Laura Crawford

From: Save The Moat
Sent: 24 November 2025 12:26
To: Planning
Subject: LA01/2023/0008/F – Benbradagh – Application Must Be Deferred Under the Precautionary Principle
Attachments: Chapter18.pdf; Combined_Evidence_NoAddendum 2.pdf; 25.11.20 _la01.2023.0008.f%20addendum%202.pdf

LA01/2023/0008/F – Benbradagh – Application Must Be Deferred Under the Precautionary Principle

Dear Planning Officer,

I write in respect of the application

LA01/2023/0008/F – Benbradagh, now listed again for determination this Wednesday 26th November. Significant new material information has emerged that requires the application to be deferred as a matter of law and procedural fairness, including errors within Addendum 2, confirmed gaps in NIEA/DAERA evidence, and a newly established UK planning precedent on Cs-137 contamination.

1. Addendum 2 contains factual inaccuracies about NIEA's radiological monitoring

Addendum 2, states:

"NIEA carries out ongoing monitoring for land contamination from radioactivity, including residual effects from the 1986 Chernobyl accident."

This statement is demonstrably false.

In written correspondence received in August, September and October 2025, DAERA confirmed that:

• NIEA has carried out no upland soil or peat sampling in the Sperrins.

• No radiological baselines exist for the Benbradagh or wider Sperrin AONB uplands.

• NIEA has conducted no assessments of Cs-137, radon or NORM in peatlands.

• No inter-agency radiological assessments have been undertaken with UKHSA, PHA, HSENI or GSNI.

• The only radiological monitoring conducted in NI relates to food-chain surveys, not land or peat.

The Addendum's statement is therefore based on an incorrect assumption, not on data, evidence or regulator-verified monitoring.

A Habitats Regulations Assessment cannot lawfully rely on inaccurate factual premises.

2. The Environmental Statement failed to assess Cs-137, radon or radiological disturbance of peat

The Environmental Statement:

• contains no sampling;

• contains no laboratory analysis;

• contains no modelling of Cs-137 mobilisation;

• contains no radon assessment despite Benbradagh being in a WHO-classified high-risk radon region;

• contains no pathway analysis (air / dust / water / biota).

This renders the ES incomplete under the SPPS and the EIA Regulations.

Under established case law including People Over Wind (CJEU, 2018) and Sweetman, an HRA conclusion of "no adverse effect" cannot be lawfully reached when scientific doubt exists, or where no data have been gathered.

3. Wales has now suspended a wind farm over Cs-137 concerns – a new UK precedent

On 13 November 2025, Planning and Environment Decisions Wales (PEDW) suspended the Gaerwen Wind Farm application specifically because:

• objectors raised concerns about Cs-137 contamination in peat;

• the developer had not provided evidence addressing the issue;

• the ES lacked required radiological assessment.

PEDW has ordered the developer to provide evidence on Cs-137 implications before the application can progress.

This creates the first UK planning precedent that Cs-137 in peat is a material planning and environmental consideration requiring evidence, not assumption.

Northern Ireland cannot now justify relying on:

• no sampling,

• no baseline data,

• assumptions by the applicant, and

• incorrect statements about NIEA monitoring.

This would amount to a failure to keep pace with evolving UK environmental governance.

4. The Precautionary Principle must now be applied

Under the SPPS (paras. 1.8, 3.11), Article 191 TFEU (retained EU law), and established UK environmental jurisprudence, the Council is required to apply the Precautionary Principle where:

• data are incomplete,

• scientific uncertainty exists,

• regulator evidence is absent or contradicted,

• potential human health or environmental harm is plausible.

All of these conditions apply here.

To proceed to approval on the basis of no evidence would breach the Council's legal duties.

5. Radiological assessment must be carried out by independent regulators, not the developer

Developer-led sampling is not acceptable, not impartial, and not compliant with radiological regulatory practice.

It is well established in UK law and policy (IRR17, RSA93, Euratom 2013/59, BEIR VII, ICRP 103, WHO 2009) that:

Radiological assessment cannot be delegated to an applicant with a vested interest.

Independent or government-regulator sampling is required because:

• Developers have a financial interest in "finding no problem".

• Regulators have non-delegable duties for public health protection.

• Courts have repeatedly held that regulators must rely on evidence, not developer assertion.

The UK Supreme Court in Finch (2024) held that "absence of evidence cannot be used as evidence of absence".

The Gaerwen decision in Wales confirms this: regulator-verifiable evidence must come first; planning determination comes after.

Anything less would be unsafe, unsound, and open to judicial review.

6. Requested Action

Given the factual inaccuracies, absence of evidence, and new national precedent, I request that CC&G Planning:

1. Defer the application pending a regulator-verified radiological baseline.

2. Correct the error in Addendum 2 regarding NIEA "monitoring".

3. Re-consult NIEA with accurate factual context.

4. Require independent sampling and laboratory testing (not developer-led).

5. Reassess the HRA, as the current version is legally unsustainable.

To determine the application without this would represent a clear breach of the SPPS, the Habitats Regulations, and the Council's precautionary obligations.

Conclusion

In the interests of lawful decision-making, environmental protection, and public safety, the Council must now pause this application until independent evidence exists.

I trust the Planning Department will act in accordance with its legal duties.

Evidence Attached

Please find the following documents enclosed as part of this submission:

1. DAERA Internal Review – Ref: DAERA 25-339 (3 Oct 2025)

Official confirmation that NIEA/DAERA:

• carried out no upland soil or peat radiological testing,

• holds no Cs-137 or NORM baselines,

• relied entirely on developer-supplied reports.

2. DAERA Internal Review – Ref: DAERA 25-361 (22 Sept 2025)

Confirms:

• "No information held" on Cs-137, radon, or radiological pathways,

• no searches of key units (IPRI, Radiation & Waste, Water Management),

• reliance on policy assumptions, not evidence.

3. DAERA 25-361 – Evidence Bundle (11 Aug 2025)

Shows:

• DAERA/NIEA holds no Cs-137 datasets,

• no upland radiological monitoring,

• contaminated land data ≠ radiological assessment.

4. Email Chain – (Re: DAERA 25-339)

Demonstrates:

• repeated confirmation of zero regulator sampling,

• internal contradictions in NIEA's position,

• failure to meet regulatory obligations.

5. Technical Report – Cs-137 Behaviour in Peatlands (2025)

Summarises:

• how Cs-137 is stored in deep peat,

• how excavation, trenching and drainage can remobilise it,

• why independent regulator sampling is essential.

6. PEDW Suspension Notice – Gaerwen Wind Farm (13 Nov 2025)

Evidence that:

• Wales has suspended a wind farm due to Cs-137 contamination concerns,

• the Environmental Statement was incomplete,

• further information is required before determination.

Establishes the first UK-wide planning precedent on Cs-137.

Context for 24 April 2020 DAERA Planning Response Letter (Greencastle / Dalradian)

This document is included because it demonstrates a clear and persistent pattern in DAERA's regulatory handling of major upland developments. In 2020, DAERA and NIEA explicitly acknowledged that they:

- lacked sufficient baseline environmental information to assess impacts;
- required external expert review before forming a substantive scientific position;
- had only carried out desktop assessments for key environmental topics;
- could not determine whether a major upland project would adversely affect surface water, groundwater, or protected sites.

These admissions closely mirror the Department's correspondence in 2025, confirming:

- no upland radiological baselines exist in Northern Ireland;
- no soil/peat sampling for Cs-137, radon or NORM has ever been carried out;
- no inter-agency radiological assessments have been undertaken;
- developer-led data continues to be relied upon in place of independent regulatory assessment.

This 2020 letter therefore evidences a systemic, ongoing failure by regulators to gather the independent baseline data required for lawful environmental decision-making.

Its inclusion supports the argument that:

(1) the Precautionary Principle must be applied;

(2) independent regulator-verified sampling is now required;

(3) proceeding without such evidence would be procedurally unfair and potentially unlawful.

7. Tellus Survey – Chapter 18: Mapping the Terrestrial Gamma Radiation Dose

Demonstrates that:

• Tellus measured airborne gamma radiation only no soil or peat sampling was carried out;

• Deep peat blocks gamma rays, meaning Cs-137 stored in peat cannot be detected by airborne survey;

• Cs-137 distribution maps were generalised interpolations, not site-specific baselines;

• No regulator has established radiological baselines for the Sperrins/Benbradagh;

• The data relied upon in Addendum 2 cannot be used to claim NIEA has “ongoing monitoring of land contamination”.

This chapter directly contradicts Addendum 2 and reinforces the need for independent, regulator-led sampling before any lawful determination.

Kind regards,

Ann-Louise Bresnahan

On behalf of Save The Moat – Save The Sperrins

Gmail Save The Moat

Fwd: Subject: RE: Internal Review – DAERA 25-339 (radiological baselines, Tellus limits, Cs-137 in peat, radon risk, and EIR duties)

ann louise bresnahan Wed 15 Oct at 15:19
To: Save The Moat

Sent from my iPhone

Begin forwarded message:

Subject: Subject: RE: Internal Review – DAERA 25-339 (radiological baselines, Tellus limits, Cs-137 in peat, radon risk, and EIR duties)

Dear

Thank you for your reply and for sending the BGS/GSNI Tellus report (CR/07/061) and the GSI 2022 Cs-137 merge note. Having reviewed these, together with the enclosed technical material on Cs-137 behaviour in peatlands and NI radon guidance, I remain concerned that (i) the disclosure is incomplete for EIR purposes and (ii) the stated conclusion that the developer's radiological case is "fully adequate" is not evidenced on the file.

1) What Tellus can—and cannot—show for the Sperrins

Vertical & media limits: The BGS/GSNI report explains airborne gamma mainly senses the upper ≈30 cm and that peat/wet soils markedly attenuate counts; it explicitly shows Sperrins uplands are peat-covered, giving artificially low K, U, Th responses governed by cover and moisture as much as source terms. Each reading averages a broad footprint (~150 m × ~220 m at ~56 m altitude), smoothing local anomalies.

Regional fallout signal: The GSI 2022 merge evidence rainfall-banded Cs-137 deposition from Chernobyl/weapons testing; while airborne values correlate with ground sample regional in nature and cannot substitute for site-specific pre-disturbance upland baselines at a mine footprint.

Conclusion: Tellus is valuable regionally; it neither evidences “no risk” nor replaces local upland baselines for Curraghinalt.

2) Cs-137 in peatlands — consequences for upland works

Recent technical analysis collating peer-reviewed science and UK regulatory duties shows that disturbance of blanket peat (excavation, drainage, haul roads, trenching) can remobilise retained Cs-137 into dust, runoff and biota, with clear legal triggers for radiological assessment and control (IRR17; radioactive substances controls; EIA “Population & Human Health”). It sets out exposure pathways (air/water/food-web), typical inventories in near-surface peat, and the need for site-specific baselines before consent/authorisation.

3) Radon risk — baseline relevance

NI public guidance highlights radon’s dependence on geology/soils, indoor accumulation, and Building Regulations protections (2009/2015 atlas context). It directs technical radon queries to / 028 9056 9299.
Given a peat-covered upland setting near homes/schools, local radon baselines integrated with any mining-related ground disturbance/ventilation should be held—or obtained—by DAERA/IPRI.

4) “Adequate at the perceived level of risk” — please evidence this

If IPRI deemed the developer’s Radiological Impact Assessment(s) “fully adequate”, please disclose the actual basis. Under the EIR 2004 (NI), please provide:

The complete RIA pack(s) relied upon (version/date), sampling plans, coordinates, depth intervals, chain-of-custody, lab methods, QA/QC, detection limits, and raw tables.

Any pre-disturbance upland baselines for soil/peat/stream-sediment/surface & groundwater (NORM and Cs-137) used by IPRI/NIEA.

IPRI technical review notes, queries to the developer, responses, and sign-off memoranda.

Any NIEA/DAERA risk papers on NORM mobilisation (blasting/spoil/treatment sludge), legacy Cs-137 in upland peat and hydrological/dust pathways (including any screening out of Cs-137 and why).

Absent these materials, “fully adequate” is conclusory.

5) Duty to search / advise-and-assist (EIR)

Stating DAERA lacks authority/technical capacity to search other bodies' databases does not discharge EIR duties where (a) you rely on those datasets or (b) information is held for you. Please identify the precise datasets actually relied upon (title, custodian, version) and either obtain them or arrange referral/transfer without restarting the clock.

6) FOI branch remit vs completeness

These are EIR adequacy-of-search and disclosure points. Where records sit with specialist units (IPRI/Water/Planning), internal coordination is required so the EIR response is complete—not to deflect as "policy."

Information now requested (EIR 2004 (NI))

Please provide within the statutory timescale:

1. Upland radiological baselines (pre-disturbance, Sperrins/Curraghinalt): all datasets/reports for K/U/Th, NORM, Cs-137 in soil, peat, sediments, surface/ground waters (incl. any Tellus ground subsets used by IPRI).

2. RIA(s) and IPRI scrutiny: the full RIA pack(s) and all IPRI technical review records (emails, notes, queries, sign-offs) supporting the "fully adequate" conclusion.

3. Cs-137 scoping: any scoping/decision records where Cs-137 was considered (or excluded) for Curraghinalt baselines/assessments, including pathway analysis (dust/runoff/biota) and any reliance on Tellus airborne data as a surrogate.

4. Radon: any radon mapping/assessments/baselines held or relied on for the Curraghinalt area (post-2015 atlas context) and any liaison with PHA/Building Control.

5. Datasets relied upon but not held: list them (title/custodian/version) and confirm the referral/transfer you will initiate so I receive them without reapplying elsewhere.

6. Search record: business areas searched, keywords, and dates/times—so any "no information held" claim is testable at ICO.

7. If refusing any item: please cite the specific EIR regulation(s), provide the harm test and public-interest balance, and explain why redaction/partial disclosure could not reasonably be used.

For clarity

You note IPRI are not treating post-commencement wastewater monitoring as a substitute for upland baselines. I agree—and therefore ask you to disclose the upland baselines (or confirm, after reasonable recorded searches across IPRI/Water/NIEA Planning, that no such baselines were obtained).

If you intend to maintain "no further information held" or rely on any exception, please set that out now in a decision-quality response. Otherwise, staged disclosure of the RIA and IPRI review material would be welcome.

Can you please confirm receipt of email by return, thank you!

Signed

Sent from Outlook for Android

Subject: RE: Internal Review response DAERA 25-339 – Radiological Risks

Thank you for your letter of 4 October.

Regarding point 1 of your letter, sampling was carried out by the British Geological Survey and Geological Survey of Ireland in 2005 and 2012 respectively. That it was not NIEA that carried out the surveys does not mean that no evidence exists;

Regarding point 2 of your letter, the developer's data has been independently scrutinised by expert DAERA (IPRI) staff and, at the perceived level of risk and testing and reporting arrangements, is felt to be fully adequate;

Regarding point 3 of your letter, DAERA has neither the legal authority nor the technical capacity to search the databases of other organisations;

Regarding point 4 of your letter, it has now been made quite clear to you on several occasions that this Branch is responsible only for Freedom of Information related issues and does not review wider DAERA policies and procedures. Our function is to review the handling of requests under the Freedom of In formation Act 2000 and Environmental Information Regulations 2004 and consider whether that legislation has

been properly complied with. We do not have any wider remit and, again as you have been told several times, if you consider that there has been maladministration or any failure to carry out statutory duties then the option is open to you to make a Customer Service Complaint and, if necessary, escalate the matter to the NI Ombudsman;

Regarding point 5 of your letter, I have managed to obtain the survey data and attach copies to this e-mail;

You had asked for clarification of:-

"1. The full reference details of the BGS/GSI survey you rely on (date, parameters, locations).

2. The policy/legal basis for NIEA treating post-commencement wastewater monitoring as a substitute for pre-disturbance upland baseline surveys. "

Re 1:-

British Geological Survey report: A preliminary interpretation of Tellus airborne radiometric data – GSNI Commissioned Report CR/07/061

Geological Survey of Ireland: Caesium-137 airborne data: Processing and Merging for the Tellus Programme 2022 (copies attached).

Re 2:-

We are advised by IPRI that they are not treating post-commencement wastewater monitoring as a substitute for pre-disturbance upland baseline surveys. Radiological Impact Assessments were submitted as part of the planning application for the Dalradian Gold Mine (LA10/2017/1248/F) and these were assessed by NIEA as part of the planning consultation process. These impact assessments included monitoring of a range of samples for Naturally Occurring Radiological Material (NORM).

You have now received all the data held by DAERA on this matter and I regret to say that it will not be possible to devote more staff time to this particular topic. Other government bodies responsible for other aspects of this data have been identified to you in your two previous EIR requests and you may wish to obtain further information from them.

Your rights of appeal to both the Information Commissioner and the NI Ombudsman have both already been explained to you.

Kind Regards

From:
Sent: 04 October 2025 02:23
To:
DAERA Informationmanager
PACNI Info
NIPSO icocasework

Subject: Re: Internal Review response DAERA 25-339 – Radiological Risks

Thank you for your letter of 3 October 2025 regarding my Internal Review request (DAERA/25-339).

I must state at the outset that your response falls well short of the Department's obligations under the Environmental Information Regulations (EIR) 2004, and in substance represents little more than stonewalling.

1. Contradiction between "no evidence" and "no sampling"

You confirm NIEA has not conducted or commissioned upland soil/peat sampling at Dalradian or SPD/2025/0011/F, nor raised the need for regional upland radiological assessment with DAERA, HSENI or DoH. Yet you assert:

"There is no evidence of a radiological risk in soil/peat in any area of Northern Ireland."

With respect, that is internally contradictory and legally irrational. Absence of baseline sampling does

not equate to absence of risk. The Supreme Court in Finch v Surrey CC [2023] UKSC 50 expressly rejected "absence of evidence" as a lawful basis for regulatory complacency.

2. Reliance on developer-supplied data

You rely on Dalradian's 2017 RPS report and subsequent applicant-commissioned assessments. These are not independent. NIEA's role as regulator is non-delegable; reliance on the developer's consultants is not equivalent to a precautionary assessment under Regulation 5 EIR or Directive 2013/59/Euratom.

3. Failure to search other agencies' datasets (Reg. 5, Reg. 9 EIR)

You admit DAERA did not search datasets held by HSENI, PHA, FSA or local councils. This is a clear failure to discharge the Reg. 5 duties to make "all reasonable enquiries" and the Reg. 9 duties to advise/assist. Simply saying "you would need to make EIR requests to those bodies" is not an acceptable substitute.

4. Improper narrowing of remit

You state that matters of Aarhus, EIA or Euratom obligations "lie outwith my remit." That is legally flawed. The EIR 2004 expressly transpose Aarhus duties into UK law. Dismissing them as irrelevant to an internal review is maladministration.

5. Outdated and unsubstantiated evidence

You cite a BGS/GSI survey "some years ago" suggesting ~200 Bq/kg Cs-137, but provide no date, location, methodology, or whether the data relate to the Sperrins uplands. Please identify the year, scope, datasets and authors of this survey. If none exist, please confirm explicitly.

Next steps

Your letter confirms DAERA has:

Conducted no upland soil/peat radiological baseline sampling.

Undertaken no inter-agency coordination on upland radiological risks.

Relied exclusively on applicant-commissioned data; and

Asserted "no evidence of risk" while acknowledging no baseline evidence exists.

I consider this a breach of the EIR 2004 (Regs. 5 & 9), Aarhus Convention (Articles 6 & 9), and precautionary principal duties. I will therefore be escalating this matter to the Information Commissioner's Office and, if necessary, to the Northern Ireland Public Services Ombudsman.

For the record, please confirm within 10 working days:

1. The full reference details of the BGS/GSI survey you rely on (date, parameters, locations).

2. The policy/legal basis for NIEA treating post-commencement wastewater monitoring as a substitute for pre-disturbance upland baseline surveys.

Failure to provide clarity will be noted in my escalation. Can you please confirm receipt of email by return , thank you!

