

National Emergency Plan for Nuclear Accidents

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AN ROINN COMHSHAOIL, OIHDREACHTA AGUS RIALTAIS ÁITIÚIL
DEPARTMENT OF THE ENVIRONMENT, HERITAGE
AND LOCAL GOVERNMENT



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Foreword

The principal features of the National Emergency Plan for Nuclear Accidents (NEPNA) are set out herewith. This Plan is intended specifically to cater for a major emergency at a nuclear installation abroad that could result in radioactive contamination reaching Ireland.

The Plan has been prepared in accordance with Article 37 of SI 125 of 2000, Radiological Protection Act, 1991 (Ionising Radiation) Order under which my Department has the lead responsibility for coordinating the emergency response arrangements among Government Departments and Agencies. It provides a framework so as to ensure that all State resources are distributed to good effect and that gaps in the response arrangements are not allowed to develop. It is one of a number of complementary national and local authority plans designed to cater for different types of emergency situation. It is in accordance with the International Atomic Energy Agency document – Safety Standard Preparedness and Response for a Nuclear or Radiological Emergency (GS-R-2).

In this foreword, I want to emphasise the practical importance for every member of the public of the provisions contained in this booklet. I want to counter especially a climate of opinion that effects on Ireland of a major nuclear emergency occurring, for instance, on the west coast of Britain, would be so devastating that it would be futile to try to implement any form of protective measures.

On the contrary, the speedy implementation of simple protective measures in the first hours and following few days after the accident would substantially reduce

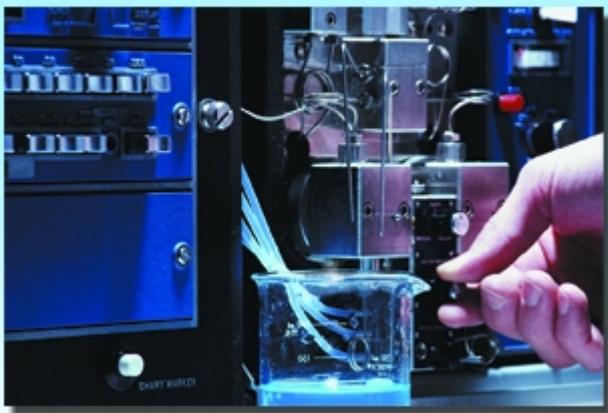
exposure, and therefore greatly improve the ultimate health outcome for the population as a whole. It is, therefore, most important that Ireland continues to plan to ensure that the appropriate measures are promptly identified and put into effect.

We all, of course, hope that the need to put this Plan into operation will never arise. However, in case it does, it is important that members of the public realise that practical protective measures are available, and that they have a general awareness of what these measures are. This booklet has a vital role to play in creating such awareness. The booklet is also accessible on my Department's web site at <http://www.environ.ie>.

To ensure that the Plan is up-to-date and that the key personnel in the Plan are ready to implement it, if and when the need arises, the Plan is regularly exercised. The Government Departments and Agencies involved in the Plan constantly review all technological, scientific and medical advancements relevant to emergency planning. Where appropriate and following international guidance, these new developments are incorporated into the on-going improvement of the Plan.

Dick Roche, T.D.,
Minister for the Environment, Heritage and
Local Government

Accident plans



What type of occurrence does the Plan provide for?

The Plan described in this booklet is designed to cater for a major emergency at a nuclear installation abroad which could result in radioactive contamination reaching Ireland. The Chernobyl accident in the Ukraine in 1986 was such an event. While radioactive contamination did reach Ireland, because of our distance from the site of the accident its effects on us were not severe. Clearly the occurrence of a similar event in Britain, or other European countries, could have much more serious consequences for this country.

The principal types of installations at which major accidents could occur are nuclear power plants, in which nuclear energy is used to generate electricity, and nuclear fuel reprocessing plants. Certain other plants involved in various stages of the manufacture of nuclear fuels also represent an accident risk. Besides accidents at these fixed installations, the Plan also caters for the possibility of other accidents, such as, to a ship carrying nuclear materials in waters close to the Irish coast.

Radioactive substances are used in Ireland in medicine, industry and education. An incident involving these substances could occur and result in danger to the public. However, such an accident would be local in its impact and response to it would be dealt with under local emergency plans in

accordance with hazardous incidents response procedures. In this situation, local emergency services would have access to the advice and resources of the Radiological Protection Institute of Ireland (RPII).

