

Operational Challenges in Nuclear Emergency Response in Ireland Identified during the ConvEx-3 (2017) Exercise

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Introduction

The International Atomic Energy Agency (IAEA) organised a level 3 Convention Exercise (ConvEx-3) which took place in June 2017. The exercise scenario involved a nuclear emergency at the Paks nuclear power plant in Hungary resulting in a release of radioactivity to the atmosphere. Ireland participated in this exercise with the overall objective of testing the National Emergency Plan for Nuclear Accidents which is currently under revision. The key elements tested were as follows:

1. Receipt and acknowledgement of the emergency notification from the IAEA by the National Contact Point (An Garda Síochána) and notification of the Duty officer in the Competent Authority (The Environmental Protection Agency).
2. Activation of emergency response by the EPA Duty Officer.
3. Exchange of information with international organisations using USIE, IRMIS, ECURIE, EURDEP.
4. Review of IAEA's Assessment and Prognosis tools.
5. Provision of information to the public.
6. Decision making regarding agricultural protective actions.
7. Provision of advice to Irish citizens in the accident country, advice to citizens travelling to the accident country and preparedness of Irish embassies for nuclear/radiological emergencies.

Figure 1. Table-top Exercise



A table-top exercise in Ireland's National Emergency Co-ordination Centre (NECC) was held on the first day of the Exercise. The table top exercise involved a sub-set of the National Emergency Co-ordination Group that dealt with objectives 5, 6 and 7 as well as discussing the monitoring of food imports from the affected areas.

The ConvEx-3 (2017) Exercise Scenario

The hypothetical accident occurred at the Paks Nuclear Power Plant approximately 2,500 km from Dublin. The scenario involved loss of coolant accidents at two of the reactors on the site, resulting in substantial releases of radioactivity to the environment. Official notification of the accident was received by the Garda Communications Control Centre and EPA from the EC and IAEA international notification systems. The EPA on-call Duty Officer for that day was notified at 05:25 (UTC) on 21st June by ECURIE of a radioactive release from the Paks plant at 04:40 (UTC).

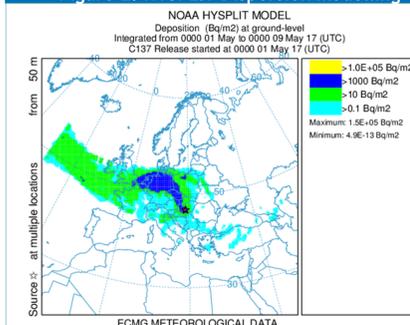
The Exercise lasted for 36 hours and involved:

- More than 700 official messages received by EPA through the IAEA and EU systems.
- Weather forecast and dispersion modelling by Met Éireann (the Irish Meteorological Service).
- EPA, Department of Foreign Affairs and Trade and Met Éireann duty officer call out.
- A half-day National Emergency Co-ordination Group meeting to identify key actions, issues and public messages chaired by the Department of Communications Climate Action and Environment (Figure 1).
- EPA undertook laboratory measurements on contaminated water samples prepared by IAEA.

For the exercise, historical weather data from 1st May 2017 was used. This date was chosen as, due to easterly winds over Europe at this time, the radioactive plume would be carried in the direction of Ireland. The dispersion of radioactivity was modelled using the HYSPLIT dispersion model using European Centre for Medium-Range Forecasts (ECMWF) meteorological data (Figure 2). The model was run assuming the release of the radionuclide caesium-137 (Cs-137) from reactor Units 1 and 2 at the Paks NPP over a time period of approximately 27 hours.

Following the table-top exercise the EPA exchanged information on protective actions with the UK Department of Business, Energy and Industrial Strategy to ensure co-ordination of the response between neighbouring countries.

Figure 2. HYSPLIT Dispersion Modelling



Using the historical weather data described, the radioactive plume is predicted to be dispersed across Europe over approximately eight days with the plume arriving in Ireland approximately 2.5 days after the beginning of the accident. The predicted activity of Cs-137 deposited in Ireland was between approximately 0.1 - 10 Bq.m⁻² with most of the deposition predicted to occur in the south and west of Ireland.

The Key Messages

PUBLIC SAFETY
The public can go about business as normal

AGRICULTURE
Shelter animals and use uncontaminated fodder.

IRISH CITIZENS ABROAD
Take the advice of local authorities

Lessons Learned

The key lessons learned for Ireland from the Exercise were as follows:

- Early response is crucial.
- For the provision of advice to the Irish Public, messages should be timely, clear and concise with a maximum of three key points.
- Training is required in communications.
- The use of social media other online applications for the provision of advice to the public in Ireland and abroad was recommended, particularly the use of Twitter and the Department of Foreign Affairs and Trade TravelWise app.
- The more prepared Ireland can be in advance the better. FAQ's for the public should be prepared in advance of an accident and made easily accessible through Twitter and other on-line sources.
- Each Government Department and Agency involved in the response should have alternate staff trained to participate in the National Emergency Co-ordination Group in the event that the primary representative is not available at the time of a nuclear emergency.
- For agricultural protective measures, it is clear that monitoring requirements and measurement capacity will be an issue. The EPA suggested a multi-agency approach to be taken to deal with this issue. It was proposed that a sub-group be formed to investigate measurement capacity and capability requirements and this will include the EPA, Department of Agriculture, Food and the Marine and other relevant stakeholders.
- It is important to involve stakeholders in the preparedness phase and it is recommended that a stakeholder group which was set up in 2014 to investigate issues around contamination in food, feedstuffs following a nuclear accident abroad be reconvened.

Conclusions

For this exercise, Ireland had sufficient time to plan for the arrival of the plume (approximately two days) - with an accident closer to the country, there would be less time to agree key messages across agencies and roll out arrangements. Ireland's revised National Emergency Plan for Nuclear Accidents and a new National Strategic Emergency Management framework clarify responsibilities with regard to communications and will facilitate the dissemination of timely information.

Other issues identified in the exercise such as the management of contaminated waste, in vivo monitoring of cattle and increased national measurement capacity require coordinated work between relevant Departments and Agencies to implement.



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