

Information Note for Water Services Authorities and Water Suppliers on Radiological Hazards and Associated Risks for the purpose of EPA Drinking Water Safety Plans (DWSPs)

Hazardous Event: Nuclear Incident Causing Contamination

Scope

The aim of this note is to provide additional guidance to Water Services Authorities and Water Suppliers for the development of their Drinking Water Safety Plans (DWSPs) regarding the following hazardous event: 'Nuclear Incident Causing Contamination' in EPA's DWSP online tool (Code CO220). This hazardous event can be attributed to an accident at a nuclear facility abroad, leading to a large release of radioactive material to the atmosphere, followed by the subsequent contamination of the catchment area of the raw water supply.

Introduction

Although Ireland has neither nuclear weapons nor a nuclear power industry, there is a detailed National Emergency Plan for Nuclear Accidents, known as the NEPNA which is coordinated by the Department of the Environment, Community and Local Government (DECLG)¹. The objective of the NEPNA is to allow the rapid implementation of protective measures, within the first few hours and in the days after a nuclear accident which would have the potential to affect Ireland. The central goal of the NEPNA is to substantially reduce public exposure to any radioactive contamination and therefore minimise the potential long term health risks to the population.

Because some accidents affecting nuclear facilities abroad could lead to large releases of artificial radioactivity to the atmosphere, with the potential of affecting large areas of Ireland in certain weather conditions, this risk assessment should be done in a consistent way across the country. For this reason, **the advice contained in this guidance document should be followed by all Water Services Authorities and water suppliers, regardless of their location or circumstances.**

¹ More information on NEPNA and other arrangements of relevance to radiological incidents available at www.environ.ie/en/Environment/EnvironmentalRadiation/NationalEmergencyPlan, [www.rpii.ie/Emergencies/National-Emergency-Plan-for-Nuclear-Accidents-\(NEP.aspx](http://www.rpii.ie/Emergencies/National-Emergency-Plan-for-Nuclear-Accidents-(NEP.aspx) and www.mem.ie.

All drinking waters contain trace amount of radioactivity, but unless the levels exceed internationally adopted levels, the water is considered acceptable for human consumption and any action to reduce the radioactivity levels (remediation) is deemed unnecessary.

Methodology

The EPA's DWSP Risk Assessment considers both the likelihood of a hazardous event and its impact or severity, should this event occur. The overall risk is obtained by multiplying the individual scores obtained for the likelihood and the severity, with a maximum possible score of 25 (very high risk classification). The risk matrix is outlined in the EPA's Drinking Water Advice Note No.8: Developing Drinking Water Safety Plans (DWSPs).

The risks for Ireland from nuclear accidents abroad have already been assessed at national level as part of the National Risk Assessment for Ireland (2012) and a risk register has been established looking at four categories of hazards (natural, transportation, technological, and civil), using a similar risk matrix approach to that of the EPA's *i.e.* a 5x5 scoring methodology. However, while the purpose of the DWSP is to assess the risks hazards pose to the **quality** of drinking water and **compliance** with drinking water quality regulations *i.e.* to ensure that drinking water is both safe and secure, the purpose of the National Risk Assessment is much wider because it **assesses the consequences of hazardous events being realised and expressed in terms of a negative impact on human welfare, damage to the environment or the physical infrastructure or other subsequent consequences**. In other words, the impacts on life, on health and on welfare, as well as the economic and social/environmental impacts are all taken into account.

Likelihood Assessment

The likelihood of a nuclear accident abroad leading to large quantities of radioactive material to be released to the atmosphere is considered to be extremely low. According to the EPA guidance, this risk assessment should be done assuming a worst-case scenario, with no control measures in place. Accordingly, the **likelihood of such an event causing contamination of Irish water supplies would be unlikely and therefore score 2**.

Severity/Impact Assessment

The levels of contamination measured in Ireland following the release of large quantities of radioactivity to the atmosphere due to an accident abroad are expected to be low. This is because of the large distances from a potential point of release², and also because any radionuclides deposited in the wake of a plume passing over Ireland would be diluted by water volumes. It is therefore unlikely that drinking water supplies would be contaminated to levels which would require controls or restrictions in the event of a nuclear emergency of this kind. Note that **in the early stage** of an emergency, the **Council Food Intervention Levels** or CFILs³ would be enforced to assess the quality/safety of water intended for human consumption, **NOT** the parametric values normally used for routine monitoring of radioactivity^{4,5}. **In the long-term** *i.e.* after the emergency phase is over and once authorities revert back to using normal parametric values to assess the quality of water intended for human consumption, Ireland's distance from any nuclear power plant is such that even in a worst case scenario, **drinking water would not remain contaminated above those parametric values for a long time**. Therefore, assuming a worst-case scenario, an **impact/severity score of 2** is advised *i.e.* minor impact, short term or localised, aesthetic or not health related, treatment at risk, no regulatory failure.

A nuclear accident releasing large quantities of radioactive material to the atmosphere **would predominantly affect surface waters**. These constitute the vast majority of Irish drinking water supplies. Therefore, in the event of a nuclear emergency situation the main surface water supplies would have to be monitored and analysed to confirm that the contamination levels are low, as predicted by the studies done on potential accident scenarios. This would be done so as to **reassure the public, food producers, decision-makers and public authorities that drinking water remained safe to consume**. This would be a high priority as soon as the radioactive plume has passed.

² The closest nuclear power plant to Ireland (Wylfa power plant, Wales) is located approximately 120 km east of Dublin.

³ Council Regulations include the specification of CFILs for the radioactive contamination of liquid foods, where liquid foods are defined to include fruit and vegetable juices, non-alcoholic beverages and alcoholic beverages. Non-alcoholic beverages include bottled waters but the Council Regulations also state that these CFILs should be applied to drinking water supplies *e.g.* tap water at the discretion of member states.

⁴ WHO screening values of gross alpha (100 mBq/l) and gross beta (1000 mBq/l), as well as TID (Total Indicative Dose) of 0.1 mSv/y (EC Drinking Water Directive).

⁵ This is because routine parametric standards are based on an annual exposure which is not a valid assumption for the early stage of an emergency.

Precautionary Measures

The risks to drinking water supplies from a nuclear accident abroad are considered to be so low that ad hoc monitoring was considered to be the best possible precautionary option. As a result, a monitoring programme involving the Office of Radiological Protection (ORP, EPA), the Water Service Authorities and Water Suppliers and the EPA (acting as the point of contact for the co-ordination of the collection of drinking water samples) was designed. These arrangements have been in place since 2009, and are tested annually as part of the ORP's routine monitoring programme. More details on this programme can be found in the *EPA Drinking Water Circular Letter DW01/09: Sampling of Drinking Water for Radioactivity*⁶.

⁶ Available on the Network for Ireland's Environmental Compliance and Enforcement (NIECE) website at www.niece.ie/documents/Documents/Circular%20Letter%20DW0109.pdf.