

Climate change Resilience of the nuclear lifecycle

Presentation for NuLEAF RWPG July 2023

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New and Operational Nuclear Sites

Radioactive Substances and Industry Regulation

Environment Agency strategy...



EA 2025
A NATION RESILIENT
TO CLIMATE CHANGE



EA 2025
HEALTHY AIR,
LAND AND WATER



EA 2025
GREEN GROWTH AND
A SUSTAINABLE FUTURE

<https://youtu.be/p7ahdhj-Qzl>

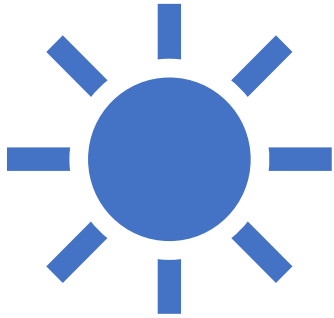
Adaptation

A dramatic landscape featuring a dark, stormy sky with a bright lightning bolt striking down over a green field. The scene is split vertically, with the left half showing the storm and the right half showing a clear blue sky with solar panels and wind turbines.

Mitigation

A clear blue sky with solar panels in the foreground and wind turbines in the background. The scene is split vertically, with the left half showing a storm and the right half showing a clear blue sky with solar panels and wind turbines.

Examples of climate change impacts



Winter/Summer daily maximum temperature



Daily extreme/average winter rainfall



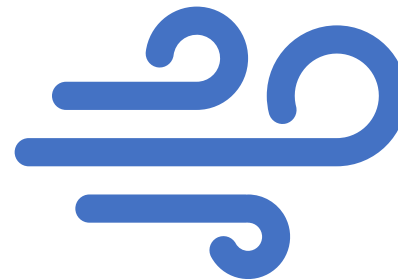
Sea level rise



Drier summers



River flow



Increased maximum wind speed

- Multiple impacts across these topics
- Chronic and acute effects

How can natural hazards impact businesses & environmental protection?

Possible failures / degradation

- **High temperature / Heat wave**
 - Insufficient process cooling, particularly where using ambient air as coolant;
 - Process equipment / instrumentation overheating and malfunctioning;
 - Increased fire risk / material decomposition / material auto-ignition;
 - Impact on workforce / reduced human performance;
 - Increased wildfire risk (either direct impact to establishment or indirect impacts – utilities/emergency response)
- **Prolonged dry weather / Drought**
 - Impact on cooling water or fire water availability;
 - Increased vulnerability of environmental receptors;
 - Subsidence / ground movement impacting on equipment supports and containment system integrity.



How can natural hazards impact businesses & environmental protection?

Possible failures / degradation

- **Flooding**

- Floating of vessels or impact damage to equipment causing loss of containment (potential multiple losses);
- Loss of power / utilities / control and communication systems;
- Compromising secondary/tertiary containment and drainage integrity/functionality;
- Hampering emergency response due to unavailable resources or access/egress issues.

- **High winds / Storms**

- Structural damage either directly or due to wind-blown debris;
- Access restrictions hampering emergency response;
- Wide area power / communications systems loss.

- **Sea level rise**

- Increased risk of local sea/estuary defences failing and sites flooding;
- Increased forces on jetties/coastal structures due to changes in marine/estuarine currents.



How can natural hazards impact businesses & environmental protection?

Possible failures / degradation

- **Heavy Snowfall**

- Access restrictions hampering process operation / maintenance;
- Weight on structures causing structural collapse / loss of containment;
- Loss of power / utilities / control and communication systems;
- Compromising secondary/tertiary containment and drainage integrity/functionality;
- Flooding impacts following thaw;
- Hampering emergency response due to unavailable resources or access/egress issues.

- **Ice / prolonged cold**

- Freezing of process pipework causing no /low flow and associated scenarios / causing potential pipework damage and loss of containment upon thaw;
- Instrumentation faults and malfunctions leading to loss of process control;
- Metal fatigue / other equipment damage causing failures and malfunctions;
- Access issues or freezing of fire systems impacting emergency response.

Is your business preparing for climate change?

