles loaded with cylinders and parked on the premises should be included in the provisions for fire protection.

145 Arrangements should be made to ensure an early call to the fire brigade in the event of a fire. Suitable access to the store should always be provided and maintained for fire brigade personnel, vehicles and other equipment.

EMERGENCY PROCEDURES

General

146 At all premises where LPG is kept there should be emergency procedures which set out the actions to be taken should an incident occur. The most likely incidents might include:

(a) LPG leaking from a container with or without ignition;

(b) a fire in the vicinity of LPG containers, subjecting them to radiant or direct heat and thereby affecting the safe containment of the LPG.

147 The aim of the emergency procedures should be to ensure:

(a) that everyone who might be in danger is warned;

(b) that steps are taken to control the incident and mitigate its consequences;

(c) that, where appropriate, the local emergency services are contacted;

(d) that all people not required to deal with the emergency are evacuated from the premises to immediately.

Action in event of leaking container

148 If a container is found to be leaking without the gas igniting the following actions should be taken provided it is safe to do so:

(a) any nearby source of ignition should be extinguished;

(b) an attempt should be made to stop the leak by closing the valve and replacing the bung or cap;

(c) if the leak cannot be stopped, the container should be carefully removed to a well ventilated open space clear of drains, buildings and sources of ignition and other LPG containers. The leaking container should be marked faulty and left with the leak (usually at the valve) uppermost. Notices prohibiting smoking and other naked lights should be displayed. General access should be prevented, eg by barriers. The supplier of the cylinder should be informed immediately. NO ATTEMPT SHOULD BE MADE TO DISMANTLE OR REPAIR DEFECTIVE CYLINDER VALVES except by persons trained to carry out the work.

Procedure in case of fire

149 Anyone who discovers a fire should:

(a) raise the alarm, including activating any fire alarm on the premises;

(b) call the fire brigade immediately and tell them that LPG containers may be involved. The Fire Officer on arrival should be told the location of the fire and the position of the LPG containers and any other hazardous materials held on the premises.

150 If gas from a cylinder valve is alight, IF IT IS SAFE TO DO SO, either turn off the valve promptly to extinguish the flame or extinguish the flame and then turn off the valve. Where possible and IF IT IS SAFE TO DO SO the cylinder and adjacent stacks of cylinders should be cooled by spraying with copious quantities of water.

151 If the flame from the leak cannot be extinguished by turning off the valve, fire fighting should only be carried out by trained personnel or fire brigade. If the flame is extinguished but vapour continues to escape, treat the cylinder as in paragraph 148. IF THE FLAME FROM A BURNING LEAK IMPINGES ON A CYLINDER AND THIS CANNOT BE STOPPED THE AREA SHOULD BE EVACUATED IMMEDIATELY.

152 Anyone not connected with the fire fighting should be evacuated in accordance with the general procedures in case of fire drawn up for the premises. The evacuation should include anyone occupying any other accommodation connected to the building.

153 Where a fire nearby is threatening LPG containers, they should be moved to a safe place PROVIDED THIS CAN BE DONE SAFELY. Where the cylinders cannot be moved they should be cooled by spraying with copious quantities of water.

154 It is essential that procedures for various categories of emergency are clearly defined and understood by everyone involved in the storage or handling of LPG. These procedures should preferably be written down and copies given to staff involved. At larger premises, those where 25 000kg of LPG or more is kept and premises where large numbers of the public may be present these procedures should form part of an emergency plan and should be discussed with the local emergency services.

155 For premises coming within the scope of regulation 7 of the CIMAH Regulations there is a specific requirement to prepare an on-site emergency plan and to cooperate with the local authority in the preparation of an off-site emergency plan. Further guidance is given in HSE booklets HS(R)21 and HS(G)25.

156 Some premises will be unattended for long periods, for example, overnight and at weekends. At such premises, where 25 000kg or more of LPG are kept, arrangements should be made with the local emergency services to ensure that someone responsible for the premises can be contacted, as necessary. Premises which are subject to the upper level requirements of the CIMAH regulations should not normally be left unattended.