How would people in Ireland be affected?

An accident at the nearest nuclear installation abroad is extremely unlikely to cause sufficient radiation exposure to people in Ireland to result in effects on health either immediately or in the short term. The principal hazard arising from an accident would be the increased long-term risk of cancer. This will vary with the level of contamination received and the contamination type. It is important that we take every possible precaution to minimise this risk and this is the central aim of the Plan.

Incidents and accidents at nuclear installations are classified from 1 to 7 on a scale known as the International Nuclear Event Scale (INES), shown in Figure 1. Accidents that could have consequences for Ireland would be rated at 5 or higher on this scale.

In such an accident, radioactive substances released into the air would be transported by wind in a manner similar to a plume of smoke, and would be deposited on the ground along the direction of travel of the



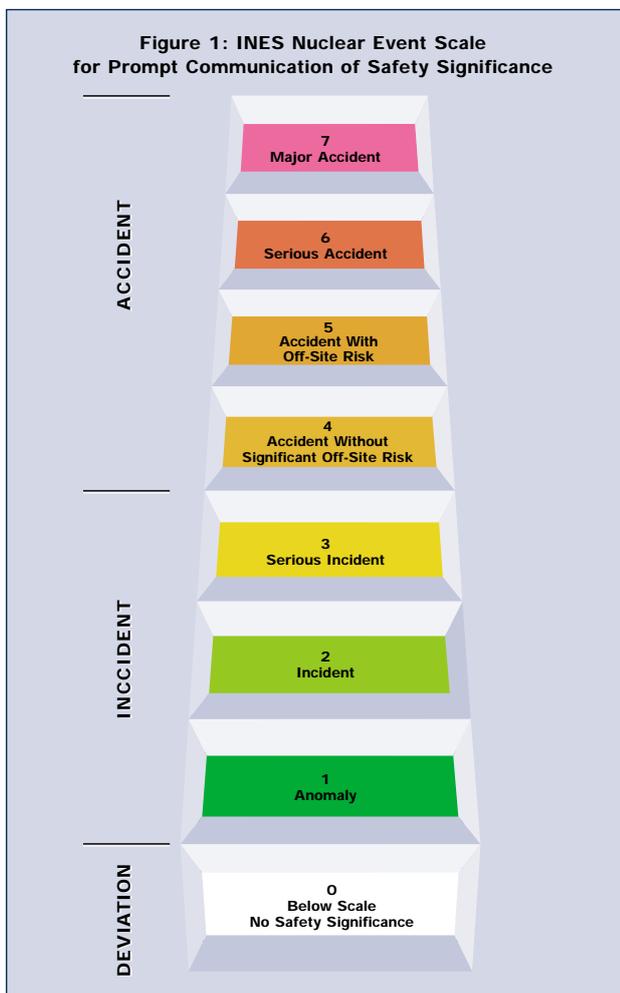
plume. The concentration of radioactivity in the plume would decrease with distance from the point of release, but could still be significant at large distances. Rainfall occurring while the plume was overhead would result in increased amounts of radioactive substances reaching the ground. Wind-

speed and direction, as well as rainfall, are also key factors influencing the consequences.

If radioactive contamination reaches Ireland, people could be exposed to radiation in three main ways:

- external exposure from radioactive substances in the air and on the ground;
- inhalation of radioactive substances present in the air;
- consumption of contaminated food or water.

Figure 1: INES Nuclear Event Scale for Prompt Communication of Safety Significance



How will the alarm be raised?

If Ireland's response to a nuclear accident is to be effective, it is essential that we learn of the accident at the earliest possible moment after it occurs. When the Chernobyl accident happened, nothing was known about it outside the Soviet Union until two days later, when monitoring instruments at a nuclear plant in Sweden detected abnormal levels of radioactivity in the atmosphere.

There are two early notification systems which are used for early warning of the occurrence of a nuclear accident abroad. Following Chernobyl, countries with nuclear power plants entered into an agreement, called the 'Convention on Early Notification of a Nuclear Accident', under which any country which operates nuclear installations is obliged to inform the International Atomic Energy Agency (IAEA) immediately of an accident, in any of the country's



installations, which could have an effect outside the country's own boundaries.

