SPINOFFS FROM RADIOLOGICAL EMERGENCY PREPAREDNESS PROGRAMMES TO GENERIC EMERGENCY MANAGEMENT

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Abstract

SPINOFFS FROM RADIOLOGICAL EMERGENCY PREPAREDNESS PROGRAMMES TO GENERIC EMERGENCY MANAGEMENT.

In the USA, the radiological emergency preparedness (REP) programme for nuclear power plants is being used to enhance emergency management programmes for other types of emergencies. The REP programme is particularly useful in developing plans and preparedness measures for chemical accidents. The Integrated Emergency Management System (IEMS) approach provides a means for maximizing relationships between the REP programme and other programmes. IEMS essentially involves applying common elements of planning and preparedness to all types of emergencies, while recognizing that unique characteristics of specific natural and man-made emergencies require special planning and preparedness considerations. Features of the REP programme that make it compatible with the IEMS approach and useful in coping with other types of emergencies are: (1) the close co-operation between the national nuclear regulatory and emergency management organizations, illustrated by compatible regulations, joint planning guidance to utilities, State and local governments; (2) the programme integration among all levels of government, the nuclear power industry, public interest groups and the general public, illustrated by joint exercises involving all responding organizations and public meetings where contents of plans and results of exercises are discussed and (3) the comprehensiveness and sophistication of the programme illustrated by the degree of detail in the Nuclear Regulatory Commission and Federal Emergency Management Agency regulations and guidance, the concepts of emergency planning zones and protective action levels and the application of acoustical engineering and public survey techniques to the alert and notification function. The REP programme in the USA represents a state-of-the-art emergency management capability. Some of its elements are readily transferrable to most other types of emergency preparedness programmes, while other elements can be adapted more readily to other hazard-specific programmes. The Bhopal accident has been a catalyst for this adaptation to chemical accidents, in such areas as furnishing hazard-specific information to the public, alert and notification systems, definition of the hazards and risks involved, establishing planning zones and developing close working relationships among industry, the public and government.

The purpose of this paper is to report on ways in which the USA's experience with its commercial nuclear power plant radiological emergency preparedness (REP) program is being used to enhance emergency management programs for other types of emergencies.

It has recently become apparent that the REP program in the USA has prototypical value for other types of emergency programs as it represents an advanced capability for managing other emergencies especially those related to technological hazards.

We are currently applying the REP program management approach and associated technologies to other specific types of emergency preparedness programs and to the Integrated Emergency Management System (IEMS), an approach for managing all types of emergencies for all levels of government, the private sector and voluntary organizations.

The REP program in the USA has matured since receiving a major impetus from the 1979 TMI accident. While initially drawing heavily on the experiences in other emergency preparedness activities, there is an increasing recognition that the REP program also contributes significantly to these other activities. There is a useful interaction between general emergency preparedness activities and those dealing with hazard-specific activities. In the REP program this interaction was recognized from the beginning. The thrust of this paper is to show that generic emergency preparedness has made significant gains because of the spinoffs from the REP program.

The TMI accident demonstrated to the world that the management approach practiced in the late 1970's was inadequate for certain types of technological hazards such as commercial nuclear power plant accidents. This accident became a catalyst in the USA for a major reassessment of policies and practices for responding to radiological emergencies at fixed nuclear facilities and transportation accidents involving radioactive materials.

This reassessment led to a new management approach involving the following:

- o Statutory requirements for emergency planning, by licensees, State and local governments and the Federal government;
- o Regulations that detailed these planning requirements;
- o Federal interagency coordination mechanisms at the national and the Federal regional levels;
- o Memoranda of Understanding between the Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA) which established the framework of cooperation between the principal agencies in the REP program;
- o Joint (NRC/FEMA) planning and preparedness guidance for use by licensees, State and local governments;

- o Institution of a regular exercise program including instructions on how to plan for, conduct, evaluate and report on exercises and the
- o Development of the Integrated Emergency Management Information System (IEMIS), a computer system and network to use in making exercises more realistic and to have a record of deficiencies in REP plans and exercises and their correction.