TRAINING

157 Those concerned with the storage and handling of LPG in cylinders or similar containers should be provided with adequate information, instruction, training and supervision appropriate to their responsibilities, both for their own safety and that of others in the vicinity who may be affected by the hazards presented by the material. They should be familiar with the following:

(a) the physical characteristics and hazards of LPG;

(b) the fundamentals of fire-fighting and fire control, particularly fires involving LPG, and the effect that radiant or direct heat can have on the safe containment of the product;

(c) the correct handling of fire-fighting equipment and limitations on its use as a 'first-aid' measure;

(d) the inspection procedures to be adopted to allow removal of certain categories of cylinders or similar containers from service, eg damaged or leaking containers or cylinders requiring revalving or periodic inspection and testing;

(e) the procedures for dealing with defective or leaking cylinders;

(f) the procedures for deliberately venting LPG from the cylinder or container;

(g) the action to be taken in an emergency, including the responsibilities to be assumed, by whom, and the procedures for contact with local emergency services, neighbours, etc;

(h) at premises where 25 000kg or more LPG is kept, suitable staff should be specially selected and trained in the correct procedures for attempting to contain an incident involving LPG until the fire brigade can take over. The time element is of great significance, prompt action may prevent a small incident escalating into a major fire.

158 All staff should receive initial and refresher training as appropriate. The emergency procedures should be practised at regular intervals to ensure everyone is familiar with the actions to be taken. Where appropriate the emergency services should be invited to take part in such exercises.

INCIDENTS INVOLVING FARM SILOS

1. Chief Officers will be aware that guidance on incidents involving agricultural silos is currently provided in DCOL 18/1971, Technical Bulletin 2/1971, and Parts 6B and 6C of the Manual of Firemanship. In addition, the Health and Safety Executive, through HM Agricultural Inspectorate, has issued advice to the farming industry aimed at promoting safe working conditions in slurry storage systems and grain tower silos (AIC 1986/155 and 1986/156).

2. Notwithstanding the aforementioned guidance, fatal accidents have occurred in silos. It is essential therefore that safe operational procedures are adopted by all fire service personnel attending such incidents. To that end, the following paragraphs have been prepared in consultation with the Health and Safety Executive and endorsed by the Joint Committee on Fire Brigade Operations.

3. Fatal accidents have occurred within silos because people enter them, often to deal with bridged grain, without realising that dangerous gases are present. Some of these accidents have involved the deaths of more than one person because a rescue attempt has ended with a further tragedy. A sealed grain tower silo will contain an oxygen-deficient atmosphere and a probable build-up of carbon dioxide (CO_2) gas.

4. Her Majesty's Agricultural Inspectorate has issued clear and positive guidance to the agricultural industry on safe working systems to be adopted involving the use of silos. This guidance, together with recommendations concerning monitoring instruments, is contained in Annex to AIC 1986/156 mentioned above.

5. It is obvious that if the Fire Service is called to rescue persons collapsed or trapped within a silo, some of the "ideal" safety procedures may have to be adjusted. However, it is essential that officers in charge of such incidents adopt the

following safe practices:

(a) no firefighter or rescuer to enter the silo unless wearing and operating a breathing apparatus set which has been donned in fresh air.

(b) a rescue line to be securely attached around the waist of each person entering the silo. Lines should not be attached to the BA set.

(c) normal breathing apparatus stage 1 entry control procedure should be strictly observed. This is particularly important because silo rescues are liable to be unexpectedly expensive in the use of breathing apparatus air, and the urgency of the task may result in the rescuer not checking the BA gauge as frequently as normal. The entry control officer should be mindful of the type of rescue being attempted and the effect this will have on duration times.

(d) it is likely that access to the interior of the silo will be difficult and possibly only through a small opening at high level. The officer-in-charge should consider this problem and if necessary request the attendance of some mechanical lifting aid. This might take the form of a simple block and tackle, or the attendance of a hydraulic platform, or turntable ladder depending on local circumstances. Some farms are equipped with mechanical "mini-lifts" which may be utilised in the rescue operations. At no time should the equipment or operator be redeployed whilst personnel are in the silo.