The IAEA, though its Emergency Response Unit based at its Headquarters in Vienna, will immediately pass on to all its Member States, including Ireland, any notification which it receives of a nuclear accident in any part of the world.

In addition to this IAEA system, there is a separate system, known as ECURIE (European Community Urgent Radiological Information Exchange), which is operated within the European Union. Under this, each EU Member State is required to notify other Member States, of any radiological accident that could have consequences outside its territory. They must also provide details of any protective actions being taken and results of radiological measurements carried out.

These early warning systems are designed to provide essential information as quickly as possible. They are tested regularly at both the national and international level and are continuously improved in line with experience gained and available technology.

Ireland has its own 24-hour national radiation monitoring network, with stations located throughout the country. Further information describing this network is available from the RPII on their website <http://www.rpii.ie>. The arrival of radioactive contamination in the air over Ireland would be

detected immediately by this system. An automatic alarm would be triggered which would notify the RPII, which is on call 7 days a week, 24-hours a day.

On receipt of information of an event of likely adverse impact in Ireland, the National Emergency Plan for Nuclear Accidents will be put into immediate effect and the public will be informed.

How will information and advice be given to the public?

The timely provision of accurate information and advice to the public is a vital component of the emergency response. Formal advice and instructions will be given principally through radio and television announcements issued by the Department of the Environment, Heritage and Local Government, as directed by the Committee of Ministers acting on behalf of the Government. These will be supplemented by material issued by the RPII through its Information Office.

It must be recognised that an emergency situation may involve considerable disruption of normal life. The Plan aims to minimise this disruption but your co-operation and careful attention to advice is essential to protecting your own health.

How will decisions be made?

The Department of the Environment, Heritage and Local Government has the lead role in ensuring that

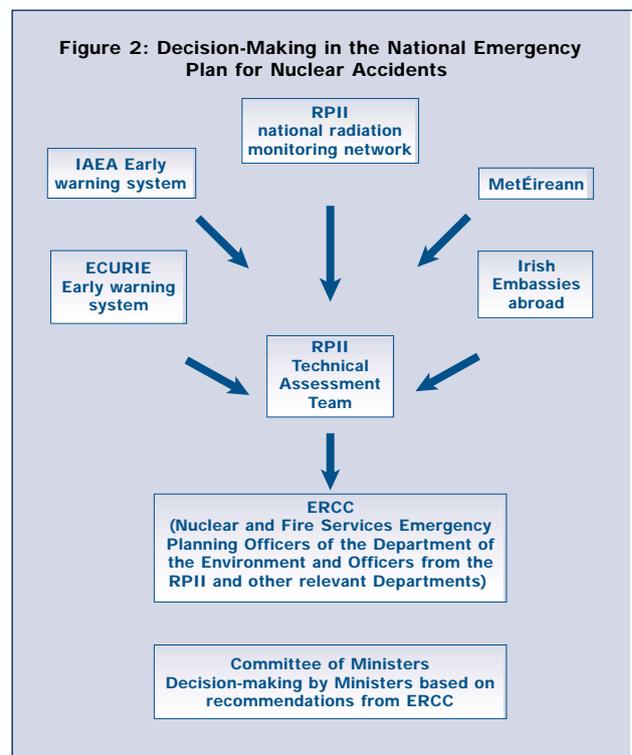


the response operates as smoothly as possible and that the necessary precautions are taken to protect the Irish people. In the event of a nuclear emergency having the potential to affect Ireland, a Committee of Ministers will assemble to give direction on recommended countermeasures placed before it by the Emergency Response Co-ordination Committee (ERCC) on the basis of advice from the RPII or, in urgent circumstances, by the RPII directly.

The ERCC will consider the technical assessment from the RPII of the actual and potential consequences of the accident and the RPII's advice on what countermeasures should be taken to minimise the radiation exposure of the public. The ERCC will also provide advice to the Committee of Ministers on the implications and practical issues associated with the recommendations of the RPII. Appendix 1 lists the membership and role of the ERCC which represents the Government Departments and agencies with key roles in the Plan.

Appendix 2 sets out the role and membership of the Committee of Ministers.

