



**Memorandum of Understanding
between
Met Éireann
and the
Environmental Protection Agency
Version 2.0
Revision Date: 1 October 2025**

The objective of this Memorandum of Understanding (MoU) is to set out areas of mutual responsibility and shared interest between the Environmental Protection Agency (EPA) and Met Éireann

Signed:

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Date:

23rd December
2020

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8th Jan 2021

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1 Introduction

This Memorandum of Understanding (MoU) between the Irish National Meteorological Service, Met Éireann, and the Environmental Protection Agency (EPA) provides a framework for enhanced cooperation in areas of mutual interest, leading to greater efficiency and effectiveness in the delivery of the work programmes of both organisations.

Environmental Protection Agency

The EPA is an independent public body established under the Environmental Protection Agency Act 1992. The EPA has responsibilities for a wide range of licensing, enforcement, monitoring and assessment activities associated with environmental protection and protection of people from the harmful effects of ionising radiation, both natural and man-made. Primary responsibilities of the EPA include:

- Environmental licensing;
- Enforcement of environmental law;
- Environmental planning, education and guidance;
- Monitoring, analysing and reporting on the environment;
- Regulating & reporting Ireland's greenhouse gas emissions;
- Regulating the use of ionising radiation in Ireland;
- Monitoring, analysing and reporting on the environment under the Water Framework Directive and the Clean Air for Europe (CAFÉ) Directive;
- Providing advice to the public and to Government on radiological protection issues;
- Environmental research development;
- Resource Use and Waste management; and
- Strategic environmental assessment.

The EPA's mission is *“to protect and improve the environment as a valuable asset for the people of Ireland, to protect our people and the environment from harmful effects of radiation and pollution”*.

Met Éireann

Met Éireann, the National Meteorological Service, maintained by Ireland as required by the Convention of the World Meteorological Organisation, is the public-service scientific organisation responsible to the Irish State for

- the collection and production of high-quality meteorological data;
- the communication of authoritative weather and climate services to protect life and property, and to promote wider societal and economic wellbeing;
- conducting research into weather and climate, to improve customer services and inform decision-making; and
- representing Ireland to the WMO (World Meteorological Organization), ECMWF (European Centre for Medium-Range Weather Forecasts) and EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites).

In pursuit of this mission, Met Éireann has the following strategic goals:

- Enhance support for impact-based decision making for weather events;
- Provide climate information services which promote the safety of citizens and supports economic and environmental resilience;
- Deliver a high quality national flood forecasting service;
- Continue to provide an effective authoritative voice on meteorology in Ireland;

- Maintain and support an expert, professional workforce; and
- Lead a modern, integrated meteorological infrastructure and support an enterprise environment for weather and climate services.

Met Éireann is a line division of the Department of Housing, Local Government and Heritage.

2 Purpose of Memorandum of Understanding (Overview)

The purpose of this Memorandum of Understanding is to record the agreement that has been reached by the Parties. In recognising each other's respective responsibilities and obligations and recognising constraints that may apply, the EPA and Met Éireann shall endeavour to liaise closely, particularly in relation to the issues set out below.

The adoption of this memorandum will:

- facilitate work in areas of shared interest and cooperation;
- with regard to relevant data policies, facilitate the free and timely exchange of available information and data;
- promote best practice in areas of common interest;
- promote a focus on improved quality and of making the most effective use of resources; and
- further improve the service delivery to members of the public from both agencies.

The implementation of this memorandum will be without prejudice to the statutory responsibilities and obligations of both organisations. Cooperation should also lead to efficiencies for both organisations, as well as for third parties, in relation to the potential to maximise the use of available information, and avoidance of duplication of effort.

3 Areas of Cooperation

This Memorandum of Understanding provides a framework for cooperation and assistance between the EPA and Met Éireann in areas of common interest concerning air quality, radiological protection, emergency planning and response, climate services, earth system monitoring, modelling and assessment, as well as related research activities.

This MoU will facilitate cooperation between the EPA and Met Éireann in discharging their respective responsibilities in these areas and so enhance the actions of both and avoid duplication of effort and conflicting requirements.