Last year the EA published its third adaptation report “Living Better with a Changing Climate”

- “business as usual” is not an option
- we are helping businesses prepare



Policy and Planning

- **DESNZ radioactive substances and decommissioning policy consultation –**
- Sustainability hardwired

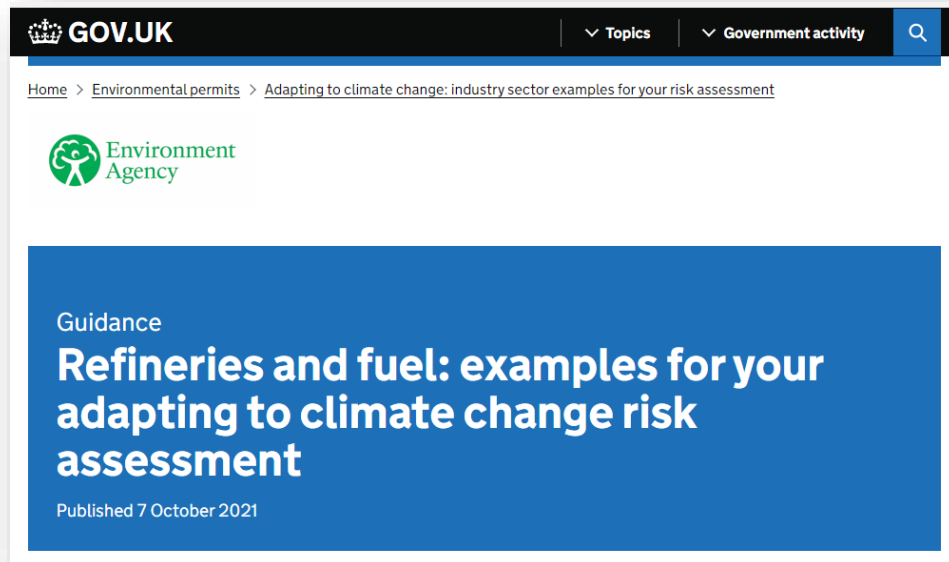
- **NPS - GDF**
- Applicants should use the latest set of UK Climate Projections available, at the time the Environmental Statement is prepared, to ensure that they have identified the climate risks and appropriate adaptation measures. This should cover the estimated lifetime of the new infrastructure up to and including the duration of the operational lifetime (see section 1.6).....

- **NPS – NNB**
- EN1 (draft) Applicants should assess the impacts on and from their proposed energy project across a range of climate change scenarios.... Applicants should demonstrate that proposals have a high level of climate resilience built-in from the outset and should also demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario..... Where energy infrastructure has safety critical elements... the applicant should apply a credible maximum climate change scenario....

- **EIADR – Guidance 2023**
- A description of the project, including in particular:
- “the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;”

Permitting

- From 31 August 2022, EPR guidance on developing a management system has been updated to focus on an existing requirement to consider a changing climate



- Guidance is available on gov.uk
 - [Develop a management system: environmental permits - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/develop-a-management-system-environmental-permits)
 - [Adapting to climate change: industry sector examples for your risk assessment](https://www.gov.uk/guidance/adapting-to-climate-change-industry-sector-examples-for-your-risk-assessment)

Identifying good/best practice - Guidance and Standards

ONR Office for Nuclear Regulation Environment Agency Cyfoeth Naturiol Cymru Natural Resources Wales SEPA Scottish Environment Protection Agency

Use of UK Climate Projections 2018 (UKCP18)
Position Statement



ONR Office for Nuclear Regulation Environment Agency

Principles for Flood and Coastal Erosion Risk Management



INTERNATIONAL STANDARD ISO 14090

First edition 2019-06

Adaptation to climate change — Principles, requirements and guidelines

Adaptation au changement climatique — Principes, exigences et lignes directrices

Reference number ISO 14090:2019(E)

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www.gov.uk/environment-agency

Preparing for flooding
A guide for sites regulated under EPR and COMAH

Flooding is the most common and widespread natural process and can never be completely avoided. While we do everything we can to reduce the impact of flooding, advance you can minimise the impact that flooding activities. Flood planning will help you comply with the Permit and the COMAH regulations where the site is in an area at risk of flooding.