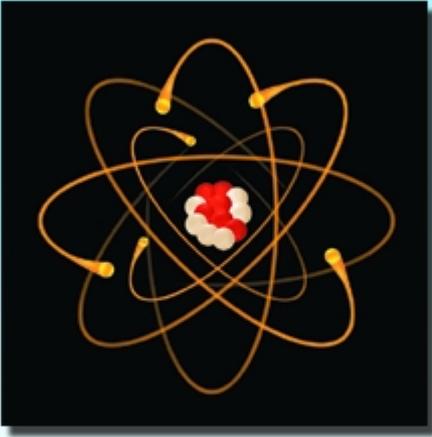
The key role of the RPII is in information gathering and assessment, leading to recommendations on the need for countermeasures. The ERCC will advise the Committee of Ministers and based on their decisions, will co-ordinate, the implementation of countermeasures.



Uncertainty is inevitable in the early stages of a nuclear accident situation because it is difficult to predict the exact outcome of an accident abroad – especially as seasonal and weather effects have such a major influence on any potential impact. The Plan aims to minimise any delays that may result from this uncertainty, by having in place a simple but effective information gathering and decision making system.

The decision making process is illustrated in Figure 2 above.

How will the response progress?



How will the response progress?

The first phase

As already stated, a first priority will be to assess whether, and how quickly, radioactive substances released by an accident will reach Ireland. An RPII assessment team, assisted by meteorologists from Met Éireann, will do this. These meteorologists have access to international data which will incorporate the predicted trajectory of the wind carrying radioactive substances from the accident site. The RPII's assessment will include estimates of the radiation doses to which people in Ireland may be subjected following arrival here of such a plume.

Based on this information, decisions will be taken on immediate countermeasures which may be needed in this country. Such countermeasures will be advised to the public immediately. As soon as a radioactive plume arrives over Ireland (whether within the first 24 hours or later), data from the stations of the national radiation-monitoring network will help to focus the implementation of countermeasures in affected regions, with particular regard to any rainfall which may occur, or which is forecast.

The following phases

Twenty-four to thirty-six hours later, the level of contamination, whether covering all or only part of the country, is likely to have peaked. The emphasis will now be on mapping and quantifying the

contamination which has occurred, and identifying the particular radioactive substances which are involved. This work will be vital in determining how best to manage the post-accident situation.

A key component of this response will be the analysis of samples of vegetation, soils or other environmental substances collected from various parts of the country. Civil Defence teams will assist Local Authorities in the collection of these samples, which will be forwarded to the RPII laboratory for measurement.

Throughout this period advice and information on the contamination levels, and on appropriate countermeasures to be taken, will continue to be issued by the relevant Government Departments, supplemented by the RPII.

The longer term

It can be expected that close surveillance of contamination levels will be necessary for weeks, months or even longer. Based on this surveillance, advice will be issued on means of keeping radiation exposure of the public to as low a level as possible. Of particular concern will be the need for control of foodstuffs susceptible to radioactive contamination through, for example, sampling and analysis of foodstuffs and control of movement of livestock.

Countermeasures



Countermeasures: what can be done to protect people?

There are internationally accepted guidelines, published by the International Atomic Energy Agency, which are used by national authorities all over the world, in deciding when and how any particular countermeasures should be introduced.

The objective of the principal countermeasures envisaged in nuclear emergency planning is to reduce exposure of people to radiation in the aftermath of nuclear emergency. The following practical precautions would minimise exposure to radioactivity:

- **Sheltering**, i.e., remaining indoors (at home, in school or in the workplace) for some period in order to minimise exposure to higher radiation levels outdoors;
- **Restrictions** on consumption of contaminated foods or water supplies;
- **Agricultural measures** with the aim of reducing the contamination of foodstuffs;
- **Iodine prophylaxis**, i.e., taking tablets containing stable (non-radioactive) iodine so as to reduce the uptake by the thyroid gland of radioactive iodine which is inhaled or ingested;
- **Evacuation**, i.e. transfer of the population from a contaminated area to one which is free of contamination, or less contaminated.

The broad principles of these countermeasures and how they can be implemented are as follows:

Sheltering

In accordance with international guidelines, sheltering, with the doors and windows closed and any ventilation systems switched off, reduces the inhalation of, and external exposure to, radioactive materials in the air and deposited on the ground. It is a particularly effective countermeasure but there are obvious practical difficulties associated with sheltering for extended periods of time.

However, sheltering for more than 24-48 hours is unlikely to be required. A situation where sheltering is most likely to be appropriate and most effective is during the passage of a radioactive plume over a populated area, particularly where this coincides with heavy rainfall. Once sheltering is no longer required, this will be advised to the public.