Since 1979, these program elements have been developed and refined to produce what is probably the most comprehensive and sophisticated emergency preparedness approach in the USA.

The December 1984 tragedy in Bhopal, India involving a release of methyl isocyanate, is proving to be a similar catalyst for chemical-related emergencies and is providing the initiative for exploring potential spinoffs of the REP program in preparing for and responding to such emergencies.

In the USA, the examination of relationships between the REP program and other emergency management programs is being done through the Integrated Emergency Management System (IEMS) approach, fostered by the FEMA. In simple terms, this approach involves the identification of common elements and linkages between and among emergency planning and preparedness for all types of emergencies. It also recognizes that there are unique characteristics associated with specific natural and man-made emergencies that require special planning and preparedness considerations.

One of the principal implementing tasks for the IEMS approach is to produce a comprehensive guidance document encompassing planning and preparedness criteria for all types of emergencies including natural hazards, technological hazards and national security emergencies. In pursuing this task, it became apparent the approach and format of the REP guidance document, NUREG-0654/FEMA-REP-1 [1], should be used as a model for the IEMS document. Through the development of this IEMS document, FEMA staff identified emergency management elements common to all types of disasters and emergencies as well as unique, hazard-specific elements. Examples of common elements include direction and control, communications, evacuation planning, alert and notification, information to the public, protective action decision-making and recovery from the effects of disasters and emergencies. Examples of unique elements for commercial power plant accidents include the assessment of the radiological hazard and risk, establishment of a specific planning basis including emergency planning zones, establishment of site-specific alert and notification systems and emergency worker protection.

Through the IEMS approach, FEMA is attempting to establish a national network of governmental and private sector organizations

that have the capability to prepare for and respond to all types of disasters and emergencies--in short, a national emergency management infrastructure.

In developing the IEMS approach, we have discovered that the REP program can be used as a model for other emergency management programs because of these attributes: (1) the close program integration achieved between the NRC, the U.S. licensing and regulating organization, and FEMA, the national emergency management organization; (2) the integration achieved among all levels of government, private sector organizations and the general public; (3) the comprehensiveness of the program and (4) the sophistication of the program.

These contributions of the REP program to generic emergency management are summarized below.

1. Regulatory and Program Integration - Despite fundamental differences in the orientations and functioning of the NRC and FEMA, a compatible program and regulatory framework have been established on a cooperative basis. This integrated program has functioned well over the last five years. FEMA and NRC have taken the lead in a coordinated program involving the provision of planning and preparedness assistance to State and local governments and for the provision of Federal response assistance and resources for radiological emergencies. To accomplish the latter, FEMA developed and published, with the cooperation and approval of 11 other agencies, the Federal Radiological Emergency Response Plan [2]. Initially, this plan dealt only with a Federal government response to an accident at a commercial nuclear power plant but was later expanded to cover the Federal response to all types of peacetime nuclear accidents. While this plan was required by a Federal law, its development and approval by 12 agencies was an achievement in itself. It will make similar efforts related to other hazards more feasible.

The policy and program framework for the NRC/FEMA cooperative program is governed by two Memoranda of Understanding (MOU) [3]: one covering planning and preparedness assistance to State and local governments and the other cooperation during Federal response to actual emergencies at commercial nuclear power plants.

Mechanisms for coordinating the REP activities of about ten Federal agencies were established in 1980 through the publication of one of FEMA's regulations, 44 CFR 351 [4]. Under this regulation, a national level committee, the Federal Radiological Preparedness Coordinating Committee, was established to coordinate the development of Federal radiological policy and programs for assisting State and local governments. Also, ten Regional Assistance Committees, or RAC's, were established by this regulation for the purpose of providing coordinated Federal assistance to State and local governments. The RAC's, chaired by FEMA, shoulder the heavy load of providing technical assistance and reviewing plans and

evaluating exercises to test the plans of roughly 500 jurisdictions that are affected by commercial nuclear power plants.