(e) resuscitation equipment should be immediately available.

6. Chief Fire Officers should make arrangements to ensure that all calls to incidents involving agricultural or industrial silos are responded to with a minimum attendance of two fully manned

appliances. The officer-in-charge should not be less than Station Officer rank. Further assistance should be immediately requested if it appears that the incident will require a large manpower commitment.

7. Any manpower or cost implications arising from the issue of this guidance will be minimal.

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ITEM C

DCOL 5 /1989

ELECTRICITY AND THE FIRE SERVICE

Chief Fire Officers will be aware that guidance on the above matter is provided in Chapter 3, Book 6b of the Manual of Firemanship. Although it will be some time before the aforementioned chapter can be revised and incorporated into a new 'book', the Fire Service Inspectorate has felt it prudent to consult the Electricity Council Safety Branch about the need to revise pages 106-119 and 144-151 of Book 6b to take account of recent developments in the electricity supply industry. The attached amendments to the Manual, provided at Annex A, reflect the outcome of that consultation. Chief Officers are asked to ensure that all operational personnel are advised of the changes. The amendments will be passed to the FSEB for comment and decision on when to include them in the examination bibliography.

Also attached, at Annex B, is a copy of the South Eastern Electricity Board's 'Notes of Guidance to Fire Brigades'. The 'Notes', which reflect advice contained in Part 6b of the Manual of Firemanship, have been prepared by Seeboard in order to remind local brigades of the need to exercise extreme caution when dealing with incidents involving apparatus on power system networks. Chief Officers may wish to consider whether the 'Notes of Guidance' should be widely circulated within their Brigade and whether they could usefully be added to existing operational orders.

There are no manpower or financial implications arising from the issue of this guidance.

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ELECTRICITY AND THE FIRE SERVICE

AMENDMENTS TO PART 6B OF THE MANUAL OF FIREMANSHIP

a) Page 107, Section II(1)(b) - Power Stations

Delete existing paragraphs and replace with the following:

"Power Stations may have outputs as high as 2,675 Megawatts (MW) while individual turbo-alternators have outputs as high as 660 MW. 900 MW alternators are planned. Energy sources can be hydro (water), fossil fuels (coal, oil or gas), or nuclear fission (uranium).

The main components of nuclear and fossil fuel power stations are fuel storage, steam raising (boiler or reactor), turbo alternators, water cooling, waste disposal, transformation and transmission of electricity to the National Grid.

To reduce fire hazard areas such as control rooms, switch and transformer rooms, etc., are usually separated from other plant by walls of fire resisting construction.

The type of building construction varies enormously but modern power stations are generally fire resisting and consist of steel frame with reinforced concrete walls at low level and metal panel walls above. Roofs are usually aluminium profile with bitumen over, they will usually burn through and partially vent major fires but are also flammable. Considerable quantities of insulating oil and other insulating materials used in electrical equipment will be found, together with lubricating oil used on turbines and generators. Most present day stations use hydrogen in closed circuit for cooling the alternators and have hydrogen generator plant, producing gas by electrolysis or catalytic conversion from methanol.

All power stations in the control of CEGB generate emergency and start-up electricity supplies with gas turbine or diesel engine driven alternators. Some large unmanned gas turbine generating stations are used for peak demands on the National Grid. Some factories and commercial buildings etc, may have small gas turbine or diesel driven alternators."

b) Page 111, Section II(2)(c) - Safety Procedures

Delete final paragraph and replace with the following:

"Competent Persons who claim overhead line supports receive extensive training and are subject to strict control rules. Both training and rules are necessary to ensure a safe system of work and compliance with legal requirements. Fire Brigade personnel should never climb overhead line supports without the approval and presence of an ESI official."

c) Page 112, Section II(3)(a)(ii) and (iii) - Substations

Delete sub clauses (ii) and (iii) and replace with the following:

"(ii) Outdoor Substations. The high voltage equipment in outdoor substations may vary in voltage rating from 6.6 kV to 400 kV.