1. Find out if your site is in an area at risk of flooding

It is quick and easy to find out if you're at risk:

- Call Floodline on 0345 988 1188 24 hours a day to check if your site is in a flood risk area.
- Look at our website www.gov.uk/prepare-for-flooding to see if your site's postcode is at risk from flooding.
- You should also consider the risk of flooding from drainage systems and from rising groundwater. We can be able to provide advice on flooding from drainage systems.

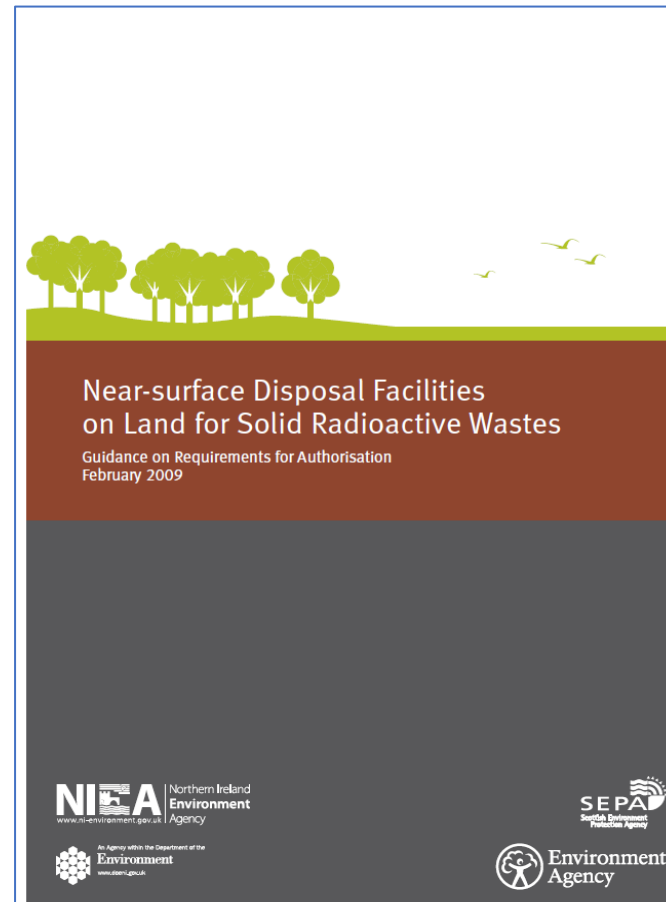
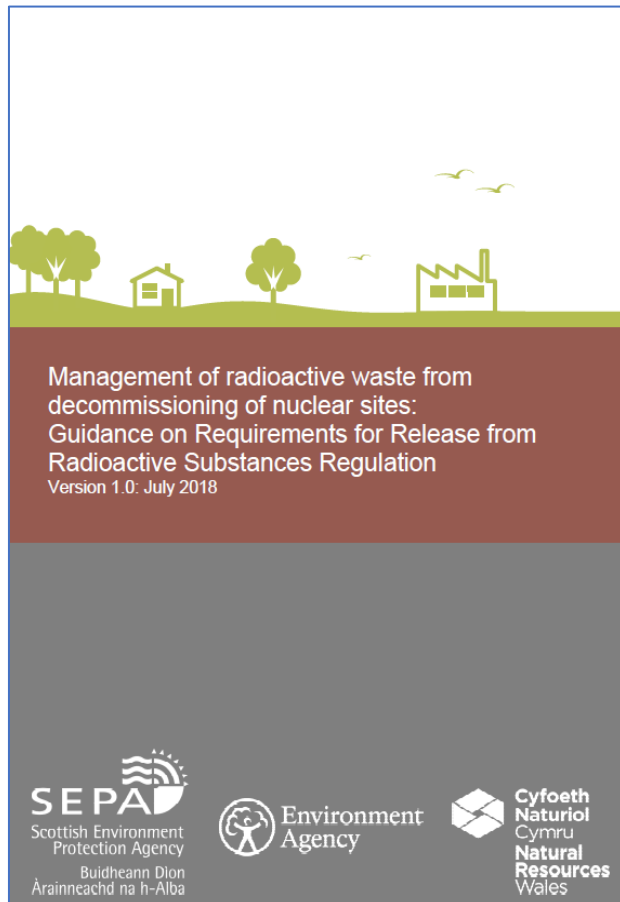
Floods can happen anywhere at anytime. Even if you should not be complacent, defences can't protect you from flooding.

