HOME OFFICE

Queen Anne's Gate London SW1H 9AT
Direct line: 071-273-
Switchboard: 071-273-3000

Our reference:

Your reference:

To: All Chief Officers 3rd November 1992

Dear Chief Officer

DEAR CHIEF OFFICER LETTER 11/1992

Items

1. BT Code of Practice.
2. UHF Radio Channels.
3. Memorandum of Understanding.
4. Hazards posed to firefighters by Asbestos.
5. MOD Guidance Document: Philosophy of MOD Reactor Accident Contingency Planning.
6. Fees for Driving and Riding Tests.
7. An Assessment of Fire Service Road Traffic Accident Rescue Equipment - CFBAC Research Report No 44.
8. Human Behaviour in Fires: CFBAC Research Report No 45.
9. Additives for hosereel systems: CFBAC Research Report No 46.
10. A study of Tank Farm Fires in Kuwait: CFBAC Research Report No 48.
11. The use of foam against large scale petroleum fires involving lead-free petrol: CFBAC Research Report No 49.
12. Sprinklers for life safety in department stores: CFBAC Research Report No 51.

Yours faithfully

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

ITEM 1

DCOL 11/1992

BT CODE OF PRACTICE

1. Attached for the attention of Chief Officers is a copy of the British Telecom Code of Practice.

2. The Code deals with the procedure for the handling of public emergency telephone calls between British Telecom (BT) and the four Emergency Authorities (EAs). The contents of the Code have been agreed by British Telecom and the EAs through the auspices of the 999 Liaison Committee.

3. The document gives details of the procedural arrangements for handling emergency calls originating on the BT network and will be subject to regular review.

4. Brigades should aim to provide at least two weeks notice of changes to emergency contact numbers to BT. The date and time that the new numbers become effective should also be stated. Details of changes should be addressed to the 999/112 liaison point in the BT Operator Services Sector and marked "**URGENT - 999/112**".

5. It is not expected that there will be any significant manpower or cost implications arising from this guidance.

File reference number : FEP/91 59/67/16

Telephone number of contact : 071-273 3842/3583

APRIL 1992

ISSUE 6

CODE OF PRACTICE
FOR
THE PUBLIC EMERGENCY CALL SERVICE

BETWEEN
BRITISH TELECOM
AND THE
EMERGENCY SERVICES

PRACTICES AND PROCEDURES

CONTENTS

1. GENERAL INFORMATION

INTRODUCTION

1.1 This Code of Practice is intended to deal with the handling of "999/112" public emergency telephone calls between British Telecom and the four Emergency Authorities (Police, Fire, Ambulance and Coastguard).

1.2 The contents of the Code have been agreed by British Telecom and the Emergency Authorities through the auspices of the Home Office/British Telecom 999 Liaison Committee. The Code has been circulated to all BT Operator Services Zone Managers and to all EA Chief Officers for their information. The Code is subject to regular review.

GENERAL DESCRIPTION OF THE 999/112 SERVICE

1.3 British Telecommunications plc (British Telecom) operates under a licence granted by the Secretary Of State for Trade and Industry under Section 7 of the Telecommunications Act 1984. Conditions 6 to 10 of this licence impose statutory obligations with respect to emergency situations. A copy of those conditions is attached as an Annex.

1.4 The "999/112" emergency call service is provided under Condition 6 of the Licence which requires British Telecom to provide a Public Emergency Call Service at all places throughout its licensed area by means of which any member of the public may, free of charge, communicate as swiftly as practicable with any of the Emergency Authorities to notify them of an emergency. In circumstances where calls cannot be dialled direct BT must also provide operator assisted services to Emergency Authorities (Condition 7).

1.5 The handling of an Emergency Call involves BT in four main phases: -

(i) Connection of the caller to the operator via the 999/112 code.

(ii) Selection by the operator of the required Emergency Authority Control Centre (EACC).

(iii) Onward connection of the caller to the EACC.

(iv) Listening by the BT operator to ensures that connection has been established with the appropriate EACC, and to provide further assistance to the caller or Emergency Authority (EA) when required.

Additionally, there are other functions which the BT operator performs on a minority of Emergency calls, e.g. confirming calling number given, obtaining or attempting to obtain name/address of the caller, arranging for a call trace.

2. QUALITY OF SERVICE (GENERAL)

2.1 Within the terms of existing legislation, there are no quality of service targets laid down for call handling for either BT or the EAs.

2.2 BT's licence conditions state that a member of the public should be able to communicate as swiftly as practicable with any of the Emergency Authorities for the purpose of notifying them of an emergency. It should be noted that the Fire, Ambulance and Coastguard Services are subject to recommended attendance times.

2.3 In order to meet this obligation, 999/112 calls receive priority by BT operators over all other calls. If the operator has any other call in hand when a 999/112 call arrives then the operator will ask that caller to hold the line and will deal instantly with the emergency call. In the same manner, the EAs place the highest priority on incomming emergency calls.

3. BT AND EA BOUNDARY OVERLAPS

3.1 BT undertakes to connect all emergency callers from each individual exchange area to the appropriate control centre as nominated by the EAs. It is then the EA's responsibility to pass on information if necessary to another EACC.

3.2 Where a telephone exchange area loses its individual named identity due to the introduction of a linked number scheme, BT will arrange to sort emergency calls on the basis of individual exchange areas.

3.3 BT and EAs will make arrangements regarding their respective Operator Assistance Centres (OACs) and Emergency Authority Control Centres (EACCs) to ensure that where a single exchange covers more than one EACC, the relevant boundaries are clearly defined to enable emergency calls to be passed to the appropriate control centre. BT and EAs will exchange details of local managers and supervisory officers, and arrange regular liaison meetings.

4. CUSTOMER CALLING DETAILS REQUIRED

4.1 BT operators will obtain, or seek to obtain, the following information from a 999/112 caller before connecting a call to the relevant emergency service:

(i) the EA the caller requires.

(ii) the exchange and telephone number of the calling line. If the caller is unable to provide the number which the call is coming from, the BT operator will ask for the location of the caller and will then seek to connect the call to the appropriate EA. In no circumstances will the BT Operator refuse to connect a 999/112 call.

4.2 It is the responsibility of EACC staff to obtain adequate address information from the caller to enable the EACC to locate the incident being reported.

5. EA SELECTION DETAILS

Digital Network

5.1 BT's Operator Services Sub-system (BTOSS) has now been introduced. When a BT operator using BTOSS answers an Emergency call that has originated from a digital exchange, the full national calling number will be automatically displayed on the operator's Visual Display Unit (VDU). This removes the necessity for an engineering trace to identify the calling line if the caller is unable to provide this information.

5.2 Prior to the completion of the digital network, calls originating from an analogue exchange will not show the full telephone number, though a partial display of the exchange code may sometimes be obtained. The customer may therefore still need to be asked for his/her number in order to route the call correctly. (See also section 4.1 (ii) for cases where the customer is unaware of the full number).

5.3 The originating calling information (exchange code or calling number) will be used by BTOSS to automatically display details of the appropriate EACC connect-to numbers. The Operator will then ask which emergency service is required, and once this is known, will move the VDU screen cursor to the appropriate connect-to number. A further single key depression will automatically connect the call to the EACC.

5.4 An increasing number of business customers have DDI systems and/or private networks. In those systems that are digitally routed, the number automatically presented to the BT operator can be different to the number that the caller gives if asked by either BT or the EA. The BT operator connects using the automatically presented number, as indicating the most appropriate EACC and to minimise any delay in connection.
It should be noted that there are also some private networks that extend over several areas. Their 999/112 calls will be "fed" into the BT network in only one of these areas, which will lead to inevitable problems as they will be presented with a telephone applicable to this area, and therefore routed accordingly. These will only become apparent at the EACC when the caller is questioned as to their location.

6. ROUTING METHODS and NETWORK SECURITY

Digital Networking (see diagram 1)

6.1 In the digital network, the standard method of routing 999/112 calls from BT Operators on BTOSS to EACCs will be via the PSTN. Calls will normally be connected over the primary route to the nominated EACC. If this route is busy, 999/112 calls will be connected to the secondary number or, in exceptional cases, to an alternative number or EACC nominated by the EA. Additional network resilience will be provided by arranging that the alternative EACC is served from a different Digital Local Switching Unit (DLSU). Because the digital network provides good transmission and fast call set-up, this method of routing will provide sufficient resilience to meet BT's licence obligations.

7. PROVISION FOR OPERATOR CENTRE BACK UP

Digital Network (BTOSS)

7.1 Security in a BTOSS environment will be provided for 999/112 calls by the pairing of BTOSSs. If it is not possible to route operator traffic to the primary BTOSS due to congestion or failure within the network, 999/112 traffic will be routed to the alternative (security) BTOSS.

7.2 The databases at both BTOSSs, and their host DLSUs, will provide the necessary information for all of the Exchange Groups served by both BTOSSs.

7.3 If it is necessary to evacuate an Operator Call Handling Centre (OCHC), all traffic will be alternatively routed to a paired OCHC or the security BTOSS.

8. CALL MONITORING and DISCONNECTION

8.1 Once the EA answers the call, the BT operator will pass on the caller's number or will advise the EA that the caller's number is not known. The BT operator will also advise the EA if the call is from an automatic alarm or from a public payphone.

8.2 BT operating procedures requires the operator to note salient points of the initial conversation between the caller and the EA controller in addition to the caller's number and the time of the call. To carry out this function the operator will remain on the line, but in monitor mode, until satisfied that all such details have been passed to the EA. However, should further 999/112 calls require answering, operators may make themselves available to answer the new calls, thus removing themselves from monitor mode on an existing call.

8.3 BT will hold such records for a period of three months.

8.4 The BT operator will not clear down the circuit to the EA until a clear is received from the EA and will not clear the caller's circuit unless a clear is received from the caller.

9. CALL TRACING and CUSTOMER IDENTIFICATION

Call Tracing

9.1 If the BT or EA controlling operators need to verify the telephone number quoted by the caller while the call is in progress, the Operator Override (OOR) facility will be used.

9.2 In an analogue environment (where no CLI is given) EAs may request that BT carries out an engineering trace to ascertain the callers details.

9.3 BT will take all steps possible to respond to requests for call tracing. EA requests for confirmation of calling numbers (using OOR), details of installation addresses, and full engineering traces of address and number must be kept to a minimum consistent with the essential nature of emergency call needs.

Name and Address Information

9.4 At the request of the EACC the BT operator will, if possible, provide the installation address of the caller.

9.5 BT operators will only provide name and address information in an emergency situation. All other routine requests for such information must be made by EAs through local BT District Directory Groups via an agreed EA liaison point.

Ex Directory Name and Address Information

9.6 BT will provide EAs with name and address information of an Ex Directory (XD) number. The EA will be made aware of the fact that the customer is XD and must undertake to treat the information in confidence and restrict its use to the incident being investigated.

Ex Directory/Telephone Numbers Information

9.7 In providing an XD/NC service BT undertakes not to give the number to anyone outside BT, including the EAs.

9.8 BT has laid down procedures to enable urgent calls to be connected to XD/NC customers without revealing the number. EAs requiring such a connection must contact the BT OAC Supervisor.

10. RECORDING AND PLAYBACK OF TAPES

10.1 BT will record all calls terminating on 999/112 circuits. Calls are recorded from the time at which the circuit is seized and ring tone connected until the caller clears and the circuit is released.

10.2 Requests from EAs to listen to, make notes of, or be given a copy of a recording of a 999/112 call must be referred to the BT District General Manager.

10.3 A BT manager must be present when tapes are being replayed at a BT Centre.

10.4 BT will keep original 999/112 recording tapes for a period of 3 months. A copy of an individual tape can be kept for a longer period on request.

10.5 BT should apply to the Chief Officer of the relevant EA for similar recordings of calls made by the EAs.

10.6 BT informs all its customers to use the 999/112 code when making emergency calls. BT does not tape record emergency calls made on 100 circuits (general operator services access code) when a caller inadvertantly uses the 100 code. However, such calls are processed despite the use of the incorrect code.

11. PRIORITY FAULT REPAIR SERVICE

11.1 There are two levels of Priority Fault Repair Service (FPRS): -

(i) FPRS within ServiceCare (paid for)

The Director General has nominated categories of customers eligible for priority fault repair within ServiceCare. These include customers engaged in the provision of an emergency service to the public, the provision of any essential services, the supply of any essential goods, certain people in public administration and others agreed in consultation with BT. PFRS entitles these customers to receive priority maintenance services over others who have contracted for the same ServiceCare option.

(ii) Free PFRS

BT and the DGT have agreed and published a formal "determination" listing those persons eligible for Free priority fault repair service. This is available to certain chronically sick and disabled people and for the primary routes used by BT to convey 999/112 calls to the Emergency Services. The level of service provided free of charge is the equivalent of TotalCare with priority over all other customers.

This determination amplifies condition 10.1 (c) of BT's Licence. The relevant extract is given below.

"(b) that Condition 10.1(c) applies to Exchange Lines or Private Circuits which are normally used -

(i) to provide Public Emergency Call Services, being Exchange Lines or Private Circuits which either

(A) Convey Messages from BT's auto manual centres to the control centres of any Emergency Organisation; or

(B) are used only to convey messages relating to Emergencies from such control centres to their sub-control centres; or

12.3 All the routes will need to be staffed on a 24 hour basis.

12.4 EAs should prepare contingency arrangements to cover the receipt of emergency calls during conditions of serious breakdown, either in the BT network or the EA communications system. Such arrangements should be planned to cover every control centre which normally receives emergency calls and be exercised sufficiently to ensure that both BT and EA staff are familiar with them.

12.5 BT and the EAs should regularly monitor the efficiency of the 999/112 emergency call arrangements and arrange regular liaison meetings at both national and local levels.

13 ISOLATION OF CUSTOMERS DUE TO BT NETWORK FAILURE

13.1 In the event of a major failure of part of its network, BT will notify the affected EAs immediately the failure is identified or anticipated.

13.2 BT will continue to provide every assistance to the EAs in order to overcome the situation.

13.3 EAs and BT should adopt local contingency arrangements in the event of a network failure.

14 EMERGENCY AUTHORITY CONTACT NUMBERS

14.1 EAs are responsible for keeping BT informed of the correct connect-to line identities for the Primary, Secondary and Alternative numbers.

14.2 EAs must give BT at least two weeks notice of changes to these numbers. Details of changes should be addressed to the 999/112 liaison point in the BT Operator Services Sector and marked "**URGENT - 999/112**".

15. USE OF CALL QUEUING SYSTEMS

15.1 BT operating procedures state that if no reply has been received from an EA primary number within 30 seconds the operator will try the secondary routing. If the BT operator is connected to a call queuing system, by clearing the original connection they are only placing themselves further back in the queue of calls and worsening their chances of being answered. To avoid this eventuality, the EA must notify the BT Operator Services Sector when planning to introduce a call queuing system. This is so that BT can amend its information to remind operators not to clear down the original connection before attempting the secondary route.

15.2 The provision of a short "comfort message" should be used by the EAs to inform both operators and callers that their calls are being held in a queue.

Issued by BT and the EAs under the auspices of the Home Office Liaison Committee.