The substations can be broadly categorised into those where the live conductors are totally enclosed within metal clad apparatus (see fig. 3.7), and those with exposed live conductors (see plates 50 and 52). The latter type are predominantly in the 33 kV - 400 kV voltage range.

The most frequently encountered type of outdoor substation is that used to distribute electricity at 415 V and 240 V to domestic commercial and light industrial premises. Such substations are equipped with metal clad apparatus with the high voltage side operating at 6, 11 or 22 kV and the low voltage side at 415 and 240 Volts.

(iii) Indoor Substations. The high voltage apparatus installed in an indoor substation may vary in voltage rating from 6 kV to 275 kV and is usually of the metal clad type, however, a significant number of indoor substations sited in urban areas also contain live exposed high voltage conductors.

The most frequently encountered type of indoor substation is that used to distribute 415/240 volt supplies. These are usually, but not always, equipped with high voltage apparatus which is metal clad and encloses the high voltage conductors. The 415/240 V distribution board however, is an arrangement of live exposed conductors."

d) Page 114, Section II(3)(b) - Transformers

Delete "10,000 gallons (45,500 litres)" in the second paragraph and replace with "113,000 litres".

e) Page 114, Section II(3)(c)(i) - Switchgear and Circuit Breakers

Delete "gas" in the last sentence of the second paragraph and replace with "explosive gas" (ie".....release the explosive gas which is generated.....").

f) Page 116, Section II(4)(c) - Junction or Link Boxes

Delete the last sentence of the second paragraph and replace with the following:

"The gas is flammable and can explode if heating or arcing occurs within the box or an external source of ignition is introduced without first venting the box.

Incidents of gas being generated by faulty equipment are rare, the most common cause of gas ingress is leakage from town gas mains."

g) Page 144, Section IV(8)(a) - Removing Persons from Electric Wiring

Delete from the first paragraph the sentence which begins "At lower voltage (3000 V and below) ....." and the sentence which begins "A steel shafted umbrella ....." and replace with the following:

"At lower voltages rescue from live conductors is possible using insulating materials once the system voltage has been correctly established. For voltages up to 4000 V rubber gloves rated at 4000 V and manufactured to BS 697 can be used.

For voltages up to 650 V, rescue can be carried out using rubber gloves to BS 697, dry synthetic fibre rope, a dry hooked wooden stick or a length of dry hose. Care must be taken to ensure that items used are free of metallic strips along their length and that any metallic attachment such as a hose coupling, does not make contact with live conductors and cause flashover and explosion."

h) Page 145, Section IV(8)(b) - Overhead Transmission Lines

Delete the final sentence of the second paragraph and replace with the following:-

"Immediate rescue action is rarely necessary. In the case of trespassers in proximity to live ESI plant, immediate action is not necessary if the persons at risk can be persuaded to remain where they are until the arrival of ESI staff. Where conductors have fallen to the ground, all that is usually necessary is for people to be kept as far away as is reasonably practicable until the arrival of ESI staff."

i) Page 146, Section V - Fire Fighting Procedure

The following should be added to the introduction in Section V:

Power Stations

"Emergency plans exist for all ESI Power Stations and liaison with the station management can be used to identify special risks such as radio-active zones, explosive gas and flammable liquid stores and areas containing live exposed high voltage conductors.

Substations

Liaison with the local ESI office is again necessary if fire fighting in substations is to be conducted safely. It will also be necessary to establish the quantities of fire fighting foam needed to deal with transformer fires that may involve oil volumes up to 113,000 litres.

Both indoor and outdoor substations can contain equipment operating at up to 275 kV with exposed live conductors. Outdoor substations can contain exposed conductors operating at up to 400 kV. If fire breaks out in a substation, some equipment may not be initially affected and will remain live presenting a lethal risk. No attempt should be made to extinguish burning electrical apparatus until advice is obtained from ESI staff.

Exposed live high voltage conductors present a lethal risk if struck by a fire fighting water jet. ESI advice will be needed on routing water hoses to the fire fighting point.