3.1 National Emergency Preparedness including Radiological and Air Quality Incidents

3.1.1 Radiological Events

The National Plan for Nuclear and Radiological Emergency Exposures ('the National Plan') provides a framework for the national response to a large-scale radiation emergency. It is intended specifically to cater for an emergency or crisis involving widely dispersed radioactive material such as that arising from a major accident at a nuclear installation abroad resulting in radioactive contamination reaching Ireland. The National Plan is one of a number of complementary national and major emergency plans designed to cater for different types of emergency situations. All national authorities/agencies having responsibilities within the National Plan are required to have written sub-plans

showing how they will carry out their responsibilities. Lead responsibility for the National Plan lies with the Department of Environment, Climate and Communications.

The EPA has been assigned particular functions under the National Plan covering early warning, technical assessment of the incident, provision of technical advice on protective actions and monitoring of the environment and the food chain. The role of Met Éireann is to facilitate the use of the EPA's established dispersion modelling capability by making available the most up-to-date local and global atmospheric data; to provide expert advice aimed at assisting in the interpretation of dispersion model output, and also in the interpretation of output from relevant Regional Specialised Meteorological Centres (RSMCs), and to assist in the operation of the EPA radiation monitoring network. Primary responsibility for the provision of advice during a radiological event rests with the EPA.

Arrangements in the EPA and Met Éireann to support a technical assessment in the event of a nuclear or radiological emergency are described in Annex 1.

3.1.2 Air Pollution Events

Modelling of Incidents/Accidents with a Potential Air Quality Impact

The EPA can use dispersion models to support the investigation of air quality incidents such as fires or chemical spills which have the potential to impact on air quality at a local/regional/national/transboundary level. The NWP data used for radiation incidents can also be used for air quality incidents.

The ADMS¹ modelling package is also used for modelling emergency and non-emergency releases to the atmosphere. This model requires hourly meteorological data (typically wind speed, wind direction, temperature, cloud cover, rainfall) and Met Éireann shall make historical data from appropriate Met Éireann meteorological monitoring stations available to the EPA (in CSV readable format) for use in the ADMS model system.

As part of this incident response function the EPA may require meteorological forecast information from Met Éireann (via phone/email) via the Met Éireann duty forecaster.

Exceedances of Air Quality Information and Alert Thresholds

The EPA and Met Éireann will continue to jointly operate a system to inform the public if an air quality information or alert threshold is exceeded in accordance with Air Quality Standards Regulations SI 180, or if any operational air quality forecast model of the EPA predicts such threshold exceedance. Upon receipt of monitoring data and/or advice from the EPA, Met Éireann will publicise, through weather broadcasts, social media accounts, and otherwise, any exceedance or predicted exceedance of the air quality information or alert thresholds specified in the Air Quality Index for Health or Air Quality Standards Regulations SI 180 of 2011, respectively. A mutually satisfactory system to fulfil this requirement will be maintained by both organisations.

Air Quality Modelling and Forecasting

Met Éireann note the ongoing work within the EPA on the development of ambient air quality analyses and the provision of air quality forecasts. Met Éireann will support, on a

¹ See www.cerc.co.uk

best-efforts basis, this initiative through the provision of available meteorological data as required, and expert advice for matters within its competence. When the forecast service is approved and made operational, the necessary interactions between EPA and Met Éireann in response to modelled, forecast exceedance of thresholds as laid out in EU regulation will be defined in a protocol to be agreed between both bodies.

To further foster and develop a community around air quality modelling both the EPA and Met Éireann will jointly organise and host an annual modelling event.

Air Quality Dispersion Modelling Meteorological Information

Met Éireann will support the EPA by providing a dispersion modelling capability linked to an operational database of atmospheric analyses and up-to-date meteorological forecasts, to enable the EPA to track the movement of air pollutants in the atmosphere both for routine work and in emergency response situations.

Air Quality Health Information Working Group

The EPA currently interacts with Met Éireann through the Air Quality Health Information Working Group, which also includes the HSE and the Department of Housing, Local Government and Heritage, in relation to issues such as air quality forecasting, developing an air quality index for Ireland and emergency response modelling. The EPA and Met Éireann will support this group and continue to work together on these areas of mutual interest.

Air Quality Index for Health Public Information

The EPA in agreement with partners from the Air Quality Health Information Working Group publish hourly ratings of air quality via its website and associated social media platforms e.g. Twitter. On occasions when air quality will be 'poor' or 'very poor' or where an operational forecast model predicts a 'poor' or 'very poor' status, additional publication on Met Éireann social media and website platforms may be sought to engage a wider public audience.