2. Comprehensiveness of Programs. The planning and preparedness guidance (NUREG-0654/FEMA-REP-1) developed and promulgated by the NRC and FEMA addresses all capabilities needed by the State and local governments and utilities for effectvely managing radiological emergencies at commercial nuclear power plants such as emergency communications, accident assessment, implementation of protective measures and recovery and to re-entry. Provisions are also made for the dissemination of emergency information to the public and the opportunity for the public to become actively involved in the REP program process through public meetings, surveys to test the alert and notification systems and opportunities to participate in licensing hearings. This guidance document, NUREG-0654/FEMA-REP-1, contains 16 planning standards and 212 evaluation criteria of which 169 pertain to State governments, 96 to local governments and 172 to licensees. These planning standards and evaluation criteria are referenced and incorporated into FEMA's regulation, 44 CFR 350 [5], which establishes the policy and procedures for FEMA's review and evaluation of State and local government emergency plans and preparedness; and in NRC's emergency planning regulation, 10 CFR 50 [6]. As mentioned earlier, these standards and criteria are being incorporated into a generic guidance document for evaluating State and local government emergency operating plans for all types of hazards. Much of the content and format of NUREG-0654/FEMA-REP-1 is being used to develop this IEMS-related document.

Recently, because of the concerns of members of the public, the courts have made decisions on the need for considering the complicating effects of earthquakes and other natural phenomena and additional medical arrangements in REP plans. While these decisions and those of the NRC and its licensing boards sometimes result in added burdens on the utilities and State and local governments, they enhance the status of emergency preparedness in the vicinity of the power plants as well as the general status of preparedness in the affected communities.

Furthermore, the REP exercise program has led to increased emphasis in exercises related to other types of emergencies. The thoroughness and comprehensiveness of the REP exercise program have made it particularly useful in the development and conduct of other emergency management exercises. There is no other emergency preparedness program that requires exercises by regulation and on a regular and frequent schedule--previously on an annual, now a biennial basis. This REP exercise activity has significant impact on the general preparedness throughout the USA.

Emergency management training has benefitted from the special training efforts that support the REP program. For example, a REP course dealing with evacuation has been made a part of a general course in emergency management. REP courses and civil defense courses dealing with radiation instruments, detection,

and measurement have been combined with the result that the same individuals are trained to handle peacetime and wartime radiation problems. This makes for better use of a speciality that is in short supply. The high quality of REP plans can be traced to the course that has taught State and local officials how to prepare these plans over the past ten years. This, in turn, has had a positive impact on the planning for emergencies involving other specific hazards and multi-hazards.

3. Program Integration. A common planning basis has been established for all organizations, including State and local governments and utilities, located within the emergency planning zones (EPZ's) including State and local governments and utilities. This integrated approach to emergency management is reflected in: (1) a common set of preparedness guidance (NUREG-0654/FEMA-REP-1) tailored to each type of organization; (2) a common concept of operations including emergency action levels and protective action guides and (3) joint participation in exercises and drills to test the capabilities of the organizations to implement their emergency plans.

The program integration achieved with the REP program for commercial nuclear power plant accidents has been the primary catalyst for using this same approach for hazardous material accidents. FEMA, in cooperation with other Federal agencies, is currently restructuring its planning and preparedness guidance document, FEMA-REP-5 [7], dealing with transportation of radioactive materials, to extend the coverage of the guidance from State and local governments to shippers and carriers. The matrix format of NUREG-0654/FEMA-REP-1 will be used in the restructured FEMA-REP-5 document. It is hoped that this effort to achieve more program integration between governmental and private sector organizations for transportation accidents may be useful for establishing a bridge for planning guidance for other types of hazardous material accidents.

4. Program Sophistication. The implementation of the REP program is based on and utilizes the best available technical and scientific data such as: the accident consequences and source term values of the Reactor Safety Study, WASH-1400 [8]; the planning basis reflected in NUREG-0396 [9], which recommended the plume and ingestion exposure pathway EPZ's; time constraints for initiating protective actions and the relationships between protective actions and exposure pathways; detailed planning guidance reflected in a joint NRC-FEMA document, NUREG-0654/FEMA-REP-1, mentioned earlier; engineering analyses and contributions for developing and evaluating systems to alert and notify the public to radiological emergencies and the development of sophisticated computer systems to model and study certain aspects of radiological emergencies, including plume dispersion, dose calculations and evacuation behavior.