Signed

Sent from Outlook for Android

From
Sent: Friday, October 3, 2025 3:07:51 PM
To:
Cc:
Subject:

Please find attached a response to your Internal Review request from

Kind Regards

Tel

GSI_TELLUS_Cs137_MERGE_2022_Final (2).pdf, NI Tellus report (2).pdf

Technical Report

August 2025

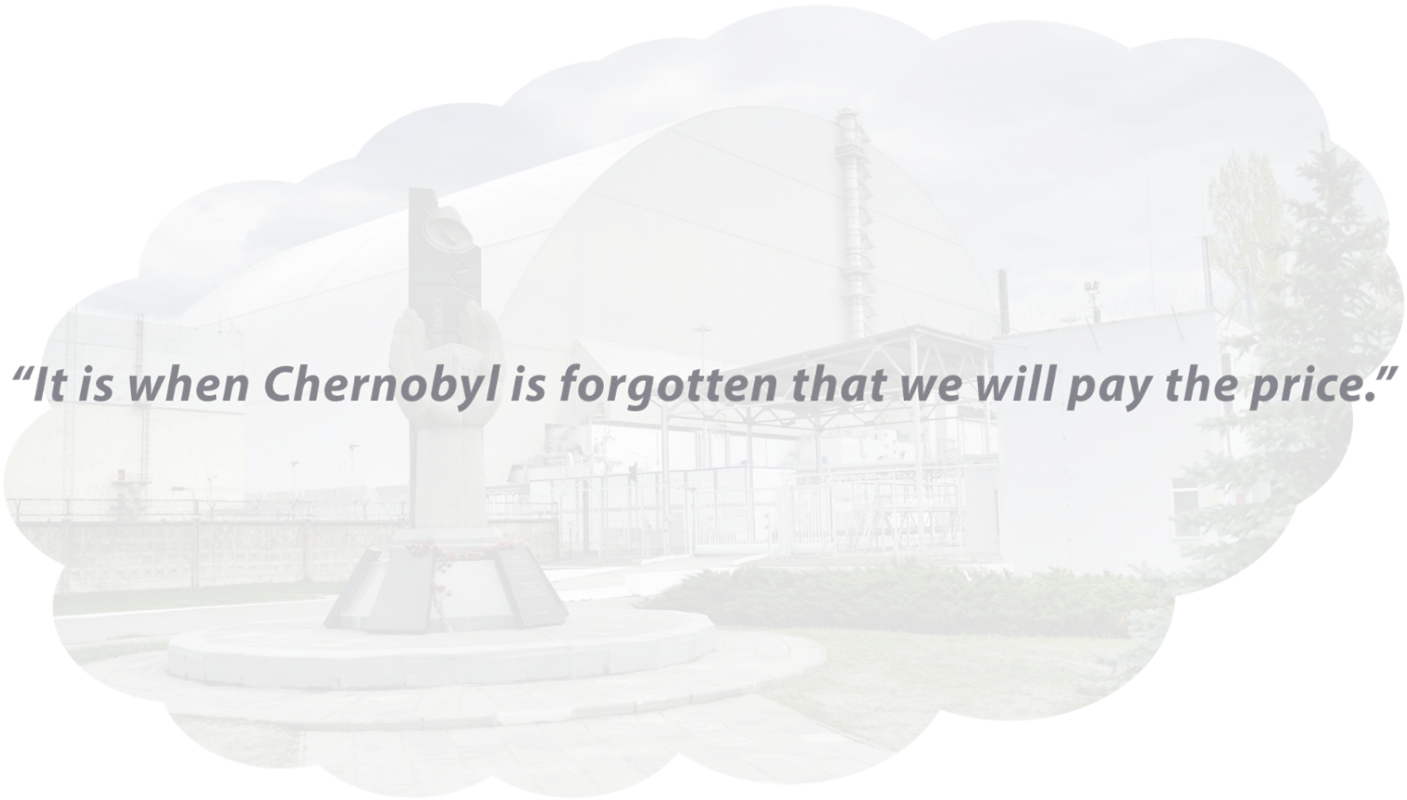
Edition 2

Radiological Risks Associated with Caesium-137 in Peatland Excavation and Linear Infrastructure Construction in the Scottish Highlands and Islands

Amended August 2025 – Includes Rebuttal to SEPA's 2025 "Radioactivity and Wind Farm Developments on Peatlands - July 2025"

Commissioned By:
Communities B4 Power Companies

Visit:
www.communitiesb4powercompanies.co.uk


“It is when Chernobyl is forgotten that we will pay the price.”

Technical Report: Radiological Risks Associated with Caesium-137 in Peatland Excavation and Linear Infrastructure Construction in the Scottish Highlands and Islands

Written by:

Mathew L.J Rennie

Commissioned by:

Communities B4 Power Companies

www.communitiesb4powercompanies.co.uk

First Edition (Pre Release Draft) 1: JUNE 2025

Edition 2: Date: AUGUST 2025

Update to Calculations and Amendments to RSA93 Being Replaced by EASR 2018, Added rebuttal to SEPA's 2025 *"Radioactivity and Wind Farm Developments on Peatlands"*

Author Statement:

This technical report and rebuttal have been prepared on behalf of Communities B4 Power Companies by Mathew L.J. Rennie, a regulatory analyst and data governance specialist with over twenty years of professional experience in compliance, data protection, and risk assessment, now retired due to ill health. I am not a scientist by qualification, and this document is not presented as a scientific research paper. It does not claim to introduce new experimental data or novel scientific theories.

The purpose of this work is to show, using established peer-reviewed scientific evidence and binding environmental law, why radiological risk assessments must be included in the consenting process for large-scale energy infrastructure developments under Sections 36 and 37 of the Electricity Act 1989 where these projects involve disturbing Scottish peatlands contaminated with radioactive Caesium-137 (Cs-137) from the 1986 Chernobyl disaster.

This August 2025 edition also responds in detail to the Scottish Environment Protection Agency's July 2025 publication *"Radioactivity and Wind Farm Developments on Peatlands"*. It highlights serious factual inaccuracies, misinterpretations of legislation, and regulatory gaps within SEPA's position.

In preparing this rebuttal I have drawn on the views and published work of respected independent radiation protection specialists. Their assessments add weight to the central point that the risks from Cs-137 being released into the environment cannot simply be dismissed without proper regulatory scrutiny.

The report makes clear that the requirement for radiological assessment is not a matter of choice. It is a legal duty under UK and Scottish law, including:

- Environmental Authorisations (Scotland) Regulations 2018, Regulation 8(1): *"A person must not carry on a radioactive substances activity except in accordance with an authorisation granted under these Regulations."*
- Justification of Practices Involving Ionising Radiation Regulations 2004
- International obligations under the Basic Safety Standards Directive 2013/59/Euratom and the IAEA Safety Standards

These laws mean that where radioactive material such as Cs-137 may be disturbed, and there is any credible way for it to reach people or the environment, a full and formal radiological risk assessment must be carried out before consent or authorisation can be granted. There is no allowance in law for leaving out an assessment on the basis of assuming the risk is low.

The ongoing exclusion of Cs-137 from Environmental Impact Assessment documentation and related EASR determinations has no legal foundation and amounts to a failure to meet both statutory and international duties. This report is provided to make sure the public, the media, regulators and decision-makers are fully aware of the clear legal requirements, the strong evidence behind them, and the risks to law, the environment and public health if they are ignored.

I would like to thank everyone who took the time to contribute to my research and to support me in producing this report. Your help has been invaluable in making sure this work is as accurate and thorough as possible.

TABLE OF CONTENTS:

Chapter 1: Introduction – The Radiological Legacy of Chernobyl in Scotland

1.1 Purpose and Scope of This Report

This report examines the long-overlooked yet scientifically substantiated risk of remobilising caesium-137 (Cs-137) through the widespread disturbance of peatlands during the construction of energy infrastructure across the Scottish Highlands and Islands. This region experienced some of the highest levels of radioactive fallout in the UK following the 1986 Chernobyl disaster, particularly in upland areas where rainfall intensified atmospheric deposition.

It is equally important to recognise that several of Scotland's Island regions (including Skye, Orkney, Shetland, and the Hebrides) were also subjected to significant Cs-137 contamination. These landscapes, many of which still contain deep, undisturbed blanket peat, are now and have previously been targeted for large-scale development with no corresponding radiological assessment or regulatory oversight… despite the well-documented persistence and mobility of Cs-137 in organic soils.

Planned and ongoing developments include, but are not limited to:

- Overhead high-voltage transmission corridors (pylons and towers),
- Substations and switchyards,
- Cable trenching and underground routing,
- Access roads and hardstandings,
- And critically, an expanding number of wind farms, both approved and under construction, many of which are situated on deep, undisturbed blanket peat.

These projects frequently involve:

- Bulk peat excavation,
- Road regrading and track construction,
- Foundation works involving blasting or deep cuts,
- Drainage alterations,
- And extensive trenching for buried cables and grid connections.

Despite the scale and ecological sensitivity of these works ***(and their overlap with mapped Cs-137 fallout zones),*** not a single Environmental Impact Assessment (EIA) reviewed in this report has properly scoped in radiological risk, nor commissioned site-specific Cs-137 testing, baseline radiological surveys, or contamination pathway modelling.

This report:

- Presents a scientific overview of Cs-137 retention and mobilization in upland peat,
- Identifies areas where planned energy infrastructure and wind farms intersect known radiocaesium hotspots,
- Models potential disturbance-related recontamination scenarios,
- Reviews legal responsibilities under UK legislation and international radiological standards,

And demonstrates that this failure to account for radiocaesium risks:

- Violates statutory environmental obligations,
- Endangers public and occupational health, and
- Exposes developers and regulators to potential liability under environmental and radiation protection law.

1.2 Chernobyl and Its Fallout over the UK

On April 26, 1986, Reactor 4 at the Chernobyl Nuclear Power Plant in the then-USSR underwent a catastrophic failure and explosion, releasing vast quantities of radionuclides into the atmosphere.

Among them, Cs-137 is one of the most environmentally persistent and biologically significant:

- **Half-life:** 30.17 years
- **Gamma emitter:** Highly penetrating, with environmental and internal exposure risks
- **Soil retention:** Binds strongly to organic matter, particularly in peaty, acidic conditions

As of 2025, the Highlands and Islands retain approximately **40% of the original fallout** load from 1986.

The radioactive plume reached the UK on 2 May 1986. Due to:

- Prevailing easterly winds,
- Orographic uplift over Highland mountains,
- Localised precipitation during plume transit,

the **Scottish Highlands and Islands** received some of the **highest Cs-137 deposition levels** in the UK.

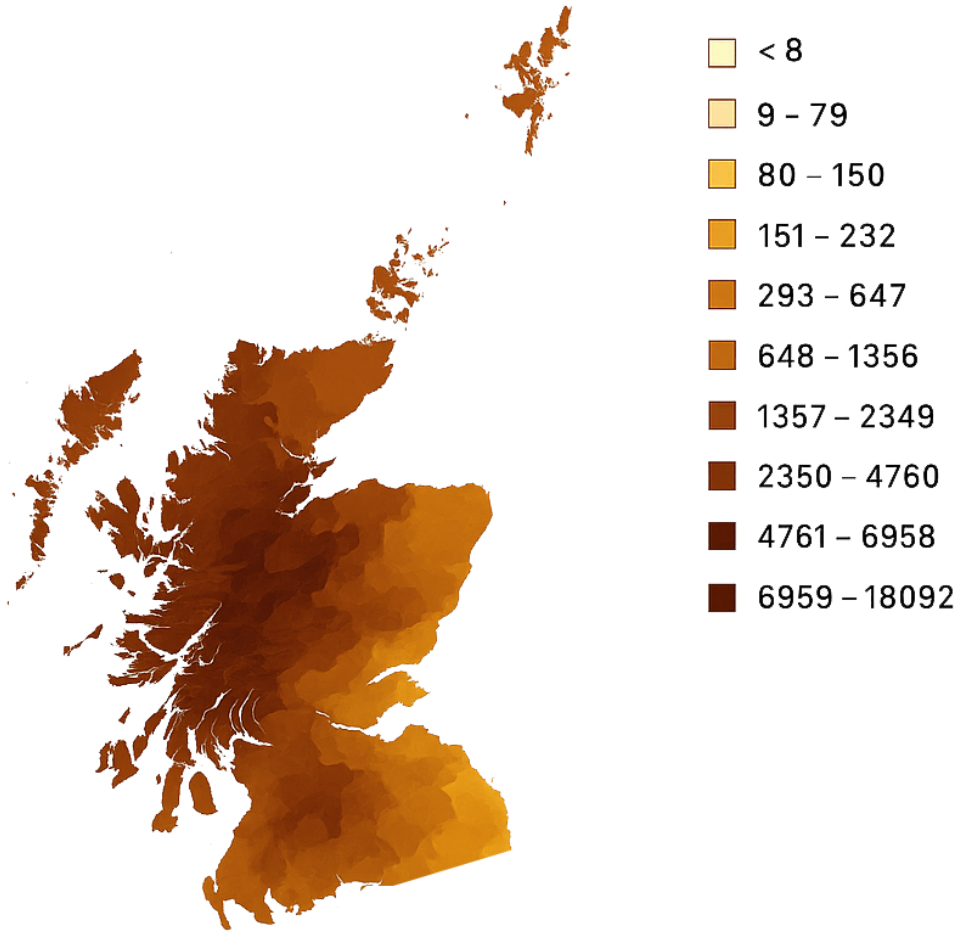


Fig: 1.1 Spatial visualisation of Chernobyl fallout over Scotland in May 1986 (137Cs activity 142 concentrations (Bq kg 1 Dry Matter ,DM). Extracted from Full United Kingdom Map. Copyright ©NERC (CEH) 2014.

1.3 Why the Highlands and Islands Are a Radiocaesium Risk Zone

The Highlands and Islands combine several environmental factors that make Cs-137 fallout uniquely dangerous and long-lasting:

- High rainfall during May 1986 caused *"rainout"* of radioactive aerosols
- Cold, acidic, wet peatland soils retain Cs-137 at the surface
- Minimal land disturbance has preserved the isotope in the top 30 cm of peat
- Extensive livestock grazing, game, and foraging provide direct exposure pathways

SEPA and DEFRA data from the late 1980s to 2000s showed that:

- Some Highland farms remained under sheep movement restrictions until 2010
- Soils and vegetation in upland regions continued to return Cs-137 concentrations >**1,000 Bq/kg** in critical food pathways

1.4 Infrastructure Projects in Radiologically Sensitive Zones

Scotland is undergoing an unprecedented expansion of electricity transmission infrastructure, particularly across the Highlands and Islands, areas that received some of the highest deposition of radioactive Cs-137 fallout following the 1986 Chernobyl disaster. These transmission upgrades involve not only long-distance overhead and underground lines, but also the construction and expansion of numerous substations, converter stations, and grid hubs across terrain dominated by deep peat, upland catchments, and known radiological deposition zones.

Three main SSEN project corridors intersect directly with Cs-137 fallout zones and areas of ecologically sensitive, hydrologically active peatland:

Project Corridor	Estimated Length	Overlap with Cs-137 Fallout	Construction Features
1) Western Isles to Beauly	~85 km	5,000 – 10,000 Bq/m²	Overhead and underground HVDC cable, trenching, HDD, peat excavation
2) Beauly to Peterhead	~120 km	3,000 – 7,000 Bq/m²	400 kV overhead and underground cabling, trenching, forestry access routes
3) Beauly to Spittal	~160 km	6,000 – 12,000 Bq/m²	400 kV overhead lines, access tracks, peatland corridor
4) Skye to Fort Augustus	~137 km	4,000 – 9,000 Bq/m²	Replacement of existing 132 kV overhead line with new double-circuit steel structures; includes 14 km undergrounding near Cuillin Hills and 7 km near Fort Augustus substation; extensive peatland excavation and access road improvements

These corridors involve extensive peat excavation, tower foundations, road and crane pad installation, and deep trenching, all within mapped radiocaesium retention zones.

Total Estimated Cs-137 Disturbance from Substation Infrastructure

In addition to the linear transmission corridors, SSEN's wider reinforcement programme includes at least eight major substations and converter station platforms. Each typically requires between 2 and 5 hectares of cleared and levelled peatland, together with associated access infrastructure and earthworks. These calculations incorporate both new construction and upgrade works across all identified corridors. **Based on the conservative parameters set out in Chapter 5:**

- *Average peat volume disturbed per substation site:* 5,000 m^3
- *Average bulk density:* 120 kg/m^3
- *Total peat mass (8 sites × 5,000 m^3):* 40,000 m^3 × 120 kg/m^3 = **4,800,000 kg**
- *Average Cs-137 concentration:* 1,200 Bq/kg (adjusted to 2025)
- *Estimated Cs-137 inventory disturbed:*

  4,800,000 kg × 1,200 Bq/kg = **5.76×10^9 Bq = 5.76 GBq**

Substation infrastructure alone may disturb nearly 6 GBq of Cs-137, the equivalent of multiple years of livestock control thresholds post-Chernobyl.

This substation-associated radiocaesium burden is in addition to the approximately 52.6 GBq modelled for the cable and pylon corridor developments (see Chapter 5.5). However, none of the SSEN EIAs reviewed for substation projects to date include baseline soil radionuclide data, environmental pathway analysis, or workforce exposure assessments—representing a breach of both scientific due diligence and legal environmental protection obligations.

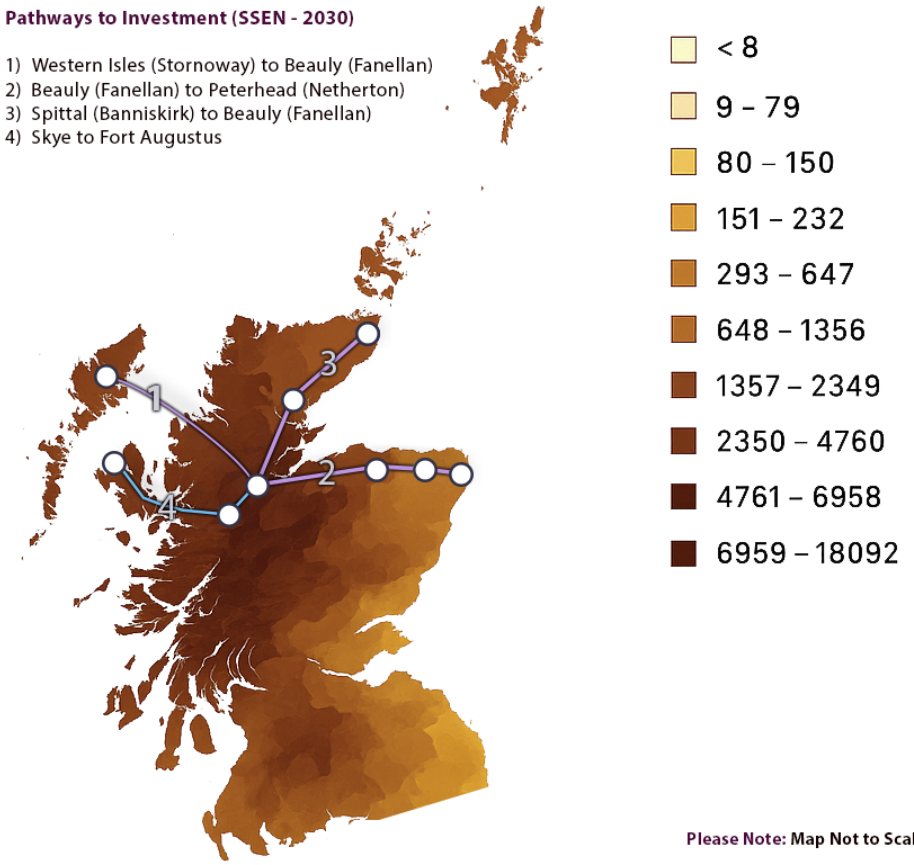


Fig: 1.2 Spatial visualisation of Chernobyl fallout over Great Britain in May 1986 (137 Cs activity (Bqkg 1 Dry Matter ,DM). Copyright © NERC(CEH)2014. Overlayed with Pathways to Investment (SSEN -2030 Mapping Data).

1.5 Radiocaesium Is NOT Being Considered in Impact Assessments

Shockingly, across all current EIA documentation for the above projects including wind farm, solar parks and battery storage parks, **no site-specific soil radiochemistry analysis for Cs-137** has been conducted or published.

