

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: Geological Characteristics 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: **Geological Characteristics Causing Contamination** in the EPA's DWSP online tool (Code CO170). This can be caused by the presence of high levels of natural radioactivity in groundwater supplies due to the local geology.

Introduction

Radioactive contamination due to local geology would be of natural origin (uranium isotopes and daughter products, including radon). **All drinking waters contain trace amounts of radioactivity**, but unless the levels exceed the parametric values for radioactivity (as specified in S.I. 122 of 2014 implementing the Council Directive 98/83/EC on the quality of water intended for human consumption)¹, the water is considered acceptable for human consumption and any action to reduce the radioactivity levels (remediation) is deemed unnecessary.

A **national survey of radioactivity levels in groundwater sources** was carried out between 2007 and 2011 by the RPII in collaboration with the EPA. The final report² contains information on the practical arrangements that are routinely used to assess the level of radioactivity in drinking water supplies in Ireland. It also includes a review of international legal requirements and recommendations as well as a description of the RPII and EPA monitoring programmes.

¹ TID (Total indicative Dose) of 0.1 mSv/y (S.I 122 of 2014) assessed using WHO screening values of gross alpha (100 mBq/l) and gross beta (1000 mBq/l). Tritium 100 Bq/l (S.I 122 of 2014).

² RPII report 'Radioactivity levels in groundwater sources in Ireland' available at www.rpii.ie/RPII/files/47/473e4acb-9064-4495-b0bb-43509a712b71.pdf

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 hazard's likelihood and severity respective scores, 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).

Likelihood Assessment

The likelihood of this hazard is **very site specific**, and it should be up to the Water Supplier to determine the likelihood of the risk posed to any given drinking water supply under its jurisdiction, taking the following aspects into account:

- the findings of the aforementioned RPII report '*Radioactivity levels in groundwater sources in Ireland*'³;
- the historical monitoring results for radiological parameters for the given supply (past contamination events of geological origin); and
- the local geological characteristics that may contribute to increased radioactivity levels.

Severity

The risk from contamination of a groundwater supply by the local geology could potentially have an **impact score of 3 to 4** *i.e.* moderate to major impact, as it could be a simple regulatory failure with no health risk, or it could also have the potential to have a more serious long-term impact if a high level of contamination is affecting a large number of people over a long period of time.

³ 203 groundwater sources from the EPA's groundwater monitoring network were tested for gross alpha and gross beta activities (uranium, radium, and polonium) while 217 groundwater sources were analysed for radon. Previous routine monitoring by the RPII has established that the levels of tritium were well below the parametric value specified in the DWD and associated Regulations (S.I. 122 of 2014). In addition, there are currently no anthropogenic sources of tritium that are likely to impact on groundwater supplies. For these reasons, analysis for tritium was not carried out as part of the national survey '*Radioactivity levels in groundwater sources in Ireland*'.