The rational, scientific approach to establishing a planning basis for the REP program is currently being applied to full-spectrum

hazardous material contingencies. FEMA has contracted with a research firm to study a wide range of hazardous material accidents, including those occurring in transportation and at facilities, to determine accident consequences based on past and postulated accidents. Through this study, FEMA will establish planning bases for groups of hazardous material accidents that have relatively similar accident consequences with respect to these factors: (a) the degree of risks associated with the type and amount of hazardous materials; (b) the geographical area that could be impacted as a result of accidents for both the plume and ingestion exposure pathway emergency planning zones; and (c) the amount of time involved from the initiating conditions until the released materials could adversely impact emergency workers and/or the public. Once determined, these data will permit the grouping of the many hazardous material accidents within prescribed planning bases.

The computer system developed by FEMA for use in the REP program is referred to as the Integrated Emergency Management Information System (IEMIS) [10]. This system includes a data base which reflects the results of 182 plans reviews and exercise evaluations. Weaknesses in the program at specific locations and generally can be identified and corrected through the use of this data base. Because of the technical aspects and dynamics of accidents at commercial nuclear power plants, computer-driven models have been developed to simulate certain consequences. Because of the success of IEMIS for power plant accidents, FEMA is currently adapting the system to perform similar technical functions for other types of disasters and emergencies including hazardous material accidents, dam failures, conflagrations and earthquakes.

Based on the above discussion of the REP program and its relevance to management approaches for other types of emergencies, we can make these conclusions: (1) the REP program has been and continues to be a model for other types of emergency programs since it represents, at least in the USA, an advanced emergency management capability and (2) certain aspects of the REP program are readily transferable (e.g., alert and notification system) to most other types of emergency preparedness programs, while other aspects can be adapted more readily to other hazard-specific programs. This adaptation is being pursued by FEMA through the IEMS approach.

An example of the potential value and use of REP planning and preparedness for other types of hazards can be seen in a study [11] of a chemical plant explosion that occurred in Taft, Louisiana (about 30 miles west of New Orleans) on December 11, 1982. In a report on this accident prepared by the Ohio State University Disaster Research Center, a finding was made that the extensive disaster planning experience that occurred with local communities for the nearby Waterford nuclear power plant provided a significant resource for effecting a successful large-scale evacuation for the chemical plant explosion. There are numerous other undocumented examples of where communities have used to advantage REP plans

and exercise experiences in responding to emergencies from other technological and natural hazards.

The primary catalyst in the USA for pursuing such an adaptation to the chemical industry is the Bhopal accident. Because of the technical complexites and magnitude of certain types of chemical plant emergencies, industry, emergency specialists, the Congress and others are recognizing the U.S. REP program has features that can be used for such emergencies. Some of these features are the requirement for furnishing hazard-specific information to the public, alert and notification systems, clearer definition of the hazards and risks involved, the establishment of planning zones, and developing close working relationships among industry, members of the public and government.

REFERENCES

1. U.S. Nuclear Regulatory Commission and Federal Emergency Management Agency, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness In Support of Nuclear Power Plants, NUREG-0654/FEMA-REP-1, Rev. 1, November 1980.

2. U.S. Federal Emergency Management Agency, Federal Radiological Emergency Response Plan, 49 Federal Register 35986, September 12, 1984.

3. U.S. Federal Emergency Management Agency and U.S. Nuclear Regulatory Commission Memoranda of Understanding:

    a. Memorandum of Understanding Between the Federal Emergency Management Agency and the Nuclear Regulatory Commission for Incident Response, 45 Federal Register 82715, December 16, 1980.

    b. Memorandum of Understanding Between NRC and FEMA Relating to Radiological Emergency Planning and Preparedness, 50 Federal Register 15485, April 18, 1985.