Control of Foodstuffs and Water Supplies

Where radioactive fallout has occurred, and depending on the level of contamination, there will be a risk of foodstuffs being contaminated. Water supplies, however, would not be expected to be contaminated to levels which would require the imposition of controls or restrictions.



Certain high-risk foods such as milk and leafy vegetables grown outdoors are particularly susceptible to radioactive fallout. Analysis of these foods, feeding stuffs and drinking water to determine the levels of contamination will establish whether restrictions are required. If required, restrictions on the distribution and consumption of contaminated foodstuffs will be applied immediately in affected areas. Under radiological protection legislation, powers for the rapid seizure and destruction of contaminated milk and other foodstuffs are available to the relevant authorities. The import and export of food from contaminated areas will be strictly controlled. Only food or drink that has not been contaminated in the open by airborne radioactivity should be consumed.

Modification of Agricultural Practices

Relatively simple measures can be highly effective in reducing the potential impact of a nuclear accident on agricultural products. Contamination of foodstuffs and subsequent doses to the public can be reduced if certain actions are taken before ground contamination occurs. The transfer of radioactivity from contaminated pasture to milk can be effectively eliminated by removing animals from pasture and by feeding them on fodder that was produced prior to the accident or in an uncontaminated area. As time passes, on-going control of animal movement and monitoring of animals slaughtered for consumption would be undertaken to ensure that levels of

radioactivity in milk and meat do not exceed permitted levels.

Crops and home-grown produce such as leafy vegetables and fruits which are grown outdoors and are ready for consumption at the time of the accident are likely to suffer surface contamination and will be unfit for consumption. Root crops on the other hand are protected by the soil and are not prone to surface contamination. Depending on the scale of the accident and the resultant contamination levels, and subject to the results of testing, advice will be given on the suitability of such produce for consumption.

Iodine Tablets

Due to the various types of activities conducted at different nuclear plants, not all nuclear accidents would result in the release of radioactive iodine. Only a very serious accident at a nuclear installation close to Ireland could result in the possible exposure of people to radioactive iodine. In these circumstances stable (non-radioactive) iodine, in tablet form, is an internationally recognised and established countermeasure as part of an overall nuclear emergency response.

Research indicates that those most susceptible to radioactive iodine are infants and young children whose thyroid glands are still growing. For these groups, stable iodine may be beneficial. Adults have



a much lower level of risk and, therefore, stable iodine tablets are of limited benefit to adults.

Exposure to significant levels of radioactive iodine can increase the risk of thyroid cancer. Stable iodine tablets, taken before the arrival of the contamination plume or within a few hours of the arrival of the plume, can effectively block the body's uptake of radioactive iodine and so significantly reduce or even eliminate any risk of thyroid cancer.

As only the most severe accidents may require the use of stable iodine tablets, staying indoors and avoiding consumption of certain foods that may be contaminated by radioactive iodine will most likely be the advice given in the early stages of an emergency. Both of these countermeasures provide significant protection against exposure to radioactive iodine. ~~The Department of Health and Children have made arrangements so that stable iodine tablets will be available to every household in the country.~~

Evacuation

It is not envisaged that an accident in a nuclear installation abroad would give rise to the need for evacuation of people in Ireland. However, evacuation could be particularly effective as a short-term measure, to avoid exposure from an incident of local origin.

This would only take place where the contamination is most severe, provided people can be moved quickly enough to areas that will remain free of contamination. In these cases, evacuation would be implemented in accordance with evacuation provisions of local major emergency plans.

Further information

If you have any comments on the Plan or if you would like further information please contact us at:

Nuclear Safety Section
Department of the Environment, Heritage
and Local Government
Custom House
Dublin 1
e-mail: nepna@environ.irlgov.ie

or

Radiological Protection Institute of Ireland
3 Clonskeagh Square
Clonskeagh Road
Dublin 14
e-mail: nepna@rpii.ie

or

Lo Call: 1890 44 33 22

See the Department of Health and Children press release of 3 April 2008 on the decision to discontinue distribution of iodine tablets
<http://www.dohc.ie/press/releases/2008/20080403c.html>

Role of the Emergency Response Co-ordination Committee

Appendix 1

Role of the Emergency Response Co-ordination Committee

Membership

- Department of the Environment, Heritage and Local Government (Chair)
- RPII
- Department of Agriculture and Food
- Department of Defence
- Department of Health and Children
- Department of Communications, Marine and Natural Resources
- Department of the Taoiseach
- Food Safety Authority of Ireland
- An Garda Síochána

Officials from the Nuclear Safety Section and the Fire Services and Emergency Planning Section will represent the Department of the Environment, Heritage and Local Government. The Chairman of the ERCC would have discretion to seek representation from other Departments/Agencies if appropriate.

