

Safety Handbook 2002

Rutherford  
Appleton  
Laboratory

# Safety Handbook

Council for the Control Laboratory  
of the Research Councils  
Rutherford Appleton Laboratory  
Chilton, Didcot, Oxfordshire OX11 0QX



## RUTHERFORD APPLETON LABORATORY SAFETY HANDBOOK

### FOREWORD

The purpose of this handbook is to inform everyone who works at the Rutherford Appleton Laboratory about the safety policy, organisation and arrangements which exist here. It summarises instructions, advice and rules which are contained in other Laboratory documents which are widely distributed and freely available.

The safety policy of the Rutherford Appleton Laboratory is to provide healthy and safe working conditions for all who work at the Laboratory, whether or not they are employees of the Council for the Central Laboratory of the Research Councils.

A. Managerial responsibility includes responsibility for safety, therefore each supervisor has a duty to ensure the safety of all persons he or she supervises. Everyone has an obligation to take care of personal health and safety, to avoid endangering others and to co-operate in the implementation of safety measures.

B. The Rutherford Appleton Laboratory Safety Committee advises on matters of policy concerning health and safety. Detailed safety matters are the concern of the Departmental Safety Committees.

C. The Health and Safety Group advises the management, employees, visitors, contractors and committees on all safety matters. It has executive responsibilities for radiation protection, statutory safety requirements and safety training.

D. Safety Representatives, nominated by their respective unions, have been appointed in accordance with the Regulations and are members of the above committees.

E. The Health and Safety Executive inspects the process and fire risks at the Laboratory.

This describes the organisational structure designed to provide you with a safe working environment. It can succeed only with your active co-operation. Although the safety record of the Laboratory is very good accidents still occur, many quite trivial and avoidable. Improved safety performance can come only from an awareness of the hazards and risks and from the effort of constant vigilance. This handbook is designed to help you in that effort.

J.V. Wood  
Chief Executive

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## 1. INTRODUCTION

Safety at work or on the roads or in the home cannot be achieved by rules and regulations alone nor by safety organisations alone. Safety requires the active co-operation of people of you in particular - recognising that hazards exist and taking adequate precautions to guard against them; you need guidance, advice and information. This handbook is intended to help you obtain this by describing the safety organisation in the Laboratory, by pointing out sources of advice and by summarising the principal safety arrangements.

Safety standards at the Laboratory are based on various Acts, Regulations and Codes of Practice, supplemented by local rules which are contained in Health and Safety Notices, Laboratory Notices, Safety Codes and Divisional Notices. The Health and Safety at Work etc. Act 1974 consolidated most of the array of previous piecemeal legislation into a single statute; it amalgamated many previous Inspectorates into the Health and Safety Executive; it introduced a noticeable shift in basic philosophy and it set up the Health and Safety Commission which has a duty to ensure that the provisions of the Act are properly developed.

Nationally there have been many changes in safety organisation since the above Act. In the Laboratory during 1975 the safety committee structure was revised and the Health and Safety Group was formed to amalgamate radiation protection and general safety. The organisation as it now exists is described in section 3.

This handbook is not intended to be a comprehensive compilation of safety practices and techniques; it is a general guide to the safety organisation and arrangements in the Laboratory.

It directs attention to the principal safety considerations relevant to the work of the Laboratory and refers to other sources of information; namely Health and Safety Notices and Safety Codes. Further advice and information is available from the Health and Safety Group.

Your attention is drawn in particular to the emergency services Health and Safety Notices, namely those dealing with Fire, Site Emergency, Injury or Illness or Dangerous Occurrences.

## 2. HEALTH AND SAFETY AT WORK ETC ACT 1974

The purpose of the Health and Safety at Work etc Act, 1974 is to provide the legislative framework to promote, stimulate and encourage high standards of health and safety at work. The Act is an enabling measure superimposed over existing health and safety legislation. Some duties under the Factories Act, for example, remain in force. It makes one comprehensive and integrated system of law to deal with the health and safety of virtually all people at work and the protection of the public where they may be affected by the activities of people at work. The Health and Safety Commission and the Health and Safety Executive administer the legislation and are the focus of initiative for all matters relating to health and safety at work.

In addition to placing duties of a general character on employers, manufacturers, employees etc. it provides a wide regulation making power. It covers the keeping of dangerous substances and their lawful acquisition, possession and use. All airborne emissions of obnoxious or offensive substances from prescribed premises can be controlled.

The Act provides for the gradual replacement of existing health and safety requirements by revised and updated regulations and approved codes of practice, the objective being not only to rationalise the law but also to improve standards of protection for people at work and the public.