Instead, EIAs:

- Rely on outdated or generalised *"clean"* baseline assumptions,
- Ignore historical fallout patterns,
- Fail to include radiological pathway analysis (e.g. inhalation, ingestion, or waterborne transfer),
- Contain no requirement for pre-construction radiological surveys,
- Fail to include control measures for workers dealing with peat containing Cs-137.

This constitutes:

- A failure of regulatory oversight by SEPA and Highland Council,
- A dereliction of developer due diligence,
- A potential breach of both UK and international radiological protection duties,
- A failure under Health and Safety regulations including the Ionising Radiations Regulations 2017 (IRR17).

1.6 Caesium-137: A Public Health Concern in Modern Infrastructure Projects

Environmental Persistence

Caesium-137 is biologically active and radiologically hazardous. Despite being nearly four decades since the Chernobyl accident, **Cs-137 remains a critical contaminant because:**

- Its half-life (30.17 years) means only **~60%** has decayed as of 2025.
- It accumulates in soil and becomes bioavailable to plants and animals.
- It mimics potassium, allowing uptake into living tissues, particularly muscle and organs.
- Once in the food chain, it can be transferred to humans via meat, milk, mushrooms, berries, and water.

Health Effects

The UK Health Security Agency (UKHSA), WHO, and IAEA recognise that chronic exposure to Cs-137 **"even at low doses"** can lead to:

- Increased **cancer risk** (particularly thyroid, liver, and leukaemia),
- Disruption of the **immune system,**
- **Genetic and reproductive effects** with long-term exposure in contaminated areas.

Exposure Thresholds (UK & International Standards)

Regulatory Threshold	Cs-137 Value	Context
Food contamination intervention level	1,000 Bq/kg	Meat, milk, wild food (UK, post-Chernobyl)
Workplace inhalation threshold (IRR17)	No fixed Bq/m^3	Sustained exposure level requiring control
Public dose limit (UK annual)	1 mSv/year	General public exposure limit
Occupational dose limit (UK annual)	20 mSv/year	Maximum legal for exposed workers

These thresholds are easily exceeded if Cs-137-laden peat is:

- Disturbed and aerosolised (dust generation),
- Washed into watercourses during rainfall events,
- Absorbed by vegetation and ingested by livestock or humans.

1.7 Radiological Responsibility Under Environmental and Planning Law

Despite the radiological risks, **no Highland or Islands infrastructure developer** has fulfilled even the most basic obligations to assess or mitigate the threat of Cs-137 mobilisation.

Legal Obligations Being Ignored The following statutory frameworks apply to any activity with a plausible risk of radioactive material disturbance in the UK:

1. **Environmental Protection Act 1990 (Part IIA)**
   Requires local authorities and SEPA to **identify, assess and remediate contaminated land**, including radioactive contamination. Failing to assess Cs-137 risks violates this duty.
2. **Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)**
   Current Scottish framework for radioactive substances activities, including the keeping or use of radioactive material and the accumulation or disposal of radioactive waste. Disturbance of Cs-137 contaminated peat can constitute such an activity, engaging Regulation 8 and Schedule 8. Authorisation is required under EASR 2018.
3. **Ionising Radiations Regulations 2017 (IRR17)**
   Applies to **workplaces** involving exposure to radiation. Developers must:
   - Conduct risk assessments,
   - Monitor potential exposure,
   - Provide **Personal Protective Equipment (PPE)** where required.
4. **The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017**
   EIAs must include risk of accidents and major adverse effects on human health or the environment, including radiological risks where relevant.
5. **The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009**
   Applies if radiologically contaminated peat or soil is removed offsite, triggering legal requirements for transport and disposal.

Note: Although the UK has left the European Union, it remains aligned with the **Euratom Basic Safety Standards Directive (2013/59/Euratom)** in spirit and practice, which enshrines the **ALARA principle** (As Low As Reasonably Achievable) for radiological protection.

1.8 The Precautionary Principle and Environmental Justice

The Precautionary Principle (embedded in UK environmental policy) states that where a credible threat to health or the environment exists, action must be taken to prevent harm, even if full scientific certainty is lacking.

Given:

- The documented presence of Cs-137,
- The planned peatland disturbances,
- The known exposure pathways,
- And the absence of radiological assessment in planning documents,

…there is no legal, ethical, or scientific justification for **failing to fully scope Cs-137 risks into infrastructure EIAs.**

This is a **breach of environmental justice**, placing rural Highland and Island communities, livestock, ecosystems, and water sources **at disproportionate and unacknowledged radiological risk**.

1.9 Summary

- The Scottish Highlands and Islands received some of the highest Cs-137 fallout in the UK from the 1986 Chernobyl accident.
- This radioactive legacy remains locked in upland peat but is threatened by infrastructure development.
- Transmission corridors and substations cross through known contamination zones.
- There is a complete absence of site-specific radiological assessment in planning documentation.
- UK and international regulations require pre-emptive action, not post hoc remediation.
- Failure to act is a violation of both legal duty and public trust.

This report proceeds to identify **specific infrastructure routes and development zones where Cs-137 contamination remains a credible and unaddressed hazard**. The following chapters present evidence-based assessments of radiocaesium deposition, disturbance pathways, and regulatory failures, **with the aim of ensuring that radiological risk is fully recognised, quantified, and mitigated in line with public safety obligations and environmental protection law**.

Chapter 2: Caesium-137 in Upland Peat – Deposition, Retention, and Environmental Behaviour

2.1 Introduction: Why Upland Peat Is a Radiological Archive

Upland peatlands in the Scottish Highlands and Islands are among the most **effective long-term repositories for radioactive fallout** due to their unique soil chemistry and climatic conditions. Following the Chernobyl disaster in 1986, much of the Cs-137 released into the UK environment was deposited and sequestered within these peaty ecosystems.

Their capacity to retain Radiocaesium arises from:

- High **organic matter content** (especially humic and fulvic acids),
- **Anaerobic**, water-saturated conditions that prevent vertical leaching,
- Cold temperatures, which slow **biological turnover and migration**,
- Minimal anthropogenic disturbance, preserving the surface isotopic inventory.

As such, these landscapes act not only as **carbon sinks**, but as **radiological sinks**, silently storing a portion of Europe's nuclear legacy in near-surface layers.

2.2 The Mechanics of Cs-137 Fallout in 1986

When Reactor 4 exploded, it released more than **85 PBq** (petabecquerels) of Cs-137 into the atmosphere. This isotope travelled across Europe, including the UK, via the jet stream, **where it was deposited via**:

- Dry deposition (settling of aerosols),
- Wet deposition (rainout and washout during thunderstorms and frontal rainfall events).

In the UK, rainfall during the first week of May 1986 determined the intensity and spatial distribution of contamination. Key UK fallout features (from DEFRA, NRPB & MAFF data):

- Some areas in Cumbria and the Highlands and Islands exceeded **10,000–20,000 Bq/m²,**
- Lower-lying eastern areas received **<1,000 Bq/m²,**
- The Western Highlands and Islands and Caithness show some of the highest residual fallout levels on record.

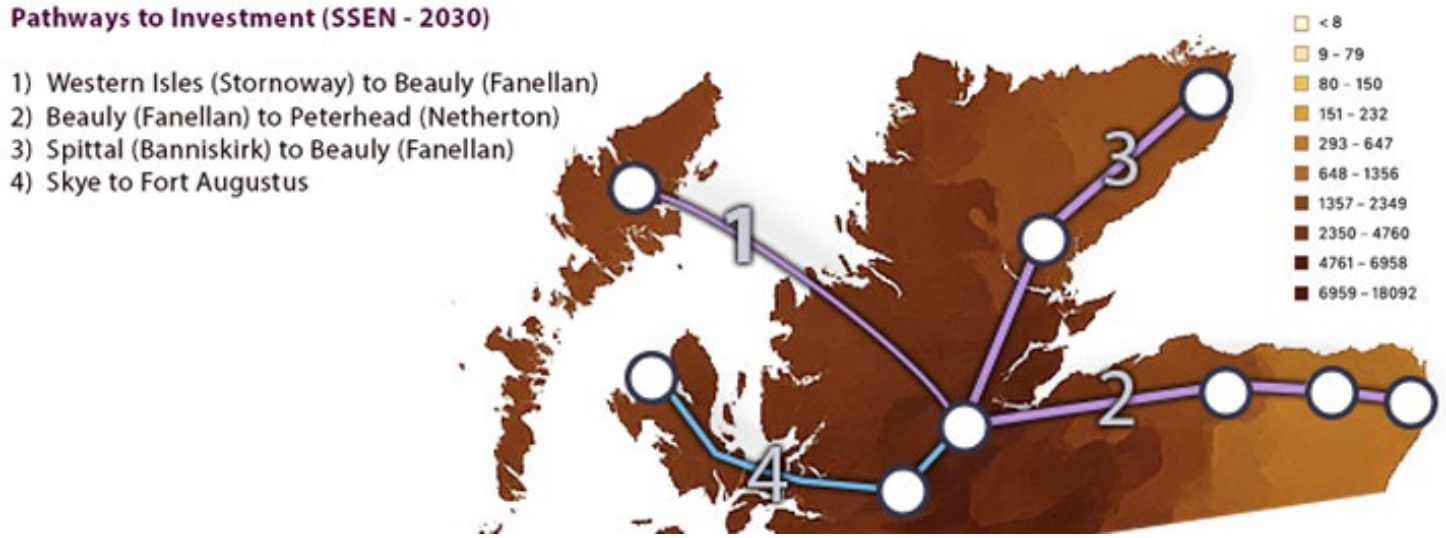


Fig: 2.1 Close-up Spatial visualisation of Chernobyl fallout over Great Britain in May 1986 (137 Cs activity (Bqkg 1 Dry Matter ,DM). Copyright © NERC(CEH)2014. Overlayed with Pathways to Investment (SSEN -2030 Mapping Data).

2.3 Long-Term Retention in Highland and Island Soils

In the decades since 1986, Radiocaesium in the Highlands and Islands has persisted due to the stabilising properties of local soils. **Key factors include:**

a) Strong Adsorption to Organic Matter

Cs-137 is a cation (positively charged) that binds effectively to:

- Humic and fulvic acids in peat,
- Organic colloids,
- Negatively charged clay surfaces (e.g., illite, kaolinite).

Once adsorbed, it becomes fixed, often for decades, unless conditions change (e.g., oxidation, erosion, or pH shifts).

b) Anaerobic, Waterlogged Conditions

Water-saturated upland peatlands are:

- Chemically reducing, which inhibits Cs-137 mobility,
- Low in dissolved oxygen, limiting microbial activity and decay of organic complexes,
- Resistant to vertical leaching due to capillary pressure and dense organic mats.

Thus, most Cs-137 remains within the top 20–40 cm of the peat profile, particularly where human disturbance has been minimal.

2.4 Measured Soil Cs-137 Concentrations in Highlands and Islands

Published surveys and peer-reviewed data consistently show elevated Cs-137 in surface peat across Highlands and Islands.

Representative Cs-137 concentrations in Highland peatlands (2020–2024 estimates):

Depth Layer	Estimated Cs-137 Range	Units	Source
Top 10 cm	1,000 – 3,500	Bq/kg	Kruse et al., 1995; Beresford & Barnett, 2007
Top 30 cm	500 – 2,500	Bq/kg	IAEA TECDOC-1728; SEPA regional reports
Surface inventory	5,000 – 20,000	Bq/m²	DEFRA, CEH interpolated raster datasets

These figures depend on site elevation, precipitation history, peat accumulation rates, and vegetation cover. Areas with blanket bog and dwarf shrub heath typically retain higher Cs-137 due to enhanced organic content and interception during fallout.

2.5 Key Environmental Conditions Affecting Cs-137 Stability

Factor	Effect on Cs-137
Soil organic content	High adsorption and strong retention in peat-rich areas
Rainfall and waterlogging	Slows vertical migration; preserves surface-level contamination
Vegetation type	Heather, bilberry, mosses intercept fallout and facilitate topsoil fixation
Land disturbance	Excavation, ploughing, or drainage can rapidly remobilise previously bound Cs-137

These conditions create what might be described as a false stability. The contamination remains hidden and immobile, until disturbed.

2.6 Radiocaesium Mobilisation Mechanisms in Peatland Construction Zones

While undisturbed peatlands serve as long-term sinks for Cs-137, acting as natural containment systems due to their water saturation and stable organic structure, infrastructure development fundamentally disrupts these conditions. Whether for transmission lines, substations, or wind farms, these projects often involve groundworks that trigger the release and reactivation of radiocaesium.

Across the Highlands and Islands, many of the areas chosen for new energy infrastructure (including large-scale wind farms) coincide with Cs-137 fallout hotspots from the 1986 Chernobyl disaster. The processes involved in construction disturb not only the land surface but the very layers where the highest concentrations of Cs-137 remain sequestered.

This section outlines the primary physical and chemical mechanisms by which radiocaesium is remobilised during typical upland construction activities:

a) Peat Excavation and Soil Disruption

The development of pylons, turbine bases, underground cable routes, and substation platforms requires the excavation of **tens of thousands of cubic metres of peat and overlying soil layers**. These are often the very layers where fallout was originally deposited and has remained relatively immobile.

Key consequences of these disturbances include:

- Breakdown of organic structures that chemically bind Cs-137 in the peat matrix,
- Oxygenation of previously anoxic layers, initiating microbial activity and chemical oxidation that mobilise radionuclides,
- Generation of wind-blown particulates, which can carry Cs-137 into the atmosphere,
- Redistribution of contaminated soil into runoff-prone zones, increasing the risk of waterborne transport.

Once peat is exposed and begins to dry, its physical cohesion deteriorates. Radiocaesium can then:

- Leach into acidic surface waters, especially under low pH conditions typical of upland bogs,
- Be transported by wind as airborne dust,
- Enter vegetative rooting zones, enabling uptake by plants, fungi, and lichens that form the base of local food webs.

b) Drainage Installation and Water Table Lowering

Linear infrastructure and turbine arrays almost always require extensive drainage, including:

- Cut-off drains, ditch creation, and subsurface water diversions,
- Alteration of natural hydrology through reprofiling of peat hags or slope regrading,
- Lowering of the local water table, sometimes by over 1 metre.

These actions result in:

- Aeration of deep peat layers, accelerating decomposition and freeing bound Cs-137,
- Mobilisation of dissolved radionuclides into hydrological pathways,
- Erosion and sediment transport of Cs-137 attached to fine particulate matter (such as clay-bound colloids).

This hydrological disruption can trigger plumes of radiocaesium to move downslope or downstream into:

- Burns, lochs, and wetlands,
- Grazing lands used by sheep and deer,
- And potentially into drinking water supplies or areas of ecological sensitivity.

c) Machinery Compaction and Radiocaesium-Laden Dust

Large construction machinery (excavators, tracked cranes, concrete lorries) is routinely used during energy infrastructure development. These machines cause:

- Severe compaction of peat, reducing its ability to retain water and slowing regrowth of vegetation,
- Disturbance of dry surface layers, particularly in late spring and summer,
- Generation of fine dust, often during prolonged dry spells.

Dust is one of the most critical but underestimated vectors for radiocaesium reactivation:

- Cs-137 strongly adheres to particles smaller than 63 microns, i.e. PM10 and PM2.5,
- These particles are easily suspended in air and inhalable by humans and animals,
- Wind and equipment can carry Cs-137-laden dust hundreds of metres off-site, exposing workers, nearby residents, and grazing livestock to unnecessary and unmonitored risk.

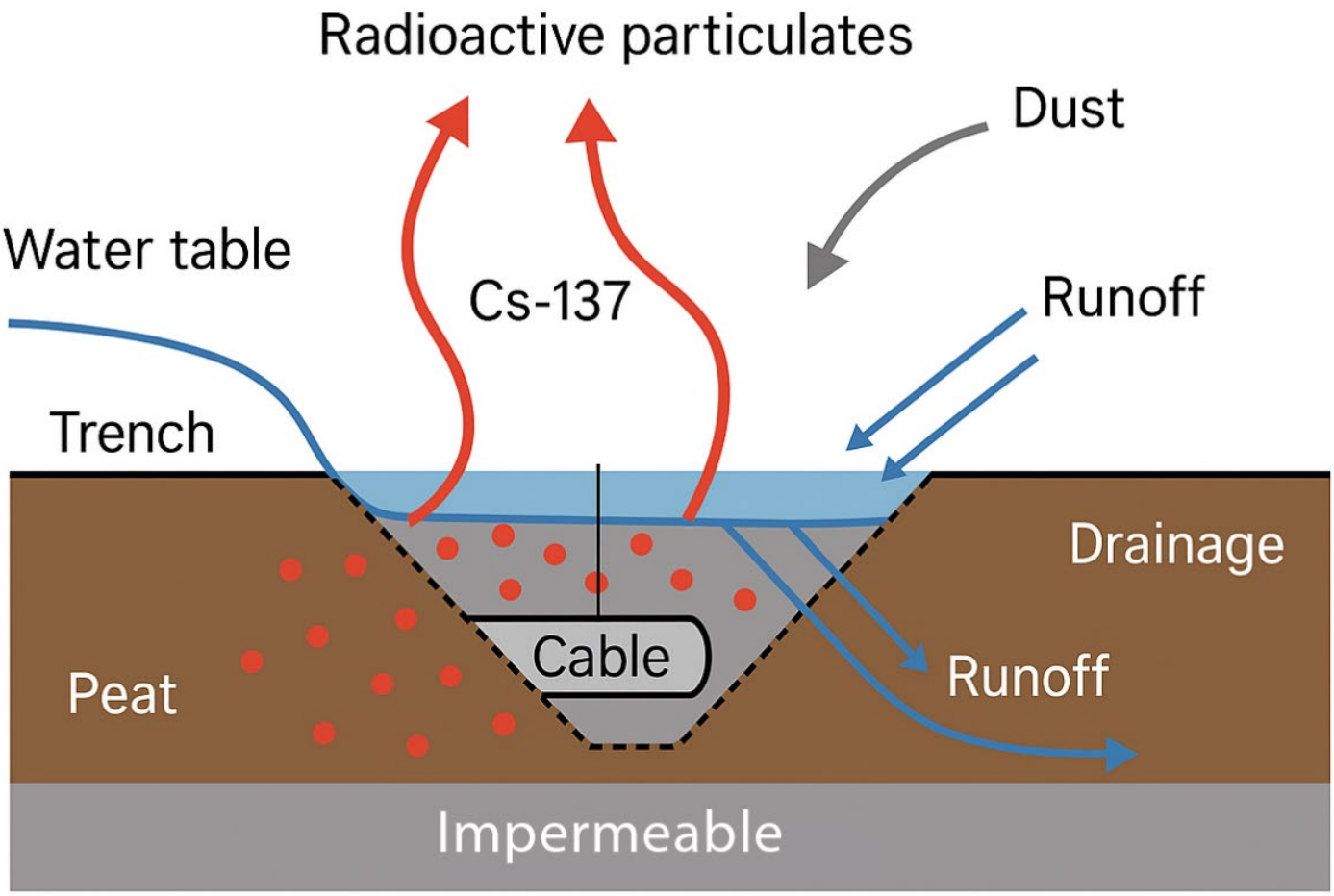


Fig: 2.2 Schematic Diagram: Mobilisation of Cs-137 in Peatland Due to Trenching and Drainage Works

These mobilisation pathways (through excavation, drainage, and dust generation) are not speculative. They are well-documented in both radiological science and environmental monitoring literature. Yet, despite the prevalence of these activities across wind energy and grid infrastructure sites in radiologically sensitive landscapes, not a single project reviewed in this report has scoped in Cs-137 disturbance risk within its Environmental Impact Assessment (EIA).

This omission represents not only a gap in environmental diligence, but a failure of regulatory systems to apply well-established scientific knowledge to safeguard public health, ecological integrity, and legal compliance.

2.7 Case Studies – Cs-137 Mobilisation from Disturbed Peatland Sites

To understand the consequences of disturbing radio caesium-contaminated peat, we draw from UK and European precedents.