4. U.S. Federal Emergency Management Agency regulation, 44 Code of Federal Regulations 351, Radiological Emergency Planning and Preparedness, 47 Federal Register 10758, March 11, 1982.

5. U.S. Federal Emergency Management Agency rule, 44 Code of Federal Regulations 350, Review and Approval of State and Local Radiological Emergency Plans and Preparedness, 48 Federal Register 44332, September 28, 1983.

6. U.S. Nuclear Regulatory Commission rule, 10 Code of Federal Regulations 50, Emergency Planning, 45 Federal Register 55402, August 19, 1980, as amended in 49 Federal Register 27733, July 6, 1984.

7. U.S. Federal Emergency Management Agency, Guidance for Developing State and Local Radiological Emergency Response Plans and Preparedness for Transportation Accidents, FEMA-REP-5, March 1983.

8. U.S. Nuclear Regulatory Commission, Reactor Safety Study: An Assessment of Accident Risk in U.S. Commercial Nuclear Power Plants, WASH 1400, NUREG-75/014, 1975.

9. U.S. Nuclear Regulatory Commission and U.S. Environmental Protection Agency, Planning Basis for Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants, NUREG-0396/EPA-520/1-78-016, December 1978.

10. U.S. Federal Emergency Management Agency documents related to the Integrated Emergency Management Information System (IEMIS).

    a. REP-6: Exercise Evaluation and Sumulation Facility Evacuation Events Models: Part I - PREDYN Users Guide, 1984.

    b. REP-7: Exercise Evaluation and Simulation Facility Events Models: Part II - Users' Manual for the Interactive Dynamic Network Evacuation Model, 1984.

    c. REP 8: Exercise Evaluation and Simulation Facility Events Models: Part III - Application of the I-DYNEV System, 1985.

11. U.S. Federal Emergency Management Agency, Evacuation Behavior: Case Study of the Taft Louisiana Chemical Tank Explosion Incident, May 1983.

Poster Presentations

IAEA-SM-280/11P

RESPONSIBILITIES OF THE STAFF AND THE NATIONAL EMERGENCY AUTHORITIES AND INFORMATION EXCHANGE IN A NUCLEAR POWER PLANT IN SWITZERLAND

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In Switzerland we make a clear distinction between the responsibilities of the nuclear power plant (NPP) and the emergency organization involved [1, 2].

The NPP is responsible for the detection of the accident, for the necessary measures on-site and for the timely alerting of the off-site authorities.

Around each nuclear power station is an installed and operable Fast Alarm System (RABE). To decide whether or not the system is energized the operator has different key signals (instrumentation) and a special annunciator in the main control room with a conspicuous alarm window.

The National Emergency Operations Centre (NAZ) is responsible for all recommendations concerning off-site protective measures. The NAZ must at all times have knowledge of the meteorological conditions at the site. Therefore, meteorological data are continuously transmitted automatically every ten minutes to the NAZ.

In the case of a release of airborne radioactivity, the hazardous sector(s) in emergency planning zone 2 is (are) evaluated by means of this information and with the advice of the meteorologist in charge from the Swiss Meteorological Institute.

The Federal Commission for Atomic and Chemical Protection (KAC) sets up radiological criteria and decides which of the protective measures recommended by the NAZ are to be implemented. The KAC also informs the public. KAC gets radiological information from the NAZ and information on the status of the NPP from the Nuclear Safety Inspectorate (HSK). The protective measures must be implemented by the cantonal and communal authorities.

After the accident at Three Mile Island, some modifications in the area of communication were demanded [3].

On the site is a special emergency room beside the main control room. This emergency room is the working area of the emergency staff and other plant specialists as well as outside experts and representatives of the authorities.

For better information exchange between the NPP staff, the Nuclear Safety Inspectorate, and the National Emergency Operations Centre a permanent line has been installed. This line functions even if the local telephone networks around the NPP are overloaded.