## 2.1 Duties of Employers

"It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees." This applies particularly to the following:-

- The provision and maintenance of safe plant and systems of work.
- The safe use, handling and storage of articles and substances.
- The provision of information, training and supervision on safety.
- The provision and maintenance of safe means of access and egress and of a safe working environment.
- The communication to all employees of a safety policy statement.
- The setting up of safety committees and collaboration with Safety Representatives.
- The protection of other persons (including the general public) who may be affected by his activities.

## 2.2 Duties of Designers, Manufacturers etc.

Designers, manufacturers, importers or suppliers of articles or substances for use at work must ensure that, as far as is reasonably practicable, these are safe when properly used. They must test articles for safety in use or arrange for this to be done by a competent authority. They must also supply information about the use for which an article was designed and include any conditions of use regarding its safety.

Anyone who installs or erects any article for use at work must ensure that, so far as is reasonably practicable, it does not constitute a risk to health and is safe for use.

## 2.3 Duties of Employees

Employees have a duty to take reasonable care to avoid injury to themselves or to others by their work activities and to co-operate with employers and others in meeting statutory requirements. The Act also requires employees not to interfere with or misuse anything provided to protect their health, safety or welfare in compliance with the Act.

## 2.4 Enforcement

A Health and Safety Executive Inspector who discovers a contravention of the provisions of the Act can:-

- Issue a prohibition notice, if there is a risk of serious personal injury, to stop the activity giving rise to the risks until the remedial action specified in the notice has been taken.
- Issue an improvement notice, if there is a legal contravention of any of the relevant statutory provisions, to remedy the fault within a specified time.

- Prosecute any person contravening a relevant statutory provision.
- Seize, render harmless or destroy any substance or article he considers to be a source of imminent danger or serious personal injury.

## 3. SAFETY ORGANISATION

For the sake of clarity of description it is convenient to divide the safety organisation within the Laboratory, into three main sections. These sections have inter-relationships with one another and with other organisations as will be described. The three main sections are:-

(a) Line Management; (b) Health and Safety Group; (c) Safety Committees

### 3.1 Line Management

Has the responsibility for ensuring that safe working conditions prevail within the management structure. Each supervisor must take executive action as is necessary to safeguard the personnel he supervises.

### 3.2 Health and Safety Group

Has advisory and executive functions to assist the management and the employees on all aspects of safety. The Group has two main functions which are supervised by the Radiation Protection Adviser and the Safety Officer who lead the Radiation Protection Section and the General Safety Section respectively. Their terms of reference are defined in HSN 21 and 27 respectively. The Radiation Protection Section provides advice and assistance on all aspects of health physics and occupational hygiene. It also operates certain central services concerned with personal dosimetry, radioactive sources and instrumentation. The General Safety Section advises on all aspects of safety, controls the issue of safety equipment, ensures that statutory inspections of mechanical handling and other relevant equipment are carried out, co-operates with the fire and medical advisers, co-ordinates the recording and investigation of accidents and supervises the safety training of personnel.

### 3.3 Safety Committees

There is a two-tier committee structure. The Rutherford Appleton Laboratory Safety Committee aims at setting the standards on safety and reviewing the record. It is advisory and reports to the Head of the Laboratory through its Chairman. The membership includes Safety Representatives from the Trade Unions and the Staff Associations and members to give expert advice in particular fields. The Departmental Safety Committees (of which there are 5 at present) have the objective of inspection and monitoring safety performance and the bringing to bear on local problems the best experience to promote safe working and the good health of all employees.

## 4. SAFETY ARRANGEMENTS

The Health and Safety Group plays a central role in the arrangements for safety in the Laboratory. In addition to the functions already stated it provides the main channel of communication with the Health and Safety Executive's Inspectors. It maintains contact with other safety organisations and safety departments. It has contracts with an insurance company for the inspection of mechanical equipment and some fire fighting installations and with an approved dosimetry service for the assessment of radiation

doses on personal dosimeters. The Group maintains regular contact with the Harwell Laboratory Fire Brigade, which provides fire fighting and ambulance services, fire appliance maintenance and advice on fire prevention, and with the Rutherford Appleton Laboratory Occupational Health Centre which provides medical examination services, first aid and occupational hygiene advice.

The Group organises safety training. A safety course is given to all new entrants to the Laboratory. Safety courses on particular subjects are also held, as requested or required.