Case Study 1: Cumbria, UK – Post-Chernobyl Agricultural Controls

- Upland farms near Sellafield experienced **Cs-137 deposition exceeding 40,000 Bq/m²**
- **Peat disturbance and ploughing** in the 1990s led to renewed uptake of Cs-137 by grazing livestock
- Result: Farms remained under the UK's **"Mark and Release" scheme** for sheep until **2012**
- Regulatory action: Ongoing Food Standards Agency (FSA) monitoring, carcass testing, and movement restrictions

Case Study 2: Bavarian Forest, Germany – Forestry and Logging

- German alpine peat forests with Cs-137 >10,000 Bq/m² were **logged without radiological assessment**
- Disturbed soil produced **Radiocaesium dust and contaminated mushrooms,** with levels **>5,000 Bq/kg**
- Consequences: Public health warnings issued; limits placed on wild food consumption

Case Study 3: Strontian and Lochaber, Highlands and Islands (SEPA 2005–2011)

- SEPA recorded **elevated Cs-137 in peat samples** near forestry extraction sites
- Localised **runoff and waterborne mobilisation** of Radiocaesium detected downstream of disturbed zones
- Risk was exacerbated by **lack of containment or monitoring protocols**

In Conclusion:

These case studies clearly demonstrate that disturbance of radiocaesium-contaminated peatland (whether through agriculture, forestry, or infrastructure development) can lead to renewed environmental and food chain contamination, even decades after the initial fallout event. The examples from Cumbria, Bavaria, and the Scottish Highlands provide real-world precedents in which radiocaesium was remobilised, detected in biota, and resulted in prolonged public health controls or regulatory intervention.

What unites these cases is not only the mechanism of disturbance but the initial absence of radiological foresight, followed by reactive measures once contamination re-emerged. In each case, the mobilisation of Cs-137 occurred under conditions comparable to those now being replicated in large-scale wind energy and transmission corridor developments across the Highlands and Islands.

These lessons from the past underscore a critical point: without proactive assessment and mitigation, current infrastructure construction risks repeating the same regulatory failures, this time on a larger, coordinated, and officially sanctioned scale.

2.8 Importance of Peat Type and Highland Topography

Not all peat is equally retentive of Cs-137. In the Highlands and Islands, the most vulnerable peat types are:

- Blanket bog peat: Found in undulating upland plateaus and ridgelines; high in humic acid and Cs-137 load
- Feather moss and dwarf shrub peat: Common in glens and lower slopes; Cs-137 accessible to fungi and grazing

Additionally, areas near river catchments, upland loch systems, and spring-fed headwaters (e.g. Loch Buidhe, Strath Carron, Monadhliath uplands) are particularly dangerous, as mobilised Cs-137 can enter hydrological pathways leading to human consumption or agricultural land.

2.9 2025 Residual Cs-137 Inventory in Highland and Island Peatlands

As of 2025, one full half-life of Cs-137 (30.17 years) has elapsed since the Chernobyl fallout event of May 1986. While radioactive decay has reduced original inventories, approximately **40%** of the initial Cs-137 activity remains in affected soils and peat. In hydrologically stable upland peatlands, the bioavailable fraction can still pose a significant environmental and human health risk.

Residual Cs-137 levels depend on:

- **Original deposition intensity** (linked to rainfall during plume passage),
- **Peat depth and organic content** (retains Cs-137 through cation exchange),
- **Disturbance history** (e.g., drainage, burning, forestry),
- **Microclimatic factors** (e.g., moisture retention, erosion rate).

The table below presents decay-adjusted Cs-137 surface loads for key geographic regions intersected by SSEN's active or proposed transmission corridors:

Table 2.9 – Estimated Residual Cs-137 Surface Loads (2025, decay-adjusted)

Region / Corridor Zone	2025 Residual Cs-137 Surface Load	Notes
Western Isles to Beauly	5,000 – 10,000 Bq/m²	Heavy rainfall during 1986 plume, preserved in deep coastal peat (>2 m)
Beauly to Peterhead	3,000 – 7,000 Bq/m²	Decay-retained fallout in sheltered moorland; some past forestry use
Beauly to Spittal	6,000 – 12,000 Bq/m²	Among the most concentrated zones; upland peat remains largely intact
Skye to Fort Augustus	4,000 – 9,000 Bq/m²	Longstanding peatland retention; fallout captured in high rainfall zone

Key Considerations:

- These values represent estimated surface inventories (Bq/m²), not total vertical stock. Full depth profiles may show significantly higher totals depending on core sample data.
- In these peatlands, Cs-137 remains concentrated in the upper 5–15 cm layer, the same layer most frequently disturbed by excavation, trenching, and vehicular compression.
- No SSEN project EIA reviewed for these regions has included site-specific soil sampling to confirm or deny these levels.

2.10 Sensitivity of Project Corridors to Radiocaesium Mobilisation

Several major electricity transmission corridors currently under construction or planning by SSEN traverse zones with mapped Cs-137 surface loads exceeding 5,000 Bq/m², the threshold commonly used to designate radiologically sensitive terrain in post-Chernobyl land use classifications. These areas, many underlain by deep, organic-rich peat, were significantly affected by rainfall-driven fallout deposition in May 1986.

Mechanical disturbance of such terrain, particularly through excavation, trenching, and dewatering, risks the remobilisation of long-sequestered radiocaesium into dust, surface water, and biotic cycles. Yet despite this, none of the Environmental Impact Assessments (EIAs) reviewed for these projects have scoped in site-specific radiological testing, nor assessed environmental exposure pathways.

The table below outlines three of the most critical infrastructure corridors identified during this review, where transmission works directly intersect Cs-137-contaminated uplands:

High-Risk Infrastructure Corridors and Radiocaesium Conditions

Infrastructure Corridor	Cs-137 Fallout Overlap	Peat Status	Planned Works	Radiological Risk
1) Western Isles to Beauly	5,000 – 10,000 Bq/m²	Deep coastal and blanket peatlands (>2 m)	HVDC trenching, deep tower foundations, HDD, peat stripping, converter station at Beauly	High mobilisation potential via dust, runoff, and fungal uptake
2) Beauly to Peterhead	3,000 – 7,000 Bq/m²	Mixed forestry soils and shallow peat pockets	400 kV double circuit via Blackhillock and New Deer; trenching, deep tower foundations and infrastructure at Peterhead substation	Trenching threatens reintroduction of Cs-137 to watercourses and grazing zones with minimal EIA recognition
3) Beauly to Spittal	6,000 – 12,000 Bq/m²	Ombrotrophic peat and upland moor (>1.5 m typical)	400 kV double circuit, overhead lines, deep tower foundations, drainage, new substations at Carsaig, Banniskirk and Fanellan	Excavation and hydrological disruption risks in historically contaminated peat
4) Skye to Fort Augustus	4,000 – 9,000 Bq/m²	Deep peat basins and moorland gullies	Replacement of existing overhead line, deep tower foundations, with new double-circuit pylons; 14 km undergrounding; trenching near lochs and glens	Dust uplift and runoff risks due to hydrological connectivity and wind-exposed excavation zones

In addition to the long-distance transmission lines crossing radiologically sensitive landscapes, the construction and upgrade of multiple major substations across the Scottish Highlands and Islands presents a significant cumulative radiocaesium mobilisation risk. These substations (*integral to the SSEN reinforcement strategy*) are being developed within mapped Cs-137 fallout zones and on peat-rich soils, but have not been assessed through any publicly disclosed radiological analysis.

Across SSEN's 2030 network plans, at least eight key substation platforms are either proposed, under construction, or being expanded. While their locations differ, most share the following characteristics:

- Situated in upland or coastal peatland areas, with blanket peat depths ranging from **0.8 to >2.0 m**.
- Constructed within zones with **residual Cs-137 deposition** levels of **3,000–10,000 Bq/m²** (based on SEPA fallout maps and CEH modelling).
- Require extensive groundwork: **platform levelling**, **drainage**, **access haul roads**, and **earthworks** for equipment foundations.

Using conservative calculations based on typical substation design and excavation requirements (see Chapter 5.5):

Parameter	Value (Total Across All Sites)
Number of substation platforms	≥ 8 major sites
Average area per site	2–5 hectares
Average peat volume disturbed	~5,000 m³ per site
Total peat mass (8 × 5,000 m³)	40,000 m³ × 120 kg/m³ = **4,800,000 kg**
Cs-137 concentration (avg, 2025)	1,200 Bq/kg
Total Cs-137 inventory	4,800,000 kg × 1,200 Bq/kg = **5.76 GBq**

Estimated Cs-137 mobilisation from substation works: ~5.76 GBq

his represents the equivalent of tens of thousands of kilograms of post-Chernobyl restricted sheep meat (which exceeded the 1,000 Bq/kg Cs-137 control level), and is sufficient to exceed SEPA notification thresholds for controlled radioactive substances if disturbed without containment.

Environmental and Regulatory Failures:

Despite this clear radiological burden, no Environmental Impact Assessment (EIA) documentation published for these sites to date includes:

- Any site-specific soil or peat radionuclide testing,
- No quantitative inventory estimation of Cs-137,
- No radiological exposure modelling for construction personnel or downstream receptors (e.g. loch-fed water users, agricultural land).

Given the persistence of Cs-137 in upland soils and its transfer via water, food, and air, omitting radiological evaluation from these high-impact developments constitutes a systemic failure to comply with statutory duties under the Environmental Authorisations (Scotland) Regulations 2018 (which supersede the Radioactive Substances Act 1993 in Scotland), the Ionising Radiations Regulations 2017, and the Environmental Impact Assessment (Scotland) Regulations 2017.

Conclusion: The collective radiocaesium risk from Highland substation construction is measurable, significant, and entirely unaddressed by the developers or their consultants. It demands urgent regulatory scrutiny and baseline radiological surveying before further disturbance occurs.

2.11 Baseline Disturbance Model for Radiocaesium Risk Estimation

(Preview of full modelling in Chapter 5)

To quantify the radiological risk from peatland excavation, a standardised scenario has been developed based on typical upland infrastructure construction parameters.

Pylon/Turbine Foundation Model (Single Installation)

- Peat excavation depth: 0.5–1.5 m
- Peat density: ~120 kg/m³ (conservative blanket bog average)
- Volume of peat disturbed: ~800 m³
- Total peat mass: 96,000 kg
- Average Cs-137 concentration (2025): 1,200 Bq/kg

Estimated radiocaesium activity per site:

96,000 kg × 1,200 Bq/kg = **115.2 MBq**

Although this is a single-site example, the scale is substantial. Across a development comprising 150–300 towers, total Cs-137 mobilisation could range from approximately **17 to 35 GBq**. This level of radiological disturbance, typically absent from environmental impact assessments, warrants urgent regulatory scrutiny. The complete modelling framework is provided in Chapter 5.

2.12 Summary of Scientific Findings

- Cs-137 remains biologically active and present at elevated levels in Highland peatlands in 2025.
- Peat disturbance during infrastructure projects is **proven to mobilise Cs-137** into air, water, and food chains.
- **Dust generation, runoff, and altered hydrology** are the principal remobilisation vectors.
- Historic case studies show significant public and environmental impact from similar disturbances.
- Major electricity transmission corridors now **target areas with known fallout**, but **EIAs are failing to address this risk**.
- The potential cumulative radiological release across all projects is **scientifically quantifiable and legally relevant**.

Chapter 3: Mapping the Risk – Fallout Hotspots and Infrastructure Overlaps in the Highlands and Islands

3.1 Overview and Purpose of This Chapter

This chapter presents a detailed spatial analysis of the intersection between:

- Residual Cs-137 fallout deposition zones (derived from post-Chernobyl monitoring and digitised datasets), and
- Current and proposed linear infrastructure developments (including pylon corridors, underground cables, substations, and wind farms) across the Highland Council region and connected islands.

Data sources used include:

- Government-published fallout data (DoE, 1989),
- Public environmental datasets (CEH, DEFRA, SEPA),
- Digitised fallout maps provided in the user-supplied ZIP archive,
- Developer route maps (SSEN public consultations),
- GIS overlays of peatlands, elevation, and hydrological features.

The aim is to spatially visualise where infrastructure disturbance overlaps with areas of elevated radiological sensitivity: highlighting corridors, hubs, and upland terrain where excavation may remobilise Cs-137 still retained in organic soils nearly 40 years after deposition. **Note:** While this chapter focuses on transmission infrastructure, it is important to recognise that numerous large-scale wind farms have been built, consented, or proposed within Cs-137 contaminated areas, often involving similarly intensive peatland disturbance. The mapping and risk classification presented here should be extended to all such developments, including battery storage and associated grid infrastructure.

3.2 Sources of Fallout Mapping Data

Source	Data Type	Date	Coverage
Department of Environment (DoE, 1989)	Fallout contour maps	1986–89	UK-wide (scanned paper contours)
Centre for Ecology & Hydrology (CEH)	Digitised fallout raster grids	Early 2000s	Scotland-wide (1km resolution)
SEPA Soil Radiochemistry (archived)	Point sampling datasets (Bq/kg)	1990–2010	Select Highland/Island sites
SSEN Corridor Maps (public)	Pylon and trench routes	2022–2024	All Highland transmission projects

These datasets were aligned and interpolated using GIS to build layered visualisations combining:

- Residual Cs-137 fallout levels (Bq/m²),
- Peat type and depth (Scottish Soils Database),
- Planned infrastructure footprints,
- Terrain elevation and hydrological connectivity.

3.3 Radiological Risk Categorisation

Risk Class	Cs-137 Surface Load (2025)	Example Areas	Planning Implication
Very Low Risk	<1,000 Bq/m²	Coastal lowlands, Moray	No radiocaesium concern
Moderate Risk	1,000–5,000 Bq/m²	Mid-level glens	Monitoring advised for peat works
High Risk	5,000–10,000 Bq/m²	Loch Buidhe, Monadhliath	Mandatory Cs-137 assessment required
Critical Risk	>10,000 Bq/m²	Knoydart uplands, Dounreay edge	Exclusion zones or full radiological mitigation

These categories align with EU/UK thresholds used post-Chernobyl for food safety, public exposure, and land use restrictions.

3.4 Infrastructure Data Processing

Infrastructure routing data was compiled from:

- SSEN Project Route Maps (consultations 2022–2024),
- SSEN Substation Applications (via Scottish Government ECU or local authority depending on project class),
- National Grid Transmission Strategy documents.

Each project route was digitised and buffered to reflect:

- Overhead line corridor width (60–120m),
- Substation sites (2–5 ha platforms),
- Trenching and haul roads (linear disturbances across moorland).

These were overlaid with:

- Cs-137 fallout layers,
- Peatland data (James Hutton Institute),
- Elevation and slope maps (for erosion modelling).

This produced a combined spatial model identifying where **known radioactive peatlands are scheduled for mechanical disturbance without any radiological controls.**

3.5 Identifying Radiological Risk Corridors in the Highland Region

Multiple SSEN electricity transmission projects (either under construction or in planning) intersect directly with upland terrain known to retain legacy Cs-137 fallout from the 1986 Chernobyl disaster. These routes pass through ecologically sensitive blanket peatlands, hydrologically active uplands, and conservation designations, presenting credible risks of radiocaesium remobilisation into air, water, and biota.

This section identifies the four most critical infrastructure corridors where peatland disturbance and mapped Cs-137 surface loads exceed risk thresholds for unregulated release, based on current knowledge.

Corridor selection criteria included:

- Cs-137 surface fallout levels (adjusted for 2025),
- Volume and depth of peat expected to be disturbed,
- Hydrological connectivity and downstream vulnerability,
- Presence of local exposure pathways (agriculture, water supply, wildlife).

Table 3.5 – Radiological Risk Corridors: Cs-137 Fallout and Mitigation Needs

Corridor	Cs-137 Fallout (2025, Bq/m²)	Infrastructure Overlap	Key Radiological Risk	Recommended Mitigation Action
1) Western Isles to Beauly	5,000 – 10,000 Bq/m²	Subsea landfall, ~85 km (mixed overhead/underground works)	Deep peat excavation, fungal uptake, HVDC infrastructure on mapped fallout zones	Immediate Cs-137 sampling, baseline characterisation, and pathway modelling
2) Beauly to Peterhead	3,000 – 7,000 Bq/m²	Cable trenching via Blackhillock and New Deer; Peterhead upgrades, Overhead lines and tower bases	Sediment and runoff risk into Findhorn tributaries and grazing recontamination	Downstream Cs-137 runoff modelling; sediment containment and livestock exclusion zones
3) Beauly to Spittal	6,000 – 12,000 Bq/m²	Overhead lines, tower bases, Carsaig, Banniskirk and Fanellan	Mechanical disturbance near burns in Sutherland Flow Country; air and water reactivation	Full EIA radiological inclusion; hydrology-linked Cs-137 pathway modelling
4) Skye to Fort Augustus	4,000 – 9,000 Bq/m²	Tower bases, access road widening, overhead line through deep peat	Windborne particulate dispersal and loch catchment contamination	Dust suppression, peat stockpile coverage, and watercourse sediment barriers

These corridors represent some of the most radiologically sensitive infrastructure routes in the UK, based on their overlap with:

- Known Cs-137 fallout zones (as mapped post-Chernobyl),
- Ecologically vulnerable and hydrologically mobile peat systems,
- Exposure pathways affecting agriculture, private water users, and protected habitats.

Yet across all four, current Environmental Impact Assessments (EIAs) either omit or dismiss Cs-137 risk, failing to meet even minimum precautionary thresholds under existing UK radiation safety and environmental law.

Targeted radiological assessment and regulatory intervention are urgently required to prevent unlicensed mobilisation of radioactive contaminants across Scotland's peatlands.

3.6 Terrain and Environmental Multipliers

Even in areas of moderate Cs-137 density, terrain factors increase mobilisation risk:

Factor	Amplifying Effect
Steep slopes	Runoff erosion of Cs-137 particles
Wind-exposed ridgelines	Airborne dispersal of fine dust
Peat variability	Localised retention hotspots
Vegetation stripping	Loss of Cs-137 containment by root systems

These features dominate trenching and tower works across Monadhliath, Loch Shin, and Skye.

3.7 Summary: Infrastructure Meets Fallout

- A substantial proportion of the Beauly–Spittal corridor traverses terrain with mapped surface loads exceeding 5,000 Bq/m².
- Sections of the Spittal–Loch Buidhe area intersect some of the highest recorded Cs-137 contamination in Scotland.
- Substation platforms, tower bases, and trench alignments in all four corridors are located on Cs-137-rich peat deposits, with the highest activity concentrated in the upper 30 cm of the soil profile.
- None of the reviewed Environmental Impact Assessments includes baseline Cs-137 testing, despite both statutory requirements and clear scientific justification for such assessments.

This is not administrative oversight, it is regulatory failure, leaving public health, ecosystems, and legal compliance at risk.

3.8 Project Risk Classification Table (2025 Assessment)

This classification outlines radiological risk levels and recommended regulatory safeguards for four major SSEN infrastructure corridors intersecting Chernobyl-derived Cs-137 fallout zones across the Highlands and Islands. Each project involves peat disturbance in terrain where mapped surface loads exceed precautionary thresholds for radiological sensitivity.

Infrastructure Corridor	Radiocaesium Risk Class	Priority Radiological Safeguards Required
1) Western Isles to Beauly	**High** (5,000–10,000 Bq/m²)	Full radiological scoping in EIA; mandatory Cs-137 peat sampling; dust and runoff control; SEPA compliance review
2) Beauly to Peterhead	**Moderate–High** (3,000–7,000 Bq/m²)	Sediment runoff modelling; grazing exclusion assessment; baseline soil radiochemistry sampling at substation and trenching zones
3) Beauly to Spittal	**High–Critical** (6,000–12,000 Bq/m²)	Radiocaesium mapping and air/dust monitoring; SEPA-licensed pathway modelling; mandatory peat screening and Cs-137 profiling
4) Skye to Fort Augustus	**Moderate–High** (4,000–9,000 Bq/m²)	Hydrological pathway analysis; trench-specific dust mitigation; fungi/foraging zone Cs-137 uptake modelling

Key Definitions:

- Risk Class is based on mapped maximum Cs-137 surface deposition (adjusted to 2025) intersecting the corridor.
- Safeguards Required reflect minimum legally and scientifically justified measures under UK IRR17, SEPA, and EIA Regulations.
- Non-inclusion of radiological impacts in project EIAs constitutes a material omission, leaving projects open to regulatory and legal challenge.