The ERCC Role

In the event of a nuclear accident having the potential to affect Ireland seriously -

- To consider the technical assessment from the RPII of the actual and potential consequences of the accident and the RPII's advice on what countermeasures should be implemented by Government to minimise the radiation exposure of the public.
- To provide advice to the Minister for the Environment, Heritage and Local Government and to the Committee of Ministers on the implications and practical issues associated with the recommendation of the RPII concerning any countermeasure.

Role of the Committee of Ministers

Appendix 2

Role of the Committee of Ministers

In the event of a nuclear accident having the potential to affect Ireland seriously -

- To give policy direction on recommended countermeasures placed before it by the Emergency Response Co-ordination Committee (ERCC) on the basis of the RPII's advice or, in urgent circumstances, by the RPII directly.

Membership

- Minister for the Environment, Heritage and Local Government (Chair)
- Minister for Health and Children
- Minister for Agriculture and Food
- Minister for Communications, Marine and Natural Resources
- Minister for Defence.

Others in Attendance

- Officials advising Ministers represented,
- A senior Official of the Department of the Taoiseach,
- The Government Information Services,
- The RPII.

Appendix 3

Responsibilities of Government Departments and Other National Authorities

Department of the Environment Heritage & Local Government

- Co-ordinate the response to the emergency from all Government Departments and Agencies.
- Provide the Chairman of the Emergency Response Co-ordination Committee (ERCC).
- Provide the link between the Emergency Response Co-ordination Committee and the Government.
- Maintain up-to-date lists of the key personnel involved in the Emergency Plan.
- Ensure that the sub-plans of the relevant Government Departments and Agencies are in place.
- Arrange with local authorities for the collection of drinking water samples and the forwarding of them to laboratories for monitoring, as directed by the RPII.
- Arrange for the control of water supplies if necessary.

Local Authorities

- Monitor and report on the impact of the radiological emergency in their area as required in their Major Emergency Plans.
- Implement countermeasures under guidance from the ERCC and Government Departments.
- Ensure that local authority essential services fulfil their normal functions.

Radiological Protection Institute of Ireland

- Provide an on-call emergency service for the receipt and rapid assessment of information concerning nuclear accidents received by the designated national contact point.

- Establish an Emergency Control Centre at the Institute's premises including accommodation for the Emergency Response Co-ordination Committee.

- Implement the relevant international conventions.

- Provide advice on the potential consequences of a nuclear accident and on protective measures to be taken by the Government and the Emergency Response Co-ordination Committee (ERCC).

- Install, operate and maintain the national radioactivity monitoring network.

- Organise the collection of environmental, foodstuffs and other samples by appropriate national organisations and provide for their analysis.

- Liaise with Irish universities and hospitals to maximise the use of their resources in the event of a nuclear accident.

- Organise in conjunction with the Department of the Environment, Heritage & Local Government, exercises of the National Emergency Plan for Nuclear Accidents.

- Provide for the certification of radioactivity levels in foodstuffs and other products.

- Provide such personnel dosimetry services as may be required.

Met Éireann

- Provide the meteorological data required for the assessment of the radiological consequences of the nuclear accident.

- Provide facilities for the gamma dose rate monitoring and the air and rainwater sampling systems.

- Provide the RPII with an analysis, using suitable computer models, predicting the spread of radioactive plumes from the site of the release of radioactive materials and the likely pattern of deposition on the ground in Ireland.

- Collect and dispatch air and rain samples from weather stations and headquarters to the RPII.