#### 4.1 Safety literature

Safety instructions are issued in the Laboratory as Safety Notices (see Section 9) and safety advice is given in Safety Information, both of these are widely distributed and copies are available from the Health and Safety Group (ext. 5611) on request. Safety Codes (see section 10) provide instructions and advice on several potentially hazardous aspects of the work of the Laboratory. These documents may also be viewed on the CLRC web pages. The minutes of safety committee meetings are widely distributed throughout the Laboratory.

#### 4.2 Alarms and interlocks

All alarm systems and interlock systems are tested periodically and require to be approved by the Safety Officer. The principal alarm systems are the fire alarm bells and the site emergency klaxons. Fire evacuation exercises are held annually in all occupied buildings. Site emergency exercises, organised by the Harwell Laboratory, are held at regular intervals. The Building Wardens and the Security Wardens have key functions in the event of fire and site emergency.

#### 4.3 Permits to Work

Permit to work systems are used for work in certain areas of the Laboratory, particularly where there could be hazards from electrical installations, radiation, work on cranes and work at heights or in confined spaces.

### 5. FIRE PRECAUTIONS

Fire and smoke can be very destructive and cause serious injuries and loss of life. It is essential, therefore, that you take proper and adequate fire precautions and obey the relevant Laboratory instructions, which are contained in HSNs 29, 30 & 31. Remember these points:-

#### 5.1 Fire Prevention

- a. Practice Good Housekeeping.
- b. Do not leave naked lights unattended.
- c. Do not leave electrical equipment energised unnecessarily.
- d. Treat flammable materials with proper respect.

#### 5.2 Fire Equipment

Know the location, in all your work areas, of the following:-

- a. All Break-Class Fire Alarm Points.
- b. All Fire Extinguishers.

- c. All Exits (including Emergency Exits).
- d. The Fire Assembly Areas (see also the map at the rear of the Telephone Directory).

#### 5.3 Fire Drill

When you discover a fire:-

- a. Call the Fire Brigade (by a Break-Class Alarm and telephone 2222).
- b. Warn others of the fire.
- c. Use the Fire Extinguisher provided, if it is safe to do so.

#### 5.4 Fire Evacuation

When you hear the Fire Alarm:-

- a. LEAVE the building by the NEAREST EXIT. Close your doors and windows if it is safe to do so. **DO NOT USE THE LIFT.**
- b. When outside go to the appropriate FIRE ASSEMBLY AREA.
- c. CHECK on the presence of colleagues known to be at work; ACCOUNT for absentees by enquiry; GIVE the names and possible locations of any persons not accounted for to the SENIOR FIRE OFFICER at the incident as soon as possible.

### 6. SITE EMERGENCY

The term 'Site Emergency' refers to the situation which would exist after an accidental release on the Harwell/Chilton Site of significant amounts of radioactive material, beryllium or other toxic substances. During such an emergency the Site Emergency organisation at the Harwell Laboratory would take control of the whole site to deal with the emergency.

A Site Emergency warning would be given by sounding the Klaxons, which are installed at several locations in the Laboratory.

The WARNING is an interrupted note on the Klaxons lasting one and a half minutes.

The ALL CLEAR is a continuous note lasting two minutes.

**On hearing the warning all persons in the open must immediately enter the nearest main building (but not a builder's hut or anything similar) and obey any instructions they may be given by a building warden or other authorised person. Those within buildings must remain inside and observe local instructions. Close all windows, sky lights and louvers and close (but do not lock) all exterior doors. Close down plant and power ventilation in accordance with local instructions.**

Vehicles must be parked so as to avoid impeding the free passage of emergency transport or obstructing the entrances to buildings.

The Laboratory telephone system must not be used except for calls connected with the incident and for other emergencies.

Building Wardens are appointed for all buildings to assist in Site Emergency and fire situations. They are empowered to direct personnel during such emergencies and to co-opt others to assist in their duties (see HSN 36).

Communication of information and instructions throughout the Laboratory during a Site Emergency would be via a system of 'cascade telephones' which would relay messages to Building Wardens and hence to all personnel. **The instructions to all personnel are detailed in HSN 35. You are advised to read and take note of these instructions.**

## **7. FIRST AID**

IN CASES OF SERIOUS INJURY OR ILLNESS-

- a. **Telephone Ext. 2222** - ask for the Ambulance.
- b. Give a brief description of the casualty and location.
- c. Meet the ambulance at the entry to the building.

Only by this procedure can first aid be obtained for an injured or ill person within four minutes, at any time of day or night. The ambulance will be manned by two firemen from the Harwell Laboratory Fire Station who have been well trained as occupational first aiders. They are also equipped to deal with the special hazards which exist in the laboratories on the Harwell/Chilton site.

The main centre for medical treatment of an urgent nature is the Rutherford Appleton Laboratory Occupational Health Centre, which is staffed by doctors and/or nurses during normal working hours.