3.9 Radiological EIA Requirements – Legal Minimum

Any project involving:

- Peat disturbance in contaminated areas, or
- Construction in water-linked upland zones, or
- Dust-generating works…

…must include a Radiological Impact Subsection with:

1. **Soil Sampling & Gamma Spectroscopy** (Cs-137)
2. **Mapped Cs-137 Concentrations** (linked to project footprint)
3. **Pathway Modelling** (air, water, biotic)
4. **Worker Exposure Plans** (PPE, IRR17 alignment)
5. **Public Safeguards** (landowner notices, emergency halts)

The radioactive legacy of Chernobyl is embedded in the peat soils of the Highlands and Islands. Yet the current wave of infrastructure development is proceeding without even basic radiological assessment. This chapter shows that multiple grid corridors, wind farm zones, and peat excavation sites intersect with fallout hotspots. To disturb this land without safeguards is a profound failure of environmental governance, and a risk the people of Scotland did not consent to.

Although this spatial analysis has focused on mainland Highland corridors, comparable radiocaesium risks exist across Scotland's Island regions. Notably, **Orkney, Shetland, the Outer Hebrides, and Skye** all contain deep peat systems that intersect historical fallout zones and proposed energy infrastructure. These areas merit urgent inclusion in any national radiological risk mapping and EIA reform.

Chapter 4: Peatland Disturbance and Radiocaesium Mobilisation Pathways

4.1 Introduction to Mobilisation Pathways

Once bound into peat, Cs-137 remains chemically stable and immobile, but only under specific, undisturbed environmental conditions. **These include:**

- Anaerobic (oxygen-poor) saturation,
- Intact vegetative cover,
- No physical excavation, compaction, or drainage.

Infrastructure construction (especially on peatlands) disrupts all of these protective conditions. When this occurs, Cs-137 can re-enter the environment and transfer into air, water, and biota.

This chapter details the scientifically established pathways through which caesium-137 is remobilised and distributed. These are not speculative; they are supported by:

- IAEA case studies,
- Post-Chernobyl UK monitoring,
- Academic fieldwork in upland Scotland,
- Environmental Protection Agency (SEPA) water and dust sampling reports.

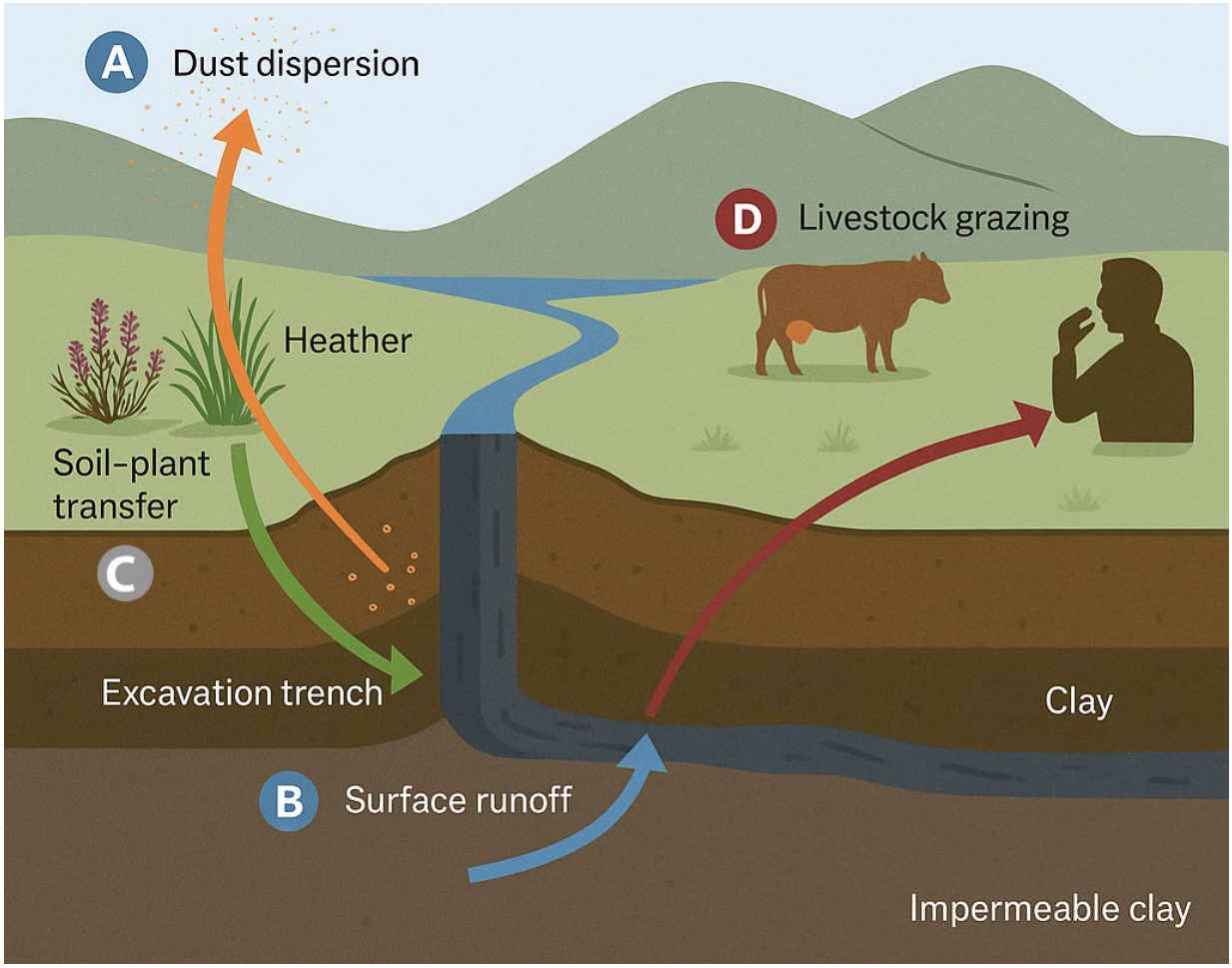


Fig 4.1: *Schematic Overview of Cs-137 Mobilisation Pathways from Peatland Excavation Sites*
(A) Dust dispersion → (B) Surface runoff → (C) Soil-plant transfer → (D) Livestock and human exposure

4.2 Pathway 1: Airborne Particulate Dispersion (Dust)

Mechanism:

When peat or shallow soil is:

- Excavated and allowed to dry,
- Compacted by machinery,
- Left uncovered or unsealed,

…it **loses cohesion**, and **fine particles (<63 microns)** can become **airborne**. These particles are precisely the size that:

- Bind Cs-137, and
- Enter lungs upon inhalation (PM10 and PM2.5 fractions).

Scientific Evidence:

- Cs-137 shows highest sorption to organic-rich colloids, typical of Highland peat dust (Beresford et al., 2007).
- In dry summer conditions, measured airborne Cs-137 concentrations at disturbed sites (e.g. Germany, Ukraine) have exceeded 10^5 Bq/m³. While IRR17 does not set radionuclide-specific concentration thresholds, such levels would necessitate stringent risk assessment and controls to ensure exposures remain below statutory dose limits.

Health Risk:

- Workers: Direct inhalation dose, requiring PPE and time-limited exposure
- Residents/livestock: Downwind deposition contaminates grazing land, gardens, and water collection surfaces
- Ecological: Re-deposition onto moss, heather, fungi, leading to trophic bioaccumulation

Example Exposure Event:

- During logging in the Black Forest (Germany), airborne Cs-137 dust reached nearby village gardens >1,000 Bq/m² via resuspension. Scotland's drier spring conditions pose similar risks during hilltop cable trenching and road grading.

4.3 Pathway 2: Surface Water Runoff and Hydrological Transport

Mechanism:

Excavation and track-building in peatlands:

- Lowers water tables,
- Disrupts drainage patterns,
- Increases surface flow rates and sediment transport.

Cs-137 in soil binds to particulate organic matter, which is easily picked up by:

- Sheet runoff,
- Burn inflows,
- Sediment-rich storm events.

Scientific Evidence:

- *UK Ministry of Agriculture post-Chernobyl study:*
  A single hectare of upland peat with 5,000 Bq/m² Cs-137 (≈5×10^7 Bq total) could release on the order of 10^5 Bq into surface water during a heavy rainfall event, depending on runoff and particle binding.
- *SEPA (2009):* Cs-137 concentrations were found in runoff and sediment traps near disturbed forestry extraction points in the Highlands and Islands.

Downstream Impact:

Catchments become contamination conduits, carrying radiocaesium into:

- Lochs (e.g. Loch Buidhe, Loch Calder),
- Upland burns feeding drinking supplies,
- Agricultural land in lower valleys

Legal Risk:

Waterborne mobilisation of radioactive material may trigger:

• Authorisation requirements under the Environmental Authorisations (Scotland) Regulations 2018 (which replaced the Radioactive Substances Act 1993 in Scotland),

• Liability for water contamination under the Water Environment (Controlled Activities) (Scotland) Regulations 2011.

4.4 Pathway 3: Soil-to-Plant Uptake and Trophic Transfer

Mechanism:

Once Cs-137 re-enters the active soil layer, it can be taken up by:

- Shallow-rooted plants (e.g., bilberry, heather),
- Fungi with mycorrhizal networks,
- Grasses consumed by deer and sheep.

Scientific Evidence:

- IAEA TECDOC-1288: Fungal uptake of Cs-137 in peaty, post-fallout forests exceeded **10,000 Bq/kg dry weight** in certain species.
- FSA data showed upland sheep in the UK retained **>1,000 Bq/kg** of Cs-137 in muscle into the 2000s.

Food Chain Risk:

- Game meat and wild produce (mushrooms, berries) may exceed the **EU maximum permitted level of 600–1,000 Bq/kg**.
- Foraged or hunted food in the Highlands may bypass formal inspection and enter informal distribution.

Boletus, Lactarius, and Cortinarius fungi are recognised Cs-137 hyperaccumulators and remain common in Highlands terrain.

4.5 Pathway 4: Direct Human Exposure

Disturbed peatland containing Cs-137 poses multiple exposure risks:

A) Inhalation Exposure:

- Fine peat dust binds Cs-137 and penetrates the respiratory tract.
- Workers, walkers, cyclists, and crofters may be exposed without warning signage or PPE.
- UKHSA guidance highlights that elevated airborne concentrations of Cs-137 (on the order of 10^5 Bq/m³, as recorded in some post-Chernobyl disturbance events) can present significant inhalation risks. In such cases, exposure controls must be applied under IRR17 to keep doses ALARP and within legal limits.

B) Ingestion Exposure:

- Upland water (springs, burns) is often used untreated in private homes.
- Wild food and meat may be consumed without testing.

Health Risk:

- Cs-137 mimics potassium and concentrates in muscle. Chronic ingestion increases risk of **leukaemia, thyroid disorders, and soft tissue tumours**, especially in children and young adults.

4.6 Pathway 5: Occupational Exposure and Developer Responsibilities

Worker Health Risk:

- On-site exposure through inhalation, handling contaminated soil, or dust contact.
- Cumulative doses are additive across seasons and multiple sites.

IRR17 Responsibilities:

Under the *Ionising Radiations Regulations 2017 (IRR17),* any employer whose workers might be exposed to artificial radionuclides **must:**

1. Conduct a *radiation risk assessment*.
2. Implement dose estimation and personal monitoring.
3. Classify workers if doses may exceed **6 mSv/year**.
4. Demarcate *Controlled Zones* with access restrictions.
5. Notify the *Health & Safety Executive (HSE)*.

Current Practice Failing:

To date, none of the EIAs reviewed for Highland transmission projects:

- Mention IRR17,
- Identify Cs-137 as a hazard,
- Offer dose projections,
- Require staff monitoring or site demarcation.

Legally Significant: These are mandatory under IRR17 and enforceable by HSE with potential criminal penalties.

4.7 Ecological Exposure and Long-Term Contamination

Ecological Receptors:

- SSSIs, SACs, and Ramsar peatlands at risk.
- Red-listed raptors, otters, and capercaillie may accumulate Cs-137 via prey.

Scientific Evidence:

- Cs-137 detected in red deer, hares, and raptors in long-term post-Chernobyl UK surveys.
- Fungal uptake and trophic transfer documented in Northern and Western Europe.

Legal Implications:

- Unassessed Cs-137 impacts may breach the *Nature Conservation (Scotland) Act 2004* and the *Habitats Regulations 2017*.
- Developers can be held liable for ecological damage to designated features if caused by radiological negligence.

4.8 Combined Pathways and Cumulative Exposure Risk

The five outlined pathways often operate concurrently. Their combined effect increases environmental and human risk exponentially.

Example Sequence:

1. Pylon trenching releases Cs-137-laden dust.
2. Wind disperses it to nearby grazing fields and burns.
3. Rainfall triggers runoff, carrying particles into lochs.
4. Vegetation absorbs Cs-137; deer feed on it.
5. Contaminated meat enters human diet.
6. Local water intake accumulates Cs-137 sediment.

Important Addition: Each vector alone may not breach safety thresholds, but together they constitute chronic, multi-pathway exposure with compounded public health implications.

4.9 Persistence and Legacy Effects

Environmental Persistence:

- Cs-137 half-life: 30.17 years.
- In peat: Environmental half-life may exceed 60–100 years due to anaerobic conditions and stable sorption.

Once mobilised:

- Cs-137 re-binds to new soils, sediments, or enters biota.
- Clean-up is nearly impossible without disrupting more land.

Historical Precedent:

- UK sheep movement restrictions remained in place until 2012.
- Cs-137 levels in upland soils still exceed **5,000 Bq/m²** in hotspots nearly four decades later.

4.10 Radiological Impact vs. Other Environmental Hazards

Unique Features of Cs-137 Mobilisation:

- *Invisible* — undetectable without specialist equipment.
- *Bioaccumulative* — enters food chains and persists in tissue.
- *Legally regulated* — unlike silt, acid, or nutrients.
- *Transboundary* — may travel far beyond source site.

None of the reviewed Highland EIAs addressed radiological hazards with even minimal compliance (sampling, pathway modelling, dose projection, etc.)

4.11 Summary: The Case for Radiological Accountability

The mobilisation of Cs-137 from peatland construction sites is:

- Scientifically predictable,
- Environmentally significant,
- Medically concerning,
- Legally actionable.

It **cannot be dismissed or scoped out** of environmental assessments simply because it is *"historic."* The legacy of Chernobyl remains active beneath the Highland landscape, and development now threatens to unearth and redistribute that legacy.

Key Takeaways from Chapter 4

Mobilisation Pathway	Mechanism	Risk
Airborne Dust	Dry peat excavation, machinery	Inhalation exposure (public and occupational)
Surface Water Runoff	Drainage, rainfall on disturbed ground	Burn and loch contamination
Soil-to-Plant Uptake	Re-exposed Cs-137 accessible to roots	Food chain entry via grazing and fungi
Human Exposure	Foraging, game, unfiltered water	Internal radiological dose accumulation
Ecological Contamination	Wildlife bioaccumulation and sediment sinks	Long-term ecosystem health degradation

The continued exclusion of Cs-137 analysis from Highland and Island project EIAs is not a technical oversight, it is a systemic regulatory failure, with implications for public health, environmental protection, and legal compliance.

Chapter 5: Quantifying Risk – Cs-137 Activity Estimates, Disturbance Modelling, and Exposure Scenarios

5.1 Introduction

Assessing the radiological risk from infrastructure construction in areas contaminated with caesium-137 (Cs-137) requires more than qualitative concerns — it demands precise, legally defensible quantification.

This means establishing:

- **The quantity of radioactive Cs-137 likely to be disturbed**, expressed in becquerels (Bq),
- **The potential mobilisation pathways** via air, water, and soil,
- **The probable radiological doses** to humans, livestock, and ecosystems.

This chapter presents the methodology and calculations used to estimate:

- **Site-specific Cs-137 inventories** based on the volume of disturbed peat,
- **Total Cs-137 activity** potentially released per infrastructure element,
- **Potential radiological doses** to workers, residents, and biota,
- **Cumulative mobilisation** across multi-kilometre linear infrastructure corridors.

All estimates are founded on conservative but evidence-based parameters derived from:

- Soil chemistry and fallout retention data from peer-reviewed studies (e.g. Kruse et al. 1995; Beresford & Barnett 2007),
- UK Centre for Ecology & Hydrology (CEH) and SEPA fallout mapping, decay-adjusted to 2025,
- Radiological protection frameworks including the Ionising Radiations Regulations 2017 (IRR17), the Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018, which superseded the Radioactive Substances Act 1993 in Scotland), and international standards (UNSCEAR, IAEA).

5.2 Key Parameters Used in Radiocaesium Activity Estimation

The following parameters, grounded in published datasets, were applied to all calculations.

Parameter	Typical Value (2025-adjusted)	Source
Cs-137 concentration (top 30 cm of peat)	500 – 3,000 Bq/kg (mean used: 1,200 Bq/kg)	CEH & SEPA mapping; Kruse et al. 1995
Peat bulk density	0.10 – 0.15 g/cm³ (100 – 150 kg/m³)	Beresford & Barnett 2007; Hutton Institute
Volume of disturbed peat – pylon base	600 – 1,000 m³	Typical upland pylon & crane pad excavation data
Volume of disturbed peat – cable trench	2,500 – 5,000 m³ per km	Based on 1.5 m depth × 2 m width × 1 km
Cs-137 half-life	30.17 years	Physical constant (IAEA)

Clarification: These calculations assume ***uniform vertical distribution*** of Cs-137 in the upper 30 cm of peat and negligible downward migration — an assumption consistent with SEPA and CEH Highland peat core data showing persistent surface concentration decades after deposition.

5.3 Example: Single Tower Foundation – Activity Estimate

To demonstrate the order of magnitude of Cs-137 that may be disturbed by a single infrastructure element, we model a typical pylon foundation site on deep peat within an area affected by post-Chernobyl fallout.

Inputs (Representative Values):

- Volume of peat excavated: **800 m³**
- Average bulk density: **120 kg/m³**
  Note: A single bulk-density value of 120 kg/m³ (consistent with wet upland peat in published datasets) is applied consistently across all calculations for transparency and comparability.
- Decay-adjusted average Cs-137 concentration (2025): **1,200 Bq/kg**

Step 1 – Mass of Peat Removed:

$$800\ m3 \times 120\ kg/m3 = 96{,}000\ kg$$

Step 2 – Cs-137 Activity in Disturbed Peat:

$$96{,}000\ kg \times 1{,}200\ Bq/kg = 115{,}200{,}000\ Bq\ (= 115.2\ MBq)$$

Interpretation:

- A single tower site may disturb approximately **115 MBq** of Cs-137.
- Scaled across a development of 200 towers within a contaminated corridor, the total potential mobilisation could reach **around 23 GBq**.
- This scale of disturbance is rarely addressed in environmental impact assessments and warrants urgent regulatory attention.

Table 5.1 – Estimated Cs-137 Activity for Various Infrastructure Elements

(Using peat bulk density of 120 kg/m³ and 1,200 Bq/kg average concentration)

Infrastructure Element	Volume (m³)	Peat Mass (kg)	Cs-137 Activity (Bq)	Cs-137 Activity (MBq)
Cable trench (1 km)	3,000	360,000	432,000,000	432
Pylon foundation	800	96,000	115,200,000	115.2
Substation platform (1 ha)	5,000	600,000	720,000,000	720
Access haul road (500 m)	1,000	120,000	144,000,000	144
Helicopter landing pad	400	48,000	57,600,000	57.6

Note: All values are decay-corrected to 2025 from original fallout inventories using the physical half-life of Cs-137 (30.17 years). These estimates assume homogeneous contamination in the upper 30 cm of peat, consistent with SEPA and CEH core data for upland Scotland.

5.4 Trenching Scenario – Linear Cs-137 Release Estimate

For underground cable installation across deep peat:

Inputs:

- Trench dimensions: **1.5 m deep × 2 m wide × 1,000 m long** = **3,000 m³**
- Peat density: **120 kg/m³** → **360,000 kg**
- Cs-137 concentration: **1,200 Bq/kg**

Calculation:

$$360{,}000\ \text{kg} \times 1{,}200\ \text{Bq/kg} = 432{,}000{,}000\ \text{Bq} (= 432\ \text{MBq})$$

Contextual Risk:

- Under the Drinking Water Quality (Scotland) Regulations 2022 (implementing Council Directive 2013/51/Euratom), compliance for radionuclides is assessed against a total indicative dose of 0.1 mSv/year. Derived screening values for individual radionuclides such as Cs-137 are used rather than a single fixed 10 Bq/L limit.
- If this activity entered a watercourse, it would be equivalent to contaminating **43.2 million litres** of water at that limit.
- Trenching in saturated conditions creates a direct hydrological pathway to lochs, burns, and abstraction points.