In addition, there is the risk of flashover caused by combustion products engulfing live plant and the problem of moving equipment where ground clearance beneath overhead live conductors is limited."

j) Pages 147 and 148, Section V(1) - Fires in Generating Stations

Delete Section V(1) and replace with the following:

"In nearly all cases, generating stations are staffed day and night (although small gas turbine stations are remote controlled) and consequently a fire is likely to be discovered in its initial stages and dealt with by the station fire team. The generating station will have a fire emergency plan, although similar in content these plans vary from location to location. The local fire brigade officer should make himself aware of the procedure to be observed in each instance. Regular training exercises should be arranged. In all instances the first attending appliance will be escorted from the gatehouse to the fire. Generating station sites are large (sometimes hundreds of acres) and it is recommended that rendezvous points should be established providing good radio communications and safe deployment of appliances. The generating station will have an incident controller and it is essential for the safety of his men and for effective firefighting activity to take place that the fire brigade officer should establish and maintain effective lines of communication to the incident controller.

Fires in generating stations may involve a considerable variety of fuels: liquid hydrocarbons such as heavy fuel oil, gas turbine oil, diesel oil, lubricating oil and transformer oil. All these oils may be pre-heated, to make them fluid or easier to ignite and burn in boilers, or because of their duty as lubricants or dielectrics. Pulverised coal dust may be present in large quantities on coal fired power stations and bulk storage of methanol, propane, hydrogen, methane and oxygen may be found. Cable insulation is usually PVC and will usually be of a quantity which will assure propagation of a fire evolving huge quantities of hydrogen chloride. Fires in generating stations can develop very quickly. It is essential, therefore, that no time should be lost in attacking any outbreak, and the fire brigade officer should co-operate closely with the station staff in order that the area of the fire may be restricted to the smallest possible limits, thus enabling the station to continue generating electricity in those parts which are not immediately affected. Electricity supply authorities use every endeavour to maintain supplies and fire brigade personnel should assist in that direction.

Generating stations are equipped with fixed fire protection systems which cover most major plants, and there are hydrants available. In the vicinity of the turbo alternators and boilers there is a high pressure hydrant main fed by the pumps for the high velocity waterspray protection. Extreme caution should be exercised in the use of the high pressure hydrants. Usually there is a lower pressure hydrant system available within the main building for general firefighting use and another hydrant main will be available outside the building. This latter main may contain salt or river water and the pump supplying it may not start automatically. Each hydrant system has an individual independent water supply. The use of water in some areas of a generating station may not be safe. Therefore, before commencing any attack, the station engineer in charge at the time should be consulted. Cable racks, tunnels etc may also be found at generating stations and will present a difficult problem should fire break out in them."

k) Page 148, Section V(2) - Fires in Transformers

Delete the first paragraph and replace with the following:

"Most fires involving transformers are caused by an electric are under transformer oil. Such an arc may be caused by an internal transformer fault and will produce hydrogen, acetylene and methane. The explosive gases produced may ignite and the resultant explosion will rupture the transformer tank and cause burning oil to flow or even be sprayed.

Power station locations usually have automatic actuation of high velocity waterspray fire protection onto transformer fires but carbon dioxide, halon and firefighting foam systems are also used to a lesser extent. Remote transformers are usually not fire protected.

The operating temperature of a transformer at the outbreak of fire may be quite high (100°C) and therefore the spread of fire can be extremely rapid. Delays in the start of firefighting will usually be necessary to ensure isolation and earthing of the affected transformer. Unless the fire is extinguished in its early stages, a major conflagration will probably result and, in the absence of barriers, ignited oil will spread to other flammable material in the vicinity. Where each transformer is not separately bunded, burning oil can flow around others in the group, or 'bank' as it is generally termed, and will rapidly involve them also. Such a fire may cause the shutdown of power over a considerable area. Firefighters should be aware that in major incidents the transformer oil cooler banks, if they are free standing, may collapse and that the porcelain insulators may shatter and throw hot porcelain over considerable distances. Where transformers are fed from overhead transmissions lines, the heat and smoke may cause ionisation of the air surrounding the conductors. This has the effect of increasing the electrical conductance of air to the point where it will allow electricity to flash from phase to phase or phase to earth. This problem is sometimes exacerbated by firefighting activity."