Each of the neighbouring countries' governments has designated a special focal point for collecting from and disseminating to Switzerland information about major nuclear accidents, e.g. NPP accidents and explosions of nuclear warheads. At the NAZ there are check-list with the relevant telephone and telex numbers.

Switzerland has an 'Agreement on Radiation Protection in the Event of an Emergency' with the Federal Republic of Germany (FRG) [4] and also with France [5].

The Agreements regulate the exchange of information on a 24-hour basis between the neighbouring countries in the event of a radiation emergency. This information must contain all available facts of importance in assessing the radiological danger.

In consequence of the location of the NPP Leibstadt, directly on the Federal German border and near the population centre of Waldshut-Tiengen (FRG), an international fixed voice-grade telecommunication network has been installed between the NAZ, the HSK, the focal point at Freiburg im Breisgau (FRG) and the Landratsamt Waldshut. This network is equipped with a telefax transmitter/receiver for the transmission of text and graphics. The network is designated to provide rapid and direct information from the NAZ and the HSK to neighbouring governmental institutions in the case of an accident at Leibstadt.

REFERENCES

[1] CONSEIL FEDERAL SUISSE, Ordonnance sur la protection en cas d'urgence au voisinage des installations nucléaires (28 nov. 1983).

[2] CONSEIL FEDERAL SUISSE, Ordonnance sur la Centrale national d'alarme (31 oct. 1984).

[3] The President's Commission on the Accident at Three Mile Island (Kemeny Report), United States Nuclear Regulatory Commission, Washington, DC (1979).

[4] Agreement between the Swiss Federal Council and the Government of the Federal Republic of Germany on Radiation Protection in the Event of an Emergency (31 May 1978).

[5] Accord entre le Gouvernement de la République française et le Conseil Fédéral Suisse sur les échanges d'informations en cas d'accident pouvant avoir des conséquences radiologiques (18 oct. 1979).

IAEA-SM-280/17P

UNIDAD MOVIL DE CONTROL RADIOLOGICO PARA CASOS DE EMERGENCIA EN INSTALACIONES NUCLEARES

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INTRODUCCION

Se presenta aquí la Unidad Móvil de Control Radiológico que la Junta de Energía Nuclear (España) tiene preparada para actuar en situaciones de emergencia que se pueden producir en las instalaciones nucleares del país.

Los equipos que componen la Unidad Móbil se han diseñado fundamentalmente para actuar con rapidez en cada una de las fases más importantes de un accidente grave (fusión del núcleo) en una central nuclear de potencia.

FASE DE LA PLUMA O NUBE RADIACTIVA

Los equipos para actuar en esta fase son los siguientes:

Equipo aéreo

El equipo aéreo está constituido por un helicóptero donde se instalará la instrumentación necesaria para determinar la situación espacial y temporal de la pluma por medidas de tasas de exposición gamma en el centro y entorno de la misma.

Equipo terrestre móvil

Este equipo consta de un vehículo todo terreno donde se encuentra instalada la instrumentación necesaria para determinar sobre el terreno la influencia del paso de la nube radiactiva. Con este equipo se mide y registra en continuo a 0,4 y 6 metros sobre el suelo: la tasa de exposición gamma, con rangos de medida 10^{-2} a 10^{3} $mR \cdot h^{-1}$, la concentración de partículas y radioyodos en aire, con límites de detección de 0,7 $Bq \cdot m^{-3}$ para partículas beta y 1 $Bq \cdot m^{-3}$ para ^{131}I, y la identificación isotópica por espectrometría gamma.

Equipo terrestre portátil

Lo constituye una serie de detectores portátiles y material de protección dispuestos para ser transportados en vehículos ligeros. Con este equipo se

determinan: las tasas de exposición gamma, con rangos de medida de 10^{-2} a 5×10^{2} $mR \cdot h^{-1}$, la contaminación radiactiva, con rangos de medida de 1 a 10^{4} $c \cdot s^{-1}$, y la toma de muestras de gases, líquidos y sólidos para su análisis posterior en el laboratorio móvil.

