Operational Experience With, and Future Development of, the Nuclear Industry Road Emergency Response Plan (NIREP)

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HISTORY

The IAEA Regulations (Safety Series 6,7,37,80 etc.) governing the packaging, package testing, and package labeling of radioactive materials for transport apply the philosophy that packaging for transport should adequately protect transport workers and the public against hazards of radioactive material under all foreseeable circumstances including the occurrence of a severe accident. In the case of the most potentially harmful nuclides, the packaging must be capable of withstanding damaging effects without any significant release of contents or increase in external radiation. In these respects emergency planning is built in at the design stage of the packaging itself.

However, the IAEA Regulations also require arrangements to be in place to respond to emergencies that may occur during the course of the transport operation. In addition, under the Ionising Radiation Regulations (IRRs) 1985 the employer has a responsibility to show that there are appropriate contingency arrangements to meet all reasonably foreseeable events. In this case the employer involved will, of course, include the carrier as well as the consignor.

The IAEA Regulations require general emergency provisions to be established in each Member State by relevant national or international organizations. In the UK this requirement is met by the 'NAIR' (National Arrangements for Incidents involving Radioactivity) scheme. The NAIR scheme is co-ordinated by the National Radiological Protection Board (NRPB). It is designed to provide advice and assistance to the police and can be activated by them in the event of unforeseen incidents involving radioactivity, which might constitute a danger to the public.

The existence of the NAIR scheme was not regarded by the UK Department of Transport and Health and Safety Executive (HSE) as sufficient evidence that the responsibilities on employers (be they consignors or carriers) with respect to the Ionising Radiation Regulations (IRRs) 1985 were covered.

A national scheme to provide contingency arrangements in the event of a road accident involving radioactive materials has been set up by the major users and consignors of radioactive materials called NIREP (Nuclear Industry Road Emergency Response Plan). In this, the member industries have agreed to despatch immediately, from the nearest organization to the incident, qualified Health Physics personnel to deal with any incident involving radioactive material belonging to (or consigned by or to) any of the participating companies. With the wide spread in the location of their establishments, all parts of the UK mainland are covered.

Participating organizations are: UKAEA, Amersham International, British Nuclear Fuels plc, Ministry of Defence, Nuclear Electric plc, Scottish Nuclear Ltd, and Rolls-Royce & Associates Ltd.

OPERATION

The aim of the plan is to achieve a rapid and effective response to any incident involving a radioactive package in transport by road covered by a member of the NIREP club.

Participating organizations on request will provide the first Health Physics response to attend an incident. Such a response would be an initial response only, and is intended to a provide confirmatory survey of the nature of the hazard in order to help safeguard the public, emergency services and the consignment for the period of time until the organization responsible for the package can arrive and take over. Any further action would be initiated by the organization responsible for the movement, which is identified on the NIREP placard on the vehicle.

Vehicles covered by the scheme will display a NIREP placard, thus giving the police or other emergency services the emergency telephone number of a coordinating center and information on the site responsible for the load.

The NIREP plan does not cover the transport of irradiated fuel flasks by road to/from a railhead. This is covered by the Irradiated Fuel Transport Flask Emergency Plan (IFTFEP). The NIREP plan also does not cover nuclear weapons cargoes or loads consisting exclusively of Excepted Packages.

The implementation of the plan proceeds in a series of stages, with responsibilities being assumed by different organizations at each stage. The initial communication from the incident is to the UKAEA Constabulary Force Communications Center (**FCC**) at Risley (Figure 1), which will decide upon the most appropriate site to provide the initial rapid response. The response team normally travels by road but, in the event of a serious or inaccessible incident, the plan can call upon the Ministry of Defence, which has agreed to provide helicopter transport as a priority.

Throughout the plan it is recognized that the legal responsibility for the package and its contents lies with the organization responsible for the package. However, the initial coordination and response may be from another organization which will act on behalf of the responsible organization. In such cases, the organization responsible for the package is expected to take over responsibility as soon as possible. Indemnity arrangements have been agreed between the members of NIREP.

INCIDENTS - GENERAL

The prime responsibility for safe shipments is with the consignor, although the carrier also has responsibilities both for safety during transport and for proper reaction in the event of an incident.

It is the duty of each consignor to comply with all applicable international and national regulations pertaining to the shipment. In addition, the consignor should make available to the carrier the appropriate emergency instructions and schedules. The legal duty to prepare a contingency plan for the period of the journey lies with the carrier. Where the carrier is not one of the organizations in NIREP, he will be covered by the plan whilst carrying radioactive material on behalf of those organizations.

All vehicles will have a notice prominently displayed giving instructions for contacting the **FCC** in the event of the driver being incapacitated. This will consist of an emergency telephone number and a site identification code (Figure 2).