British Telecom
Product & Services Management
6th Floor
Weston House
246 High Holborn
LONDON
WC1V 7DQ

Chairman - Home Office 999
Liaison Committee
Home Office
Fire and Emergency
Planning Department
50 Queen Anne's Gate
LONDON
SW1H 9AT

GLOSSARY OF TERMS

AMC	Automanual Centre
BT -	British Telecom
BTOSS -	British Telecom Operator Services Subsystem
CLI -	Calling Line Identity
DLSU -	Digital Local Switching Unit
DMSU -	Digital Main Switching Unit
EA -	Emergency Authority (eg. Kent Fire Brigade, Met. Police)
EACC -	Emergency Authority Control Centre
ELs -	Exchange Lines
EO -	Emergency Organisation (eg. FIRE, POLICE)
OAC -	Operator Assistance Centre
OCHC -	Operator Call Handling Centre
OOA -	Out of Area
OOR -	Operator Override
PCs -	Private Circuits
PSTN -	Public Switched Telephone Network
VDU -	Visual Display Unit
VIF -	Visual Index File
XD -	Ex Directory
XD/NC	Ex Directory/No Calls Offered

Department of Trade and Industry

oftel
Office of Telecommunications

Licence granted by
The Secretary of State for Trade and Industry
to British Telecommunications
under Section 7 of the Telecommunications Act 1984

London: Her Majesty's Stationery Office (1984)
(Revised September 1987)

Price £7 50 net

Public Emergency Call Services

6.1 The Licensee shall provide a Public Emergency Call Service, that is to say a telecommunication service by means of which any member of the public may, at any time and without incurring any charge, by means of any item of telecommunication apparatus which is lawfully connected to any of the Applicable Systems at any place in the Licensed Area and which is capable of transmitting and receiving unrestricted two way voice telephony services, communicate as swiftly as practicable with any of the Emergency Organisations for the purpose of notifying them of an Emergency.

6.2 For the purposes of this Condition:

(a) "Emergency Organisations" means in respect of any locality:

(i) the relevant public police, fire, ambulance and coastguard services for that locality; and

(ii) any other similar organisation providing assistance to the public in Emergencies in respect of which the Licensee is providing a Public Emergency Call Service on the day on which this Licence enters into force;

(b) telecommunication apparatus shall only be regarded as capable of transmitting and receiving unrestricted two way voice telephony services if it is capable of both:

(i) transmitting for conveyance by means of an Applicable System specific signals designated by the Licensee for the purpose of establishing communication with voice telephony apparatus controlled by the Emergency Organisations; and

(ii) transmitting and receiving uninterrupted simultaneous two way speech conveyed, or as the case may be to be conveyed, by means of that Applicable System

6.3 The Licensee may restrict the telecommunication services provided under this Condition in respect of any of the Emergency Organisations mentioned in paragraph 6.2(a)(ii) to the extent to which such restriction is agreed by the authority responsible for that Organisation or, in the absence of such agreement, to such extent as may be authorised by the Director.

6.4 In this Condition, the "Licensed Area" does not include any area to which the Act is extended under section 107.

Calls Made by Emergency Organisations

7.1 The Licensee shall, for the purpose of facilitating the provision of services by Emergency Organisations in circumstances where telephone numbers cannot be dialled direct, provide operator-assisted voice telephony services with a view to enabling officials of any authority designated by the Secretary of State for the purposes of this Condition to send messages for conveyance by means of any of the Applicable Systems to any Network Termination Point for switched voice telephony within the Applicable Systems either:

(a) with the least possible delay if such officials send specific signals designated by the Licensee for the purpose and proffer evidence of identity sufficient to establish to the Licensee's satisfaction that they are such officials; or

(b) with priority over all communications except emergency calls and those covered by (a) above if such persons send specific signals designated by the Licensee for the purpose and proffer such evidence of identity.

Planning and Implementation of Special Arrangements for Emergencies

9.1 The Licensee shall, after consultation with the authorities responsible for Emergency Organisations and such departments of central and local government as the Director may from time to time determine and whose names are notified to the Licensee by him for the purpose, make plans or other arrangements for the provision or, as the case may be, the rapid restoration of such telecommunication services as are practicable and may reasonably be required in Emergencies.

9.2 The Licensee shall, on request by any such person as is designated for the purpose in the relevant plans or arrangements, implement those plans or arrangements insofar as it is reasonable and practicable to do so.

9.3 Nothing in this Condition precludes the Licensee from:

- recovering the costs which it incurs in making or implementing any such plans or arrangements from those on behalf of or in consultation with whom the plans or arrangements are made; or

- making implementation of any plan or arrangement conditional upon the person or persons for whom or on whose behalf that plan or arrangement is to be implemented indemnifying the Licensee for all costs incurred as a consequence of the implementation.

Priority Fault Repair Service

10.1 Without prejudice to any other obligation under these Conditions the Licensee shall, when notified of any fault or failure of any of the Applicable Systems or of a Relevant System which causes any interruption, suspension or restriction of the telecommunication services provided by means of that Applicable System or that Relevant System, provide

(a) to any person described in paragraph 10.2;

(b) to any person described in paragraph 10.3; and

(c) in respect of any Exchange Line or Private Circuit described in paragraph 10.3;

a priority Fault Repair Service with a view to restoring those services as swiftly as practicable and with priority so far as is reasonably practicable over Fault Repair Services provided by the Licensee to other persons.

10.2 The persons to whom paragraph 10.1*(a)* applies are those:

(a) who are engaged in the provision of an emergency service to the public, the provision of any essential services, the supply of any essential goods or in public administration; and

(b) (i) (A) whom the Licensee reasonably believes are within any class or description included in a list prepared by the Director in consultation with the Licensee and notified to the Licensee by the Director; and

(B) who apply, or on behalf of whom an application is made, to the Licensee for priority Fault Repair Service; or

(ii) whose names and other particulars are notified to the Licensee by the Director; and

(c) who pay the Licensee's charges for the priority Fault Repair Service or in respect of whom those charges are paid; and

(d) who have a bona fide need for an urgent repair.

10.3 Subject to paragraph 10.4, the persons to whom paragraph 10.1*(b)* applies and the Exchange Lines or Private Circuits to which paragraph 10.1*(c)* applies, are those:

(a) whom or which the Licensee reasonably believes are within any class or description contained in a determination made and notified to the Licensee by the Director; and

(b) who apply, or in respect of whom or which an application is made, for priority Fault Repair Service; and

(c) who pay, or in respect of whom or which are paid, the Licensee's charges for the priority Fault Repair Service; and

(d) who have or in respect of which there is a bona fide need for an urgent repair.

10.4

(a) The Director shall not make a determination under paragraph 10.3*(a)* without the consent of the Licensee.

(b) A determination made under paragraph 10.3*(a)* may require the Licensee to provide the priority Fault Repair Service free of charge or on charges which are less than those which are payable by the persons described in paragraph 10.2.

(c) Where the Director has made a determination under paragraph 10.3*(a)* and:

(i) the Licensee gives notice to the Director that it wishes the determination to cease to have effect; or

(ii) the Director notifies the Licensee that he wishes the determination to cease to have effect;

the determination shall cease to have effect at the end of the period of six months beginning on the day when the notification was given.

10.5 The priority Fault Repair Service shall be available for 24 hours a day or for such lesser periods of each day as may be agreed between the Licensee and the person paying for its provision.

10.6 In this Condition:

"Fault Repair Service" means a service consisting in such repair, maintenance, adjustment or replacement of any of the Applicable Systems or such repair or adjustment of any Relevant System as is necessary to restore and maintain a sufficient service; and

"Relevant System" means any:

(i) telecommunication system not comprised in any of the Applicable Systems; or

(ii) telecommunication apparatus which is or is to be connected to any of the Applicable Systems and in respect of which the Licensee is contractually bound to provide Maintenance Services.

10.7 Where on the date on which this Licence enters into force, the Licensee is unable to comply with this Condition, it shall do so as soon as reasonably practicable thereafter and meanwhile shall provide a priority Fault Repair Service as like to that required under this Condition as is reasonably practicable.

Office of Telecommunications

Whereas the Secretary of State has granted to British Telecommunications ("BT") on 22 June 1984 a Licence ("the BT Licence") under section 7 of the Telecommunications Act 1984 for the running of the telecommunication systems specified in Annex A to that Licence:

Whereas Condition 10 of the BT Licence, as amended, obliges BT to provide a priority Fault Repair Service to certain persons and in respect of certain Exchange Lines and Private Circuits: and

Whereas BT has consented to the making of this determination:

Now, therefore, the Director General of Telecommunications, in exercise of the powers conferred upon him by Condition 10.3 of the BT Licence, hereby determines:-

(a) that Condition 10.1(b) applies to persons -

(i) (A) who usually -

(1) live alone in a private dwelling; or

(2) live in a private dwelling only with one or more other persons each of whom would qualify under this sub-paragraph (a) if he or she lived alone in a private dwelling; and

(B) who are at risk; and

(C) who are immobile through long term sickness or disability;

or

(ii) whose lives are dependant upon the home use of renal or peritoneal dialysis machines or artificial ventilators;

or

(iii) who suffer from quadriplegia and who rely on the use of the Patient Selector Unit No 3 or the Basic Environmental Control System Model No.BEC/1 or other similar environmental control equipment;

(b) that Condition 10.1(c) applies to Exchange Lines or Private Circuits which are normally used -

(i) to provide Public Emergency Call Services, being Exchange Lines or Private Circuits which either -

(A) convey Messages from BT's auto manual centres to the control centres of any of the Emergency Organisations; or

(B) are used only to convey Messages relating to Emergencies from such control centres to their sub-control centres; or

(ii) to convey Messages relating to Emergencies from the control centres of the Coastguard to the control centres of the Royal National Lifeboat Institution,

but (except where it is used exclusively for the conveyance of such Messages) not any Exchange Line or Private Circuit which may be used or available to be used as a second choice or other alternative route for the conveyance of such Messages; and

(c) that any priority Fault Repair Service provided by BT to any person or in respect of any Exchange Line or Private Circuit described in sub-paragraph (a) or (b) above shall be provided by it free of charge.

In this determination the terms 'control centre' and 'sub-control centre' refer respectively to the regional and local control centres of the Emergency Organisations which control and monitor emergency call-outs, but do not refer to any individual stations of the Emergency Organisations which may in fact respond to the call-outs, except where any such individual station is contained in the same premises as a control centre or sub-control centre.

Any word or expression used in this determination shall unless the context otherwise requires have the same meaning as it has in the BT Licence.

4 December 1988

Director General of Telecommunications

AC2AAS

ITEM 2

DCOL 11/1992

UHF RADIO CHANNELS

Item 12 of Dear Chief Officer Letter 6/1992 advised Chief Officers of the outcome of the investigation by the Home Office into the problem reported by a number of brigades in late 1991: that if two of the new six UHF radio channel assignments were used simultaneously at the area of an incident one channel could "block" the signal from the other channel.

2. The action outlined in DCOL 6/1992 has been completed and the attention of Chief Officers is drawn to the revised Home Office Radio Frequency Policy Statement (FPS) 16 which was circulated to brigades on 20 August 1992.

3. The revised FPS defined the regulatory conditions applicable to the use of Home Office VHF and UHF radio channels available for incident communications by fire brigade in England, Wales, Northern Ireland, Isle of Man and the Channel Islands.

4. DCOL 6/1992 outlined a recommendation made by the Joint Committee on Fire Brigade Communications Working Group on Fireground Radio Communications Channels that the existing UHF incident channel 3 should be replaced with a new assignment. FPS(16) identifies a replacement for UHF channel 3 and revises the dates for the withdrawal of certain existing UHF channels.

5. FPS(16) also places restrictions on the non-speech use of incident channels and confirms the regulatory conditions applicable to the use of UHF and VHF incident channels by other organisations (set out in DCOL 5/1991 as amended by DCOL 6/1992).

6. There may be cost implications arising from the implementation of the changes described in this guidance.

File reference number : FEP/92 59/1507/4

Telephone number of contact : 071 273 3842 (technical)
071 273 3583 (general)

File reference number: FEP/92 59/1507/4

Telephone number of contact: 071 273 3842 or
071 273 3583

ITEM 3

DCOL 11/1992

MEMORANDUM OF UNDERSTANDING

1. Attached for the attention of Chief Officers is an updated version of the "Memorandum of Understanding" with the cellular radio companies. This replaces the Memorandum of Understanding dated January 1990 issued as an annex to Item 3 of DCOL 7/1990.

2. The attention of Chief Officers is drawn, in particular, to the revised contact numbers given in the appendix to the document.

3. It is not expected that there will be any significant manpower or cost implications arising from this guidance.

File reference number: FEP/92 59/67/5

Telephone number of contact: 071 273 3842/3583

MEMORANDUM OF UNDERSTANDING

Cellular Radio 999 Emergency Access

NOTES:
BT's Operator Assistance Centres (OACs) use digital technology to handle Cellular 999 calls. Operators work on computer consoles which provide call details and the information necessary to connect the calls to Emergency Authority Control Centres.

Cellular radio customer equipment - which may be either hand-portable or fitted carphones - are referred to as "cellphones" rather than "mobiles" to avoid confusion as some Emergency Authorities (EAs) refer to their vehicles as "mobiles".

1) INTRODUCTION

1.1) The following document describes the arrangements that have been agreed between Cellnet, Vodafone, BT and the Emergency Authorities in England, Wales, Northern Ireland and Scotland for forwarding emergency 999 calls originating from cellular radio customers to the appropriate emergency services.

It outlines how the system operates and details the procedural aspects as agreed by all concerned and is accepted as being the best possible method of handling cellphone 999 calls given the facilities that are available.

1.2) Description of system

The principle behind cellular radio is the multiple re-use of valuable radio channels. The country is divided up into a series of "cells", each served by its own low powered transmitter/receiver (base station). Each of these base stations is assigned a set of frequencies differing from those assigned to adjacent cells. The resulting pattern can be repeated enabling radio channels to be used again but geographically far enough away to prevent interference.

The very nature of the provision of radio telephone communication means that users do not necessarily know their exact location and the radio communication system cannot pinpoint the caller either.

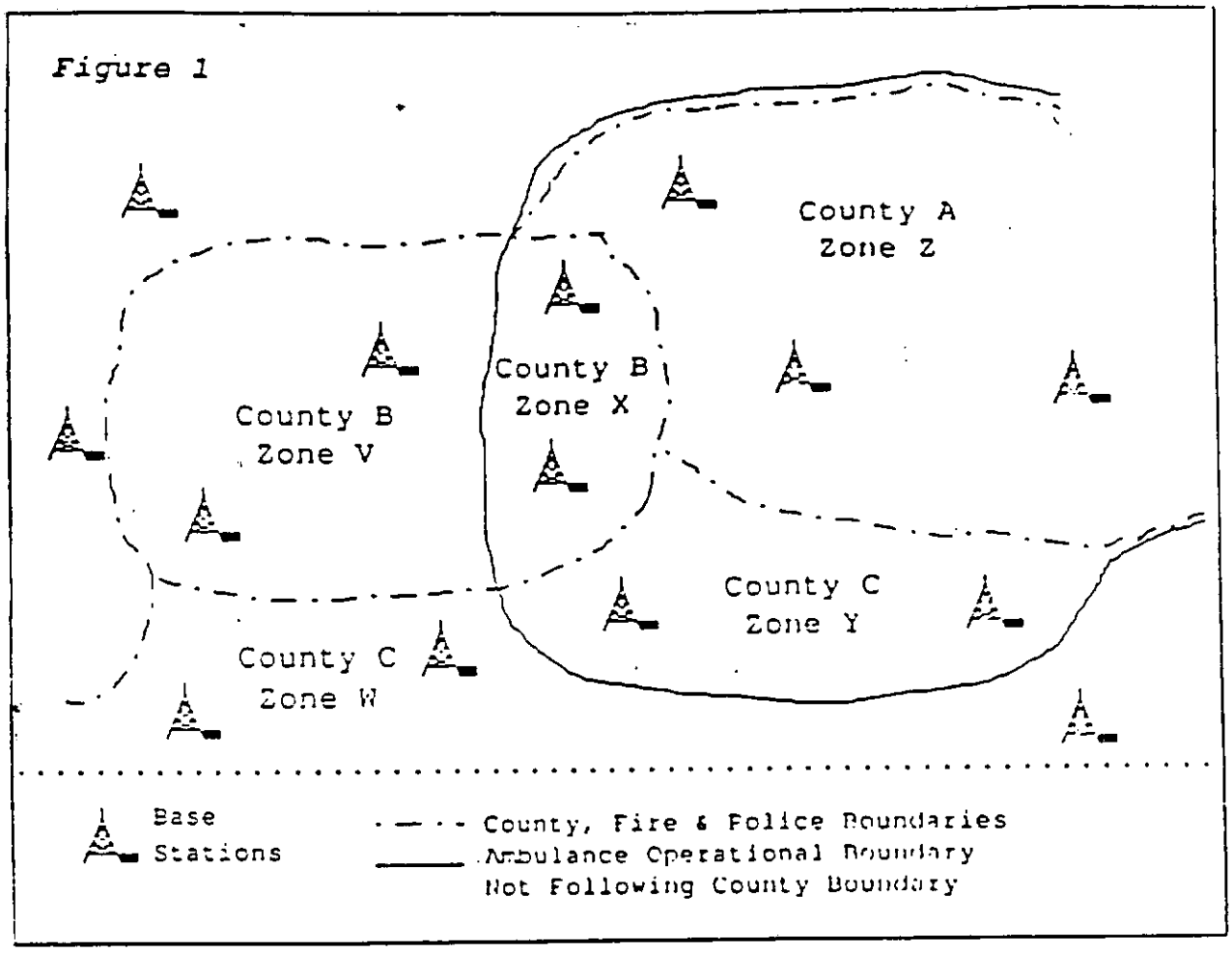
The resultant problem in a cellphone user having to detail this information when making a 999 call is likely to lead to delays in satisfactorily reporting particular incidents.