During silent hours casualties may, at the discretion of the ambulancemen, be taken to the Accident Department of one of the local hospitals in Oxford or Reading.

For minor injuries or ailments during working hours, contact the Occupational Health Centre on extension 6666.

First aid boxes, stocked to a level recommended by the Occupational Health Physician, are widely distributed throughout the Laboratory. Each box is in the custody of a nominated person who is responsible for maintaining the contents.

Practical instruction on life-saving techniques is given on courses provided by the Occupational Health Centre.

The procedure in the event of injury or illness at work or of a dangerous occurrence is given in HSN 39.

## **8. IONISING RADIATIONS**

At the Rutherford Appleton Laboratory the main sources of ionising radiations are the proton accelerator ISJs and the various activated components, samples and other material produced during its operation, various sealed radioactive sources and high voltage apparatus producing X-rays either deliberately or adventitiously. The procedures and precautions to protect employees and others from these hazards are detailed in HSN 20 and in the "local rules" produced by the operating Divisions.

### **8.1 Legislation**

All work involving exposure to ionising radiations or radioactive substances must be conducted in such a manner that the requirements of "The Ionising Radiations Regulations 1985" (issued under the Health and Safety at Work etc. Act 1974) are complied with. For the keeping, storage and disposal of radioactive substances the Laboratory is subject to the requirements of "The Radioactive Substances Act 1960" through specific Certificates of Registration and Authorisation.

### **8.2 Administration**

The Chief Executive of the Council for the Central Laboratory of the Research Council is the employer as defined in the Regulations and he has delegated to the Senior Managers (the Director, Research and Development, Departmental Heads and Unit Heads) those executive and administrative duties detailed in HSN 20. These duties will be performed by Division Heads on behalf of the Senior Managers, in the cases where Units do not have separate Divisions the duties will be performed by the appropriate Unit Head. Certain central services are provided by the Radiation Protection Section of the Health and Safety Group; the Section Leader has been appointed as the Laboratory's Radiation Protection Adviser (RPA) and his duties are detailed in HSN 21.

Medical supervision is provided by the Rutherford Appleton Laboratory Occupational Health Physician.

### **8.3 Designated Areas**

Areas where work with ionising radiations or radioactive substances is carried out are designated as either "supervised" or "controlled" according to the potential hazard as detailed in HSN 20.

Warning signs are fixed to all entrances to these areas and may be supplemented by temporary notices where specific hazards exist. All persons required to enter controlled areas (whether Laboratory employees or others) must be classified as radiation workers or be subject to the provisions of a written scheme of work. Additionally they may be subject to the provisions of a Permit to Work system. Work in all designated areas is directly supervised by a Radiation Protection Supervisor (RPS) appointed by the appropriate Division Head.

### **8.4 Personal Monitoring**

The Radiation Protection Section issues or supervises the issue of all film badges and other types of personal dosimeter, and maintains the appropriate dose records. These dosimeters should not be worn in designated areas at other establishments where locally issued dosimeters must be used.

Everyone entering a designated area must wear the personal dosimeter appropriate to that area. The standard issue dosimeter should be worn in such a position as to give a fair indication of the whole body dose (say on the trunk between the waist and neck) and should not be used to estimate exposure to other parts of the body, nor must it be used for experimental purposes. The wearer is responsible for the safe-keeping of his or her dosimeters and for their prompt return at the end of each issue period.

#### 8.5 Instruments for monitoring

The Radiation Protection Section holds a stock of hand survey instruments for loan to Radiation Protection Supervisors as required. All other instrumentation is the responsibility of the user Division.

#### 8.6 Installations Emitting Radiation

The Radiation Protection Adviser must be consulted on the use, specification, shielding and interlocking of all apparatus potentially capable of emitting radiation (either deliberately or adventitiously).

#### 8.7 Radioactive Substances

All radioactive sources must be ordered through the Radiation Protection Section, subsequent use and storage of these sources and other radioactive substances is the responsibility of the user. The Radiation Protection Section must be consulted regarding the transport of all radioactive substances off site.

#### 8.8 Radioactive Waste Disposal

All solid and liquid waste must only be disposed of via the Harwell Site waste disposal service.

#### 8.9 Responsibility of Individuals

Every individual working with ionising radiations or radioactive substances has a duty to protect himself and others from any hazards arising from his work. He must not expose himself or others to ionising radiation to a greater extent than is reasonably necessary for the purpose of his work.