3.2 Radioactivity Monitoring and Air Quality Monitoring

3.2.1 Radioactivity Monitoring

EPA is the competent authority in Ireland for reporting monitoring data to the EC under Article 35 and 36 of the Euratom treaty. With support from Met Éireann, Defence Forces, Third Level Institutes, and Local Authorities, EPA operates the National Radioactivity Monitoring Network (NRMN) of permanent monitoring stations. The purpose of the NRMN is to provide an alert and characterise radionuclides arriving in Ireland via atmospheric dispersal from a major incident at a nuclear installation abroad. The network can also confirm that a radioactive plume has not reached Ireland. A list of monitoring sites and their equipment can be found in Annex 2.

Met Éireann, as the National Meteorological Service, operates a national network of weather observation stations producing high quality observational datasets to World Meteorological Organisation standards.

3.2.2 National Ambient Air Quality Monitoring Network

Met Éireann will continue to operate a ground-level ozone monitor at Valentia in accordance with the requirements of the national ambient air quality network including QA/QC and real-time reporting. As manager of the network, the EPA will include the station in all relevant national QA/QC procedures and will include the results in national reporting.

3.2.3 OSPAR-Comprehensive Atmospheric Monitoring Programme (CAMP)

Met Éireann will continue to measure nitrate and ammonium at Valentia and report the annual results along with rainfall measurements to the EPA before 31 July each year. Met Éireann will collect monthly deposition samples and despatch them to the EPA. The EPA will analyse these samples for metals and report all results to the OSPAR-CAMP programme annually. Met Éireann is planning a review of atmospheric monitoring activities they undertake. The EPA welcomes this initiative and looks forward to working with Met Éireann on this review and providing information on the national requirement as well as process recommendations.

3.2.4 Transboundary Air Quality Monitoring (EMEP Network)

The EPA will continue their partnership with Met Éireann on the Transboundary Air Quality Monitoring Network which is Ireland's contribution to the European Monitoring and Evaluation Programme (EMEP) under the Convention on Long Range Transboundary Air Pollution (CLRTAP).

Met Éireann will continue to provide equipment and analytical support, as outlined in Annex 3.

3.3 Climate Services

Both parties agree to cooperate on the development of climate services for Ireland, in the context of the requirements of the Irish citizen, through enhancing existing collaborations and exploring opportunities in relevant areas including:

- the provision of fundamental knowledge with respect to climate change and future climate scenarios for Ireland;
- the development of a National Framework for Climate Services following best international practice;
- continuing and expanding linkages to EU initiatives in this area e.g. under Copernicus, JPI Climate and Horizon Europe;
- engaging with the work of UN bodies as appropriate; and
- supporting an operational Climate Ireland information platform designed to improve data access and assist adaptation planning and actions.

3.3.1 Climate Communications

Each organisation will support each other and their activities in relation to climate science communication and regularly update each other on planned activities.

3.4 Research

The EPA Research Programme is currently structured around three pillars (climate, water and sustainability), representing the key research priorities associated with delivering a protected Irish environment. The structure will be revised later in 2020 in the context of the new EPA Research 2030 Strategy.

Met Éireann engages in focussed meteorological and climatological research with a particular emphasis on the transfer from research into operations. Research priorities include the development of weather and climate services, short range NWP systems for Ireland, global climate modelling (under the Coupled Model Intercomparison Project, CMIP) and dynamical downscaling of regional climate.

Met Éireann is a member of the national Research Coordination Groups on Water, Sustainability and Climate, which have been set up and are facilitated by the EPA.

Both parties agree to continue to cooperate on the development of research projects. Where relevant, opportunities for co-funding research projects will be explored in areas and topics of common and shared interests. Specific co-funding agreements will be drawn up on a project basis.

Each organisation will seek to coordinate their support and funding of activities, will support each other's pre-award and post award processes, including research topics selection, project evaluation process, participation on project steering groups where appropriate and reviewing final reports.

The EPA and Met Éireann will support research assessment processes in Ireland and internationally, particularly the work of the Intergovernmental Panel on Climate Change (IPCC), and will continue to support expert engagement with such processes.

3.5 Observations and data exchange

Met Éireann recognises that observational data from a diverse range of external sources can complement and supplement existing Met Éireann observational networks. Through the framework of the WMO Integrated Global Observation System (WIGOS) Met Éireann is committed to developing partnerships with external data providers.