Department of Agriculture and Food

- Collect samples of milk, meat, dairy produce and other agricultural produce, as appropriate, for monitoring for radioactivity levels by the RPII.
- Collaborate with the RPII in the certification of the radioactivity levels in agricultural produce, including live animals and foodstuffs, for export or for movement in and out of intervention storage.
- Control, seize and, if necessary, destroy contaminated agricultural produce (up to the point of distribution to consumers).
- Monitor live animals in their habitat and at point of slaughter or export.
- Collect samples of food imports for analysis at points of entry, as appropriate, in liaison with Customs and Excise Officials.
- Provide information to the farming community on actions to be taken.
- Restrict the movement of livestock, as appropriate.

Department of Health and Children

- Determine if health problems to the public have arisen and ensure that appropriate measures for their alleviation are provided where appropriate.
- Assist the Health Service Executive in the provision of information services at local level.
- Arrange for the stocking and plan for distribution of medicines, particularly stable iodine, in case this should be necessary.
- Provide for the issue of medical advice.
- Arrange for the provision of services at designated hospitals for injured and contaminated persons, including whole body monitoring and screening services where the uptake of radioactivity, particularly iodine to the thyroid, can be measured and quantified.

Food Safety Authority of Ireland

- Arrange for the collection of samples and the seizure and destruction of contaminated milk and other foodstuffs at points of distribution to the consumer and their transmission to the RPII laboratory for analysis.

- Arrange for the collection of samples of food imports at points of entry by Environmental Health Officers, in liaison with Customs and Excise officials.

Department of Defence

- Arrange for the collection of sea water samples by the Naval Service.
- Provide aircraft for such aerial surveys as may be required.
- Arrange for the Reserve Defence Forces to monitor radiation levels at predetermined and other locations as may be required.
- Provide such assistance as may be required within their competence to assist in the implementation of countermeasures.

Civil Defence

- Arrange with local authorities to have an effective Civil Defence Organisation available to undertake the various duties assigned to the force under the Emergency Plan.

- Train and equip Civil Defence personnel to undertake the following functions:-

- (i) monitoring of radiation levels, as required, throughout the country.
- (ii) monitoring of radiation levels on ships, aircraft, vehicles, individuals and their personal effects at seaports and airports, as required.
- (iii) the collection of samples of soil, vegetation etc. for analysis.
- (iv) assisting, where required, in implementation of control measures.

Department of Communications, Marine and Natural Resources

- Collect freshwater and marine environment samples including fish, shellfish, seawater, lake waters, seaweeds and lake and marine sediments as may be required for monitoring of radioactivity levels by the RPII.

- Collaborate with the RPII in the certification of radioactive levels in fish and shellfish.

- Collaborate with the RPII and the Department of Health in the seizure and destruction of contaminated marine produce.

- Arrange for notification to shipping where necessary and for the provision by Harbour

Authorities of advice, guidance or instruction to shipping in their harbours.

- Provide the fishing and aquaculture industries with information on the actions to be taken.
- Arrange for the provision by Harbour Authorities to the RPII of information concerning shipping entering ports including information on their cargoes.
- Arrange for the Coast Guard to co-ordinate the transmission through the Coastal Radio Stations (CRS) to shipping and fishing vessels in Irish waters of such advice, guidance or instructions as the ERCC may consider necessary.

RTE and Commercial Stations

Broadcast information on radio and television which will provide the public with up-to-date information about the nuclear accident, its effect on the country and advice on actions to be taken.

Department of Foreign Affairs

- Arrange for Embassies to immediately inform the Garda Communications Control Centre of the nuclear accident and to seek information on the accident through diplomatic channels.
- Assist the RPII in the making of arrangements under the terms of the IAEA Mutual Assistance Convention and any other agreements in place.
- Consult and co-ordinate with other States, especially our European Community partners, in determining appropriate action at international level following a nuclear incident.

Department of Transport

- Promulgate any restrictions it may be necessary to impose on aviation services.

Garda Síochána

- Ensure that the Garda Communications Control Centre, Harcourt Square, Dublin 2 acts as the key communications point for the receipt of information about nuclear accidents.
- Notify the RPII Duty Officer on receiving notification of a nuclear accident.
- Notify, at the request of the RPII Duty Officer, all members of the ERCC and the duty officers of key Government Departments.

- Provide such assistance as may be required within their competence to assist in the implementation of countermeasures.

- Control access to areas as required.

Revenue Commissioners (Customs and Excise)

- Collaborate in the collection of samples for monitoring for radioactivity levels by the RPII at points of import and export.
- Seize and detain such products as are deemed unsuitable for import or export.