### 9. HEALTH AND SAFETY NOTICES

HSN 1	Health and Safety Notices
HSN 2	Safety Equipment
HSN 3	Apparatus left Working - Emergency Instructions
HSN 4	RALSC 15 - Dangerous Atmospheres and Confined Spaces
HSN 5	Breathing Apparatus
HSN 7	Earthing of Portable Electronic Apparatus
HSN 8	Pressurised Equipment and Gas Systems
HSN 9	Biological Effects of Magnetic Fields
HSN 11	Safety Interlocks
HSN 12	The Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972
HSN 13	Glove Boxes and Shielded Process Enclosures
HSN 14	Colour of Hoses for Gases
HSN 15	Abrasive Wheels
HSN 16	The Use and Storage of Explosives
HSN 17	Structural Loading of Buildings
HSN 19	Mercury
HSN 20	Protection Against Ionising Radiation
HSN 21	The Radiation Protection Adviser
HSN 22	RALSC 4 - Batteries
HSN 23	The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995
HSN 24	RALSC 10 - Safety in the Handling and Use of Cryogenic Liquids
HSN 25	RALSC 1 - Hydrogen and Deuterium - <b>CANCELLED</b>
HSN 26	Lasers
HSN 27	The Safety Officer - Terms of Reference
HSN 28	Contract Superintending Officer's Responsibilities Regarding Safety
HSN 29	Fire Prevention
HSN 30	Procedure in the Event of Fire
HSN 31	Fire Regulations Affecting the Construction and Alteration of Buildings
HSN 32	Rutherford Appleton Laboratory Safety Codes
HSN 33	Use of Liquefied Petroleum Gas Cylinders
HSN 34	Safety Signs, Symbols and Colours
HSN 35	Site Emergency
HSN 36	Building Wardens
HSN 37	Eye Bolts
HSN 38	Electricity at Work Regulations 1989
HSN 39	Procedures in the Event of Injury or Illness or of a Dangerous Occurrence at Work
HSN 40	Audible Alarms
HSN 41	Safety of Visitors
HSN 42	RALSC 2 - Flammable Gases and Liquids (excluding Hydrogen and Deuterium)
HSN 43	RALSC 5 - Safety in the Construction and Use of Scaffolds
HSN 44	RALSC 14 - Lifting Equipment
HSN 45	RALSC 9 - Ladders, Steps and Trestles
HSN 46	RALSC 8 - Portable Electrical Equipment
HSN 48	RALSC 7 - Repair of Drums and Small Tanks - Explosion and Fire Risks
HSN 49	RALSC 6 - Precautions to avoid Ignition of Flammable Gases by Static Electricity
HSN 50	Management and Safety Representatives Guide to Procedures
HSN 51	Control of Substances Hazardous to Health Regulations 1989
HSN 54	Noise at Work Regulations 1989
HSN 55	The Health and Safety Information for Employees Regulations 1989



HSN 57 The Manual Handling of Loads Regulations 1992  
HSN 58 Health and Safety (Display Screen Equipment) Regulations 1992  
HSN 59 Personal Protective Equipment at Work Regulations 1992  
HSN 60 Hot Working Permits

#### 10. SAFETY CODES

These Codes give advice and mandatory instructions on a variety of subjects. If difficulty is experienced in complying with any recommendations in a Code the advice of the Safety Officer (ext. 5329) should be sought. Copies of the Codes are available from the Health and Safety Group and may be viewed on the CLRC web pages.

The current Codes are:-

RALSC 1 Hydrogen and Deuterium. (UNDER REVIEW)  
RALSC 2 Flammable Gases and Liquids  
RALSC 3 Electrical Safety  
RALSC 4 Batteries  
RALSC 5 Safety in the Construction and Use of Scaffolds  
RALSC 6 Precautions to avoid Ignition of Flammable Gases by Static Electricity  
RALSC 7 Repair of Drums and Small Tanks - Explosion and Fire Risks  
RALSC 8 Portable Electrical Equipment  
RALSC 9 Ladders, Steps and Trestles  
RALSC 10 Safety in the Use of Cryogenic Liquids  
RALSC 14 Lifting Equipment  
RALSC 15 Dangerous Atmospheres and Confined Spaces

**11. TELEPHONE NUMBERS**

Safety Officer .....	5329
Radiation Protection Adviser .....	5480
Security Wardens .....	5545 / 5505
Tannoy Calls in ISIS Area .....	6205 / 6615 / 6736
Welfare Officer (Harwell) .....	72-2128 / 3061
Medical Appointments and Treatment .....	6666
Harwell Fire Watch Room .....	2222
(for FIRE And AMBULANCE)	
Site Services .....	(see Telephone Directory under Estates Management Division)