1.3) Cell/EA boundaries

Comparison of cell site boundaries and EA boundaries shows that cell boundaries are unlikely to overlap more than two adjacent EA coverage areas. Where a cell coverage area straddles two or more EA coverage areas, neighbouring EAs are asked mutually to agree and then nominate a control centre to which 999 calls from that cell are to be directed.

A number of cells pertinent to particular EA areas - generally a county or region - are grouped together for 999 purposes and allocated a zone code. Such a zone code is unique to that county or region and also to each individual Cellular Radio Company.

Figure 1



This figure shows typical cellular 999 zone code allocation with a hypothetical situation where the EA operational boundaries do not coincide.

The fire and police authorities are organised on a strict county by county basis, while the ambulance authority covers parts of several counties. The calls to the fire and police authorities from zones X and Y will be connected via the BT Operator to the EA control rooms in counties B and C respectively.

Calls to the ambulance authority for zones X, Y and Z will all be connected to the ambulance control room located in county A.

2) METHOD OF ROUTING

2.1) 999 calls originating from a cellphone on either network are routed to one of three of BT's Public Switched Telephone Network (PSTN) Operator centres so that calls appear at the BT 999 Emergency Operators' positions. These centres are at Orpington and Beckenham OACs in Kent, and Glasgow (Cameron) OAC in Scotland. It should be noted that though Orpington and Beckenham are separate centres, they are actually both fed calls from the same switch, and should be thought of as "halves" of a single centre. Beckenham is only open between 08-00 and 22-30, monday to saturday, and from 09-00 to 22-30 on sundays - outside these

times all calls to this switch go to Orpington.

The calls are connected via dedicated circuits from the Mobile Switching Centre (MSC) to the BT Interconnect switch. The calls are then routed to the BT Operator centres using the same level of security as that provided for fixed 999 calls. The zone location of the receiving base station associated with the calling cellphone is given a code number for signalling and displaying to the BT Emergency Operator. These code numbers comprise four digits.

The BT Emergency Operator is equipped to translate the displayed digit code to an individual EA's access number. A look-up table is used for this purpose. The list of routings shown in this look-up table has been agreed between the Cellular Radio Companies and EAs. This information is updated as necessary to account for number changes, new zone codes, etc. The Operator is also equipped with a list of all EA contact numbers filed alphabetically against counties, regions and operational names such as Thames Valley Police.

The BT Operator will determine from the cellphone user which service is required, and from the zone code display and look-up table the appropriate EA contact number for that zone code. He/she will connect the cellphone user, generally over the PSTN, to the designated numbers. The Operator will introduce him/herself as a Glasgow(Cameron), Beckenham or Orpington Operator when offering a cellphone 999 call and will , whenever possible, pass to the EA the caller's cellphone number (to facilitate recall).

2.2) Emergency Authorities' contact numbers

The EAs should aim to provide at least two weeks notice of changes to emergency contact dial up numbers to the Cellular Radio Companies who will follow their mutually agreed update procedure with BT. The date and time that the new numbers become effective should also be stated. The notice of changes should be forwarded to the Cellular Companies whose addresses and telephone numbers will be found in Annex 1.

Communication by post should be in an envelope boldly marked **"URGENT - 999"**

2.3) Cellnet's, Vodafone's and BT's contact numbers

The Cellular Radio companies and BT should aim to give two weeks notice of any number changes in Annex 1 to the EAs through the sceretary of the 999 Liaison Committee.

3) SECURITY OF CONNECTIONS

All three Operator Centres have full UK capability. Calls originating in the Midlands and the North of England, Scotland and Northern Ireland route to Glasgow as a first choice and calls from the remainder of the UK route to Orpington or Beckenham as a first choice.

Both Cellular Radio Companies have provided a minimum of five private circuits from the MSCs to both the BT switches, one routing calls to Glasgow and one to Orpington and Beckenham.

These circuits are separately routed where possible to minimise the effect of equipment or line plant failures.

Further safeguards exist in the form of back up service provided between the two switches which will be effective against temporary closure of one switch site due to emergencies such as fire alarms or bomb threats. Alternative routings from the MSCs will be automatically invoked when route congestion to or failure at either switch is detected.

4) ZONE CODE FAILURE

The zone code information is incorporated on the console used by operators in OACs, along with the callers number. Failure to display a zone is extremely unlikely for these centres. However, should a Zone code not be displayed on an incoming call, the BT Operator will tell the cellphone caller that there is a network fault and that some information checking will be necessary.

BT will make use of the Cellular Radio Companies' facilities to locate the cell of origin of a cellphone call and hence the zone code. Although this may lead to delays in call connection, the Home Office and Emergencies Authorities have agreed to the use of the cellphone location facilities which the Cellular Radio Companies are able to provide in these circumstances. It is recognised that extra time will be needed to go through this procedure.

It is essential that the BT Operator is given a zone identity code by the Cellular Radio Company on all occasions and with the minimum of delay. If the Cellular Radio Company is unable immediately to determine the zone code, it will persist in determining the cellphone user's whereabouts. Once the zone identity is provided, the BT Operator will refer to the look up table and forward the call to the corresponding EA control.

The cell and zone location facilities described above can be carried out providing the calling cellphone holds the connection. Post event traces are not possible but records are kept by the Cellular Radio Companies which include time of call, duration, originating cellphone number, the cell which received the call and the resulting zone code. These records are kept and will be readily available for cross checking for approximately three months. The BT Operator will also make a written record of the details of the call.

NOTE

Any circuit suspected of being faulty will be removed from service - either by the BT Operator or the Cellular Radio Company - until such time as engineering tests have proved the fault rectified and operational tests have been performed. Whoever removes a circuit from use should inform the other party as soon as possible.

5) MISROUTED CALLS

5.1) Valid but incorrect zone code

It is possible that the zone code display could give an incorrect

but apparently valid code to the Operator. This could occur as a result of:

a) a faulty console,

b) a fault in transmitting the display information from the MSC,

c) more commonly, where a cellphone has accessed a base station located in a different zone to the one where that cellphone is actually located, due to an anomaly in radio propagation. This most typically will occur across river estuaries and between the coastal areas of the mainland within cellular radio distance of offshore islands.

In all these cases, the Operator would forward these calls to the EA shown in the look up table in the usual manner.

Once connection is established to the EA control, it would be incumbent on the EA controller to establish that the call is proper to the EA area and to instigate means of transfer if it is not.

This can be achieved in a number of different ways:-

(i) The EA may find it advantageous within the authority's own procedure to take the details of the call and pass the information on to colleagues in the correct authority.

(ii) The EA controller may recall the Operator back into circuit and request that the call is passed to another EA exchange line (see paragraph 5.2).A pre-requisite of the Cellular Radio Companies and BT for the cellular 999 scheme was to put into place means to enable this to be carried-out.

(iii) The EA controller may advise the BT Operator of the correct EA to handle the call. The BT operator will then look-up the appropriate contact number.

(iv) If it is not possible for the EA to advise of the correct connect-to number, or even merely the correct county, then the BT Operator will instigate a call trace procedure as described in paragraph 4, resulting in the cellular company providing the zone code pertinent to the area from where the cellphone accessed the cellular network. The Operator will then reroute the cellphone customer to the EA of this zone.

The ultimate responsibility for redirecting the call to the correct EA , however, will rest with the operating company who will take all reasonable steps to do so.

NOTE: Call traces can only be carried out providing the cellphone customer continues to hold the connection.

5.2) Ways of calling the BT Operator back into circuit

The means of calling the BT Operator back into circuit will

depend upon the type of equipment the EA uses to handle emergency calls.

The three ways of calling the BT Operator back into circuit, in preferred order, are:

a) BT operating procedures require the Operator to note salient points of the initial 999 conversation between the cellphone customer and the EA controller. To carry out this function, the Operator will remain on line but in monitor mode until satisfied that relevant details have been passed to the EA. During this period, it is possible for the EA controller to recall the BT Operator into circuit with a verbal request. However, should multiple 999 calls occur, Operators may make themselves available to answer the new calls, thus removing themselves from monitor mode on an existing call.

b) By connection/disconnection at the EA centre ("flashing")

The BT operator has a set of symbols that indicate the status of the incoming and outgoing circuits. When the EA controller "flashes" the BT operator, the operator is alerted to the fact by the word FLASH appearing on their screen, again prompting them to go back into the circuit concerned.

It is suggested that individual EAs satisfy themselves whether their control equipment is able to successfully carry out the function described above.

NOTE: The BT Operator, having set up the connection to the EA, will be in control of that connection until he/she chooses to release it.

c) A separate call can be made to the centre concerned, (the BT Operator, when offering the call, will advise that he/she is calling from Orpington, Beckenham or Glasgow (Cameron)). The number to be called will be a supervisor's line within the switchroom concerned - contact numbers can be found in Annex 1. A particular 999 call can be identified by the EA controller quoting the time of his call as well as his/her county or region. The supervisor will then be able to associate the 999 call with the Operator concerned who can then reroute the call as advised or go back into circuit and speak further with the EA controller.

NOTE: As a provision of last resort, the police control for a given zone will accept an emergency call from BT, should another EA ever fail to take that call.

7) SUMMARY

Certain points should be borne in mind when considering the type of 999 service given by the cellular network:

a) The cellphone 999 service complements rather than replaces the existing fixed 999 service.

b) The time taken in connecting cellphone calls to the correct EA can be offset by removing the need to find a fixed network phone before being able to report an incident.

c) The Cellular Companies provide direct circuits from their respective networks to the BT 999 Operator ensuring a rapid connection to a trained Operator who is able to offer a level of comfort at an early stage.

d) Onward connection by the BT Operator is completed via the BT PSTN where the Operator has the facility of alternative routing.

e) Use is made of EA contact numbers which normally consist of a PRIMARY and SECONDARY route into the main EA control centre. In the event of a major problem which results in this EA control centre being unavailable, the EA should provide BT with an ALTERNATIVE means of taking delivery of the call.

f) "999" progress meetings continue under the chairmanship of the Home Office where developments, difficulties and improvements can be discussed by representatives of all parties.

Issued by BT, Cellnet, and Vodafone under the auspices of the Home Office Cellular 999 Liaison Committee.

Annex 1

Contact points

1) CELLULAR RADIO COMPANIES:

1.1) For on-line call trace facilities, contact the Cellular Operations Centres.

CELLNET		VODAFONE
(0860 & 0850 ....)		(0836,0831,0385,0374..)
Primary	0753 512151	081-847 3153
Secondary	0753 504604	081-847 2131

All the above numbers are available 24 hours a day.

1.2) For operational aspects, advice of control room contact numbers, post event traces and misroute advice.

CELLNET	VODAFONE
999 Coordinator Cellnet Customer Services 1, Brunel Way, Slough Berkshire SL1 1XL	Engineering Dept(Telecoms) Vodafone Ltd The Courtyard 2-4, London Rd Newbury Berkshire RG13 1JL
Tel:0753 504999	0635 506999
Fax:0753 504053	0635 523615

2) CAMERON OCHC

Contact numbers for assistance and advice

041 248 4367

041 220 2664

3) ORPINGTON OCHC

Contact numbers for assistance and advice

0689 830003 or 0689 828605

4) BECKENHAM OCHC

(open 08-00 to 22-30, mon-sat, and 09-00 to 22-30 on sunday)

Contact numbers for assistance and advice

081 663 3207 or 081 663 3203

ITEM 4

DCOL 11/1992

HAZARDS POSED TO FIREFIGHTERS BY ASBESTOS

1. Since the issue of Fire Service Circular 1/1984 on 9 April 1984, the Home Office has received further information from a number of sources about the effects of fire on asbestos materials. The Joint Committee on Fire Brigade Operations has therefore recommended that the existing guidance should be updated and that it should include advice on operational procedures. This guidance replaces that in item B of Fire Service Circular 1/1984 which should be destroyed.

The nature of asbestos

2. Asbestos is a fibrous mineral which occurs in many parts of the world. The three main types of asbestos produced commercially are:

Chrysotile	- white asbestos	UN 2590	EAC 2X
Crocidolite	- brown asbestos	UN 2212	EAC 2X
Amosite	- brown asbestos	UN 2212	EAC 2X

Asbestos fibre is mechanically strong and highly resistant to heat and chemical attack and because of its fibrous nature, it can be woven into fabrics and used as reinforcement for cement and plastics. It is the very fine fibres, invisible to the naked eye, which are dangerous when inhaled, and processes which produce very small airborne fibres are, in general, the most hazardous. These fibres pose no threat to health when left intact in undamaged material containing asbestos, which should be either left alone and managed, sealed or enclosed or removed if deteriorating.

Asbestos related diseases

3. The principal diseases known to be caused by exposure to asbestos are asbestosis, lung cancer and malignant mesothelioma.

(i) Asbestosis fibrosis or scarring of the lung in which the tissue becomes less elastic making breathing progressively more difficult. It is irreversible and may progress even after cessation of exposure to asbestos. Asbestosis is an industrial disease arising from high levels of exposure to airborne dust and there is no risk of contracting this disease from normal levels of environmental exposure to asbestos.

(ii) Lung cancer an increased incidence of lung cancer has been found amongst people who have worked with asbestos. The increase in risk depends on the degree of exposure and is very much greater for smokers than non-smokers. All three types of commonly used asbestos fibre can cause lung cancer, but crocidolite and amosite are thought to be more dangerous than chrysotile.

(iii) Mesothelioma a cancer of the inner lining of the chest or of the abdominal wall. The incidence in the general population is very low: the overwhelming majority of cases are attributable to occupational or more rarely, para-occupational (those living in the same house as an asbestos worker) exposure to asbestos.

General advice to the fire service

4. Items of equipment which contain asbestos should not be used where it is practicable to use items manufactured from alternative suitable materials instead. Precautions should always be taken by fire brigades when dealing with incidents where asbestos fibres are likely to become airborne.

Asbestos blankets

5. Heat resistant leather is recommended for blankets used for brigade operational purposes; this came out best in tests conducted by the Department although, unlike asbestos, it will burn. Blankets made from heat resistant leather can be stored folded in a locker and will in most cases be re-usable except, perhaps, after a severe chip pan type of fire. The optimum size of blanket is considered to be about 1.2m x 1.8m. Sizes exceeding 1.2m x 1.2m require stitching; the tests showed that this did not affect use of the blanket. However it was noted that blankets exceeding the recommended size can be difficult to handle.

6. With regard to the use of asbestos fire blankets by the public, persons seeking advice should be advised that suitable alternatives to asbestos are readily available. The appropriate standard for both industrial and domestic use is BS 6575 Fire Blankets.