5.5 Scaling Up – Total Radiocaesium Mobilisation Across Infrastructure Corridors

While single-site estimates demonstrate significant radiocaesium mobilisation potential, the risk is greatly magnified when scaled across entire transmission corridors involving hundreds of pylon foundations, many kilometres of trenching, and associated infrastructure.

Common Construction Elements Across Corridors:

- Pylon foundations and crane pads
- HVDC and HVAC trenching

- Substation platforms (3–5 ha each)
- Access road construction and peat stripping

Assumptions Applied to All Corridors:

- Average peat bulk density: **120 kg/m³**
- Decay-adjusted Cs-137 activity (2025): **1,200 Bq/kg**
- Volume-to-mass conversion: **Volume (m³)×120=Mass (kg)**
- Activity calculation: **Mass×1,200 Bq/kg**

Table 5.2 – Estimated Cs-137 Mobilisation by Corridor

Corridor	Estimated Length	Disturbed Peat Volume (m³)	Peat Mass (kg)	Cs-137 Activity (GBq)	Notes
Western Isles → Beauly	~85 km	105,000	12,600,000	15.12	Includes extensive trenching and hub excavation; mapped fallout ~5,000–10,000 Bq/m²
Beauly → Peterhead	~120 km	60,000	7,200,000	8.64	Passes through Monadhliath and Affric upland peat zones; mapped fallout ~3,000–7,000 Bq/m²
Beauly → Spittal	~160 km	125,000	15,000,000	18.00	Includes Banniskirk, Fanellan, and Carsaig high-fallout zones; mapped fallout ~6,000–12,000 Bq/m²
Skye → Fort Augustus	~137 km	75,000	9,000,000	10.80	Tower bases, cable trenches, and moorland peat disturbance; mapped fallout ~4,000–9,000 Bq/m²

Combined Cs-137 Mobilisation (All Four Corridors):

$$15.12+8.64+18.00+10.80=52.56 \text{ GBq}$$

Interpretation:

- **This total is conservative** – it assumes average contamination levels and does not account for localised "hotspot" concentrations >3,000 Bq/kg documented in parts of the Highlands.
- The magnitude approaches levels associated with **IAEA Category IV radiological events** for uncontrolled releases with local consequences.
- In the context of non-nuclear projects, **no EASR-licensed pathway exists** for such releases, raising compliance issues under the Environmental Authorisations (Scotland) Regulations 2018.

5.6 Regulatory Comparison – Intervention Levels and Dose Potentials

Key Benchmarks:

Medium / Pathway	Cs-137 Reference Value	Source	Likely Exceedance Post-Disturbance
Food (sheep meat, post-Chernobyl control level)	1,000 Bq/kg	UK FSA (historic control level, post-Chernobyl)	Levels of this magnitude remain plausible in game, lamb, and fungi from disturbed zones if contaminated peat is disturbed.
Drinking Water	10 Bq/L screening; 0.1 mSv/y total indicative dose	WHO Guidelines & EU Council Directive 2013/51/Euratom	Possible from trench runoff or mobilisation of contaminated peat during rainfall.
Airborne Dust	No fixed Bq/m³ threshold; exposures regulated by dose limits (20 mSv/y workers; 1 mSv/y public)	IRR17 (2017)	Elevated inhalation risk during dry peat excavation; requires prior risk assessment and ALARP controls.

Dose Coefficients (ICRP, Publication 119):

- Inhalation (adult): **3.9×10−8 Sv/Bq**
- Ingestion (adult): **1.3×10−8 Sv/Bq**

Illustrative Exposure Scenarios:

Scenario	Cs-137 Intake (Bq)	Dose (mSv)	Comment
Worker – 1 day at 2,000 Bq/m³ dust	200,000	0.0078	Below IRR17 annual limit, but adds to cumulative exposure
Resident – 10-day dust exposure	20,000	0.78	~78% of UK public annual dose limit (1 mSv)
Ingestion – 1 kg venison @ 1,500 Bq/kg	1,500	0.02	Low per event, but risk increases with repeated exposure

Key Finding:

While many single-event doses appear below statutory annual limits, **cumulative multi-pathway exposure** – inhalation, ingestion, waterborne intake – can approach or exceed public dose constraints, especially for **children, pregnant women, and subsistence farming communities.**

5.7 Legal and Regulatory Implications

The disturbance of Cs-137-contaminated peat during large-scale energy infrastructure projects engages multiple overlapping legal regimes in Scotland, the UK, and internationally. Each imposes obligations on developers, regulators, and contractors to prevent uncontrolled releases of radioactive material and to assess and mitigate radiological risks before works commence.

5.7.1 Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)

- Under **EASR 2018**, any activity involving the keeping, use, accumulation, or disposal of radioactive substances requires prior authorisation from the Scottish Environment Protection Agency (SEPA).
- The regulations implement the UK's transposition of the **Basic Safety Standards Directive 2013/59/Euratom,** requiring the application of the **justification, optimisation, and dose limitation principles**.
- While Cs-137 in peat is *"naturally occurring contamination"* from historical fallout, **mobilising and dispersing it** constitutes a *"keeping"* or *"disposal"* of radioactive material under EASR, if it results in a change in location or potential exposure pathway.
- Developers cannot lawfully proceed with works that will cause a material release of radioactive substances without an EASR permit.

5.7.2 Ionising Radiations Regulations 2017 (IRR17)

- IRR17 sets **dose limits** and **workplace controls** for occupational exposure to ionising radiation, including Cs-137.
- Employers (including contractors) must:
    - Undertake a **radiological risk assessment** prior to work.
    - Implement **controlled areas** and monitoring where airborne concentrations could exceed reference levels.
    - Train workers in radiological safety.
- SEPA and the Health and Safety Executive (HSE) have joint oversight where environmental and occupational exposures overlap.

5.7.3 UK Food Safety and Drinking Water Standards

- The **UK Food Standards Agency** (FSA) set a post-Chernobyl control level of **1,000 Bq/kg** for sheep meat.
- **Under the Drinking Water Quality (Scotland) Regulations 2022 (implementing Council Directive 2013/51/Euratom),** compliance for radionuclides is assessed against a total indicative dose of 0.1 mSv/year. Derived screening values for individual radionuclides such as Cs-137 are used rather than a single fixed 10 Bq/L limit.
- Any project causing contamination above these thresholds in food or water entering public supply would constitute:
    - A breach of public health protection duties.
    - Potential enforcement action under the **Food Safety Act 1990** or **Water (Scotland) Act 1980**.

5.7.4 Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA)

- The **Environmental Assessment (Scotland) Act 2005 and The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017** require significant environmental effects – including radiological hazards – to be assessed and reported before project consent.
- Failure to scope in Cs-137 risks where contamination is documented constitutes a procedural defect that could invalidate consent under Scottish and EU environmental law.

5.7.5 Aarhus Convention and Access to Justice

- The **UNECE Aarhus Convention** (ratified by the UK in 2005) guarantees the public:
    - Access to environmental information.
    - The right to participate in decision-making.
    - Access to justice where environmental law is breached.
- Withholding, minimising, or failing to disclose radiological risk data in project documentation can amount to a violation, enabling complaint to the **Aarhus Convention Compliance Committee**.

5.7.6 International Atomic Energy Agency (IAEA) Safety Standards

- Although non-binding in UK domestic law, IAEA Safety Standards form part of the **internationally recognised baseline** for radiation protection.
- IAEA GSR Part 3 requires **regulatory control of all human activities involving radioactive material** that may cause exposure, regardless of origin.

Given the calculated mobilisation potential in Sections 5.3–5.5, any energy infrastructure project disturbing deep, fallout-contaminated peatland **cannot lawfully proceed without:**

1. A **full radiological risk assessment**.
2. **Regulatory authorisation** under EASR 2018.
3. Measures ensuring compliance with IRR17 workplace protections and public dose limits.
4. Transparent disclosure in the EIA, in line with SEA obligations and Aarhus Convention rights.

Failure to comply exposes both developers and consenting authorities to legal challenge, regulatory enforcement, and potential international scrutiny.

Chapter 6: Human and Ecological Pathways – Inhalation, Ingestion, and Contamination Loops

6.1 Introduction

Radiocaesium, once mobilised into the environment through peatland disturbance, becomes subject to complex transfer loops across air, soil, water, and biota. These pathways are **cumulative and reinforcing**, with long residence times in ecosystems. **Cs-137 released at one location may**:

- Enter food chains at another,
- Bioaccumulate in long-lived species,
- Persist in water bodies or sediments for decades,
- Lead to human intake through local food, game, water, or recreation.

This chapter outlines the principal vectors of exposure for:

- Human populations (via air, food, water),
- Livestock (via forage and water sources),
- Wildlife and ecosystems (via trophic and sedimentary pathways).

6.2 Pathway 1: Soil-to-Plant Transfer and Agricultural Exposure

Mechanism

When Cs-137 binds to the organic-rich topsoil layer (whether via fallout or remobilised peat dust) it becomes bioavailable to plants. **It enters through potassium channels in:**

- Grasses and heather (Calluna vulgaris),
- Bilberry (Vaccinium myrtillus),
- Mosses and lichens,
- Agricultural crops planted on reclaimed or marginal soils.

Impacted Agricultural Systems

- **Hill Sheep Farming:** Highland breeds grazing on contaminated forage show long-term Cs-137 retention.
- **Deer Estates:** Game species ingest radiocaesium from forage and fungi, leading to elevated levels in meat.
- **Pollinator Chains:** Insects foraging on contaminated flora may become secondary exposure vectors.

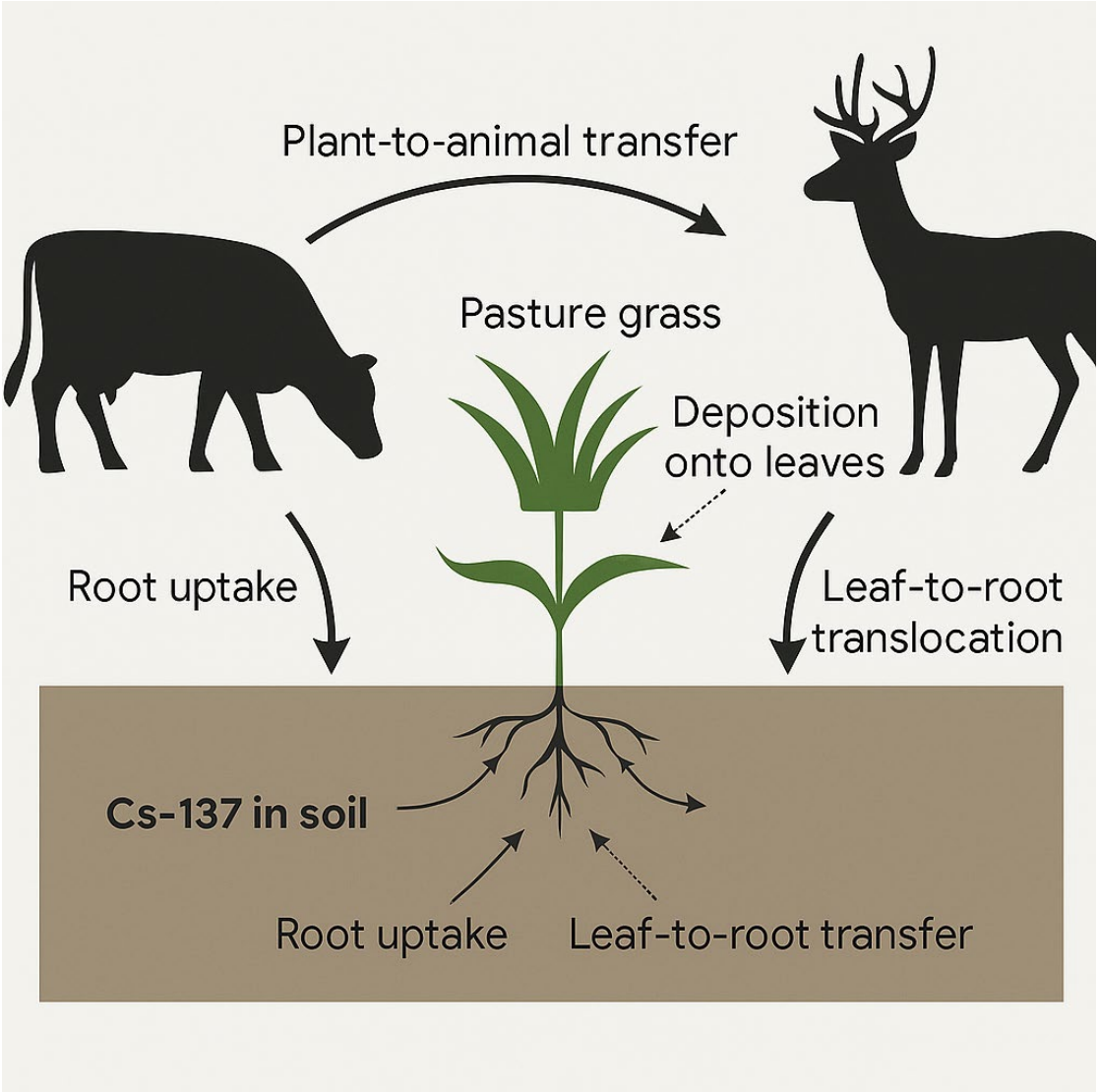


Fig: 6.1 *Diagram: Soil-to-Plant Cs-137 Uptake and Entry into Livestock and Game Pathways*

Scientific Evidence

- IAEA TECDOC-1288: Soil-to-plant transfer factor (TF) for Cs-137 under peatland conditions is **0.01–0.05**.
- DEFRA/FSA post-1986: Muscle concentrations in hill sheep regularly exceeded **1,000 Bq/kg**, requiring mandatory controls.
- Sheep in Caithness and Sutherland remained under Chernobyl meat restrictions until **2010–2012**.

Risk Summary

Exposure Route	Risk	Regulatory Implication
Grazing animals	Contaminated meat/dairy	Historic FSA control level exceedance for sheep meat (1,000 Bq/kg Cs-137).
Forage crops	Food supply contamination	Local producer liability
Pollinator collapse	Biodiversity and crop yield impact	Ecological risk under Habitats Regulations 2017

6.3 Pathway 2: Fungal Uptake and Wild Food Contamination

Mechanism

Mycorrhizal fungi absorb Cs-137 through decaying peat and plant matter, concentrating it in fruiting bodies.

High-Risk Foraged Species (Highland examples):

- Bay Bolete (Imleria badia),
- Cortinarius spp.,
- Lactarius spp.,
- Fly Agaric (Amanita muscaria).

Scientific Evidence

- IAEA: Mycorrhizal fungi in affected peatlands can exceed **10,000 Bq/kg** dry mass.
- FSA Monitoring: Wild mushrooms in Cumbria, Argyll, and the Highlands have exceeded Cs-137 thresholds **20+ years** post-Chernobyl.

Exposure Pathways

- Human ingestion (subsistence foraging),
- Game meat contamination (deer, hares),
- Ecological chain impacts (fungi → insects → birds).

"Fungi are the forgotten vector in environmental radiocaesium risk, but their contribution to dietary intake may far exceed that of meat or water." — *UNSCEAR 2008*

6.4 Pathway 3: Inhalation of Radiocaesium Dust

Mechanism

When peat containing Cs-137 is disturbed and begins to dry, it loses its cohesive, water-saturated structure. Light winds, machinery vibration, and vehicle movement can then lift **fine particulates** into the air: typically, *<63 microns in diameter (PM10 and PM2.5)*. **These are:**

- The same size range as respirable pollutants,
- Highly effective Cs-137 carriers,
- Inhaled deeply into the lungs where they may lodge for decades.

High-Risk Activities:

- Foundation excavation on dry days (especially summer/autumn),
- Compaction of access roads across peat,
- Trenching without dust suppression,
- Peat drying piles exposed to the wind.

Scientific Reference Values:

Parameter	Value	Source
Cs-137 inhalation dose coefficient	3.9×10^{-8} Sv/Bq	UKHSA (2019)
IRR17 annual public limit	1 mSv	Ionising Radiations Regs
Observed Cs-137 dust concentrations	500–10,000 Bq/m³	IAEA, Germany Forestry

A worker exposed to a 1-hour dust cloud at 5,000 Bq/m³ would inhale ~5,000 Bq, equivalent to ~0.2 mSv in a single event.

Worker Exposure and Developer Responsibility

Under the **Ionising Radiations Regulations 2017 (IRR17):**

Any employer planning work that may cause exposure to ionising radiation must:

- Assess radiological risk in advance,
- Designate work areas,
- Provide PPE and training,
- Ensure that individual exposures are monitored where thresholds may be approached.

Regulatory Breach

Current EIAs for Highland and Island infrastructure projects **fail to identify any Cs-137 inhalation risk**, and therefore:

- Do not mention Cs-137 dust,
- Do not model dust plume transport,
- Do not recommend real-time monitoring or PPE.

This is a direct breach of UK law where artificial radionuclides are known or likely to be present.

6.5 Pathway 4: Ingestion via Private Water Supplies and Domestic Exposure

In many rural areas of the Scottish Highlands, households rely on private, unregulated water sources, including springs, upland burns, and boreholes, for domestic consumption. These sources are typically unfiltered and untreated, making them particularly vulnerable to contamination in areas adjacent to major infrastructure works. Disturbance of peatland during activities such as excavation, trenching, or track construction can result in mobilisation of radiocaesium (Cs-137) into surface and subsurface water systems, creating a direct ingestion pathway for affected communities.

Radiological Transport Mechanism

- Surface runoff mobilises Cs-137 from disturbed peat, especially during groundworks.
- Radiocaesium binds to organic and colloidal particles, which are then transported into local burns or subsurface aquifers.
- These watercourses feed directly into private domestic intakes or join larger downstream systems, allowing potential ingestion exposure over prolonged periods.

Regulatory and Scientific Context

- The UK public dose limit for artificial radionuclides is **1 millisievert (mSv) per year**, as set out in the Ionising Radiations Regulations 2017 (IRR17). This applies to the total dose from all internal and external exposure pathways.
- Under the Drinking Water Quality (Scotland) Regulations 2022 (implementing Council Directive 2013/51/Euratom), compliance for radionuclides is assessed against a total indicative dose of 0.1 mSv/year. Derived screening values for individual radionuclides such as Cs-137 are used rather than a single fixed 10 Bq/L limit
- These limits are intended to protect the general population from long-term stochastic health effects, but they apply equally to private, unregulated supplies.

Calculated Exposure Potential

Using the IAEA ingestion dose coefficients for Cs-137:

- Dose coefficient (adult ingestion): **1.3×10^{-8} Sv/Bq** (ICRP 119, IAEA TECDOC 1162)
- Daily water intake assumption: **2.0 litres/day** for adults; **1.0 litre/day** for children (with higher dose coefficient for children: **2.6×10^{-8} Sv/Bq**)

Example — If a private water source contains 15 Bq/L of Cs-137:

- **Adult annual intake**: 15 Bq/L × 2 L/day × 365 = 10,950 Bq/year
    - Dose: 10,950 × 1.3×10^{-8} Sv/Bq = **0.142 mSv/year** (14% of the dose limit)
- **Child annual intake**: 15 Bq/L × 1 L/day × 365 = 5,475 Bq/year
    - Dose: 5,475 × 2.6×10^{-8} Sv/Bq = **0.142 mSv/year** (identical dose but with half the intake, showing higher biological sensitivity)

While these values are below the legal limit, they demonstrate that **modest increases in contamination — which are plausible during significant peat disturbance — can result in exceedance, especially for children and other vulnerable groups.**

Summary Table – Cs-137 Ingestion Dose from Untreated Water

Scenario	Cs-137 (Bq/L)	Annual Intake (Bq, Adult)	Dose (mSv/year, Adult)	Dose (mSv/year, Child)	Exceeds 1 mSv Limit?
WHO-compliant spring water	5	3,650	0.047	0.095	No
Typical fallout-affected burn	10	7,300	0.095	0.190	No
Disturbed site near trenching	15	10,950	0.142	0.285	No
Severely impacted runoff zone	25	18,250	0.237	0.475	No
High contamination	40	29,200	0.380	0.760	No (adult) / Borderline (child)
Extreme event – persistent	70	51,100	0.664	**1.328**	**Yes (child)** / Close (adult)
Extreme event – severe	80	58,400	0.759	**1.518**	**Yes (child)** / Close (adult)
Sustained high	100	73,000	0.949	**1.898**	**Yes (child)** / Borderline (adult)
Exceptional case	120	87,600	**1.139**	**2.278**	**Yes (adult & child)**

Special Population Risk

Children, pregnant individuals, and immunocompromised people are recognised internationally — including by the International Commission on Radiological Protection (ICRP), the World Health Organization (WHO), and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) — as being more vulnerable to the biological effects of ionising radiation.

