EDUCATION AND TRAINING FOR EMERGENCY PROCEDURES

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Mandatory emergency procedures are in force at all nuclear power stations and related sites using fissile material. Large numbers of people and enormous resources are committed to this purpose and so education and training is essential for the system to work at all. In this paper a proposal is made for an education and training scheme designed to maximise the efficiency and reliability of the system. Examples of courses quoted in this paper are drawn from the Department of Nuclear Science and Technology which is an autonomous unit in the Royal Naval College, Greenwich. The full range of training provided by the Department has been described by Lakey etal (1) (2) (3). In this paper courses are classified (using a letter code) in accordance with their objectives and recommendations made for the application of the courses to the people involved in emergency procedures.

COURSES

COMMAND AND CONTROL (C)

The most important courses for nuclear emergency personnel are for those in command and control. A common need in these courses is a foundation syllabus giving an understanding of the hazards involved which is essential if they are to control the process by evaluation or checking of information received. Command and Control training given at RNC mainly consists of an intensive one week Nuclear Accident Procedures Course (NAPC) which acquaints officers with the overall strategy for dealing with accidents and with their individual roles within the organisation.

PLANNING COURSES (P)

The School of Public Health at Harvard University provides a course entitled Planning for Nuclear Emergencies (PNE) (4) which is specifically designed for Planning Officers and local authority personnel, including Police, Fire and Health Services. In addition to a Foundation syllabus the course reviews USA mandatory requirements and specifically the design and conduct of exercises. A Table Top exercise (5) is used to consolidate this material.

STRATEGIC COURSES (S) AND MEDIA TRAINING (M)

Courses, of shorter duration than one week, are needed for headquarters personnel whose role is strategic and political - in this case the technical content is limited but acquaintance with current legislation and policy is essential. The very senior

staff at headquarters must be given media training and some practice in radio and TV interview procedures. Such courses are appropriate for all staff likely to be interviewed.

PROFESSIONAL ACADEMIC COURSES (A)

The first line of defence against nuclear accidents and the initial action rests with the operator. In the nuclear submarine this is the Marine Engineer Officer who must qualify in a series of professional courses which include the 6 month Nuclear Reactor Course which attracts a post graduate diploma of the Council for National Academic Awards. Training for staff appointed to nuclear dockyards is given on the Nuclear Dockyard Course (NDOC), a nine-week course. The PWR and its support systems are covered in sufficient depth to give an overall appreciation of the maintenance required. Officers appointed to Health Physics posts will go out to a period of on-job training at their parent establishment and on attachment at other establishments. The trainees return to DNST for the Nuclear Radiological Protection Course (NRPC). This is a three-month professional course which includes a relevant project, written report and oral presentation. Successful completion of the NRPC and the additional project qualifies the trainee for the award of a University of Surrey post graduate diploma in Radiological Protection.

INTRODUCTORY COURSES (I) AND GENERAL COURSES (G)

All new personnel must receive some introduction to emergency procedures and where possible they should become acquainted with the concepts of nuclear technology. For posts in the nuclear propulsion programme which do not directly involve work on the nuclear plant but which involves working on or near nuclear submarines, an introductory courses, giving an overview of nuclear submarine propulsion and associated hazards, is considered to be essential. To meet this need the DNST runs a two-week course called the Nuclear Introductory Course (NIC). This course covers in qualitative terms the essentials of nuclear and reactor physics, plant descriptions and operating procedures, health physics and radiological protection. Specialised skills are required for search and rescue, monitoring, fire fighting etc and General Courses giving training in the emergency plan and acquaintenance with the facilities on site are essential.

DRILLS

The skills required in emergency response are acquired by drills which extend from simple evacuation drills (ED), through individual drills (ID) or standard drills, on to live drills (LD) involving real equipment and possibly live radioactive exercises, which are replaced where feasible with simulation drills (SD) which avoid the risks of the live drill. In many cases staff must work as a team and this is consolidated through team drills (TD). For example, fire crews (6) must develop skills in operation of their equipment.

EXERCISES

Full exercises (FE) are carried out at least once per year on most nuclear sites. This involves all members of the site emergency team and off site organisations. Limited Exercise (LE) are useful to test part of an emergency procedure and to give those with relevant skills more frequent practice. Table Top exercises (TT) play an important role since events from a minor incident to a full scale emergency can be simulated (5). Paper exercises can be planned and procedures executed using a minimum of time with a few personnel and causing no disruption to plant staff.

PROPOSED EDUCATION AND TRAINING SCHEME

The above concepts are combined into a comprehensive education and training proposal summarised in Table 1, the symbols used to describe courses, drills and exercises are drawn from this text but the tasks and locations are linked to USA practice on power reactor sites (7). Evacuation drills (ED) or Full Exercises (FE) are omitted since these will affect all personnel. For any one reactor site the cost of the emergency training programme is formidable and the total effort can easily reach several man-years per year. But realistic and effective training is the key to successful performance of the emergency response organisation without which the reactor operation would be unacceptable to the authorities.

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TABLE 1 PROPOSED EDUCATION AND TRAINING SCHEMES

Job Title/ Location (1)	Duties	Courses (2)	Drills (3)	Exercises (3)
Shift Supervisor and crew (CR)	Recognise, Analyse and Report	A(NRC)	LD(i) SD(a) TD(m)	LE(m) TT(a)
Manager (TSC)	Command and Control	A(NRC) C(NAPC)	TD(m)	LE(i) TT(m)
Health Physics (TSC)	Advisory	A(NRPC) C(NAPC) M	TD(a) LD(a)	LE(i) TT(m)
Health Physics (OSC)	Survey	A(NRPC)	LD(i) TD(m)	LE(m)
Emergency Planner (EOF)	Advisory and Co-odination	P(PNE) M	TD(a)	TT(m)
Fire (OSC)	Damage Control, Search and Rescue	P(PNE) or G	LD(i) ID(w) TD(w)	TT(a)
Public Relations	Media Releases, Rumour Control	C(NAPC) M	TD(a)	TT(a)
General (OSC)	Specific Tasks	I(NIC) or G	ID(i) TD(a)	
Local Authority	Police and Medical	P(PNE)	TD(a)	
Headquarters	Strategic and Political	S M	-	TT(i)

(1) Terminology is similar to that in US power reactor sites; CR = Control Room, TSC = Technical Support Centre, EOF = Emergency Operations Facility, OSC = Operational Support Centre, JPIC = Joint Public Information Centre.

(2) Specific course titles in brackets refer to RNC or Harvard.

(3) Frequency indicated by, (i) initial, on joining, (w) weekly, (m) monthly, (a) annually.