l) Page 149, Section V(2) - Fires in Transformers

Add the following sentence to the last paragraph in Section V(2):

"Fires involving brushwood etc, beneath overhead transmission lines may cause ionisation of the surrounding air and allow arcing to take place."

m) Page 149, Section V(3)(a) - Grid Substations

After "can safely be made" in line 6 of the first paragraph add the following sentence:

"The substation attendant will usually not be competent to allow safe entry to a substation for firefighting activity."

n) Page 150, Section V(3)(a) - Grid Substations

After "injured" in line 2 add the following sentence:

"It should be understood that the statutory right of entry to substations only applies to fire incidents."

Delete the sentence beginning "When planning predetermined attendances....." in the second paragraph and replace with the following:

"Fires involving supergrid transformers will require large quantities of water and foam concentrate. Planning predetermined attendances for such a risk should therefore take account of the possible need for extra pumps for water replaying and a form tender."

ITEM C

ANNEX B

DCOL 5 /1989

SOUTH EASTERN ELECTRICITY BOARD

CHIEF ENGINEER'S DEPARTMENT

OPERATIONS AND MAINTENANCE SECTION

NOTES OF GUIDANCE TO FIRE BRIGADES

Incidents involving Apparatus on the Power Supply Network

Extreme caution is necessary when attending a fire situation associated with electrical apparatus on the power supply network. Voltages on this electrical system vary from 240 Volts up to 400,000 Volts (400kV) and firefighters should appreciate that considerable danger is present. Contact with a conductor or, under certain conditions, approach to electrical equipment will cause a severe shock or even death.

On arrival at incidents involving electrical apparatus connected to the power supply distribution system, the officer-in-charge should request the attendance of a Seeboard engineer and ensure that crew members of responding appliances do not:-

1. Enter any enclosure surrounding electrical apparatus.

2. Climb any steel tower, structure, or pole supporting overhead lines.

3. Manipulate ladders or long objects in close proximity to any electrical apparatus or overhead line.

4. Spray water or foam directly on to electrical apparatus.

One most important point with which all firefighters should be conversant is that switching "OFF" the supply to overhead lines, cables, transformers, and switchgear does not necessarily render it "SAFE". Where electrical apparatus is involved, a Seeboard engineer will undertake the necessary operations to allow unrestricted working at the scene of the incident. This will be achieved in two stages:-

Stage 1.

The apparatus will be made "DEAD" by switching "OFF" the normal supply. If the engineer agrees, it may be possible at this stage to rescue human life or take action to contain a fire, provided the electrical apparatus is not disturbed. No other action must be taken at this stage.

Stage 2

The apparatus will be made "SAFE" by disconnection from the normal supply and connecting all high voltage conductors to earth. Following this stage, the engineer will issue a certificate to the officer-in-

charge stating that it is safe for work to proceed on the apparatus, without restriction.

The operations in the above two stages must be carried out by Seeboard authorised engineers only.

Overhead lines and pole-mounted electrical apparatus present more electrical hazards than cables and ground mounted apparatus, and the engineer may not agree to any work being carried out until the overhead line or pole equipment has been made "SAFE". This could apply even when a life is at risk.

THE ARMENIAN EARTHQUAKE OF DECEMBER 1988

Chief Fire Officers will be aware that Mr Roundell of the Fire Service Inspectorate headed a team of firefighters from the London Brigade which under arrangements agreed with the Overseas Development Administration (ODA) went to Armenia to assist in rescue operations following the earthquake of 7 December. The tragedy elicited many offers of help from individual brigades, some of whom committed men and equipment in their response, and the Administration has readily acknowledged their appreciation of both the sympathy expressed and the practical help given. In order to clarify some areas of uncertainty which have been drawn to my attention, however, and with the aim of improving the co-ordination of fire service efforts in time for the next occasion on which they may be needed I set out below details of the arrangements which have been agreed with the ODA and have been in place for some time now.