Met Éireann will work in partnership with the EPA (i) to identify EPA data sources to complement Met Éireann's existing networks, (ii) to ingest EPA data into Met Éireann systems, subject to data quality controls and (iii) to share data through the WIGOS framework and the WMO Information System (WIS) both nationally and internationally.

The EPA and Met Éireann agree to continue their cooperation on development of climate related observations. The EPA, as a member of the national Global Climate Observation System (GCOS) committee, chaired by Met Éireann, acts to coordinate these activities and supports the committee's aims and goals including the ongoing analysis of trends and changes in essential climate variables as well as sustaining and developing systems that support the provision of these data for Ireland.

EPA's requirements for meteorological datasets may arise on an ad-hoc basis due to the EPA's core work areas or due to involvement in a research project requiring access to data. Where such data requests are not covered under pre-existing agreements within this MoU a request will be made through the relevant contact on the contact list held by both organisations. Should this data request become a recurring request, consideration of its inclusion in the MoU will be undertaken in the annual MoU meeting.

3.6 Land Use and Inventory Development

Data may be required for process based modelling of GHG emissions from soils associated with agricultural practices and land use management. In general, process based soil models require;

- daily min, max and mean temperature; and
- daily rainfall.

Research in this area is on-going regarding the specific data requirements and other data needs may be identified. It is envisaged that fully QA/QC data, in digital format for synoptic stations and for the previous year, would be delivered by Met Éireann to the EPA on or before 30 June each year (See Annex 4).

3.7 Hydrometrics and Water Quality

Precipitation is an important component in hydrological assessments. Under the Water Framework Directive, data is required for reporting water availability to the EU on a River Basin District basis at monthly and annual time scales and as Long Term Annual Averages for Areal Precipitation and Potential Evapotranspiration. It is beneficial for catchment analysis and integrated assessment of catchments to receive in digital format the following data sets:

- Hourly rainfall data at synoptic stations;
- Rainfall data at specific rainfall stations, at the highest available temporal resolution, if requested;
- Evaporation and evapotranspiration data; and
- Soil moisture deficient data.

Under the annual WISE-SOE Reporting: Water Quality dataset request, Ireland is required to provide water balance data. The Hydro-meteorological parameters required to support this request are presented in Annex 5. Extreme weather events (particularly periods of elevated or prolonged rainfall) can also impact on EPA work areas such as drinking water quality and bathing water quality. Met Éireann and the EPA will investigate future exchange of forecast information to assist in preparing for such incidents. Met Éireann and the EPA may also cooperate in the siting of rain gauges in specific areas or catchments to provide real-time information.

Bathing water quality

The Beaches website (www.beaches.ie) was developed by the EPA to provide the public with bathing water quality information and other information related to bathing waters. Beaches has a national overview home page but the main information is provided at bathing water level. The site links to Met Éireann weather information.

Modelling of flows from daily rainfall and evapotranspiration

Daily rainfall values are useful for calculating material fluxes in rivers e.g. nutrient loading to lakes when combined with water chemistry results. Combining rainfall with evapotranspiration estimates (or soil moisture deficit) and observed flow measurements can allow for modelling of flows in rivers especially in rivers where continuous flow measurements are not available. Modelled river flow data can also be used to estimate lake residence time if the volume of the lake is known.

In support of the above activities Met Éireann will supply a full suite of hourly weather data (in addition to the information requested in Annex 5) for each of the 25 synoptic stations including:

- Temperature including degree days;
- Rainfall;
- Wind;
- Radiation;
- Humidity; and
- Pressure.

3.8 Citizen Science, Education and Outreach

Each organisation will inform the other of projects they are involved in that may be of mutual interest. Where appropriate both organisations may plan and implement joint projects. Such a citizen science, education and outreach liaison will take place on an ongoing basis and reported on and reviewed at annual MoU meetings

4 Memorandum of Understanding Review

The Term of this Memorandum is five years from the date of signing and may be reviewed by agreement of both parties from time to time during the term in order to ensure the greatest efficacy of its implementation. The memorandum shall in any event be reviewed on an annual basis by agreed representatives of both agencies as outlined below.

5 Continuity of Arrangements

Met Éireann will offer support for radioactivity and EMEP air quality monitoring activities where present, at manned sites for as long as existing staff members remain available.

6 Confidentiality

Notwithstanding the expiry or early termination of this Memorandum of Understanding for any cause, the provisions of confidentiality shall survive such expiry or early termination.