Asbestos gloves and anti-flash hoods

7. Fire Service Circular 30/1976 recommended the phasing out of these items of equipment and their replacement with gloves and flash hoods made from alternative materials. Guidance on alternative materials for both these items was given in Fire Service Circular 31/1976 which included a new specification for an anti-flash hood (specification E9) to replace the hood containing asbestos and recommended that protective gloves should conform to British Standard 1651: 1966 (which does not provide for the use of asbestos). The Joint Committee on Fire Brigade Operations considered that this guidance was not affected by the outcome of the review by the Advisory Committee on Asbestos in 1979.

Asbestos in railway rolling stock

8. Blue asbestos (crocidolite) has been used in the past for thermal and acoustic insulation in the construction of passenger rolling stock and locomotives. In addition, brown asbestos (amosite) has been used in a few instances as a pipe or tank insulant and small quantities of white asbestos (chrysotile) have been used in items such as brake pads, heat insulation panels, exhaust manifolds and gaskets. British Rail have advised that since the late 1960s, when the use of sprayed asbestos for sound and thermal insulation of rolling stock was discontinued, all asbestos in rolling stock (except asbestos cement sheet and tape wrappings) has been the subject of a planned removal programme

which was due to be completed by the end of the 1980s (this work is still taking place).

9. In the event of an incident involving British Rail rolling stock, it will be possible to establish whether a coach contains blue asbestos by contacting the Railway Control Office and notifying them of the coach number, which will be found painted at the waist of one end of each side of the vehicle. This number will be checked against a central register of coaches containing blue asbestos in order to ascertain whether blue asbestos is present. This advice has been taken into account in detailed guidance on procedures at incidents on railway property agreed by the Joint Committee on Fire Brigade Operations.

Asbestos in ships

10. All types of asbestos have been widely used in shipping in processed form because of the properties of heat resistance. Asbestos provides electrical insulation and imparts strength to other materials when used as a reinforcement. It is likely to be found on board ships in the cladding of fire-retardant bulkheads, in the glands of high temperature valves, in friction materials in machinery and most commonly, in lagging on boilers and steam pipes.

Asbestos in buildings

11. Asbestos has been widely used in construction materials for buildings for many years as well as for pipe and boiler lagging. Although its use in new building materials has been much reduced, a significant tonnage is still used, mainly white asbestos in the manufacture of asbestos cement. Asbestos fibres in asbestos cement will only be released through damage or deterioration with age. Asbestos cement is relatively resistant to light abrasion and impact, but dust will be generated when it is being worked or if the material fractures under exposure to heat in a fire. In the latter case, this dust is likely to rise with the convection current creating a potential airborne risk.

12. More detailed information about asbestos in buildings can be found in the third edition of the Department of the Environment (DOE) publication 'Asbestos Materials in Buildings' published in 1991 by Her Majesty's Stationery Office, (ISBN 0 11 752370, price £4.80). An extract from the DOE publication is reproduced in full at Annex A and provides information on recent research carried out into the fate of asbestos in fires.

Operational procedures

13. A note on typical operational procedures is attached at Annex B.

Precautionary measures

14. The Officer-in-charge will ensure that a restricted zone is set up around the incident and that personnel entering the fire/smoke plume area are protected by positive pressure breathing apparatus and a chemical protection suit if fibrous asbestos products are, or are thought, to be involved.

15. At incidents involving asbestos, care must be taken to ensure that dust concentrations are kept to minimum. Cutting or drilling asbestos should be avoided, unless this work is absolutely essential for the purpose of completing the task being undertaken. Such work will give rise to dust, the level of which will depend, for example, upon the amount of cutting involved, whether hand or powered tools are employed, whether the work is dampened and whether the work takes place in the open air or a confined space. Contamination from asbestos can be reduced by the use of hand tools instead of powered tools and by wetting or thoroughly dampening the material before commencing operations.

16. Once dust particles have been allowed to become airborne, it is not possible to control the concentration of respirable fibres by use of water spray although this does help to reduce the airborne fibres. Insulation boards can be coated with a sealant to suppress the amount of dust; however, since both boards and sealing agents will vary, it would be prudent to treat such material with caution.

17. Although the main danger from asbestos is through the respiration of fibres, firefighters should avoid eating, drinking or smoking near an incident involving airborne asbestos fibres.

18. The Health and Safety Executive issued a revised Guidance Note (EH10: Asbestos - Exposure Limits and measurements of airborne dust concentrations, ISBN 0-11-885427-5) in 1990 which gives advice on asbestos exposure limits and the measurement of airborne dust concentrations and air sampling procedures. This is a complex procedure and would normally be carried out by specialist laboratories and organisations and by local Environmental Health Departments during normal removals or turning-over periods.

Decontamination and cleaning of clothing and equipment

19. In the event of protective clothing and/or equipment becoming contaminated with asbestos, decontamination procedures should be undertaken. If firefighting kit becomes contaminated with asbestos, it should initially be cleaned using a vacuum cleaner with a high efficiency filter such as a Type H cleaner and then packed in a suitable container, such as a special plastic bag which dissolves in hot water, to prevent the escape of any residual dust.

20. Contaminated clothing must be sent for cleaning before re-issue, and the cleaner advised of the reasons for cleaning and the fact that the clothing has been decontaminated by use of a suitable vacuum cleaner. Such clothing should be sent to cleaners who are aware of the risk to health from asbestos and who are able to observe the relevant precautions. Contaminated clothing should not be taken home. Where chemical protection suits are used, these can be decontaminated using portable showers or wiped down manually.

21. Any asbestos dust remaining on the skin should be immediately washed off. In the case of hair becoming contaminated with asbestos, it should be washed several times to ensure that it is thoroughly cleansed.

Disposal of asbestos

22. Any waste containing asbestos is classed as a controlled waste under the Control of Pollution Act 1974. It must be taken to a site licensed under the Collection and Disposal of Waste Regulations 1988. In England, in all areas other than Greater London and the other metropolitan areas, the waste disposal authorities are the county councils.

23. In Greater London, the London Waste Regulation Authority is the body responsible for controlling the disposal of asbestos wastes, and in Merseyside and Greater Manchester, it is the Merseyside Waste Disposal Authority and the Greater Manchester Waste Disposal Authority respectively. In Tyne and Wear, West Yorkshire, South Yorkshire and the West Midlands, the metropolitan district councils are the waste disposal authorities. In Scotland, Wales and Northern Ireland, the waste disposal authorities are the district (or islands) councils.

24. It would be advisable for brigades to maintain a list of licensed sites within their locality so that appropriate precautionary measures could be put into effect without delay should fire brigade assistance be required at such a licensed site.

Conclusion

25. Brigades are reminded that the wearing of positive pressure breathing apparatus should normally be the appropriate means of protecting firefighters from asbestos fibres, and that the provision of specialist respiratory equipment, appropriate for asbestos fibres, is a matter for each fire authority. In addition, brigades are advised to consult their local Environmental Health Department for information and to use the Section 1(i)(d) inspection procedure in order to identify asbestos risks in their area.

File reference number: FEP/92 16/271/2

Telephone number of contact: (071) 273 3342 (general)
(071) 273 4184 (technical)

ANNEX A

ITEM 4

DCOL 11/1992

EXTRACT FROM THE DEPARTMENT OF THE ENVIRONMENT (DOE) PUBLICATION "ASBESTOS MATERIALS IN BUILDINGS"

Published 1986 by HMSO (3rd edition published 1991)

Asbestos in Fires

6.10 Asbestos fibres change their mineral structure after prolonged heating, losing both their fibrous nature and mechanical strength. However, DoE has carried out research into the fate of asbestos in fires, which has shown that typically only the outer layers of asbestos materials are changed, and therefore potentially hazardous fibres remain within fragments of fire debris. Thus, following a fire involving asbestos the precautions outlined below should be followed.

6.11 Experience of real fires, such as that at the warehouse at MOD at Donnington, has shown that some debris containing asbestos will remain at the site of the fire and some may be dispersed over a wide area. Severe fires and explosions in buildings which are clad or roofed with asbestos-bitumen or asbestos coated cement metal may cause the coating to burn off from the metal, generating a grey paper-like ash which may contain changed and unchanged asbestos fibres. Asbestos-cement can explode when involved in fires, spreading changed and unchanged asbestos-cement debris over a wide area.

6.12 DoE research, on asbestos fibres which have been subjected to heat, has shown that identification of fibre types can be difficult, and that optical analysis of such fibres must take account of the changes in the microscopic characteristics. However, further research on the examination of debris from actual fires has shown that identification of fibre types within a material should not normally present problems. Relatively unaffected samples will always be available for analysis, and fire damage seldom penetrates the outer layer of asbestos materials. In such samples, identification of fibre types will be possible provided that a sufficient number of fibres are viewed. A random selection of blackened debris in order to assess the presence of asbestos is not recommended. Wherever feasible, sampling should concentrate on products most visually similar to unaffected asbestos materials.

6.13 The binding matrix of asbestos materials can become weakened during fires and to minimise any subsequent release of fibres from solid debris or ash, for example by trampling it underfoot, it should be damped down gently and collected carefully with the minimum physical disturbance as soon as possible. The appropriate precautions to protect the person

should be taken and the ash and asbestos debris should be sealed into strong plastic bags, labelled as indicated in Annex 7 (copy attached), prior to disposal. Where it is known that a building contains asbestos materials, appropriate precautions should be taken before debris remaining at the site of a fire is disturbed.

Annex 7

The Asbestos Waste Label

ASBESTOS WASTE CONTAINS	
ASBESTOS BLUE ASBESTOS BROWN 2212	ASBESTOS WHITE 2590

TOXIC BY INHALATION
POSSIBLE RISK OF IRREVERSIBLE EFFECTS
DANGER OF SERIOUS DAMAGE TO HEALTH BY PROLONGED EXPOSURE
WEAR PROTECTIVE CLOTHING
DO NOT BREATHE DUST
IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW LABEL WHERE POSSIBLE)

NAME, ADDRESS AND TELEPHONE NUMBER OF SUPPLIER:—

ANNEX B

ITEM 4

DCOL 11/1992

OPERATIONAL PROCEDURES FOR DEALING WITH ASBESTOS INCIDENTS

EXPOSURE RISKS

All asbestos materials undamaged and not involved in fire	No risk
Asbestos materials involved in fire:	
Within fire/smoke plume	Normally low - BA required
Interior of building	Significant risk - BA required
Working with disturbance of asbestos materials	Significant risk -BA required

Asbestos debris/slurry will contaminate firefighting kit and brigade equipment which will require decontamination.

COMMAND AND CONTROL

1. Early assessment of involvement of asbestos should be undertaken.
2. An early "asbestos involved" message will provide support.
3. The number of personnel exposed to asbestos must be kept to a minimum.
4. Plan work methods which do not create unnecessary dust.
5. Avoid the use of power tools with asbestos.
6. Avoid unnecessary breaking and disturbance of asbestos.
7. Keep asbestos material wet whenever reasonably practicable.
8. Smoking, drinking or eating must not to be allowed until simple washing facilities are provided and used.
9. All personnel should be made aware of any hazard.

MOBILISING

Message "Asbestos involved":

1. Emergency tender containing BA, chemical protection suits and decontamination equipment (including special hot water soluble plastic bags or containers).

2. Support pump.

3. Decontamination Officer and/or Hazmat Officer.

4. Health and Safety Officer (for further advice and/or sampling).

Note:

For small incidents, elements of the above attendance may not be required and the Officer-in-Charge may restrict the attendance.

PROTECTION

External (ie out of doors)

1. No protection required unless contamination with asbestos debris is likely, then BA and chemical protection suits.

2. Within fire/smoke plume - BA and chemical protection suits.

3. A restricted zone should be set up for contamination control and the protection of personnel.

Internal (ie indoors)

Fire fighting, damping down, turning over, fire investigation - **ALL** personnel - BA and chemical protection suits if asbestos is likely to be present.

Note:

Chemical protection suits should be worn when situation permits.

Re-committing BA Wearers

1. This procedure MUST be carried out under strict supervision.

2. Keep contaminated personnel separate from uncontaminated personnel.

3. Wipe around head and seal of face mask with a wet sponge.

4. Break seal and carefully exchange expired BA set with serviced BA set without disturbing contaminated protective clothing.

DECONTAMINATION

Command and Control

1. All personnel who are required to wear BA and chemical protection suits must undergo decontamination.

2. Personnel requiring decontamination MUST proceed directly to the DIRTY ZONE.

3. Arrangements must be made to maintain respiratory protection whilst awaiting decontamination.

Procedure - Full Firefighting Kit

1. Gently vacuum clean the tunic and other firefighting kit.

2. Wash or wipe down tunic, boots, leggings, helmet and gloves.

3. Carefully remove tunic and double bag in soluble bags.

4. Wash around head and face mask.

5. Remove BA set and wash set down.

6. All personnel to have a shower (either on site or on return to station).

7. All waste containing asbestos to be double bagged in plastic bags. If distinguishable, avoid mixing asbestos waste with other waste.

Note:

1. Decontamination operators should wear chemical protection suits and BA which can be decontaminated using portable shower units.

2. Where vacuum cleaning facilities are not available, tunics should be dampened with water spray, removed and double bagged into non-soluble bags.

ITEM 5

DCOL 11/1992

MOD GUIDANCE DOCUMENT: PHILOSOPHY OF MOD REACTOR ACCIDENT CONTINGENCY PLANNING

1. The Ministry of Defence, in conjunction with relevant local authorities and emergency services, maintains contingency plans for all locations in the United Kingdom where nuclear powered warships are permitted to visit. These plans are designed to protect the public in the extremely unlikely event of an accident affecting the warship's nuclear reactor.

2. The detailed plans which are developed for each such location contain a common section which gives a general description of the naval nuclear power plant and contingency planning. The guidance document attached at Annex A is a copy of this common text.

3. Brigades who need to be involved in the detailed planning at each approved nuclear powered warship berth are already contacted as a matter of routine by the relevant Royal Navy staffs. Such brigades might wish to include relevant sections of the local plan in their brigade orders. Other brigades might wish to be aware of the general philosophy behind such plans, and Annex A is offered for their information.

File reference number : FEP/90 23/298/2

Telephone number of contact : 071-273-3342

PART 1

PHILOSOPHY OF MOD REACTOR ACCIDENT CONTINGENCY PLANNING

CONTENTS

ANNEXES

ILLUSTRATIONS

PART 1

PHILOSOPHY OF MOD REACTOR ACCIDENT CONTINGENCY PLANNING

INTRODUCTION

1. The Royal Navy operates a number of nuclear powered submarines which form a vital element of the defence of the UK. The nuclear reactor offers the submarine a level of speed and underwater endurance which cannot be achieved by any alternative method of propulsion. Nuclear power is the only mechanism available to allow HM Submarines to carry out elements of the Navy's task in support of the UK's independent nuclear deterrent, anti-submarine warfare and in the protection of maritime supply routes.

2. The nuclear safety of naval reactors is given the highest priority and is independently assessed by safety and reliability experts from AEA Technology. In addition, the Secretary of State for Defence is advised on public safety by a specialist committee, the Nuclear Powered Warship Safety Committee (NPWSC), whose membership includes independent nuclear and radiation safety experts as well as those from within the Ministry of Defence (MOD) and other government departments. The prime contribution to nuclear safety comes from engineered safeguards, good design, quality in construction, training and competence of staff in operations and maintenance. Such measures ensure that the likelihood of a reactor accident occurring is extremely remote. Indeed during over 30 years of the Naval Nuclear Propulsion Programme there has never been a reactor accident nor has any radiation incident resulted in a significant hazard to service personnel or a member of the public. Nevertheless it is MOD policy, in accord with UK statutory requirements and International Commission on Radiological Protection (ICRP) recommendations, to have in place detailed reactor accident contingency plans. These plans forming an additional level of public protection for use in the extremely unlikely event that an accident were to occur.