DRIVER

The driver will have been provided with emergency instructions from the consignor, and will, if possible:

- report the incident to the **FCC** giving a brief report of the position, circumstances and whether the packages appear damaged;
- report the incident to the local Emergency Services;
- ensure that members of the public are kept at a safe distance if there is evidence of damage to the package, sign of leakage, or a fire near the package; and
- carry out any further instructions as provided in the Emergency Instructions.

ALERT CENTER

On receipt of the report of an incident, the UKAEA Constabulary Force Communications Center **(FCC)** will immediately assume responsibility for initial co-ordination of the nuclear industry response for as long as is required. It will:

- Contact the most appropriate site (Near Site) and request the call out of a Health Physics team to the scene of the incident, if necessary arranging for a police escort and helicopter support.

- Contact the local Emergency Services to check that they have been informed of the incident, and they will supply personnel and vehicle details of the response team.

- Inform the site responsible for the package of the incident and inform them of the responding Near Site.

- Inform the Department of Transport that an incident has occurred.

- Maintain communications and offer advice where necessary.

NEAR OR FIRST RESPONSE SITE

On receipt of the report of an incident from the **FCC**, the responding Near Site will immediately assume responsibility for local nuclear industry support for as long as necessary. They will:

- despatch immediately a Health Physics Response Team to the incident;

- supply the **FCC** with details of the Health Physics Response Team and vehicle; and

- liaise between the Health Physics Response Team and the Responsible Site to obtain details of the package contents and hazards.

HEALTH PHYSICS RESPONSE TEAM

On arrival at the scene of the incident, the Health Physics Response Team will contact the Senior Police Officer in charge of the incident and Officers in charge of the other emergency services at the site. They will:

- advise their home base of arrival;

- arrange for restricted access to the package and road vehicle, if not already done;

- measure the radiation dose rate in the vicinity of the package, examine the package for leakage, and check for local contamination;

- limit the spread of contamination and institute decontamination measures, including the monitoring of other personnel involved in the incident; and

- liaise with the local Emergency Services, their home base, and the **FCC.**

RESPONSIBLE SITE

On receipt of the report of the incident from the **FCC**, the Responsible Site will collect all information about the package and transporter involved in the incident. They will:

- provide advice to the Near Site as to the precautions to be taken when handling the packages;
- if necessary, arrange for a back-up team to be despatched to the incident;
- liaise with the local Emergency Services, Near Site and the **FCC**;
- ensure that press statements and public relations releases are made as quickly as possible; and
- make a confirmatory report of the incident to the Department of Transport on the Incident Report Form.

HISTORY OF A RECENT INCIDENT

In the UK low-level waste (LLW) is deposited in a surface repository at Drigg near Sellafield. The waste is now being stored in ISO containers in a concrete vault to minimize volume and therefore cost. The majority of LLW is supercompacted prior to loading into the ISO containers. Because of weight limitations the normal half-height ISO container is used.

On 9 March 1995, a UKAEA articulated lorry was transporting a half-height ISO container from Winfrith to Drigg. The ISO contained supercompacted pucks of LLW. The vehicle was traveling at approximately 60 mph in a northerly direction on the M5 motorway, some 14 miles north of Bristol, when the front near side tire blew out. This caused the vehicle to run off the motorway, down an embankment and into a field. The lorry jack-knifed and the trailer and ISO were turned onto their sides. The vehicle was made up of a two-axle tractor unit and a new three-axle trailer, on which the ISO was positioned. The load on the trailer (i.e. the ISO plus contents) was 22.6 tonnes. The ISO container was approved as an IP-2 container to the IAEA 1985 Safety Series 6 (as amended 1990) Regulations.

The driver, who was slightly injured, contacted his home transport office who contacted the NIREP emergency number. The **FCC** contacted the Nuclear Electric Oldbury Nuclear Power station, as the nearest site, which despatched a Health Physics team. They arrived at the incident site within 30 minutes. They monitored the ISO container and the surrounding area for direct radiation and contamination. No contamination was found and the direct radiation was as indicated on the consignor's certificate. Meanwhile, UKAEA Winfrith had despatched a team to supervize the recovery phase. Also, the UKAEA Public Relations office was contacted and informed of this incident and that there was no danger to the public.

The UKAEA recovery team took 3 hours to arrive, together with their coordinated support from the Harwell Health Physics Response Team who took over from the Nuclear Electric team. Eventually, two 70 tonne cranes were required to lift the ISO container back onto the motorway and load it onto a replacement trailer. The recovery phase took approximately 6 hours, and it was notable that, despite its recent escapade, the half-height ISO container fitted onto the replacement trailer with all of the Twistlocks on the trailer capable of fastening the container down without any problems. The ISO container was then taken to UKAEA Harwell for examination and cleaning. Following measurements to check for distortion and retention of sealing, the ISO container was sent on to Drigg.