FASE DE INGESTION

Para actuar en esta fase, además de los equipos citados anteriormente, se dispone del equipo siguiente:

Equipo laboratorio móvil

Se compone de un vehículo semipesado donde se encuentra instalada la instrumentación necesaria para realizar las acciones siguientes: medida en continuo de concentración de actividad en líquidos; medida de la actividad alfa y beta en muestras sólidas con límites de detección de 0,07 Bq para alfas y 0,4 Bq para betas, análisis por espectrometría gamma con detector de germanio intrínseco, embarcación con detector gamma, con rango de 1 a 10^{4} $c \cdot s^{-1}$ para la medida de deposición de material radiactivo sobre sedimentos en ríos, lagos y litorales, estación meteorológica para determinación de parámetros atmosféricos, mini-ordenador con 544 Kbytes de memoria.

Todos los equipos están comunicados entre sí y con los centros de emergencia por un sistema de radio en VHF con 25 canales y una potencia de 70 W.

PLANIFICACION

Dada la probabilidad tan pequeña de que se produzcan situaciones de emergencia en centrales nucleares de potencia que tengan repercusiones radiológicas en el exterior de la instalación, la experiencia ha demostrado que las unidades móviles de control radiológico destinadas a actuar en caso de emergencia pierden, con el paso del tiempo, su eficacia operativa por falta de actuación.

Por todo ello y con objeto de mantener un alto rendimiento operativo, la Unidad Móvil se ha planificado para que en todo momento pueda realizar un control radiológico tanto en situaciones de emergencia como en régimen normal de funcionamiento, en los alrededores de las instalaciones o en aquellas zonas que por sus características radiológicas se consideren de interés.

El plan de actuación de la Unidad Móvil en régimen normal de funcionamiento de las instalaciones se realizará con los mismos equipos y personal técnico previsto para actuar en caso de emergencia. Estas actuaciones se pueden enmarcar dentro de las áreas de actuación siguientes: simulacros de emergencia, control radiológico en los alrededores de los emplazamientos, y cobertura radiológica en

el transporte de material radiactivo. Con esta planificación, la Unidad Móvil está en servicio activo de una manera constante a la vez que sirve para incrementar el entrenamiento del personal técnico y comprobar la respuesta de la instrumentación de medida y cálculo.

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INFORMATION FOR THE POPULATION LIVING NEAR THE NUCLEAR POWER PLANT OF CAORSO

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In the case of an emergency, the population living around the nuclear power plant of Caorso is immediately warned about the danger occurring by means of an intermittent whistle and subsequently by cars equipped with loudspeakers and through radio and TV broadcast. The aim is to instigate individual and group measures quickly and properly, so as to prevent or limit damage to people, livestock and to the environment in general.

Correct behaviour in the case of an emergency is based on preliminary as well as exhaustive information about the most suitable forms of intervention and actions to protect health and territory. Wherever nuclear technology is being developed, Italian law calls for a programme of interventions to be implemented in the case of an accident.

In Caorso, local and national government authorities, in co-operation with the managing board of the reactor, are responsible for providing preliminary information, which they disseminate as follows:

(1) By setting up and running an Information Centre, located near the plant and continuously open. A scale model of the nuclear power plant is available here to acquaint the visitor with nuclear technology, with the structure and working of the plant, with the health and environmental controls continuously carried out in the area around the plant, and with the general approach and operative instructions of the intervention programme issued by the authorities for implementation in the case of an accident. Moreover, information is provided on energy problems; leaflets, magazines, newspapers and films are continuously produced which may be examined at the Centre or in social centres and schools.

(2) By implementation of an information plan for the population of the different areas established by the intervention programme on the basis of the possible risks caused by reference accidents:
- 2 km radius from the plant chimney (evacuation and medical examinations are envisaged for this area): about 1000 persons;
- 10 km radius from the plant chimney (environmental diagnosis and precautionary measures are envisaged for this area: grazing, slaughtering and hunting prohibited, precautionary sequestration of food, animals, etc.): about 28 000 persons;
- persons relevant from a social point of view (farmers, breeders, hauliers, health workers) as they could help directly in the emergency.