Channels of communication

2. The official Government response to specific appeals for help from overseas in times of disaster is met or co-ordinated by the ODA's Disaster Unit. When the help of the fire service is requested, the ODA will make contact with me or, in my absence, Mr Kilford of the Fire Service Inspectorate. Having determined the manpower and equipment involved and the degree of urgency I will consult in the first instance the Chief Fire Officer of the London Brigade because that brigade is the largest in the UK and can consequently call upon a wide range of equipment and its specialist handlers; its headquarters are geographically close to the Home Office thereby facilitating face-to-face meetings at short notice; the brigade has facilities for arranging documentation, any necessary medical preliminaries, finance and rapid transport to airports; and the brigade has had the experience of response to the Mexico City and San Salvador disasters of 1985 and 1986. If necessary in the light of

subsequent events and the wishes of the affected country I may contact other brigades with a view to providing a relief or back-up team.

Finance

3. The ODA accept responsibility for reimbursement of any necessary additional insurance cover for both men and equipment and the provision or reimbursement of all transport and other expenses incurred by firefighters who are away from their home brigade under these arrangements.

Unofficial initiatives

4. Neither the ODA nor the Home Office can accept financial or other responsibility for the despatch of teams or equipment overseas in circumstances outside the arrangements described above. It was from an organisational point of view unfortunate that in the case of Armenia it seems the Soviet authorities continued to accept and welcome initiatives from the fire service even after they had formally told the ODA that no further help was required.

Reports

5. Mr Roundell has reported to me on the team's visit to Armenia so that I may consider inter alia in conjunction with ODA what changes, if any, are necessary in the mobilising arrangements described. If any CFO wishes to let me know of anything affecting his brigade arising from the Armenian disaster and the response of the fire service to it I shall be happy to hear from him and to pass on any relevant comments to the ODA.

Telephone number of contact: 0 273 3501

File reference: FEP/88 81/1024/1

ISSUE OF TECHNICAL BULLETINS

You will be aware that the Home Office Fire Department ceased issuing technical bulletins in 1978, and since then technical operational information has been issued in the form of Dear Chief Officer Letters or Fire Service Circulars.

Some of the advice contained in existing technical bulletins has recently been revised by working groups of the Central Fire Brigades Advisory Council, and it is now considered appropriate that technical bulletins should be re-introduced.

Technical bulletins will be issued as an attachment to Dear Chief Officer Letters. As the contents will be examinable, brigades should ensure that there is sufficient local reproduction and circulation. There will be no restriction on brigades reproducing copies of technical bulletins, the contents of which will be mainly confined to technical and operational matters. JCDD specifications will not be produced in the form of technical bulletins, and there will be a gradual revision of existing bulletins.

The Fire Services Examinations Board has been advised of this decision.

Home Office
Fire and Emergency Planning Department
Queen Anne's Gate

(Telephone number of contact: 01-273 3151)
FEP 88 19/139/1

BUILDING BULLETIN NO 7
FIRE AND THE DESIGN OF EDUCATIONAL BUILDINGS

1. The Department of Education and Science have recently revised Building Bulletin No 7 and I am enclosing a copy of the sixth edition for the information of chief fire officers.

2. This sixth edition is of a wider scope than previous editions and applies to the whole range of educational buildings. It sets out national standards for local education authorities to follow in meeting their statutory requirements in new schools, as laid down in the Education (Schools Premises) Regulations 1981, and in other educational establishments.

3. Fire prevention officers may wish to refer to the Bulletin when responding to requests for advice about educational buildings in general. The uses to which the Bulletin may be put are qualified in its introduction and fire authorities will have to exercise their judgement in deciding whether to apply its guidelines, particularly where premises are used during the day time by people in addition to the normal school population or sometimes not used exclusively for school purposes.

4. Further copies of the Bulletin may be purchased direct from HMSO, ISBN 0 11 270585.

5. There are no significant costs or manpower implications arising from the issue of this guidance to fire authorities.

6. DCOL 2/1976 is now cancelled.

File reference FEP/88 18/129/2
Telephone number of contact: 01 273 3406