WHY THERE ARE TWO PLANS

There are two main plans in England to cover the transport of radioactive material: NIREP (Nuclear Industry Road Emergency Response Plan) covering road transport, and IFTFEP (Irradiated Fuel Transport Flask Emergency Plan) covering the transport of irradiated nuclear fuel by rail.

The two plans have run in parallel because of the different modes of operation of the two plans. NIREP utilizes a permanently based coordination center at UKAEA Risley manned 24 hours a day by the UKAEA Constabulary. Only a small number of people need to be trained to man the NIREP coordination center. The plan also invokes the despatch of a Health Physics team from the Near Site, and any recovery phase is the responsibility of the consignor.

IFTFEP uses the nearest Nuclear Electric Power Station to the incident and its coordinating center, and therefore a large number of people need to be trained. The plan also originally required a Health Physics team closely followed by a Flask Recovery team to be despatched.

Recently, the IFTFEP plan has been modified by experience and now only requires the despatch of a Health Physics team, and the recovery phase is the responsibility of the flask owner. Therefore, the two plans are becoming much closer in their mode of operation. The time will be ripe in the near future for the operation of the two plans to be combined.

ENLARGEMENT OF NIREP TO COVER OTHER AREAS

Very little radioactive material other than irradiated nuclear fuel is transported by rail. With the eventual building of the NIREX repository at Sellafield in Cumbria, it is planned to make a considerable number of LLW and Intermediate Level Waste (ILW) shipments by rail. An investigation of the requirement for emergency planning for the movements suggested that NIREP should be extended to cover these moves. Discussions are continuing with Railtrack, the pre-privatized track and signalling parts of the UK rail system, to incorporate the non-irradiated package movements within NIREP.