Each Party possesses valuable information, technical knowledge, experience and data of a confidential nature that it regards as assets of considerable value. Each Party may disclose such information to the other Party on the condition that the recipient of the information does not disclose it to any third party or make use of it in any manner except insofar as is necessary to achieve the purposes of this Agreement.

This Memorandum does not provide for the transfer of personal data as defined in the Data Protection Acts 1988 and 2003 and the parties agree to adhere to the provisions of those Acts.

7 Operational Liaison

An up to date list of the contact details and areas of responsibility of key personnel involved in the work covered by this Memorandum of Understanding shall be maintained and held by both organisations.

An MoU liaison group will be set up to include representatives from Met Éireann and EPA. Staff from each organisation will through their representatives on the liaison group

make contributions and liaise with their relevant counterparts and maintain an effective exchange of information. Items for implementation can be addressed by the person(s) responsible in each organisation on an informal basis between both parties.

An annual MoU meeting between staff, including senior representatives of both organisations will be held where activities in the areas of shared responsibility and practical cooperative measures as set out in the MoU will be reviewed. This review shall encompass suggestions for improvements in these areas as technological systems and expertise develop.

Minutes of these meetings will be agreed and held by both organisations. The liaison group may decide to refer certain matters of cooperation to technical sub-groups. This liaison group, or its designates, will also review as necessary any of the specific detail of cooperation specified in the Annexes to this MoU. Additional technical meetings covering more specific areas in detail shall also be arranged when required.

The EPA and Met Éireann may agree to establish working groups or make other arrangements to examine matters of common interest. Such groups may examine matters of a technical, legal or administrative nature where co-operation may provide opportunities for more effective operations between both organisations. Such working groups as may be established from time to time will operate as may be necessary under agreed Terms of Reference and report to the Liaison group. Such agreements will be included as appendices to the Memorandum of Understanding.

8 Costs

There is an agreed financial contribution from the EPA to Met Éireann towards costs incurred for the following areas:

- Analysis of rainfall and filter samples from the EMEP – Transboundary Air Quality Monitoring Network (Annex 3); and
- National Radiation Monitoring Network: Power costs incurred by Met Éireann at sites due to increased power demands by NMRN equipment will be monitored and recouped as appropriate by Met Éireann.

These costs may be reviewed annually and any amendments to be jointly agreed by the relevant budget holder. Each Party shall be responsible for any other costs incurred by it in connection with this Memorandum of Understanding.

Annex 1 Technical Assessment in a Radiation Emergency

Technical Assessment

The EPA is responsible for the development and maintenance of the capability to make technical assessments of potential accidents and their radiological consequences for Ireland. EPA deploys specialised decision support systems as well as atmospheric dispersion models as primary tools for technical assessment and emergency preparedness.

Numerical Weather Prediction Data

As the National Meteorological Service, Met Éireann produces high resolution, short range Numerical Weather Predictions for Ireland deploying the Harmonie modelling system. Met Éireann is also the official conduit for medium range numerical weather prediction (NWP) data from the European Centre for Medium Range Weather Forecasting (ECMWF). These meteorological predictions and further data supplied by Met Éireann shall provide the meteorological basis for relevant EPA applications.

Atmospheric dispersion modelling is deployed by EPA to predict the transport, dispersal and deposition of radioactive material after release to the atmosphere. Atmospheric dispersion models are driven by input data from NWP models.

To enable the operation of atmospheric dispersion modelling by the EPA, Met Éireann shall extract a subset of the full operational NWP forecast covering Ireland and Britain after completion of each NWP model run, convert these data to the text format required for input to EPA's models and arrange for the NWP data to be sent to the EPA's FTP server each day at pre-arranged frequencies.

NWP data from the most recent five days shall be made available by Met Éireann. The EPA is responsible for managing the transfer and storage of the NWP data on its internal servers. Usage of the data by EPA will be strictly in pursuance of its stated objectives; it undertakes not to release the data to any other party without the prior consent of Met Éireann.

The EPA may request Met Éireann to obtain archive weather data from the ECMWF. This data will be made available on the ECMWF's FTP server for downloading by the EPA. Met Éireann has arranged for the EPA to have security token access to the ECMWF computing services and Archive Products. The EPA adheres to the ECMWF security token usage rules.

Met Éireann will support the EPA in developmental work to incorporate the use of ensemble NWP predictions into nuclear emergency decision support systems.