3. Ultimate responsibility for the Government response to a reactor accident would rest with the Prime Minister and Cabinet. The primary co-ordination role, however, would be taken by a pre-designated lead minister. For civilian power reactors this would be performed by the Secretary of State for Energy. For naval reactors the responsibility lies with the Secretary of State for Defence. Detailed central contingency plans exist for naval reactor accidents involving full co-operation between all relevant government departments. At the local level, MOD policy requires there to be an approved contingency plan developed in conjunction with local civil authorities at all berths cleared by the NPWSC for use by nuclear powered warships. The fact that it is a similar submarine reactor plant which uses each berth allows the production of a skeleton generic plan of the local accident organisation and response, which can be used in the production of site specific plans. Having a common basis, format and terminology in all Naval reactor accident plans greatly facilitates the overall training of, and understanding by, response organisations both from within and outside MOD; and, hence increases the probability of the successful implementation of the plans in the unlikely event that an accident were to occur.

4. The common reactor plant and generic plan also allow the production of a single document providing all personnel who may be affected by a local plan with the same basic background information on naval reactors, reactor accident definitions and hazards, as well as the basis for and details of, the contingency plan. The required information is provided within Part 1 of this book which is to be included, in total, as the first section of all local reactor accident orders.

REACTOR PLANT AND OPERATION

The Pressurised Water Reactor (Fig 1.1)

5. A Royal Naval nuclear powered warship is driven by steam turbine machinery. However, unlike a conventional steam driven vessel, which uses fossil fuels to fire its boilers, the source of heat within a nuclear powered vessel is provided by a nuclear reactor. The type of reactor used is known as a Pressurised Water Reactor (PWR).

6. The reactor core contains fuel modules and control rods. To achieve criticality, the state in which the reactor is able to provide useful power, the control rods are slowly withdrawn from the core until the fission reaction becomes self-sustaining. The reactor is shut down by re-insertion of the control rods. The heat produced by the fission of the fuel is removed from the core by water contained in a sealed primary circuit. This water is circulated using coolant pumps through boilers where the heat is used to produce steam in a separate, secondary circuit. It is this steam which is used to provide power to the submarine. The primary circuit is kept under pressure to prevent the coolant water from boiling.

7. As well as heat, the fission process also produces radioactive fission products. Unlike some civilian power reactor designs where fission products can escape from the fuel modules and have been detected in the primary coolant, submarine fuel modules are contained in metallic cladding and there has never been an instance when fission products have been released from the fuel. Although the fission products remain contained in the fuel, the gamma radiation which they emit is highly penetrative and thus there is a need for shielding to be fitted around the core and to be built into the submarine's reactor compartment. The shielding installed in RN nuclear powered submarines reduces the radiation levels within the manned compartments of the submarine so that the average levels of radiation dose to members of the crew from reactor operation are less than the average natural background levels received by the UK population.

8. The heat produced by the fission process would be sufficient to melt the fuel modules if they were not cooled. To overcome this the submarine design incorporates a number of mechanisms which are able to supply cooling to the reactor. These include natural convection so that cooling would continue even on complete loss of electrical power.

Reactor Containment (Fig 1.2)

9. Following an accident the potential hazards associated with nuclear reactors would come from the release of fission products outside the fuel. As already stated submarine reactor fuel is encased in strong cladding, but beyond this protection there are a number of other barriers designed to contain the fission products. Should the cladding fail, the primary coolant system, which is a closed circuit, would contain the fission products and prevent further spread.

10. Beyond the primary coolant system, the submarine's reactor compartment is designed and constructed to meet the severe rise in pressure that could be associated with the very unlikely event of a complete failure of the primary system. This barrier to the release of fission products is termed Primary Containment. Pipes, ducts and other penetrations between the primary containment and the remainder of the submarine are designed to be shut off automatically, but even if these openings were to allow a slow release of a proportion of fission products, they would still be contained by the immensely strong hull of the submarine which is, of course, designed to withstand the enormous pressures associated with operations at depth. The submarine's pressure hull is referred to as Secondary Containment.

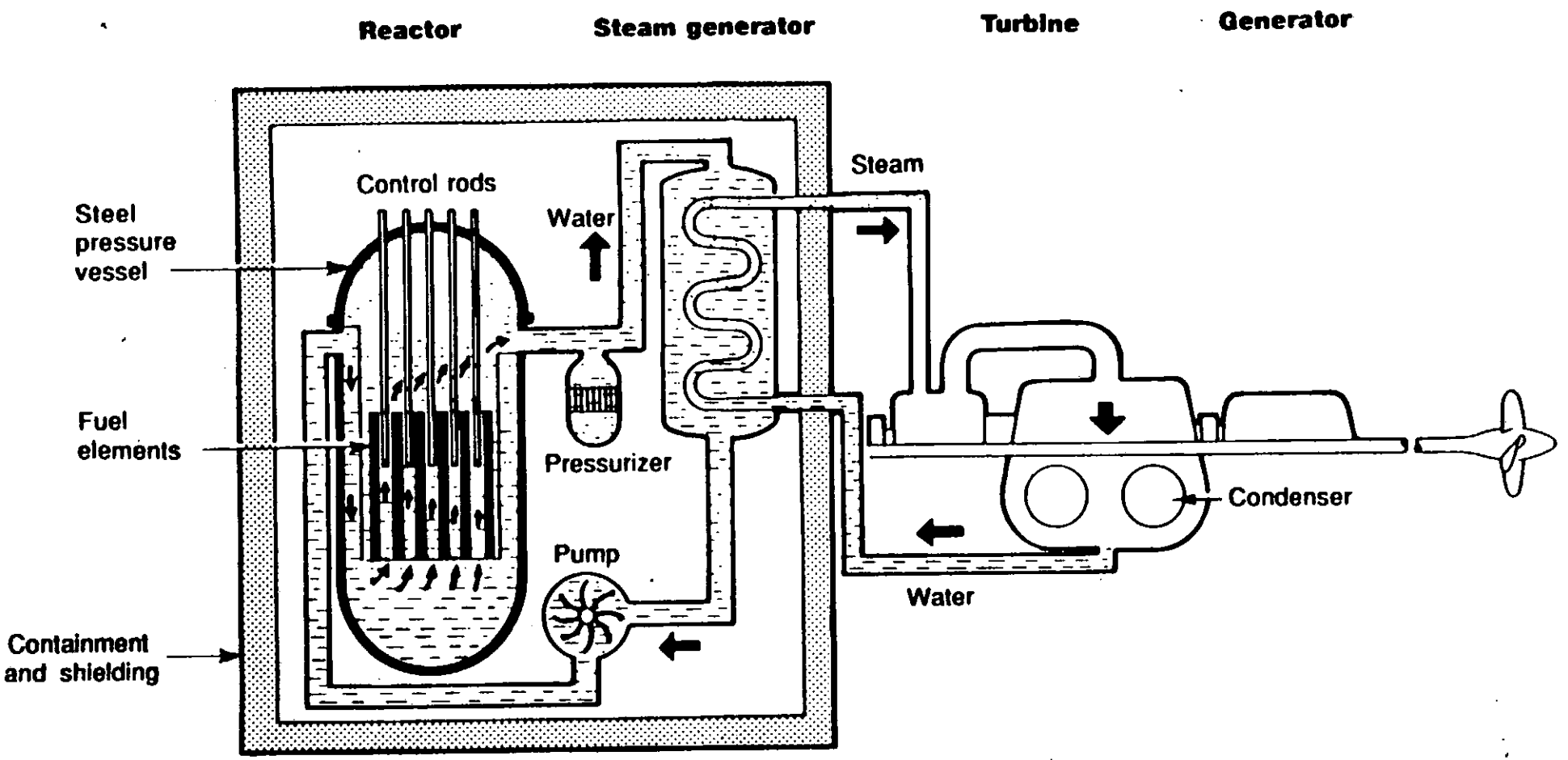
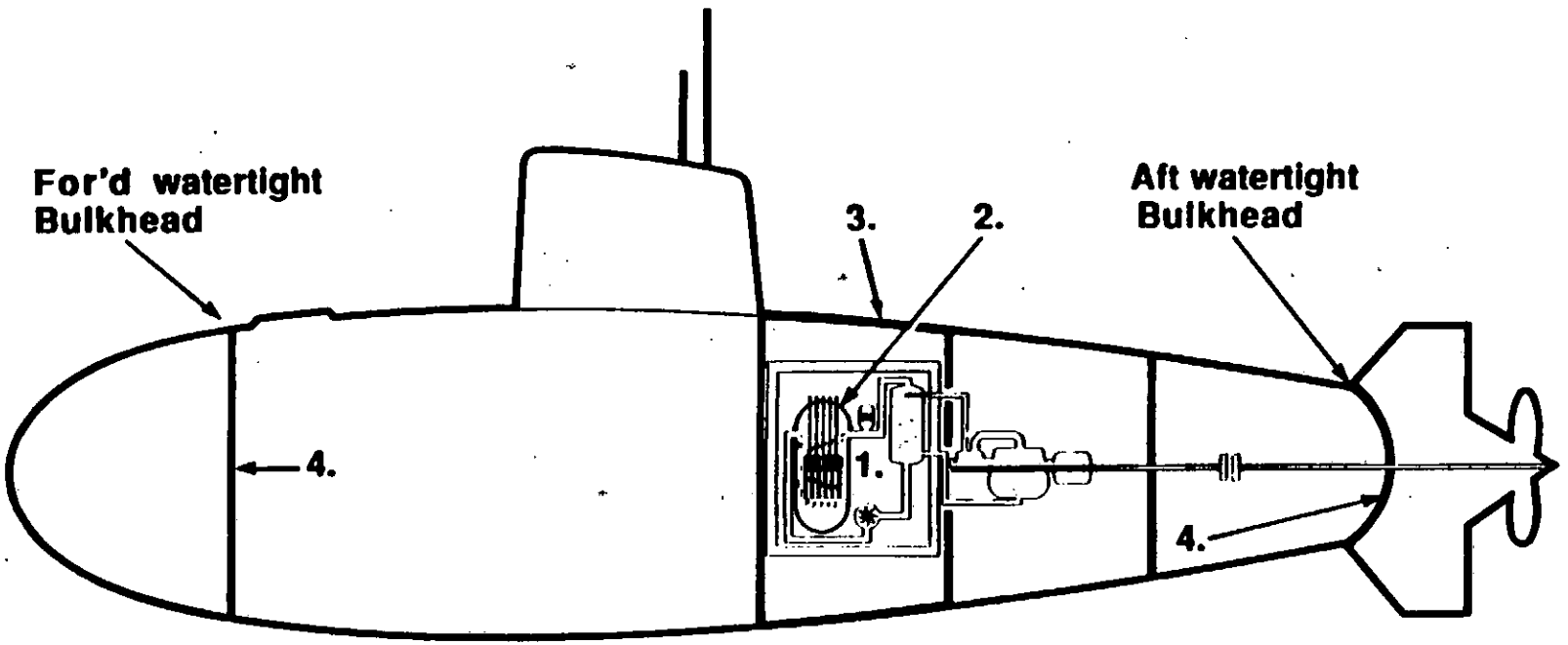


Fig 1.1 Schematic Illustration of a Pressurised Water Reactor



1. Fuel Elements and Cladding

2. Primary Circuit Boundary (nil leakage)

3. Primary Containment Boundary

4. Secondary Containment Boundary

Fig 1.2 Barriers to Fission Product Release

REACTOR ACCIDENTS

Definitions

11. It is impossible for an accident in a naval pressurised water reactor to result in a nuclear explosion. The only reactor accident which can result in a hazard to personnel outside the nuclear warship is one which leads to a release of the fission products normally retained within the reactor core. A nuclear Reactor Accident is defined therefore as:

> "an unexpected event which is likely to lead to, or has resulted in, a release of fission products external to the fuel".

This general definition is sub-divided into 3 categories of accident, which would be used to provide, in shorthand form, further information on the accident severity in the unlikely event that one were to occur.

(a) Category 1 - an event which is likely to lead to, or has resulted in, the release of fission products from the fuel.

(b) Category 2 - an event which has led to a radiation hazard as the result of the release of fission products from the fuel.

(c) Category 3 - an event which has led to the release of fission products from the fuel to the environment outside the pressure hull.

12. These categories are related to the functioning of reactor containment. The Category 1 definition allows for the precautionary implementation of contingency plans in a period before any hazards exists; it also refers to a situation where fission products remain contained within the primary circuit. Category 2 accidents have an associated hazard, but, since fission products are not being detected outside the pressure hull, the definition relates to the effectiveness of primary and secondary containment. The definition of a Category 3 accident states clearly that a release of fission products outside the submarine has occurred. While it is convenient to discuss accident types in terms of accident Category, in the remote possibility that a severe accident were to develop it should be recognised that the Category could change with time as the accident progressed, or as more information became available. A Category 1 report might refer to an initial event which is followed by a Category 2 report as a hazard inside the submarine was detected, and Category 3 as monitoring outside the vessel detected that a release had occurred. It is MOD policy that the local plan, including the implementation of automatic countermeasures (Para 32(b)) should be instigated in full following the declaration of a reactor accident irrespective of Category.

Accident Probabilities

13. As part of the Naval PWR design safety justification to ensure that all reasonably practical measures have been taken to prevent accidents, detailed analyses are carried out into the mechanisms by which a reactor accident could be initiated, and the performance of the many safety systems. The results of such analyses provide quantitative estimates of both the probability of accidents and their consequences in terms of the magnitude of any release of fission products into the environment. The results of this work are independently assessed and then endorsed by the NPWSC.

14. The various accident analyses are combined to provide a detailed assessment of reactor accident risks which demonstrates that the most severe accidents have by far the lowest probability of occurrence. In common with ICRP recommendations to ensure that plans should consider a wide range of potential scenarios, including those having a low probability of occurrence, it is the assessed consequences of the full range of naval reactor accident scenarios which are used to evaluate the performance of the MOD contingency plan. In this respect the MOD plan differs from those adopted for civilian power plants which are based on a single specified "Reference Accident". In order to provide some indication of the scale of submarine reactor accidents, it is assessed that the worst case event predicted to occur at about once in every ten thousand years of reactor operation, should not require the emergency evacuation of people beyond 550 metres from the accident submarine. More severe accidents involving the failure of primary containment have a predicted probability of occurrence of about once every million years of reactor operation.

HAZARDS OF A REACTOR ACCIDENT (Fig 1.3)

Biological Effects of Radiation

15. It is the ionising radiation given off by the fission products which would pose the hazard following any reactor accident. As radiation passes through the human body, ionisation events occur which may damage or kill cells. The body is of course being subjected continuously to natural background radiation and has well developed repair processes to deal with radiation damage. Different human cell types have very different radiation sensitivities but if the radiation dose is great enough and large numbers of cells are killed, signs and symptoms of acute radiation exposure would appear. These acute radiation effects include skin burns and most severely death, but all have a defined threshold of dose below which the effect will not take place.

16. At radiation doses below the thresholds, acute effects cannot occur, though cells may have been damaged with the result that individuals exposed have a statistically increased risk of the development of cancer in years to come. Reproductive cells may also have been damaged so that children born to those people exposed may have an increased risk of hereditary defects. For radiation protection purposes, the increased risk of these effects is assumed to be directly proportional to the radiation dose, without any threshold.

Radiation and Contamination

17. In order to understand the hazards of a reactor accident, it is important to appreciate the meaning of and differences between the terms radiation and contamination. Even in a situation where the fission products remain contained, the penetrating radiation which they give off may still irradiate people in the vicinity. Protection against such a hazard would be afforded by reducing the time people spent close to the fission products, placing shielding between the individuals and the radiation source or increasing the distance between them and the source. This is termed a radiation hazard. If, however, personnel became contaminated with fission products, either on the surface of their body or internally by breathing, eating or drinking, then the subjects carrying the source of the radiation around with them would continue to be irradiated until that source was removed. This is termed a contamination hazard.

The Hazards

18. Following a severe reactor accidents involving the release of fission products outside the primary circuit, there are 2 distinct ways by which people could be irradiated:

(a) Gamma radiation from fission products retained within the submarine containment would be transmitted in all directions through the vessel's hull. The intensity of this pure radiation hazard would be diminished by both shielding and distance from the submarine, but excessive levels of radiation could be received by people within, or in close proximity to, the vessel. This hazard is referred to as Gamma Shine.