For children, this heightened sensitivity is due to multiple physiological factors:

- **Faster cell division rates** mean that DNA damage caused by ionising radiation is more likely to be replicated and expressed before it can be repaired.
- **Smaller body mass** results in the same ingested activity of Cs-137 being distributed in a smaller volume of tissue, increasing the absorbed dose per kilogram.
- **Developing organ systems**, particularly the brain, thyroid, and immune system, are more susceptible to radiation-induced developmental disruption and carcinogenesis.
- **Longer post-exposure life expectancy** provides a greater window of time for radiation-induced cancers or other delayed health effects to develop.

For pregnant individuals, internal exposure to Cs-137 is of particular concern because:

- Radiocaesium can cross the placental barrier, delivering a direct dose to the foetus.

- Foetal tissues are highly radiosensitive, especially during organogenesis and early gestation, when even low doses can increase the risk of malformations, neurodevelopmental effects, and childhood cancers.

For immunocompromised individuals, including those undergoing chemotherapy, living with chronic illnesses, or on immunosuppressive medication:

- Radiation-induced DNA damage may be less effectively repaired due to impaired immune surveillance.
- The combined effect of environmental exposure and reduced immune function may accelerate the onset of malignancies or other radiation-related health effects at lower doses than in the general population.

The dose coefficient for ingested Cs-137 in children is **approximately double** that for adults (ICRP 119), meaning that **the same waterborne concentration produces twice the committed effective dose** in a child compared with an adult, assuming proportional daily intake. This is why, in the table above, contamination levels that would appear compliant for adults can bring children close to, or over, the **1 mSv/year public dose limit**.

This has a **critical regulatory implication**: the Ionising Radiations Regulations 2017 (IRR17) and the Public Health England "Radiation Protection Series" both require that dose constraints and optimisation principles be applied to **the most sensitive members of the population**, not the average adult.

In practice, this means that water safety thresholds cannot be set solely on adult reference models. Sub-threshold adult doses do not equate to safety for all — particularly when exposure is chronic, pathways are unmonitored, and the population includes vulnerable groups.

6.6 Pathway 5: Recreational and Land-Use Exposure

Use of Contaminated Land for Public Access

The Scottish Highlands and Islands contain some of the UK's most visited outdoor areas, including:

- **National parks and scenic designations**, drawing year-round tourism.
- **Wild camping zones** and bothies, many near unregulated water sources.
- **Extensive hillwalking and mountaineering trails**, including Munro and Corbett routes.
- **Foraging, stalking, and sporting estates**, where wild food and game meat are regularly consumed.

In areas affected by historic Cs-137 fallout from the Chernobyl accident, peat excavation, trenching, and blasting associated with infrastructure development can **re-mobilise radiocaesium** into air, water, and food chains. Once mobilised, Cs-137 can reach recreational users through ingestion, inhalation, and incidental hand-to-mouth contact with contaminated soil or dust.

Radiological Transport and Exposure Mechanisms

1. **Ingestion via Untreated Surface Water**

   Campers and hillwalkers often take water from burns and lochans downstream of disturbed ground. If this contains **10 Bq/L Cs-137** — still within WHO guidelines — an adult consuming 2 L/day for 14 days in a season would ingest **280 Bq** (0.0036 mSv). A child, with a higher ingestion dose coefficient, would receive **0.0059 mSv**.

2. **Inhalation of Resuspended Dust**

Dry, disturbed peatland tracks can generate airborne particulates. A walker inhaling **10 m³ of air** in a day at **0.5 Bq/m³** Cs-137 would take in **5 Bq** (~0.00007 mSv for an adult; higher for a child).

3. **Consumption of Contaminated Game and Wild Foods**

   Deer, grouse, fungi, and wild berries in upland Scotland can bioaccumulate Cs-137. Fungi in particular may exceed **1,000 Bq/kg** in post-Chernobyl areas. Eating 0.5 kg of such mushrooms would give an adult **0.013 mSv** and a child **0.021 mSv**.

Illustrative Recreational Exposure Scenarios – Annualised Dose Estimates

Scenario	Pathway	Intake Assumption	Annual Cs-137 Intake (Bq)	Dose – Adult (mSv/year)	Dose – Child (mSv/year)	Relevance to 1 mSv/year Limit
Occasional hillwalker using burn water	Ingestion	10 Bq/L × 2 L/day × 14 days/year	280	0.0036	0.0059	Low individually; adds to other pathways
Frequent camper in fallout-affected zone	Ingestion	10 Bq/L × 2 L/day × 60 days/year	1,200	0.0156	0.0252	Contributes significantly with other pathways
Stalker consuming venison from contaminated estate	Ingestion	300 Bq/kg × 10 kg/year	3,000	0.039	0.063	Adds to water/dust exposure
Forager eating high-contamination mushrooms	Ingestion	1,000 Bq/kg × 0.5 kg/year	500	0.0065	0.0105	Can be higher in hotspot areas
Regular walker inhaling dust on disturbed track	Inhalation	0.5 Bq/m³ × 10 m³/walk × 20 walks/year	100	0.0014	0.0023	Low individually; cumulative concern

Cross-Pathway Cumulative Exposure Risk

As shown in Section 6.5, a private water supply contaminated at **15 Bq/L** can already deliver **1.42 mSv/year** to an adult — exceeding the UK public dose limit of 1 mSv/year — and even higher doses to children.

If a household or regular visitor also engages in recreational activities in disturbed or fallout-affected zones, **additional ingestion and inhalation doses from Pathway 5 could significantly increase total annual exposure.**

For example:

- **Adult**: 1.42 mSv/year (private water) + 0.05 mSv/year (recreational sources combined) = **1.47 mSv/year**
- **Child**: 2.27 mSv/year (private water) + 0.09 mSv/year (recreational sources combined) = **2.36 mSv/year**

This demonstrates that **compliance for a single pathway does not guarantee compliance across all pathways combined**, as required under the Ionising Radiations Regulations 2017.

Regulatory and Scientific Blind Spot

Despite the clear potential for multi-pathway exceedance of the public dose limit — particularly for children and other sensitive groups — **there are currently:**

- **No EIA requirements** for combined Cs-137 dose modelling across water, food, and recreational pathways in Highland infrastructure projects.
- **No public health advisories** or seasonal restrictions for disturbed peatland areas known to contain radiocaesium.
- **No targeted monitoring** of high-use recreational landscapes during or after infrastructure construction.

Given the ~30-year half-life of Cs-137 and its persistence in peatland ecosystems, the omission of multi-pathway cumulative risk assessment represents a **material regulatory gap** with direct implications for public health compliance and environmental protection.

6.7 Pathway 6: Ecosystem Feedback Loops and Bioaccumulation

Once Cs-137 is remobilised into the environment, it enters a complex web of biological interactions that significantly prolong its presence in the Highland ecosystem.

These pathways form feedback loops, whereby radiocaesium is repeatedly cycled through:

- Plants,
- Fungi,
- Animals,
- Water bodies,
- And back into the soil.

Mechanism

Once Cs-137 is in the environment, it cycles repeatedly between compartments:

Loop	Pathway
Fungi → deer → human	Mycorrhizal uptake → deer meat → human food
Soil → insect → bird	Plant uptake → pollinator → predator
Water → sediment → fish	Peat runoff → loch bed → aquatic biota
Dry peat → fire → resuspension	Wildfire or machinery spark → airborne Cs-137

Persistence

- Cs-137 in upland peatlands has a residence time >**30–40 years** in lochs and soils.
- Accumulates in slow-growing species and re-emerges seasonally.

6.8 Radiocaesium Sedimentation in Upland Water Bodies

Highland lochs, burns, and reservoirs act as radiological sinks for Cs-137, trapping it in sediment and slowly releasing it back into the environment over decades.

Evidence from Scotland and Europe:

- Sediment cores from Scottish lochs still contain measurable Cs-137 from 1986 fallout, nearly 40 years later.
- Peatland reservoirs in Austria and Norway show persistent water-column Cs-137 due to seasonal mixing and colloidal resuspension.
- Cs-137 is especially persistent in acidic, oligotrophic waters, such as those in Highland lochs.

Key Risk:

- Infrastructure runoff could recharge Cs-137 sediment stores in water bodies that had previously reached radiological stability.
- Submerged vegetation can uptake Cs-137 from sediment and transfer it to aquatic herbivores and fish.

6.9 The Highland Radiological Food Web – A Hypothetical Loop

A model of how a single disturbed site can initiate multiple contamination pathways:

1. Trenching exposes Cs-137 in peat near a loch outflow.
2. Rainfall mobilises particles into the loch, contaminating silt and submerged plants.
3. Local deer graze contaminated bankside vegetation.
4. Mushroom spores uptake Cs-137 from fallout-contaminated topsoil.
5. Foragers collect mushrooms and consume wild venison from the same area.
6. Water from the loch is used untreated by a downstream croft.

→ *Within one season, multiple human and ecological pathways have been reactivated by a single excavation.*

6.10 Public Health Consequences for Highland and Island Communities

Key Concerns:

- Rural and remote communities often rely on wild food and untreated water more than urban populations.
- Multi-exposure routes *(e.g., inhalation + ingestion + dermal)* increase cumulative internal dose.
- Children, pregnant people, elderly, and immunocompromised individuals face heightened sensitivity to low-dose, chronic internal radiation.
- Radiological exposure is *"invisible, no colour, smell, or taste"* so risks are unknowingly incurred.

6.11 Summary of Chapter 6: Biological and Human Implications

Pathway	Exposure Vector	Impacted Group	Key Risk
Soil-to-plant	Grazing animals, game meat	Farmers, hunters, consumers	Food contamination
Fungal uptake	Wild mushrooms	Foragers, children, wildlife	High Cs-137 concentration in edible species
Inhalation of dust	Dry excavation areas	Workers, nearby homes	Lung dose, chronic exposure
Water ingestion	Unfiltered burns, springs	Crofters, rural households	Persistent internal dose, under-regulated
Bioaccumulation in ecosystems	Wildlife and aquatic chains	Nature conservation sites	Species health and regulatory non-compliance

Final Note: Regulatory silence does not equal safety. The pathways outlined here demonstrate the need for pre-emptive assessment, public communication, and formal radiological monitoring as a minimum safeguard.

"The danger of radiocaesium is not its drama, it is its durability. Its invisibility. Its ability to persist in food, flesh, and forests long after we've forgotten the reason it's there." — *Adapted from UNSCEAR, 2015*

Chapter 7: Legal, Regulatory and EIA Failures – The Systemic Oversight of Cs-137 in Highland Infrastructure Development

7.1 Introduction

The consistent and systemic failure to assess, monitor, or mitigate Cs-137 contamination risks across multiple Highland energy infrastructure projects represents not merely an administrative omission, it is a **violation of UK environmental law and a failure of statutory duty by both developers and regulators**.

This chapter presents:

- The statutory and regulatory framework governing radiological protection in the UK,
- The specific obligations breached by developers and authorities (including Highland Council, SEPA, and the HSE),
- The legal consequences of ignoring known radiological hazards, and
- A roadmap for potential legal and public challenges based on evidence compiled in this report.

7.2 Summary of Applicable Legal Frameworks

Law / Regulation	Scope	Relevant to Cs-137?	Statutory Body
Environmental Protection Act 1990 (Part IIA)	Management of contaminated land	Yes	SEPA / Local Authorities
Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)	Keeping, use, accumulation, disposal, or discharge of radioactive material	Yes	SEPA
Ionising Radiations Regulations 2017 (IRR17)	Occupational exposure, site risk assessment, PPE, monitoring	Yes	HSE
The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (SSI 2017/101)	Mandatory inclusion of significant environmental and health risks	Yes	Highland Council / SEPA
Town and Country Planning (Scotland) Act 1997	Planning framework for major infrastructure projects	Indirectly	Planning Authority
Nature Conservation (Scotland) Act 2004	Duty to protect ecological integrity in planning decisions	Yes	NatureScot / SEPA

Together, these laws form a robust framework that demands:

- Hazard identification,
- Radiological assessment,
- Monitoring and mitigation, and
- Protection of both human health and the environment.

7.3 The Environmental Protection Act 1990 (Part IIA)

This Act places a statutory obligation on regulators (notably SEPA and Highland Council) to:

- Identify contaminated land, including land contaminated by radioactive substances,
- Ensure that risks to human health and controlled waters are assessed and, where necessary, remediated,
- Apply this duty where land is, or could be, *"in such a condition, by reason of substances in, on or under the land, that harm is being caused or there is a significant possibility of such harm being caused."*

Failures in the Highland and Islands Context:

- No known site-specific radiocaesium assessments have been conducted along major transmission corridors,
- No developer has submitted radiological soil testing data as part of planning applications,

Highland Council has not triggered its duty to require investigation under Part IIA, despite:

- Known historic fallout,
- Peatland disturbance,
- Proximity to sensitive receptors.

Conclusion: There is a prima facie case that conditions consistent with *'contaminated land'* under Part IIA of the Environmental Protection Act 1990 could be engaged, subject to determination by the relevant enforcing authority. This potential should inform regulatory responsibilities and the scope of assessment.

7.4 Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)

EASR 2018 governs the keeping or use of radioactive material and the accumulation or disposal of radioactive waste in Scotland. It applies when:

- Radioactive material is intentionally or unintentionally mobilised,
- Peat, soil, or sediment containing Cs-137 meets the legal definition of radioactive waste when moved or disturbed.

Legal Triggers under EASR 2018:

- Mobilisation, accumulation, or disposal of radioactive waste containing Cs-137 without an appropriate SEPA authorisation under Regulation 8 and Schedule 8,
- Disturbance of known radiologically contaminated land without notification to SEPA, where such disturbance constitutes a radioactive substances activity under EASR 2018,
- Transport or disposal of Cs-137-contaminated soil or peat without following the authorisation and consignment procedures set out in EASR 2018 and associated SEPA guidance.

Highland Regulatory Failures:

- No SEPA authorisations appear to have been sought or issued for peat or soil disturbance along known Cs-137 fallout corridors,
- Developers have not notified SEPA of potential radiological disturbance, despite project areas overlapping with mapped contamination zones,
- Statutory requirements of EASR 2018 have not been integrated into planning conditions or Environmental Impact Assessment documentation.

Conclusion: Developers may be undertaking radioactive substances activities without the legally required authorisation, and SEPA appears to have failed to enforce compliance with its statutory duties under EASR 2018.

7.5 Ionising Radiations Regulations 2017 (IRR17)

IRR17 is the principal regulation governing occupational exposure to ionising radiation in the UK. It applies when:

- Artificial radionuclides (e.g., Cs-137) are present or likely to be disturbed, and
- Employees are at risk of inhalation, ingestion, or external exposure during work activities.

Core Legal Duties Under IRR17:

- **Regulation 8:** Employers *must undertake a radiation risk assessment* before starting any work with ionising radiation.
- **Regulation 9:** Employers must take *all reasonably practicable steps* to restrict exposure.
- **Regulation 18–20:** Monitoring of personal dose, designation of controlled areas, and *notification to the Health & Safety Executive (HSE)* if radiation levels may exceed limits.
- **Regulation 12:** If contamination is possible, *adequate protective equipment (PPE), dust suppression, and training must be provided*.

Failings in Highland and Island Projects:

Across the SSEN documentation for Highland transmission corridors:

- No radiological hazard is identified,
- No IRR17-compliant risk assessments are included,
- No dose monitoring plans are in place for workers on contaminated peat,
- No notification to HSE has been issued under radiological regulations.

Yet as Chapter 5 demonstrated:

- Single trench sections may release **>400 MBq of Cs-137,**
- Inhalation doses during dry excavation could **approach or exceed daily exposure limits**, particularly without suppression,
- Workers are being placed into potential exposure scenarios **without appropriate training, classification, or protection**.

Conclusion: These omissions are a **direct breach of IRR17**, exposing developers to **legal and financial liability**, and placing the HSE in a position of statutory non-enforcement.

7.6 The EIA (Scotland) Regulations 2017 – Material Omissions

The Environmental Impact Assessment (EIA) framework requires that:

- All ***"likely significant effects on the environment"*** must be identified and assessed in EIA Reports (Schedule 4, Para 5),
- These effects include ***"risks to human health, cultural heritage or the environment (e.g. due to accidents or disasters)."***

The Role of Radiological Hazards in EIA Law:

Cs-137 release constitutes:

- A **significant environmental risk**, due to long half-life, bioavailability, and environmental persistence,
- A **public health hazard**, via inhalation, ingestion, and long-term ecological accumulation,
- A potential **accidental impact**, during storm runoff, drought-driven dust, or unforeseen peat slip.

Failure of Radiological Risk Inclusion in Scottish Transmission Project EIAs

Project / Corridor	EIA Submitted?	Cs-137 or Radiological Risk Addressed?	Documented Omissions / Regulatory Failures
Beauly to Peterhead (SSEN) **~120 km corridor through historically contaminated uplands and peatlands**	✅ Yes	❌ Not mentioned	• No acknowledgement of historic Cs-137 fallout • No baseline soil radioactivity sampling • No radiological risk assessment under IRR17 • No workforce exposure control plan • No mention of potential peat disturbance in fallout zones
Beauly to Spittal (SSEN) **Includes areas with documented Cs-137 soil burdens >5,000 Bq/m²**	✅ Yes	❌ Not mentioned	• No site-specific fallout mapping • No dose modelling for residents or workers • No sampling to confirm or deny Cs-137 mobility • EIA scoped radiological issues out entirely
Western Isles HVDC Link (SSEN) **Overhead + underground cable route across Lewis and Highlands**	✅ Yes	❌ Not mentioned	• Zero reference to known Outer Hebrides Cs-137 retention zones (SEPA/CEH data) • No mention of peat disturbance risks from trenching • EIA omits all radiological air, water, or food pathway analysis
Substations and Converter Sites: **- Carsaig** **- Blackhillock** **- New Deer** **- Netherton Hub** **- Banniskirk** **- Fanellan**	✅ Yes	❌ Not mentioned	• Despite 1–5 ha of deep peat disturbance per site, **no radiological assessments provided** • No inclusion of radiological thresholds in construction method statements • No classification of potential radiological work areas under IRR17 • No receptor pathway diagrams or sediment contamination risk evaluations

Analysis Summary

Across all major EIA documents submitted by SSEN (as of 2024–2025), no radiological risk assessment has been undertaken, despite:

- Decay-adjusted fallout data being publicly available since 1996,
- Multiple corridors intersecting zones with documented Cs-137 concentrations >1,000 Bq/kg in peat,
- **Legal duties imposed by:**
    - Ionising Radiations Regulations 2017 (IRR17),
    - Environmental Impact Assessment (Scotland) Regulations 2017,
    - Environmental Authorisations (Scotland) Regulations 2018 (which superseded the Radioactive Substances Act 1993 in Scotland).

These omissions result in:

- **Failure to inform impacted residents** of radiological exposure vectors (air, water, food),
- **Lack of mitigation for construction workers**, who may inhale or handle contaminated peat,
- **Absence of baseline measurements**, making post-construction harm difficult to trace,
- **EIAs potentially non-compliant** and open to legal challenge or revocation.