HYSPLIT Dispersion Model

The EPA uses a local installation of the HYSPLIT dispersion model to predict the spatial and temporal evolution of a radioactive release to the atmosphere. The EPA is responsible for the use of its version of HYSPLIT and outputs produced. In parallel, Met Éireann has installed a version of the HYSPLIT model at the ECMWF, which can use the latest ECMWF global analyses/forecasts to track the movement of radioactive material in the atmosphere over the global scale. Met Éireann is responsible for maintaining the HYSPLIT model at ECMWF. It is possible for the EPA to use HYSPLIT installed at the ECMWF.

Meteorological Advice

To perform its technical assessment function effectively, the EPA may require the assistance of an expert meteorologist from Met Éireann. An assigned forecaster will be dispatched by Met Éireann to join the EPA technical assessment team (TAT) in the event of an emergency and/or take part in EPA technical assessment exercises as appropriate (approximately once per year). The Head of the TAT (normally the Manager of the EPA's Emergency Preparedness section) will lead and coordinate the work of the team members. The role of the assigned forecaster within the TAT shall be clearly documented at the earliest opportunity by Met Éireann's Forecast Division and the EPA's Emergency Preparedness section. The EPA shall ensure that all appropriate Met Éireann staff, including assigned forecasters, are kept up to date regarding the EPA's technical assessment capability and actions and information which might be expected from them in the event of a radiation emergency. Following exercises, the role of the assigned forecaster shall be reviewed and modified if necessary.

In the event of a radiation emergency, the TAT will operate by default at EPA offices in Clonskeagh Square, Dublin, unless remote working is advised. The EPA is responsible for ensuring that appropriate communications infrastructure is available at this location to enable full access to meteorological data by Met Éireann's assigned forecaster. To facilitate this access, a communication link between EPA (Clonskeagh Square) and Met Éireann (Glasnevin) offices has been setup. This link is tested approximately twice per year and relies on the respective dedicated microwave links to the National Emergency Coordination Centre (NECC) of both agencies. If EPA offices are not viable, the TAT will operate from the NECC in Agriculture House (Kildare Street, Dublin 2). At this location each organisation shall be responsible for provision of required communications infrastructure for its own staff.

Met Éireann shall also make available to the EPA products, interpretation and any other outputs from the World Meteorological Organization's Regional Specialized Meteorological Centre (RSMC) during exercises and in the event of an emergency. The Met Éireann assigned forecaster shall assist the EPA in their interpretation.

Radar Rainfall Data

In assessing the consequences of a release of radioactive material to the atmosphere, precipitation measurements can help to identify and evaluate areas of enhanced contamination on the ground resulting from wet deposition. Radar rainfall images and data are used by the EPA for this purpose.

Met Éireann shall automatically make available high resolution radar data from its own rainfall radars on the island of Ireland, and also composite rainfall radar data files covering both Ireland and Britain, on a FTP server for download by the EPA. The files shall be in an agreed format (BUFR). They shall be uploaded without unnecessary delays and remain available for download for a period of at least 48 hours.

In order to facilitate visualisation of radar images at EPA or NECC for use in matters associated with the National Plan, Met Éireann shall provide access to full resolution radar images through its website, ww.met.ie and through www.metweb.ie.

Annex 2 National Radiation Monitoring Network (NRMN)

NRMN equipment includes online gamma dose rate monitors that report live to EPA and EC websites, online monitors of alpha/beta and radon radioactivity in aerosols, plus offline rainwater and aerosol samplers that are changed manually and posted to the Dublin Environmental Monitoring Laboratory for analysis of alpha/beta radioactivity and gamma spectrometry.

In order to assist the EPA in the operation of its radioactivity monitoring network Met Éireann shall:

- host gamma dose rate and alpha/beta activity monitors, plus aerosol and rainwater samplers, at agreed locations (Table 1);
- at staffed sites, undertake basic maintenance of this equipment; and
- at staffed sites, undertake limited intervention in the event of faults to this equipment occurring.

In the case of aerosol samplers:

- On a weekly basis or, in the event of an emergency on instruction from the EPA, collect filters and return to the EPA offices in Clonskeagh; and
- On instruction from the EPA, insert charcoal filters for the measurement of radioactive iodine into this equipment, and collect and return to the EPA offices in Clonskeagh.

In the case of rainwater samplers:

- Collect samples on a monthly basis and retain for one month while the subsequent sample is collected. After this period the sample shall be disposed of, unless otherwise instructed by EPA; and
- In the event of an emergency, return samples to the EPA offices in Clonskeagh.