(b) Less likely is the release of some of the fission products from the submarine to the surrounding atmosphere or water. With the release of the fission products, the actual source of the radiation, a contamination hazard would exist.

Release of Fission Products to Atmosphere (Fig 1.3)

19. If released to atmosphere the fission products would be dispersed in the area downwind of the vessel. The extent of any hazard and the distance to which such a fission product cloud could be detected would be highly dependent on the weather conditions during the period that the release took place. Such a cloud of radioactive contamination could irradiate people in 5 distinct ways:

(a) Direct radiation from the cloud as it passes by.

(b) By inhalation of radioactive fission products from the cloud. The parts of the body receiving the greatest radiation doses would depend on the chemical and physical form of the individual fission products. It is possible that a significant dose could result from the inhalation of radioactive iodine which is readily absorbed and concentrated in the thyroid gland. Another group of fission products in insoluble form, would remain in the lung. A third main group would be readily absorbed but are not concentrated particularly in any organ.

(c) Direct radiation from fission products which have been deposited on the ground. This route like above would result in fairly uniform whole body radiation exposure.

(d) Inhalation of fission products which have been resuspended after deposition on the ground. This route has been shown to be insignificant compared with doses that would result from (b) and (c).

(e) Consuming food or drink which have been contaminated by fission products. As a radioactive cloud moves downwind, some of the radioactive fission products could be deposited onto the surface of food, either growing in fields or lying open on market stalls etc. This superficially contamined food would cause internal contamination to those who consumed it in the immediate post accident period. Fission products deposited on the ground may also be taken up by growing plants and animals which may be eaten by man with the resultant internal contamination and radiation dose. The contaminated plants and animals may not be eaten directly by man, but may enter a food chain and pass through a number of stages before entering the human diet. It is probable that radioactive iodine would give rise to a significant proportion of doses arising from contamination of pasture. Iodine deposited on grass could be concentrated in the milk of grazing dairy

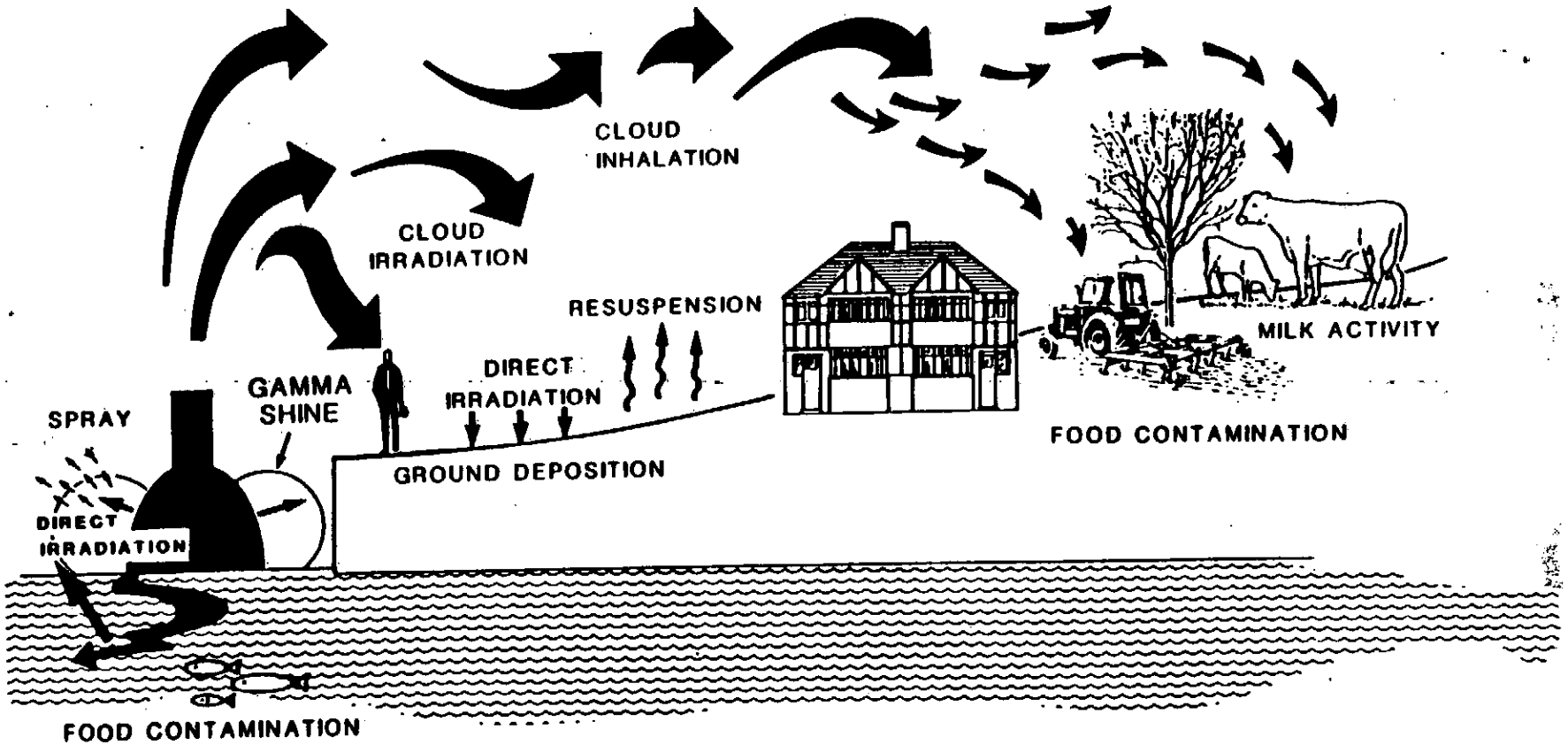


Fig 1.3 Hazards of a Reactor Accident

animals and hence pose a hazard if the milk was drunk. Peak levels of radioactive iodine in food would be reached 2 days after the release with levels decaying over the next several weeks. After the decay of the iodine, the dominant hazard via the ingestion route would be the take-up of longer lived fission products into the food chain.

20. In the very unlikely event of a release to atmosphere the principal short term hazards would be direct irradiation from the cloud, inhalation of fission products and radiation from ground deposition. Food chain contamination although representing less of a hazard initially, would come to be of increasing significance in the longer term.

Release of Fission Products to Water

21. The radiation effects from fission products released to water would be highly dependent on the state of the tide and the characteristics of the estuary into which the release took place. There are 4 ways in which people would receive a dose of radiation following such a release:

(a) Direct radiation from the water either to those immersed within it or to those in its immediate vicinity.

(b) Ingestion of the water.

(c) Irradiation from the deposition of fission products on banks and areas uncovered by the tide.

(d) Fission product contamination of marine food chains.

22. Following a reactor accident, the immediate radiation hazards to the population resulting from a fission product release to water would be very small in comparison with the same magnitude of release to atmosphere. The hazards would be confined to the area around the water's edge and the release would be continuously dispersed and diluted, but food chain contamination could become of increasing significance in the longer term.

PROTECTION OF THE PUBLIC FROM THE HAZARDS OF A REACTOR ACCIDENT

Accident Management

23. If a reactor accident were to occur, emergency procedures would be followed by the submarine crew and engineering support with the aim of preventing or minimising core damage, maintaining the integrity of containment and minimising any release of fission products. This accident management strategy would form an important element in the overall protection of the public.

Emergency Countermeasures

24. The entire population of the UK is constantly exposed to naturally occurring radioactivity, however, as a general rule the levels of this radiation are so low as to be considered insignificant. In the event of a radiological emergency, increases in this background radiation would result and probably continue unless some form of intervention were to take place. For a serious accident, intervention in the form of emergency countermeasures which are implemented population-wide in the surrounding area, could be required. Since the implementation of widespread countermeasures, even in accordance with a pre-planned scheme, is not a risk-free activity, it follows that there must be some criteria on which to base any decision to take such measures following a reactor accident.

25. The development of criteria for the implementation of emergency countermeasures following a reactor accident should be based on the principle that countermeasures are to be introduced if they would achieve more good than harm, and that introduction and withdrawal of measures should be aimed to provide optimum protection. Despite the fact that the measures would be taken population wide, it is the risk to the individual which is considered of greatest importance in determining the need for emergency countermeasures. The basic requirements for implementation criteria are as follows:

(a) Countermeasures should be introduced to ensure no individual suffers acute effects of radiation for which there is a threshold.

(b) The increase in probability of the individual suffering cancer or hereditary effects from radiation exposure should be balanced against the detriment from the countermeasure itself to determine the optimum protection of the individual.

26. Within the UK, guidance on emergency countermeasures to protect the public following nuclear accidents is provided by the National Radiological Protection Board (NRPB). Basic methods of reducing radiation exposure such as time, distance and shielding are still relevant in the mass countermeasure situation but they are incorporated into three countermeasures which may be applicable to implementation to a population:

(a) Sheltering. The public remaining indoors with doors and windows shut.

(b) Stable Iodine Administration. If stable iodine (non-radioactive) is taken prior to or within a few hours of internal contamination with radioactive iodine, the resultant radiation dose to the thyroid gland would be reduced substantially.

(c) Evacuation. In the context of nuclear accident contingency planning, the term evacuation refers to the movement of people out of an area as a countermeasure implemented in emergency. At the time of implementation little consideration is given to how long people may have to be away from the locations from which they are evacuating. If carried out prior to the existence of any hazard, evacuation would prevent almost all the radiation exposure that would have resulted. The adverse effects and difficulties of population evacuation however, are significantly greater than for shelter.

27. The NRPB also recommends dose criteria for the implementation of these emergency countermeasures in an accident situation. The intervention levels are known as Emergency Reference Levels (ERLs) and are presented in terms of the dose to an individual which would be averted by taking the relevant countermeasure. ERLs are specific to each countermeasure because the detriment associated with each countermeasure is different, and are promulgated as a range between two specified values. If doses that can be avoided by the measure are below the lower level for that measure, then the NRPB advise that the countermeasures should not be introduced because it would be unlikely to be justifiable. If doses that could be avoided are estimated to exceed the upper level, then the NRPB would expect every effort to be made to introduce the measure.

28. In addition to the promulgation of ERLs the NRPB also recommends consideration of precautionary actions, that is to say automatic implementation of countermeasures without waiting for information on the extent of the hazard, and also states that it is important to determine specific intervention levels for use in specific countermeasure plans.

29. In considering emergency countermeasures following a release of radioactivity to the environment, it is important to recognise that radiation exposure or the extent of contamination does not necessarily stop at the distances to which countermeasures have been implemented. It is simply that extension of emergency countermeasures beyond the implementation distance would not be justified and, indeed, could pose more of a threat to the public than the radiation dose they are intended to avert.

Other Countermeasures

30. In addition to emergency countermeasures for which ERLs are promulgated, other measures may be applicable to protect the public following a reactor accident.

(a) Food Controls. In the UK the public would be protected from the hazards of fission products in food or water by the control and disposal of the contaminated material. Intervention levels for food are promulgated by the European Commission and are very low being based on doses that individuals would receive if they consumed such food for a year following the accident. It is probable, therefore, that in the event of a reactor accident which did release fission products, food and farm restrictions could extend to distances significantly greater than those to which emergency countermeasures have been taken.

(b) Relocation. Relocation, as distinct from evacuation which is an emergency measure, is the term used to describe the movement of the public from contaminated areas to avoid long term radiation exposure or to allow decontamination to take place. There are no national criteria for the implementation of this measure. Any decision regarding relocation would be on the basis of local government discussion together with relevant national bodies such as the NRPB with the aim of optimising the protection of the public. The protection provided by adequate emergency countermeasures would allow the required time to assess the need for relocation.

NAVAL REACTOR ACCIDENT CONTINGENCY PLANNING

Aims of the Naval Plan

31. The Naval reactor accident plan includes automatic and pre-planned response actions to mitigate the consequences of an accident and to protect the public to standards which accord with national guidance. In addition the plan involves the establishment of the required command, control and liaison organisation, at the local and national level, capable of the successful implementation of these early measures. This organisation allows consideration, by all relevant authorities, of the later follow-on and recovery aspects of the accident for which detailed pre-planning is not considered appropriate.

Planning Zones (Fig 1.4)

32. The basic Naval reactor accident plan used at all berths cleared for use by nuclear powered warships specifies 3 zones where differing actions would take place in the event of an accident.

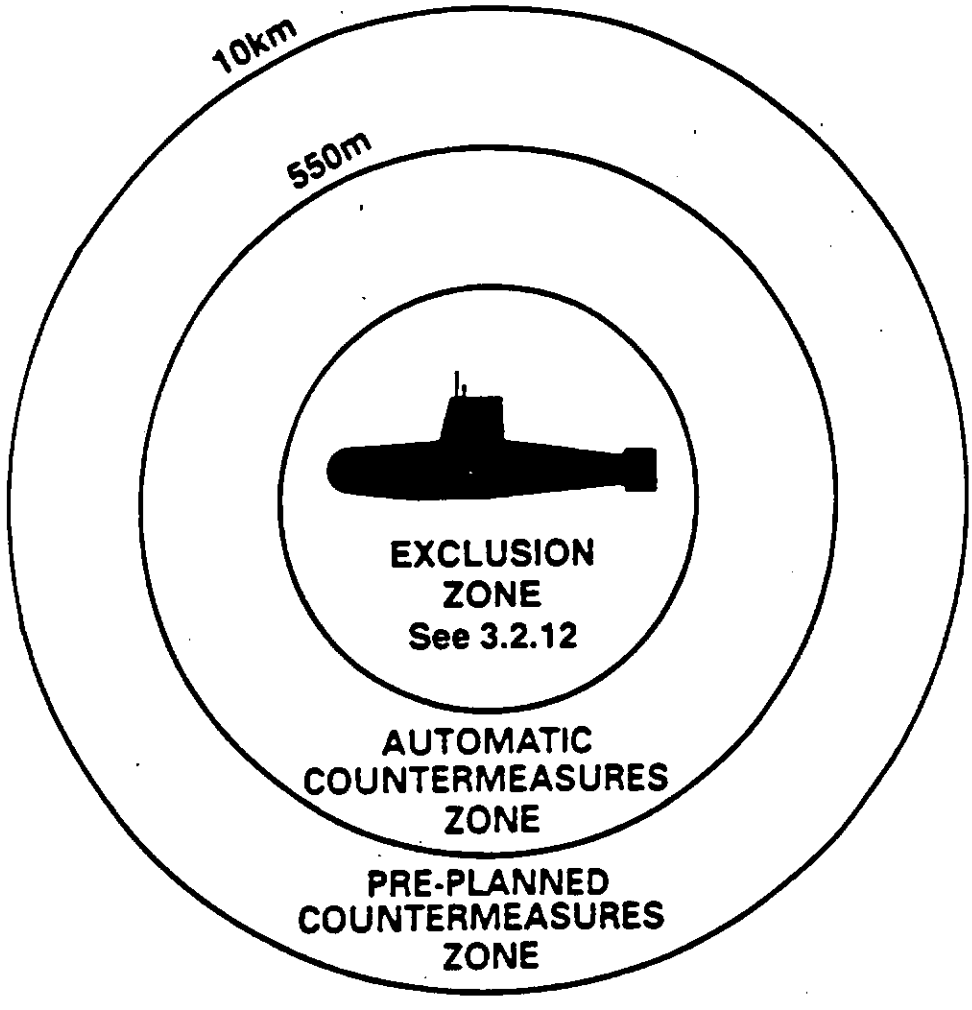
(a) The Exclusion Zone. The Exclusion Zone is an area including the submarine itself in which people would be at greatest risk from the hazards of an accident. The size of this zone varies with local plans but the most basic consideration in its identification is that people within it, even if they took immediate automatic countermeasures, could still receive radiation doses above the upper ERL for evacuation. Within this zone, all people are accounted for and are provided with equipment by which their radiation dose

can be assessed. The local plan must provide for an Exclusion Zone reception centre where personnel evacuating from the zone would have access to medical, radiation protection, monitoring and decontamination facilities. Stable Iodine, in the form of Potassium Iodate is also to be provided at the reception centre.