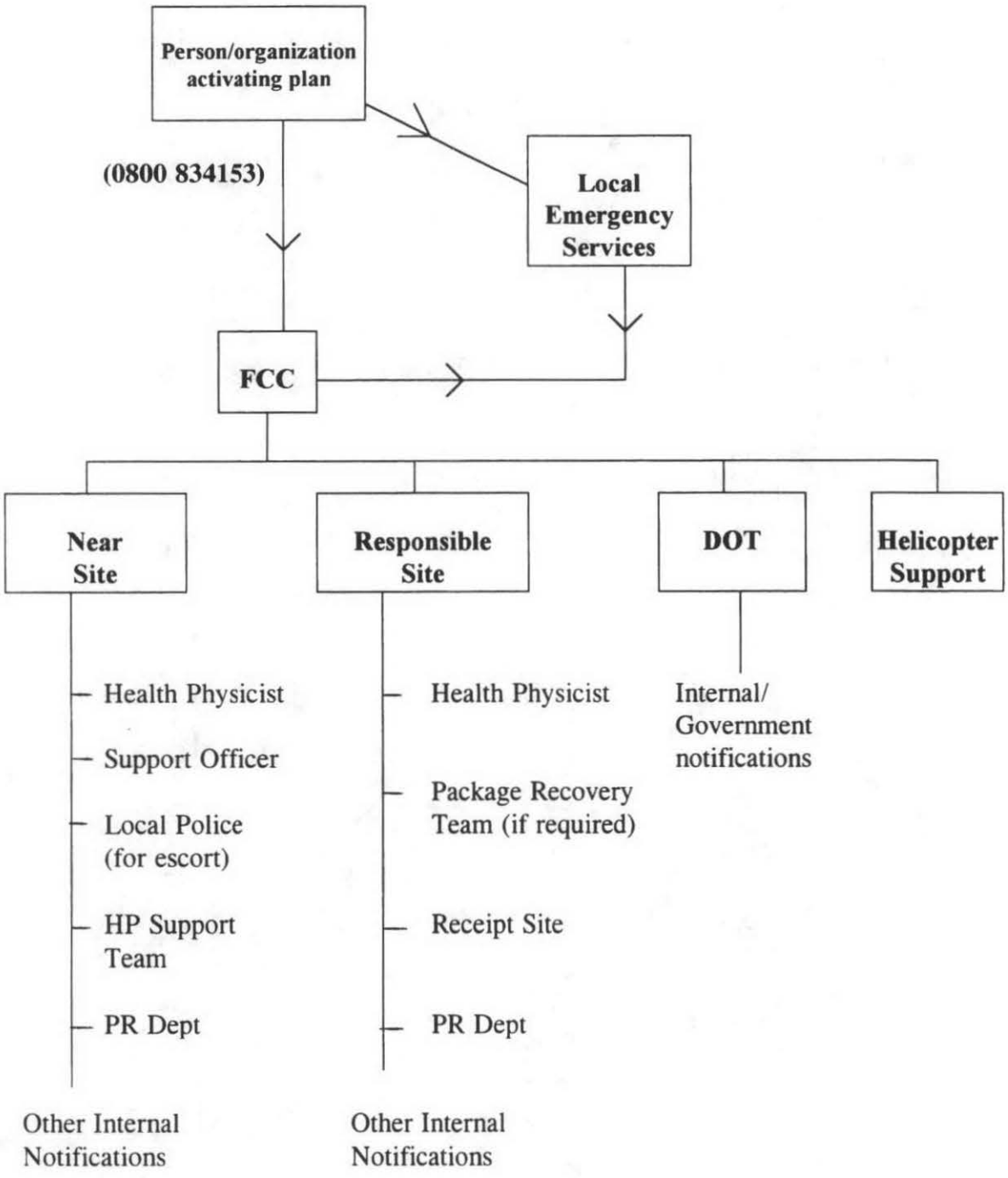

Figure 1. Simplified Nirep Notification Chain

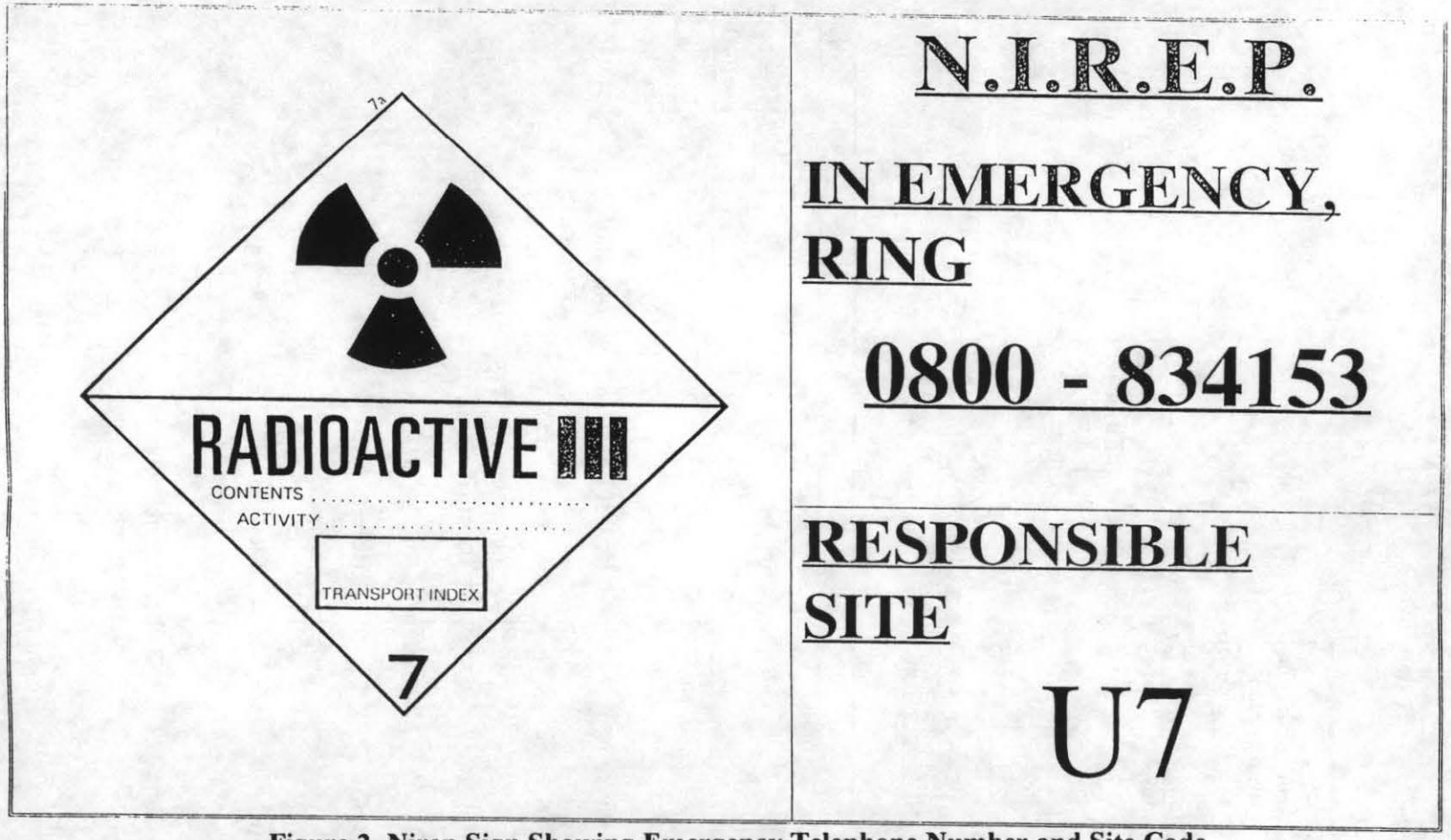

Figure 2. Nirep Sign Showing Emergency Telephone Number and Site Code