Requirements in relation to the maintenance, interventions and other undertakings mentioned above are listed below. The EPA shall provide Met Éireann site managers and other personnel as appropriate with all necessary detailed procedures for supporting the operation of gamma dose rate, aerosol monitoring and rainwater sampling equipment. The EPA shall have responsibility for all other required maintenance, repairs and upgrades. The EPA shall ensure an adequate supply of aerosol filters and pre-addressed envelopes for their return at each aerosol monitoring site.

Met Éireann and the EPA shall each keep the other party informed of planned changes which may influence or impact monitoring activities or monitoring equipment at the NRMN sites. When new sites are being considered, both organisations shall interact with a view to optimising the use of their respective resources.

The EPA has commenced the NRMN renewal project which seeks to establish 23 sites that are appropriate for NRMN equipment. Ambient dose rate ($H^*(10)$) monitors, precipitation samplers and either aerosol monitors or aerosol samplers will all be included at as many sites as possible. The redeveloped network will augment measurement/sample types (dose rate, aerosol filter and precipitation monitoring) per site, improve automation and online reporting, leverage technology to ensure reliable communication between samplers and EPA offices, develop synergies across EPA monitoring, and evolve siting, maintenance and outreach. The NRMN renewal project will seek to upgrade the current Met Éireann sites in which EPA has already installed equipment. The addition or upgrade of equipment at each site will be agreed with Met Éireann at each of the ten Met Éireann sites listed in Table 3. Equipment at the Met Éireann sites of Casement Aerodrome and Dublin Airport will be taken offline within the next three years (Table 2).

Table 1 Met Éireann Sites included in the National Radiation Monitoring Network Renewal Project

Station Name	Site Address	Staffing	Equipment Installed	
			Current	Target
Ballyhaise	The Agricultural College, Ballyhaise, Co. Cavan	Unstaffed	Gamma	Gamma Aerosol Precipitation
Belmullet	Belmullet, Ballina, Co Mayo	Business Hours	Precipitation	Gamma Aerosol Precipitation
Cork Airport	Cork Airport, Co. Cork	24 hours	Gamma Aerosol Precipitation	Gamma Aerosol Precipitation
Glasnevin	Met HQ, Glasnevin Hill, Dublin 9	24 hours	Aerosol Precipitation	Aerosol Precipitation
Knock Airport	Knock Airport, Co. Mayo	0600 - 1900	Gamma	Gamma Aerosol Precipitation
Gurteen	Gurteen Agricultural College, Ballingarry, Roscrea, Co. Tipperary	Unstaffed	Gamma	Gamma Aerosol Precipitation
Malin Head	Malin Head, Co. Donegal	OPO	Gamma	Gamma Aerosol Precipitation

Station Name	Site Address	Staffing	Equipment Installed	
			Current	Target
Mullingar	Met Éireann, Irishtown, Mullingar, Co Westmeath	Unstaffed	Gamma	Gamma Aerosol Precipitation
Shannon Airport	Shannon Airport, Co. Clare	24 hours	Gamma Aerosol Precipitation	Gamma Aerosol Precipitation
Valentia (Cahirciveen)	Valentia Observatory, Cahirciveen, Co. Kerry	Business Hours	Gamma Aerosol Precipitation	Gamma Aerosol Precipitation

OPO: One Person Operation

Table 2 Met Éireann sites to be taking offline

Station Name	Site Address	Staffing	Equipment Installed
			Current
Casement Aerodrome	Casement Aerodrome, Baldonnel, Co. Dublin	24 hours	Gamma Precipitation
Dublin Airport	Level 3, Old Central Terminal Building, Dublin Airport	24 hours	Precipitation

Maintenance of National Radiation Monitoring Network equipment

Current NRMN equipment is listed. In the renewal project this will be replaced by similar more modern types of equipment: any changes needed will only be implemented following agreement with Met Eireann.