(b) The Automatic Countermeasures Zone. Beyond the Exclusion Zone is the Automatic Countermeasures Zone. Within this area all people not essential to the management of the accident would be evacuated and supplied Potassium Iodate tablets. Automatic actions would commence immediately on the declaration of an accident, irrespective of category. In a number of local plans, automatic countermeasures include initial shelter within pre-designated shelter stations followed by a controlled evacuation. All people living or working within this zone should be given instructions on what action they should take in the event of an accident. The extent of the automatic countermeasures zone is set at a distance of 550 metres from the submarine in all directions. Automatic measures provide the great advantage of early and perhaps, complete public protection if they are in place prior to the existence of the hazard. The distance to which they are planned however, must represent a balance between this possible benefit and the detrimental effects resulting from their implementation for the more probable accidents producing either no hazard or hazards which would not require measures to be taken to such distance. The approximate frequency of accidents for which the upper ERL for evacuation would be exceeded beyond the 550 metre distance is assessed to be once every half a million years of continuous reactor operation.

(c) Pre-planned Countermeasures Zone. Assessments of the likely consequences of reactor accidents demonstrates that emergency countermeasures would only be required beyond the Automatic Countermeasures Zone downwind from the accident submarine and in the very improbable event of a large release of fission products to atmosphere. Advice on the need for these measures would be based on the technical assessment of the way in which the accident was developing and on an assessment of doses to the public obtained from monitoring information. The Naval plan requires there to be a local pre-arranged monitoring scheme and for consideration to be given as to how emergency measures could be implemented in an area designated the Pre-planned Countermeasures Zone. The zone extends around the Automatic Countermeasures Zone, and while the zone itself is designated in all directions around the berth. Following an accident it is assumed that monitoring and any countermeasure requirements would be confined to the downwind areas. The Pre-planned Countermeasures Zone includes a number of distances applicable for various planning activities. The overall zone extends 10km from the submarine and 2km is specified as the extent to which plans for the issue of Potassium Iodate should be made. The approximate frequency of accidents in which an upper ERL for any emergency countermeasure would be exceeded beyond 10km is assessed at once every million years of continuous reactor operation.

Beyond the Pre-planned Countermeasures Zone the probability of a requirement for emergency countermeasures is so remote that specific Naval reactor accident contingency plans for emergency public protection are not required. At these distances the main considerations would be possible monitoring for pasturage contamination and of food stuffs.



Note:-Not to Scale

Fig 1.4 Reactor Accident Planning Zones

Emergency Action Guidance Levels

33. The requirement for, and extent of, countermeasures within the Pre-planned Countermeasures Zone would be based on a comparison of projected individual doses with Emergency Action Guidance Levels (EAGLs). Like ERLs, EAGLs refer to the dose which can be averted by taking the countermeasure. EAGLs are specific to Naval reactor accident plans, and fall within the ERL range. Numerical values for the EAGLs have been derived from a detailed assessment of the likely impact of a range of postulated submarine reactor accidents. The levels are endorsed by the NPWSC and monitoring procedures are designed to assess doses in a format which facilitates direct comparison with the EAGLs.

Berthing Policy

34. The requirements to maintain nuclear safety and for there to be a site specific local accident plan, determine that all berths used by nuclear powered warships require to be assessed and their use approved by the NPWSC. Berth Assessment examines the safety aspects of navigational hazards, provision of tugs and other facilities and the existence of any other hazards in the local area. Because there must be effective evacuation of persons from the Automatic Countermeasures Zone, berths are chosen so that few members of the general public live within that area. Special consideration is given to the proximity of public utilities such as schools and hospitals.

35. Berths cleared for use by nuclear powered warships are categorised in terms of their use.

(a) X Berths. X Berths are cleared for the building, commissioning, refitting, refuelling or defuelling of nuclear powered submarines or for the repair and maintenance of the nuclear plant together with tests and trials.

(b) Z Berths. Z Berths are cleared for operational or recreational visits by nuclear powered warships. These berths are not cleared for the maintenance or repair of the nuclear plant.

36. During all periods when a nuclear powered submarine is at a UK cleared berth there is a requirement for a number of personnel to be in the area. These specialists will either be part of local Naval Base Organisations or collocated at the berth for the duration of the visit. They are:

(a) An element of the Naval Emergency Monitoring Organisation (NEMO), able to carry out monitoring in the event of the accident. The activities of these monitors are co-ordinated through a pre-designated Emergency Monitoring Headquarters (EMHQ) which may be either mobile or static.

(b) A qualified professional Health Physicist who is able to advise on the need for emergency countermeasures.

Elements of the Local Nuclear Accident Organisation

37. A Nuclear Accident Response Organisation (NARO) is established in all ports containing nuclear cleared berths, with the primary function of safeguarding the Service and civilian workforce and the local population in the event of a reactor accident in a nuclear powered warship. While the detailed composition of the NARO has some variation between sites, the key elements of the organisation remain the same.

38. The principal Naval elements of the NARO are the Military Co-ordinating Authority (MCA) and the Incident Commander (IC), both supported by teams providing advice on health physics, monitoring, public information and technical matters. The MCA is in overall administrative control of the post accident procedures and reports directly to the MOD central organisation, and thence to the Cabinet and Prime Minister.

39. The MCA delegates responsibility to the IC for the control of the immediate situation on site, including the implementation of the automatic countermeasures and the continuing process of accident management. Within a Naval Base, this would be an almost total Naval function and the MCA and IC headquarters are normally combined to form a Nuclear Accident Headquarters (NAHQ). Within civil ports the IC forms the Naval element in an organisation which includes the Port Authority and Emergency Services, termed the Port Safety Panel, which would co-ordinate this on-site role.

40. While receiving reports from the IC, the MCA co-ordinates the post accident response outside the Automatic Countermeasures Zone. He is responsible for liaising with local and national civil authorities and providing them with all relevant information. He is also responsible for the co-ordination of the local media response. A key element of the MCA role is advice to the police and to the local health authority on the need for emergency countermeasures. In order to provide independent validation of MCA advice, a senior member of NRPB staff will go immediately to the MCA headquarters. Another NRPB staff member is also included within the central organisation.

41. In addition to the Naval response to a reactor accident, the local plan co-ordinates the responses of local civil authorities, a number of which have statutory roles to carry out. These groups include the police, fire and ambulance services, the local health authority, water authority and the local authority itself. In addition to these bodies there are also the local or regional representatives of central government departments such as the Ministry of Agriculture Fisheries and Food, Scottish Office, Welsh Office and Her Majesty's Inspectorate of Pollution. The local plans drawn up in consultation with all these bodies reflect their requirements and in most cases the authorities are collocated together in a Local Accident Headquarters (LAHQ). There is a clear requirement for good communication between the MCA headquarters and the LAHQ, and both authorities should exchange liaison representatives to facilitate exchange of information.

Liaison with Local Authorities and Public Information

42. Plans for the protection of the general public must be prepared allowing for full consultation with the local authorities. This is facilitated by forming Local Liaison Committees (LLCs) which are to be formed at all X and Z berths in UK and Gibraltar. However:

(a) In places where there are Z berths and where contact between Naval authorities, civil emergency services and local authorities confirm the civilian view that such a committee is not required, a LLC need not be formed.

(b) In certain areas, such as the Highlands and Islands of Scotland, a single LLC may apply to several berths.

43. A LLC should consist of naval authorities, local authority representatives, emergency services representatives and local representatives of central government departments. Its purposes are:

(a) To inform the public on the scale of the hazards involved in operating nuclear submarines.

(b) To produce and review local plans for the protection of the population in the unlikely event of a serious accident.

44. LLCs should meet at least annually but members may request the Chairman to call meetings at a greater frequency.

45. Local safety plans are required to be submitted for approval to the Commander-In-Chief Naval Home Command. Public safety plans are to be unclassified documents and, once approved, they should be made available to the public, normally by their placement by local authorities in public libraries.

Exercise Policy

46. It is Ministry of Defence policy that reactor accident response plans should be exercised regularly.

Claims for Injury Damage or Loss

47. In the very unlikely event that a reactor accident did occur, injury, damage to property and other financial difficulties for members of the public could result. The Ministry of Defence will deal with claims under the principles for nuclear injury and damage (including the sole and absolute liability of the operator) established by the Nuclear Installations Act 1965; the Act does not apply to nuclear vessels, but claims will nevertheless be dealt with according to the same principles. The Ministry of Defence is prepared to consider any reasonable claim for compensation for any loss or damage which can be shown to have been directly attributable to the incident concerned. Each claim will be considered on its merits, taking into account the full circumstances surrounding the incident. Any claim received will be dealt with as expeditiously as possible but no fixed timescale can be given in view of the wide and varied nature of any likely claim.

PART 1

ANNEX A

GLOSSARY OF TERMS

AUTOMATIC COUNTERMEASURES ZONE	An area extending to at least 550m from the berth in all directions, within which countermeasures will be taken automatically on declaration of an accident.
BECQUEREL (Bq)	Unit of amount of radioactivity, 1 Bq = 1 disintegration per second.
CHAIN REACTION	A process which, once started, provides the conditions for its own continuance. In a reactor, neutrons released in the fission process cause further fission, and so on.
CLADDING	The metal sheath within which the reactor fuel is sealed.
CONTROL ROD	Rod of neutron-absorbing material inserted into the reactor core to soak up neutrons and either shut down or reduce the rate of fission reaction.
CONTAINMENT	Primary Containment The compartment surrounding the reactor plant made up of the pressure hull of the submarine and internal bulkheads designed to withstand the build-up of pressure after a severe reactor accident. Secondary Containment The compartment within the submarine hull on either side of the primary containment which can prevent internal leakage from primary containment to the atmosphere.
CONTAINMENT STATE	The state of integrity of the various containment boundaries within the submarine.
CORE	The region of a reactor containing fuel within which the fission reaction is occurring.
CRITICAL	A reactor is critical when the fission chain reaction is in a controlled self-sustaining state and hence maintains power output from the reactor at a constant level.
CURIE	Old unit of amount of radioactivity. Now superseded. See BECQUEREL. 1 Curie = 3.7×10^{10} BECQUEREL.

DECAY HEAT	Heat produced by radioactive decay, particularly of fission products, in the reactor fuel. This continues to be produced after the reactor has been shut down. It cannot be shut off, but gradually dies away after the reactor has been shut down.
DECONTAMINATION	The removal of radioactive material from a person or surface.
DOWNWIND SECTOR	Normally refers to the sector 15° either side of the prevailing wind direction downwind of the accident site.
EMERGENCY ACTION GUIDANCE LEVEL (EAGL)	Radiation dose selected from the ERL range at which a particular countermeasure would be instituted within Naval reactor accident plans.
EMERGENCY COUNTERMEASURES	Measures consisting of shelter, evacuation or the administration of stable Iodine which may be instituted to protect the public in the emergency phase of a reactor accident.
EMERGENCY REFERENCE LEVELS (ERLs)	A range of intervention levels of dose advised by the NRPB providing guidance on the need for emergency countermeasures following a nuclear accident.
EXCLUSION ZONE	A special control area for personnel, established in the immediate vicinity of the NPW.
FISSION	Disintegration of a nucleus into two lighter fragments (known as fission products) plus free neutrons - either spontaneously or as a result of absorbing a neutron plus energy.
FLASHING UP) PULLING RODS) STARTING UP)	Terms often used instead of 'GOING CRITICAL'.
FUEL	The enriched uranium fabricated for use in the core.
GAMMA RADIATION	High energy electro-magnetic radiation of considerable penetrating power emitted by most radioactive substances.
GAMMA SHINE	The gamma radiation which would emanate directly from a submarine following a reactor accident.
GOING CRITICAL	The process of withdrawing control rods to increase the rate of fission, hence power, until the self-sustaining condition is reached.
HALF LIFE	Period of time within which half the nuclei in a sample of radioactive material undergo decay.

MELTDOWN	In a severe accident melting of the fuel elements within the core.
NEUTRON	Uncharged sub-atomic particle, constituent of nucleus - ejected at high energy during fission, capable of being absorbed in another nucleus and bringing about further fission.
PLANT STATE	Refers to the pressure and temperature state of the reactor.
POTASSIUM IODATE TABLETS	Tablets containing stable (ie non-radioactive) Iodine which would minimise the uptake of radioactive Iodine into the thyroid gland.
POWER RANGE TESTING (PRT)	A series of tests carried out after the initial criticality of a new core and designed to provide assurance of its integrity at all power levels.
PRE-PLANNED COUNTERMEASURES ZONE	An area extending in all directions from the boundary of the Automatic Countermeasures Zone to a distance of 10km from the berth. Within this area contingency planning is required to facilitate monitoring and to allow the implementation of countermeasures in the area of the zone downwind of the NPW.
PRESSURISER	Electrically heated boiler in the primary coolant system which boils water as necessary to maintain coolant pressure by means of a steam bubble.
PRIMARY CIRCUIT	The pipework containing primary coolant connecting the reactor pressure vessel to the steam generator.
PRIMARY COOLANT	Water which is pumped through reactor core to remove heat generated there.
RADIATION (Ionising)	Neutrons, alpha or beta particles or gamma rays which can emanate from radioactive substances.
RADIOACTIVITY	Behaviour of substance in which nuclei are undergoing transformation and emitting radiation. It is measured in Bequerels, ie the number of nuclear disintegrations per second.

RADIATION DOSE	Absorbed Dose - Energy imparted by radiation to unit mass of tissue. Unit: Gray. Symbol: Gy (Formerly expressed as rad). Dose Equivalent - Absorbed Dose weighted for harmfulness of different radiations. Unit: Sievert. Symbol: Sv. (Formerly expressed as rem). Effective Dose Equivalent - Dose Equivalent weighted for susceptibility to harm of different tissues (risk weighting factors). Collective Effective Dose Equivalent - Effective Dose Equivalent to a group from a source of radiation.
REACTOR CRITICAL	This is the normal operating state of the reactor with the control rods withdrawn sufficiently to give a stable neutron population and fission rate.
REACTOR PRESSURE VESSEL	The large container surrounding the reactor core.
RELOCATION	The movement of members of the general public away from contaminated areas to avoid chronic long term radiation dose.
SCRAM	Rapid shutdown of fission process in reactor by inserting control rods.
SECONDARY CIRCUIT	The system that takes steam from the steam generators to the turbines and returns feed water.
SELF-SUSTAINING	The condition where the reactor is critical and is meeting the electrical demands of the submarine.
SHIELDING	Material which attenuates radiation, ie reduces its intensity. Different materials provide effective shielding against different types of radiation.
SHORE SUPPLY	An electrical supply to the submarine derived from a shore system and used to supply the submarine with electrical power when the reactor is shut down.
SHUTDOWN	The reactor state when all the control rods are fully inserted and the neutron chain reaction has ceased.
STEAM GENERATOR	Boiler in which hot primary coolant from the reactor core raises steam in a separate secondary system to drive propulsion machinery and turbo-generators.
SUB-CRITICAL	A reactor is sub-critical when the fission is insufficient to maintain a self-sustaining chain reaction.