2. Be aware - know when flooding is likely

- Floodline Warnings Direct: sign up to receive warnings by visiting our website. Once registered you can receive warnings by phone, text, email or fax. Remember to check your details.
- Our website: view www.gov.uk/data-flood to see if your local river or coastline and if you are at risk of flooding.
- Call Floodline: listen to recorded messages or speak to our staff for more general advice.
- Tune in: you may see or hear flood warnings on the radio.
- Using our live data: contact our live data warning service for a network of flood gauges.

Decommissioning and clean-up, and waste management

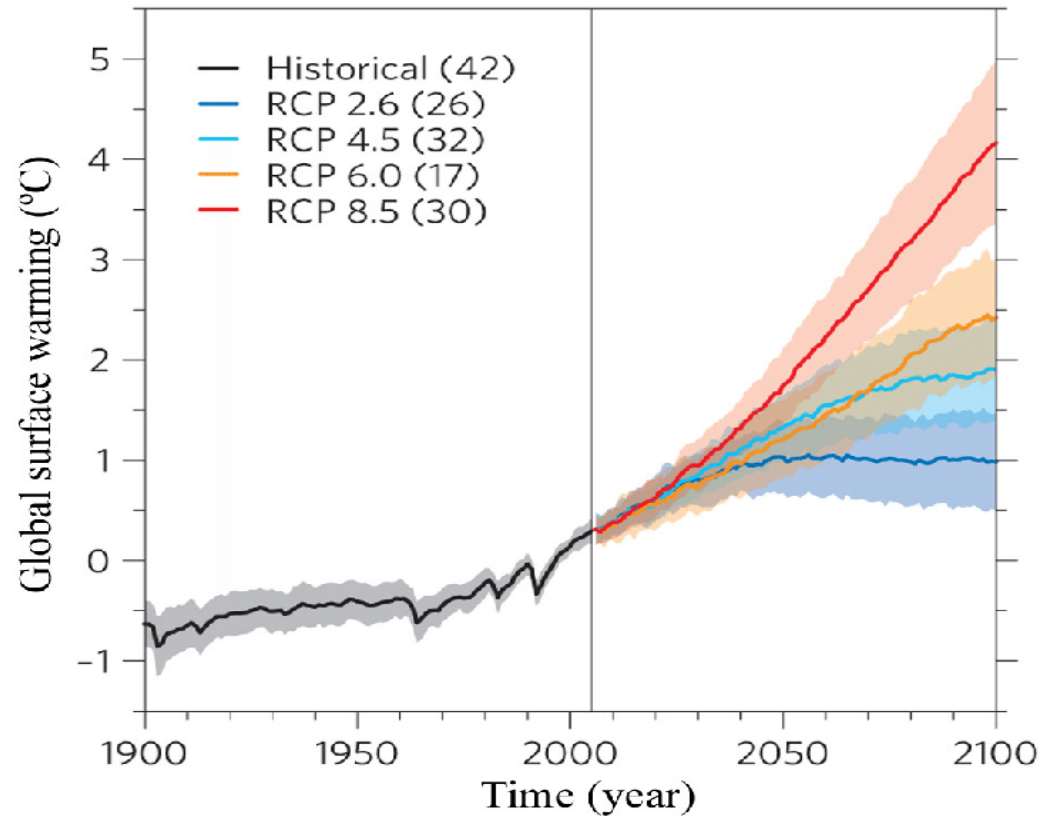
Guidance on Requirements for Release (GRR) and Guidance on Requirements for Authorisation (GRA)



*“Our thinking needs
to change faster
than the climate”*



What is the ambition under the EPR regime?



Predicted Warming for different Representative Concentration Pathways (RCPs)

By 2026 operators will

- ✓ Assess the risks associated with a 4°C rise by 2100
- ✓ Plan to manage the risks associated with a 2°C rise by 2050, (~RCP 8.5)
- ✓ Avoid Lock-in during transition to Net Zero
- ✓ Approx 12,000 permitted sites (EA regulated)
- ✓ Approx 400-500 permitted sites (LA regulated)