Envinet MIRA Gamma Monitors (solar powered and self-contained monitor)

- Regular visual inspection for cleanliness, damage and reporting to EPA where appropriate.
- Cleaning of solar panel, rainfall detector and GSM antennae when required

Envinet AGS Gamma Monitors (solar powered and self-contained monitor)

- Regular visual inspection for cleanliness, damage and reporting to EPA where appropriate.
- Cleaning of solar panel, rainfall detector and GSM antennae when required

Envinet DLM Gamma Monitors (mains powered indoor data logger connected to outdoor sensor)

- Regular visual inspection for cleanliness, damage and reporting to EPA where appropriate.
- Cleaning of rainfall detector when required
- Replacement of detector tube when required
- Assist with troubleshooting telephone line problems
- Assist with instrument power problems (mains, battery or fuses) where possible

On-Line Berthold Aerosol Samplers

- Regular visual inspection for cleanliness, damage and reporting to EPA where appropriate.
- Assist with troubleshooting telephone line problems
- Assist with instrument power problems (mains or fuses) where possible

Off-Line Berthold Aerosol Samplers

- Continue weekly exchange of filters, request for spares as needed
- Fitting new sampling heads
- Regular visual inspection for cleanliness, damage and reporting to EPA where appropriate.
- Assist with instrument power problems (mains or fuses) where possible

NILU Rainwater Collectors

- Continue precipitation sampling routine
- Regular visual inspection for cleanliness, damage and reporting to EPA where appropriate.
- Cleaning of funnel and collection bottle, and request for spares as needed.

Annex 3 EMEP Network Support

Equipment maintenance support is provided by Met Éireann Staff for the Eigenbrodt Rainfall Samplers.

In addition, the Met Éireann laboratory based in Glasnevin has provided essential analytical support to the Transboundary Air Quality Monitoring network since its start-up. Rainfall and filter samples are collected daily by instrumentation on sites (EPA EMEP sites plus Met Éireann's site at Valentia). EPA and Met Éireann personnel collect the samples on weekly basis and courier the samples to Met Éireann Glasnevin for analysis for a range of anions and cations. Analytical data is compiled and QA/QC checked by Met Éireann Lab staff. Results of analyses are submitted electronically by Met Éireann to EMEP.

Annex 4 Data requirements for Land Use and Inventory Development

Parameter	Definition	Scale
Daily minimum, maximum and mean temperature	Standard Met Éireann values	Synoptic stations
Daily Rainfall	Standard Met Éireann values	Synoptic stations

Annex 5 Hydro-meteorological Parameters Required for WISE-SOE Annual Reporting

Table 3 Hydro-meteorological Parameters

Parameter	Definition	Temporal Scale	Spatial Scale	Unit
Areal Precipitation (P)	Total volume of atmospheric wet precipitation (rain, snow, hail etc.).	Monthly ^M , Seasonal, Annual ^{M, 1} , LTAA ^M	Irish National Grid on a 1km resolution	millimetres (mm)
Potential Evapotranspiration (PET)	The maximum quantity of water capable of being evaporated in a given climate from a continuous stretch of vegetation covering the whole ground and well supplied with water.	Monthly ^M , Seasonal, Annual ^{M, 1} , LTAA ^M	Synoptic stations	millimetres (mm)
Actual Evapotranspiration (ETa)	Actual evapotranspiration as calculated from the Met Éireann/Teagasc hybrid model.	Monthly ^M , Seasonal, Annual ^{M, 1} , LTAA ^M	Synoptic stations	millimetres (mm)

^M This field is mandatory.

¹ LTAA = Long Term Annual Average - based on annual values averaged over a period of at least 20 consecutive years. The time period used to calculate the LTAA should also be provided.

Ireland is also required to report stream flow, reservoir inflows and outflows and groundwater levels at specified monitoring points. Included in this data set are data from rain gauge stations as set out in Table 4.

Table 4 Hydrometeorological Point measurements

Variable	Definition	Spatial Scale
Rain gauge stations	Only basic information on the characteristics of the rain gauge stations which are located within the reporting unit (e.g. latitude, longitude, period of available record etc.) is requested (precipitation measurements are not requested). It is assumed that these stations were used to calculate the Areal Precipitation requested in the above Water Balance Table	Rain gauge Station ^M RBD ^M RB Sub-units Administrative Region Country ^M

^M This field is mandatory.

The current requested information has been scaled down to each particular RBD and sub-unit. Additionally, the minimum proposed time step is monthly to allow distinguishing seasonal patterns and assessing dry periods within a hydrological year. There is the flexibility to report at different scales: River Basin District (RBD), sub-unit (SU), River Basin (RB), Administrative Region (ADR). The smallest available spatial scale is the default requirement for reporting. There is also flexibility regarding the temporal resolution for which the data can be reported, Monthly, Seasonal, Annual. Again, the lowest available temporal scale possible is required. Data is requested annually in arrears at the end of October.