PART 1

ANNEX B

LIST OF ABBREVIATIONS

ACDS (Pol/Nuc)	Assistant Chief of the Defence Staff (Policy and Nuclear)
ADS	Approved Dosimetry Service
ASP	Area Safety Panel
CAC	Casualty Action Centre
CMC	Combined Media Centre
CNNTSP	Chairman Naval Nuclear Technical Safety Panel
CPCA	Central Plant Control Authority
D Nuc Pol/Sy	Director of Nuclear Policy and Security
DGSM	Director General Submarines
DMS(N)	Director of Marine Services (Naval)
DNOT	The Director of Naval Operations and Trade
DRPS	Defence Radiological Protection Service
EAGL	Emergency Action Guidance Level
EMHQ	Emergency Monitoring Headquarters
ERL	Emergency Reference Level
FOSM	Flag Officer Submarines
HCMF	Health Control and Monitoring Force (RAF)
HSE	Health and Safety Executive
IC	Incident Commander
ICC	Information Co-ordination Centre
ICRP	International Commission on Radiological Protection
IRR85	The Ionising Radiations Regulations 1985
JOC	Joint Operations Centre in MODHQ
LAHQ	Local Accident Headquarters
LEMT	Local Emergency Monitoring Team
LLC	Local Liaison Committee
LOCA	Loss of Coolant Accident

MAFF	Ministry of Agriculture Fisheries and Food
MCA	Military Co-ordinating Authority
MLR	Monitoring Landrover
MOD HQ NARO	Ministry of Defence Headquarters Nuclear Accident Response Organisation
NABUST	Nuclear Accident Backup Support Team
NAHQ	Nuclear Accident Headquarters
NAIAG	Nuclear Accident Information and Advisory Group
NAR Ops	Nuclear Accident Response Operations Cell
NAR Sec	Nuclear Accident Response Secretariat Cell
NEMO	Naval Emergency Monitoring Organisation
NEMT	Naval Emergency Monitoring Team
NII	Nuclear Installations Inspectorate
NOTAM	Notice to Airmen
NPWSC	Nuclear Powered Warships Safety Committee
NRPB	National Radiological Protection Board
NUSAFE	Nuclear Reactor Accident Response Orders
OPCON	Operational Control
PIC	Personnel Information Cell
PIO	Police Incident Officer
PL(LS)	Personnel and Logistics (Legal Services), MOD
PUBSAFE	Public Safety Scheme
PSP	Port Safety Panel
RHC	Radiation Health Cell
RNCCC	Royal Navy Casualty Co-ordination Centre
RPV	Reactor Pressure Vessel
SAR	Search and Rescue
SOER	Scottish Office Emergency Room
SPECSAFE	Special Safety Scheme
SPO	Senior Press Officer

SPRO	Staff Public Relations Officer
SUBOPAUTH	Submarine Operating Authority
TASG	Technical Advisory Support Group
TGG	Technical Guidance Group
TGGSG	Technical Guidance Group Support Group

ITEM 6

DCOL 11/1992

FEES FOR DRIVING AND RIDING TESTS

The Driving Standards Agency have revised their fees for driving and riding tests with effect from 14 August 1992. Details are as set out below:

WEEKDAY TESTS

Car test	£23.50
Motorcycle test	£34.00
Lorry/bus test	£35.50

WEEKDAY EVENING TESTS (from 1 January 1993 weekday evening tests will be charged at the Saturday rate)

Car test	£23.50
Motorcycle test	£23.00

SATURDAY TESTS

Car test	£23.00
Motorcycle test	£44.00
Lorry/bus test	£75.00

EXTENDED TESTS FOLLOWING COURT DISQUALIFICATION

Car test - weekday	£47.00
Car test - Saturday	£75.00
Motorcycle test - weekday	£57.00
Motorcycle test - Saturday	£90.00

CBT CERTIFICATES	£5.00

ITEM 7

DCOL 11/1992

AN ASSESSMENT OF FIRE SERVICE ROAD TRAFFIC ACCIDENT RESCUE EQUIPMENT - CFBAC RESEARCH REPORT NO 44

1. During 1990, the Fire Experimental Unit (FEU) of the Home Office Fire Research and Development Group (FRDG) undertook a survey of equipment and methods available to the fire service for use in road traffic accident rescue work. The main part of the work was an appraisal of the various powered hydraulically operated rescue tools available at the time the research was carried out in 1990. This was intended to assist brigades when deciding what equipment, or types of equipment, to carry on fire appliances.

2. The report concludes that the need to rescue people trapped in vehicles at road traffic accidents is unlikely to diminish in the foreseeable future, and that this task will almost certainly continue to fall to the fire service. The move towards self-contained, powered, hydraulically operated rescue tools, apparent throughout the fire service, is seen as a step in the right direction. The research is summarised in CFBAC Research Report No 44 and has been fully reported in FRDG Publication 7/1991.

3. A copy of CFBAC Research Report No 44 is enclosed. Additional copies can be obtained from:

Fire Research and Development Group
Fire Experimental Unit
Moreton-in-Marsh
Gloucestershire
GL56 0RH
tel 0608 50004

Copies of the full report, FRDG Publication 7/1991, and a short video can also be obtained from the FEU.
File reference number: FEP/90 20/1504/1
Telephone number of contact: 0608 50004

ITEM 8

DCOL 11/1992

HUMAN BEHAVIOUR IN FIRES: RESEARCH PROJECT BY PORTSMOUTH POLYTECHNIC - CFBAC RESEARCH REPORT NUMBER 45

1. Following the fire at Woolworth's Manchester store on 8 May 1979, the Home Office commissioned a small study on 'Human Behaviour in fire in Public Buildings' from the University of Surrey. In the light of the recommendations contained in that report, the Building Use and Safety Research Unit (BUSRU) of Portsmouth Polytechnic, headed by Dr Jonathan Sime, was contracted to examine what factors may deter people who are escaping from fire from using internal escape routes and to assess their importance.

2. The original proposal for research examined the following 6 factors:

(a) smoke obscuration,

(b) other fire characteristics (such as smoke and smell),

(c) familiarity with escape routes,

(d) characteristics (such as age or infirmity),

(e) advice provided, and

(f) light levels.

It was subsequently decided to extend the factors to 11 by adding the following:

(g) role in occupancy,

(h) group dynamics and attachments,

(i) location and proximity to exit,

(j) information and communication on fires in progress, and

(k) fire exit signs.

3. Two kinds of exit choice situation, defined in terms of building occupancy and type were examined:

(a) escape from a single room (as in a hotel or hall of residence), and

(b) escape from an assembly situation (as in a department store or theatre).

The most significant finding was that 'start-up time' (ie people's reaction to the alarm) is as important as the time taken to physically reach an exit, if not more so. A distinction is made between two time phases in 'exit choice behaviour' of:

(a) 'time to start to move' from the onset of an alarm or, discovery of a fire, and

(b) 'time to move' (reaching a relative point of safety inside the building or a place of safety outside the building).

4. The report proposes that 'escape time' should take into account 'reaction to alarm time' and that the two phases of 'time to start to move' and 'time to move' should be addressed in design codes of practice and in guidance which is issued to support legislation.

5. Early findings of the research project were taken into account by the BSI committee responsible for the revision of BS 5839: Fire detection and alarm systems for buildings Part 1 Code of practice for system design, installation and servicing. As a result of the recommendations of the report it is intended that there should be future research on the contents of evacuation messages, wayfinding and the development of an evacuation strategy for managers of buildings.

6. A Management Summary of the report is attached.

7. It is not anticipated that there will be any cost or manpower implications arising from this part of the letter.

Telephone number of Contact: Mr P Boshell 071 273 3324

File reference: FEP/92 17/207/1

ITEM 9

DCOL 11/1992

Additives for hosereel systems - a Research Report

1. As part of the Home Office Fire Research Programme, the Fire Experimental Unit (FEU) of the Fire Research and Development Group (FRDG) was requested to undertake a project to recommend a suitable additive or selection of additives for use in fire appliance hosereel systems. The FEU carried out a five year programme to assess the relative qualities of the different products available when used through hosereel systems and the impact of their usage on firefighters, fire appliances and firefighting equipment. The results of FEU's work appear in the report enclosed.

2. A total of eleven additives were tested in separate trials involving fires with Class A fuel, Class B fuel and various non-standard fuels such as tyres, polyurethane foam and alcohol. Most of the fires were fought with an Angus Superfog hosereel branch.

3. Details of the individual trial results appear in the report. The overall project conclusions were that a significant improvement in firefighting efficiency only occurred when certain additives and hosereel systems were used to tackle tyre fires where access to the fires was restricted; small improvements were found in restricted access situations for Class A fires; little or no improvements were found when fighting Class A, Tyre or Polyurethane foam fires in situations where access was not restricted; although water is not recommended for fighting Class B or alcohol fires, the use of hosereel systems with certain additives and primary aspirating equipment resulted in convincing control and extinction of Class B fires; and similar performance can be

expected when fighting alcohol fires except that the high application rate required will greatly limit the size of fire that can be fought.

4. Further copies of the summary report, copies of the full report and a video can be obtained from the Fire Experimental Unit Information Desk.

c/o Fire Service College
Moreton-in-Marsh
Gloucestershire
GL56 0RH

Telephone 0608 51470

File reference number: FEP 90 20/126/2

ITEM 10

DCOL 11/1992

A Study of Tank Farm Fires in Kuwait - a Research Report

1. In July 1991 the Home Office Fire Research and Development Group (FRDG) sponsored a small team on a 12 day visit to Kuwait. The object of the visit was to assess the effect of major fire damage on petroleum storage facilities and to see if there were lessons to be learned for the British fire service.

2. The visit, which was made before remedial work at the farm sites had destroyed the evidence, afforded the team a unique opportunity to study a wide variety of tanks which had been on fire, some where the fire had been fought and others which had been allowed to burn out. Some of the tanks inspected had individual bunds; others shared bunds with other tanks.

3. In some cases the team were able to learn the course of events from eye witness accounts. They had contact also with Kuwaiti firefighters and were able to discuss firefighting techniques with them. In general, the study has shown that the problems encountered in Kuwait provide pointers to what might happen in incidents in tank farms elsewhere in the world.

4. A copy of the summary report is enclosed. Further copies of the summary report, copies of the full report and a video can be obtained from the Fire Experimental Unit Information Desk.

c/o Fire Service College
Moreton-in-Marsh
Gloucestershire
GL56 0RH
Telephone 0608 51470

File reference number: FEP 91 20/1500/2

ITEM 11

DCOL 11/1992

The use of foam against large scale petroleum fires involving lead-free petrol - a Research Report.

1. Background

1.1 During 1989 the Home Office Scientific and Research Development Branch (now FRDG) evaluated the effectiveness of portable fire extinguishers on fires of various petrol formulations. Their report, which was issued under cover of DCOL 1/1991, concluded that the use of these extinguishers with Fluoroprotein Foam (FP), Aqueous Film Forming Foam (AFFF) and Film Forming Fluoroprotein Foam (FFFP) resulted in no significant loss of fire extinguishing capability when used on unleaded petrol fires and that consequently there appeared to be no need to change fire extinguisher requirements for garage forecourts.

1.2 The report did suggest, however, that oxygenates, which are more likely to be present in greater quantities in unleaded petrol, can reduce the stability of the foam blanket and this might be significant at large scale incidents. It was therefore agreed that further research should be undertaken into fighting large scale fires involving both unleaded and traditional petrol formulations.

2. Further research

2.1 A series of foam trials, again using FP, AFFF and FFFP, was carried out in September 1991 by the Fire Experimental Unit and the results appear in the enclosed report.

3. Types of fuel used in the trials and likely future trends

3.1 Three types of fuel were used in the trials:

Fuel 1. Unleaded petrol with no oxygenates. This is 95 octane premium unleaded petrol.

Fuel 2. Unleaded petrol with a moderate oxygenate level, using an alcohol component of 3% Methanol and 2% Tertiary Butyl Alcohol (TBA). This gives a total oxygen content of 1.93% which approaches the UK maximum of 2.5%

Fuel 3. Unleaded petrol with 15% MTBE. This is the maximum allowed under EEC Directive and is greater than allowed in the British Standard for use in the UK.

3.2 Fuel 1 is equivalent to 2 star unleaded petrol currently available at the pumps. Fuels 2 and 3 are not currently available fuels but were chosen following advice from the Petroleum Industry on the most suitable combination to represent blends towards the upper limits of oxygenate concentrations which could potentially be present in the UK.

3.3 Methyl Tertiary Butyl Ether (MTBE)has been widely used in European Continental petrol and is increasingly appearing in UK blends. Alcohols, notably TBA and methanol are also used intermittently as components in gasolines in Europe and, provided that the fuels conform to the British Standards, they could in theory be imported for sale in the UK. At present, the likelihood of this happening is low, but cannot be ruled out in the long-term. The Petroleum Industry is unable to predict the future trends of additive blends and reserves the right to use such additives as are legally permissible.

4. Qualities of the foams tested

4.1 In brief, the trials showed that there was no difficulty in extinguishing all of the fuels tested using AFFF and FFFP through a Chubb FB5X MKII branchpipe at the minimum

recommended application rate even when plunging the foam into the fuel. The Angus 225H branchpipe is expected to perform similarly.

4.2 FP achieved extinction with the unleaded fuel with no oxygenates (Fuel 1) when used at the minimum application rate with an Angus 225H branchpipe. Extinction was not achieved with the other two fuels without using indirect application. The burnback performance of FP was better than that of AFFF and FFFP.

4.3 The tests have shown that foams applied with the Angus 225H have superior performance than when applied with the Chubb FB5X MKII.

4.4 The tests showed that AFFF and FFFP had slightly better extinguishing performance than FP on currently available unleaded petrol (Fuel 1) and would have significantly better extinguishing performance than FP on Fuels 2 and 3 as used in the tests, if such fuels ever came into use in the UK. FP showed the best burnback resistance, however, on any of the test fuels which were used. Foams specifically intended as alcohol resistant types were not tested on Fuels 2 and 3 and might have been an appropriate choice.

5. Conclusions

5.1 The report concludes:

> "In selecting foam additives, brigades should consider the relative importance of extinguishing and burnback performance. FP has the better burnback performance. AFFF and FFFP have significantly better extinguishing performance. Providing that brigades follow the guidance in the Manual of Firemanship, as amended by DCOL 10/1991, no problems would be expected when using good quality AFFF or FFFP against petrol formulations permitted by current and likely future standards"

6. Recommended application rates

6.1 Brigades are reminded of the recommended application rates which are detailed in the Manual of Firemanship Book 3, Part 3, Chapter 11, Paragraph 2(b) and Part 6B and Chapter 5, Section 6, paragraph 3(b) and in Item 2 of DCOL 10/1991. Brigades are also reminded of the importance of using the correct application techniques and recommended equipment, particularly the need to avoid forceful application whenever possible.

7. General

7.1 Further copies of the summary report, copies of the full report and a video can be obtained from the Fire Experimental Unit Information Desk.

c/o Fire Service College
Moreton-in-Marsh
Gloucestershire
GL56 ORH

Telephone number of contact: Copies of Report: 0608 51470
Technical matters: 071 273 2716

File reference number: FEP 92 321/1500/1

ITEM 12

DCOL 11/1992

SPRINKLERS FOR LIFE SAFETY IN DEPARTMENT STORES - FIRE RESEARCH PROJECT

1. This part of the letter informs brigades of the completion of a research project financed by the Home Office to assess the effectiveness of sprinklers in reducing the hazard to life sufficiently for occupants to escape from the compartment of origin of the fire. The method and results of this research project are summarised in the enclosed report (Research Report Number 51).

2. Further Action

2.1 In the opinion of the Home Office the work carried out, in conjunction with the appropriate British Standards, provides a basis upon which guidance can be given on the various applications of sprinklers in department store and shopping complex scenarios.

2.2 Therefore, steps will be taken to activate section 15 of the Fire Safety and Safety of Places of Sport Act 1987 to permit sprinkler systems to be specified in fire certificates and to make regulations under section 12 of the Fire Precautions Act 1971 in respect of the continuing maintenance of sprinklers and other active fire prevention systems in premises. It is intended to commence section 15 as soon as the necessary guidance on the use of sprinklers is ready.

2.3 The Home Office has also agreed with the Department of the Environment that regulations made under section 12 of the 1971 Act should require the continued maintenance in working order of sprinklers and other active fire protection measures incorporated in buildings under Building Regulations. This will enable Fire Authorities to ensure that sprinkler systems in premises which do not require a fire certificate and which are not subject to a licensing regime, are also adequately maintained.

2.4 Chief Officers will be advised about the commencement of section 15 of the Fire Safety and Safety of Places of Sport Act 1987 and of the regulations to be made under section 12 of the Fire Precautions Act 1971 in due course.

File Ref: FEP/91 6/93/6

Telephone number of contact: 071-273-2867 (policy)
071-273-4020 (technical)