The information programme is based on:

(a) a general programme: all families living in the area within 10 km radius of the plant will receive a copy of the general part of the intervention programme and a leaflet describing the actions to be taken individually or collectively in the case of an emergency;

(b) a detailed programme:
- 2 km radius: meetings are being held with small groups of the population (20–30 persons) with the showing of a film and a discussion together with control unit operators;
- 10 km radius: public assemblies (about 1000 persons each) and meetings in intermediate and secondary schools (2–3 classes every meeting) will be carried out as above;

– professional categories: meetings with the persons involved in the intervention programme will be held. During such meetings, a film will be shown and the operative plans will be illustrated. A debate will follow.

The effectiveness of the information programme will depend on the population playing its role in an emergency simulation. Also, a survey of every family in the area around the Caorso plant was made in 1974 and will be repeated in the near future so as to verify how knowledge of, and attitudes to, the power plant, have changed.

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A NUCLEAR REACTOR EMERGENCY EXERCISE

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1. INTRODUCTION

Provision must be made for periodic training of emergency response staffs, including management, monitoring and support teams. Most of the personnel will have the knowledge needed for their specialized emergency assignments but they may not be familiar with the different conditions imposed by the radiological characteristics of the accident, under which they must carry out their duties. Plans which were adequate when drawn up may have become ineffective due to changes in the nature of the hazard, personnel, communications and the population at risk. Exercises and drills can be used to maintain the proficiency level of the teams and to test the adequacy of the plans, procedures, equipment, communications, etc.

2. EXERCISES AND DRILLS

Training exercises usually relate to the functioning of the emergency response organization as a whole, while training drills develop individual skills such as the operation of equipment. It is not always desirable to exercise the whole of an emergency organization and the cost of the event can be formidable. The managers of the emergency team will be primarily concerned with strategy and can

be kept fully occupied in any exercise. Staff at the tactical level may have little to do during long spells of an exercise and will learn best from drills. Lower-level tasks also tend to be well-defined and are easy to drill in isolation compared with higher-level tasks. The emergency response monitoring teams should be trained as a group and they will benefit most from drills.

At the strategic level a wide range of scenarios using 'paper' or 'table top' exercises can be used effectively and critically. The scene is set on paper and the exercise consists of questions for group discussion which is conducted like a seminar. This gives the participants an overview of the situation, each being able to present his own views and resolve his own problems.

3. EXAMPLE OF A TABLE TOP EXERCISE

The aims of this table top exercise are:

(1) To evaluate the organization for dealing with an accident to a pressurized water reactor.
(2) To examine the problems which might arise following a reactor accident from the point of view of the Emergency Co-ordinator.

This exercise involves an accident to a pressurized water reactor at an imaginary location. In the scenario the PWR develops a major primary coolant leak due to a failure in steam generator tubes and this leads to a major release of radioactivity.

This exercise has been tested on the Course on Planning for Nuclear Emergencies [1] held at the Harvard School of Public Health and on other courses. The aim of the exercise is to give the students practice in the application of the Nuclear Regulatory Commission criteria [2]. The emphasis of the exercise is on decision-making; it involves the public relations aspects of the response and gives considerable opportunity for discussion.

The exercise requires a period of three hours for its execution and it is necessary for the course to be allocated to syndicates who will carry out the exercise play. Each syndicate is supported by a tutor who will provide the initial scenario of the accident, a sequence of events and a series of questions to which the syndicate will respond. The syndicate will play the role of the Emergency Co-ordinator but in order to cover the full range of features embodied in NUREG 0654 other roles have to be played occasionally.

A supporting handbook is provided which is in two parts: Part A contains the Directing Staff papers and methods for the evaluation of the radiological impact of the incident. A rough estimate of doses can be obtained by using a pocket calculator but a more satisfactory approach is to use the IRDAM [3] program, which accepts flexible input concerning the specific reactor, is rapid in response and prints out radiological dose rates at convenient distances around the site. This exercise is based on an actual incident but this information is not