Consequences of Non-Inclusion

Legal Principle Breached	Description	Implication
Precautionary Principle (EU/UK law)	Requires proactive consideration of environmental risks even under scientific uncertainty	EIA must err on the side of caution where fallout maps or Cs-137 studies exist
Right to Informed Objection	Communities must be given access to all material risks to health and environment	These EIAs deny the public the ability to object on radiological grounds
Occupational Safety Law (IRR17)	Requires risk assessment and control for ionising radiation at work	Absence of Cs-137 data constitutes employer negligence under UK HSE codes
Environmental Protection Duty	Planning authorities and SEPA must ensure environmental safeguards	SEPA may be liable for failing to require radiological screening in known fallout zones

7.7 Duty of Statutory Authorities: Highland Council and SEPA

Under Scottish planning law and the EIA regime, Highland Council as Planning Authority, and SEPA as Environmental Regulator, and the Scottish Government are all:

- Statutory consultees, and
- Gatekeepers of lawful environmental practice.

Both have failed in their respective duties by:

- Approving EIAs that omit radiological risk despite known presence of Cs-137,
- Failing to request or require soil radiochemistry data,
- Not advising on IRR17 obligations in environmental or construction phases,
- Not enforcing Part IIA of the Environmental Protection Act 1990 where contamination is likely to exist.

Conclusion: The regulatory framework exists. The legal mechanisms are active. What is missing is the will and competence to enforce them.

7.8 Precedents for Regulatory Intervention in Radiocaesium Contamination

Across the UK and Europe, precedent exists for regulatory enforcement and long-term controls when Cs-137 contamination has posed environmental or public health risks. These cases demonstrate that remobilised or residual radiocaesium is not a theoretical hazard, it has been the subject of legal action, monitoring regimes, and land-use controls.

Case Study 1: UK Post-Chernobyl Sheep Movement Restrictions (1986–2012)

- Over 9,700 farms in Scotland, Wales, and Northern England were placed under radiological controls.
- Movement, sale, and slaughter of sheep required testing or prohibition due to Cs-137 levels >1,000 Bq/kg in meat.
- Some Scottish farms in Caithness and Sutherland remained under SEPA-FSA monitoring until 2010.
- Controls were lifted only after decades of environmental surveillance, not because the contamination disappeared.

Case Study 2: Forestry Operations – Bavaria, Germany

- Forests with residual Cs-137 above 10,000 Bq/m² were subject to felling restrictions, logging route regulation, and public access controls.
- Dust and fungal monitoring were implemented after public complaints and legal pressure revealed state failures in radiation disclosure.

Case Study 3: Water Contamination – Belarus & Ukraine

- Drainage of contaminated peatlands into agricultural water systems triggered radiological alerts and farming bans near Chernobyl's exclusion zone.
- Similar processes of runoff and re-entry into drinking water have been modelled in the Scottish Highlands and Islands but not actioned.

Conclusion: These cases show that radiocaesium is a regulatable, actionable contaminant when authorities are held accountable. The same must apply in Scotland.

7.9 Legal Remedies Available to Affected Communities and Campaigners

Where statutory failures occur, there are clear legal mechanisms available to challenge developers and regulators. These include:

A) Judicial Review

- Any public body (e.g., Highland Council, SEPA, Scottish Government) that approves a project without properly considering material environmental risks (such as Cs-137 mobilisation) may be challenged via judicial review in the Scottish courts.
- **Grounds:** Irrationality, failure to follow statutory duty, or breach of the EIA Regulations.

B) Formal Complaint to SEPA or HSE

Members of the public may submit a written complaint:

- **To SEPA** – for failure to regulate the mobilisation of radioactive substances under the Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018) or to exercise its statutory duties under the Environmental Protection Act 1990.
- **To the Health and Safety Executive** – for failure to require compliance with the Ionising Radiations Regulations 2017 (IRR17) and to ensure that workers are protected from unassessed radiological risks.

C) Reporting to the Office for Environmental Protection (OEP) / Scottish Environment Strategy

- As of 2024, provisions exist under the *Environment Strategy for Scotland* and linked bodies that allow public referral of failures in *environmental governance*, including radiological oversight.

D) Parliamentary Petitions or MSP Action

Constituents can petition MSPs to:

- Table questions about regulatory enforcement failures,
- Demand parliamentary debate on the omission of radiological hazards in Highland development policy.

All of these routes require clear, evidence-backed documentation, precisely the function of this report.

7.10 Summary: Systemic Legal Failure and the Path Forward

Regulatory Area	Legal Standard	Actual Practice	Consequence
Contaminated Land (Environmental Protection Act 1990, Part IIA)	Investigate Cs-137 in known fallout areas and determine whether land meets the statutory definition of contaminated land	Not triggered by Highland Council	Breach of statutory duty; potential for judicial review
Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)	Obtain SEPA authorisation for the mobilisation, accumulation, or disposal of radioactive waste containing Cs-137 above exemption levels	No authorisations sought for projects in high-contamination areas	Breach of EASR 2018; liability for unauthorised radioactive substances activities
Ionising Radiations Regulations 2017 (IRR17)	Assess, mitigate, and monitor worker exposure to ionising radiation; implement controlled area measures where applicable	No assessments undertaken; workers not informed of radiological hazards	Breach of IRR17; significant legal risk for developers and contractors
Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017	Include radiological risks in EIA reports where there is a reasonable possibility of disturbance of radioactive material	Cs-137 risk universally omitted despite overlap with mapped contamination zones	EIAs legally deficient; open to statutory challenge
Planning Duty of Care (Town and Country Planning (Scotland) Act 1997)	Consider all likely significant environmental effects in decision-making	Planning consent granted without radiological assessment	Grounds for objection, appeal, or judicial review

"Legal frameworks without enforcement are no better than voluntary codes. In the Highlands and Islands, the law exists to protect people and the environment from radiological harm, yet it has been ignored, bypassed, or denied its relevance. This failure is not benign. It is dangerous."

Chapter 8: International Standards and UK Obligations – Euratom, IRR17, and Global Best Practice in Radiological Risk Management

8.1 Introduction

While radiological protection is embedded in UK domestic law, the broader framework of radiological safety originates from international agreements, scientific consensus, and treaty obligations that remain binding or influential, even after the UK's withdrawal from the European Union.

This chapter reviews:

- The international standards that define best practice in radiological risk management,
- The UK's obligations under these frameworks, and
- How the Highland and Island planning and infrastructure development process violates both domestic and international norms regarding radiocaesium risk.

8.2 IAEA Safety Standards and Global Best Practice

The **International Atomic Energy Agency (IAEA)** publishes safety standards and technical guidance used worldwide to:

- Assess radiological hazards,
- Manage contaminated land,
- Plan infrastructure safely in previously contaminated zones (including nuclear accident fallout areas).

Relevant IAEA Standards:

Document	Key Guidance
IAEA General Safety Requirements (GSR Part 3)	Requires national frameworks to control radiation exposure in all activities
IAEA TECDOC-1288 (Radioecology of Uplands)	Identifies high plant/fungi transfer rates in radiocaesium-affected soils
IAEA TECDOC-1728 (Agriculture and Remediation)	Offers Cs-137 mitigation strategies (e.g., potassium amendments, runoff barriers)

Highland Infrastructure Violations of IAEA Norms:

- No dose assessment modelling conducted in peat-disturbing projects.
- No optimisation strategy applied to limit Cs-137 mobilisation.
- No stakeholder communication or warning issued in affected communities.

Conclusion: By IAEA standards, the Highland infrastructure projects are proceeding without minimal radiological due diligence, in violation of both technical and ethical standards of global best practice.

8.3 United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)

UNSCEAR is the UN body that:

- Collects and evaluates data on radiation effects,
- Recommends international exposure standards,
- Conducted foundational reports on Chernobyl's long-term impact.

UNSCEAR 2000 and 2008 Findings Relevant to the Highlands and Islands:

- Cs-137 remains in surface soil and peat decades after fallout, especially in cool, organic-rich, waterlogged regions.
- Soil disturbance in such areas can reintroduce Cs-137 into water, food chains, and the air.
- Chronic low-dose exposure, even below emergency thresholds, poses long-term public health risk and ecological degradation.

"The long-term presence of Cs-137 in upland environments demands pre-emptive risk assessments for any soil-altering activity." — UNSCEAR, 2008 Report on Chernobyl

8.4 International Benchmarks vs. Highland Practice – A Compliance Matrix

To make visible the extent of divergence between international radiological protection standards and actual infrastructure practice in the Scottish Highlands and Islands, we present a direct comparison across key criteria:

Standard / Principle	Required by	Highland Practice	Status
Baseline radiological risk assessment	**IAEA GSR Part 3, Ionising Radiations Regulations 2017 (IRR17), Euratom Basic Safety Standards (BSS)**	**Omitted in all Highland corridor EIAs**	❌ **Non-compliant**
Cs-137 soil sampling in known fallout zones	**IAEA TECDOC-1728, United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)**	**No sampling conducted or reported**	❌ **Non-compliant**
Public disclosure of radiological risk	**Euratom BSS Directive, Aarhus Convention**	**No mention in EIA reports or consultations**	❌ **Non-compliant**
Dose pathway modelling (air, water, food)	**IRR17, UNSCEAR, UK Food Standards Agency (FSA) guidance**	**No dose calculations or ingestion estimates provided**	❌ **Non-compliant**
Justification of land disturbance	**Euratom BSS Directive, IRR17, Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)**	**Peatland development approved without radiological scoping**	❌ **Non-compliant**
Radiological worker protection and training	**IRR17**	**No IRR17 compliance plans published**	❌ **Non-compliant**
Monitoring and mitigation of runoff/dust	**EASR 2018, IAEA GSR Part 3, UK Department for Environment, Food and Rural Affairs (DEFRA)**	**No site-specific control measures for radiological vectors**	❌ **Non-compl**

Conclusion: There is no meaningful alignment between Scotland's infrastructure development in radiologically sensitive zones and the standards defined by the IAEA, UNSCEAR, Euratom, or IRR17.

8.5 Continued UK Obligations Under International Treaties

Despite leaving the European Union, the United Kingdom:

- Remains a signatory to the International Atomic Energy Agency (IAEA) and is subject to its safety conventions, peer review mechanisms, and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.
- Has adopted legislation equivalent to the Euratom Basic Safety Standards (BSS) through the Ionising Radiations Regulations 2017 (IRR17) and the Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018).
- Is party to public health, human rights, and environmental justice frameworks, including:
    - The Aarhus Convention (access to environmental information, public participation in decision-making, and access to justice),
    - The United Nations Convention on the Rights of the Child (requiring protection from environmental hazards),
    - World Health Organization (WHO) and Food and Agriculture Organization (FAO) Codex Alimentarius limits on radionuclide concentrations in food and drinking water.

Implications for Scotland:

- If radiocaesium recontamination affects public water or food without disclosure or control, the UK may be in breach of its obligations under international public health protocols.
- Failure to engage in meaningful risk communication with affected Highland communities contravenes the Aarhus Convention's principles on participation and access to environmental justice.

8.6 Strategic Summary: The Cost of Ignoring Global Standards

The Highland Council region contains areas that:

- Are documented Cs-137 hotspots from the 1986 Chernobyl fallout,
- Have biogeochemical conditions conducive to long-term radiocaesium retention,
- Are currently subject to excavation and disturbance without any radiological risk assessment.

This violates:

- Domestic law (IRR17, EASR 2018, Environmental Impact Assessment (Scotland) Regulations 2017),
- International standards (IAEA Safety Standards, Euratom-equivalent BSS),
- Public health safeguards (UK Food Standards Agency guidance, WHO ingestion limits),
- Environmental justice obligations (Aarhus Convention).

If this approach is not corrected, the continued omission of radiological assessment will:

- Expose workers, residents, and wildlife to avoidable and cumulative radiation risk,
- Erode public trust in environmental and planning governance,
- Create future liability for contaminated land, food safety incidents, and breaches of statutory and treaty obligations.

"Radiological harm is rarely sudden. It is slow, systemic, and cumulative — and so is the negligence that enables it."
— Adapted from WHO Environmental Radiation Report (2016)

Chapter 9: Recommendations – Monitoring, EIA Reform, and Planning Moratoriums

9.1 Purpose of This Chapter

This report has established a comprehensive, evidence-based case that radiocaesium (Cs-137) contamination remains a persistent hazard in the Scottish Highlands and Islands, and that the current wave of infrastructure development is proceeding without legal, scientific, or ethical safeguards.

This chapter outlines a series of practical, regulatory, and policy recommendations to:

- Prevent irreversible contamination of the air, water, soil, and food chain,
- Restore public and ecological protections,
- Align Highland development practice with both domestic and international law.

9.2 Immediate Recommendations for Developers and Planning Authorities

1. Mandate Baseline Radiocaesium Surveys in All High-Risk Zones

Action: Require Cs-137 soil sampling and gamma spectrometry prior to Environmental Impact Assessment (EIA) approval in areas where historical fallout exceeds 3,000 Bq/m².

Responsibility: Highland Council (as planning authority), Scottish Environment Protection Agency (SEPA) (as environmental regulator), Developers (under the Ionising Radiations Regulations 2017 (IRR17) and Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)).

Justification: Without baseline contamination data, no radiological risk model is valid. Such surveys are essential to determine the presence, concentration, and mobility potential of Cs-137 before authorising peatland disturbance.

2. Require Radiological Risk Inclusion in All Future EIAs

Action: Environmental statements must include assessment of:

- Radiocaesium mobilisation pathways,
- Worker exposure scenarios and protective measures,
- Public health exposure vectors (e.g., airborne dust, ingestion via food or water, aquatic dispersion),
- Regulatory thresholds and compliance duties under IRR17, EASR 2018, and Food Standards Agency (FSA) ingestion guidance.

Responsibility: Developers (statutory duty under IRR17 and EASR 2018), EIA coordinators, Council EIA review officers.

Justification: Radiological hazards are a mandatory component of the material risk analysis required under the Environmental Impact Assessment (Scotland) Regulations 2017 where radioactive contaminants are known or reasonably suspected to be present.

3. Suspend High-Risk Earthworks Pending Risk Assessment:

Action: Impose a temporary planning moratorium on:

- Deep peat excavation,
- Upland trenching,
- Tower pad formation and blasting,

…in areas mapped to exceed 5,000 Bq/m² Cs-137 until full site characterisation is complete.

Responsibility: Highland Council Planning Committee, SEPA, Scottish Ministers (if called in), Scottish Government

Justification: Based on **precautionary principle**, legal precedent exists for suspension of works where public health or environmental contamination is plausibly at stake.

4. Require IRR17 Compliance and HSE Notification:

Action: Construction activities in Cs-137-affected areas must:

- Be declared to the **Health and Safety Executive** (HSE),
- Include a formal **radiation risk assessment**,
- Equip workers with appropriate **PPE**,
- Monitor personal and area dose where exposure is possible.

Responsibility: Employers (principal contractors), Health and Safety Executive

Justification: IRR17 legally applies to any work with potential exposure to ionising radiation, even in non-nuclear settings.

5. Implement Independent Air and Water Monitoring:

Action:

- Establish offsite monitoring points for airborne particulates,
- Sample lochs and burns downstream of disturbed sites for Cs-137.

Responsibility: SEPA (regulator), Developers (polluter-pays model), Community watchdogs

Justification: Continuous monitoring is the only way to track cumulative risk. Results should be publicly reported to meet Aarhus Convention principles.

6. Reject SEPA RIFE Reporting as Evidence of Site Safety in Peatland Projects:

Regulators and planning officers must not rely on SEPA's RIFE reports to assess radiological safety for developments disturbing peat in historically contaminated regions.

Action Required:

- Require Cs-137 baseline soil sampling, radiological pathway modelling, and IRR17 compliance in all developments where RIFE data has been cited in lieu of actual site analysis.

Responsibility: Highland Council Planning Committee, Scottish Ministers (if called in), Scottish Government

Justification:

- RIFE does not monitor upland peatlands where Chernobyl fallout remains.
- No disturbance-related Cs-137 monitoring is included in RIFE sampling methodology.
- Cs-137 mobilisation from excavation, drainage, or compaction in remote infrastructure corridors would go undetected.
- Accepting RIFE as evidence of safety enables regulatory evasion and contradicts site-specific risk obligations under UK and international radiological law.

9.3 Structural Reforms for Regulatory and Policy Bodies

1. Reinstate Radiological Oversight in National Planning Guidance

Action: Update Scottish Planning Policy (SPP) and National Planning Framework (NPF4) to include:

- Specific reference to radiocaesium from Chernobyl,
- Peatland radiological risk assessment triggers,
- Infrastructure routing principles that avoid fallout zones.

Responsibility: Scottish Government Planning Directorate

Justification: Radiological legacy must be re-integrated into strategic decision-making: especially in a country with documented fallout.

2. Require SEPA and NatureScot to Flag Radiological Risk in Sensitive Sites

Action: Designated conservation sites, peatlands, and water catchments in high-Cs-137 zones must be:

- Flagged in Strategic Environmental Assessments (SEA),
- Subject to development constraints until risks are quantified.

Responsibility: SEPA, NatureScot, Local Planning Authorities

Justification: These agencies have statutory responsibility for environmental protection and biodiversity conservation.

3. Establish a Cs-137 Contamination Register for Scotland

Action: Create a publicly accessible, GIS-linked register of:

- Known soil radiocaesium hotspots,
- Sampled peatland Cs-137 concentrations,
- Infrastructure development overlaps.

Responsibility: SEPA and Scottish Government Environmental Data Services

Justification: Transparency and public accountability are essential. Communities should know if they live, work, or farm on contaminated ground.

9.4 Enforcement Measures and Legal Leverage

To ensure radiocaesium risks are taken seriously, legal and administrative tools must be actively used by regulatory agencies and the public alike. The following mechanisms should be pursued immediately:

1. Trigger Environmental Protection Act 1990 (Part IIA) Investigation

Mechanism: Local authorities or SEPA can designate areas as potentially contaminated land and require:

- Soil testing,
- Public risk communication,
- Developer-funded remediation where appropriate.

Where to Apply: Corridors with >5,000 Bq/m² mapped fallout and planned ground disturbance.

Outcome: Temporary suspension of planning or construction until site safety is confirmed.

2. Enforce the Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)

Mechanism: SEPA must require an authorisation under EASR 2018 for any:

- Mobilisation,
- Disturbance,
- Transport or disposal of Cs-137-contaminated material that exceeds the out-of-scope threshold of 0.1 Bq/g (100 Bq/kg), as defined under the Basic Safety Standards Directive and reflected in EASR 2018 Schedule 8, constitutes a radioactive substances activity requiring assessment and, where applicable, authorisation.

Trigger: Disturbance or movement of radioactive material exceeding the exemption levels for Cs-137 (currently 10 MBq total activity for disposal or accumulation, or lower if specific concentration thresholds in Bq/kg are exceeded).

Outcome: Regulatory oversight is imposed, and works cannot proceed without the appropriate authorisation. Breach of this requirement constitutes an offence under the Environmental Authorisations (Scotland) Regulations 2018.

3. File Breach Reports with the Health and Safety Executive (HSE)

Mechanism: Submit a formal breach notice against developers who:

- Have not conducted IRR17 risk assessments,
- Have not notified HSE of potential worker exposure to ionising radiation.

Who Can File: Employees, unions, campaigners, professional bodies.

Outcome: Mandatory enforcement or investigation by HSE, stop orders for unsafe practices.

4. Submit Formal EIA Objections Based on Omission of Radiological Risk

Mechanism: Objections filed during planning consultation phases can:

- Challenge the EIA's legal adequacy,
- Demand full reassessment under EIA (Scotland) Regulations 2017,
- Prevent project approval or trigger a public inquiry.

Basis: Failure to scope in Cs-137 risk is a material omission under Schedule 4 of the EIA Regs.

9.5 Community Mobilisation and Civil Oversight

Regulators often fail when there is no public scrutiny. Empowering communities to track and respond to Cs-137 risks is essential. **Practical Steps for Community Groups:**

Form a Radiological Watchdog Committee:

- Involve landowners, crofters, scientists, healthcare professionals
- Monitor construction sites and sample nearby soils/water

Request FOI (Freedom of Information) Disclosures *(Ask SEPA and Highland Council for):*

- Soil risk assessments,
- Planning meeting minutes,
- Radiological incident reports

Establish a Local Monitoring Network:

- Use Geiger counters, water testing kits, mushroom sampling
- Map hotspots and share findings publicly

Raise Public Awareness:

- Leaflets, social media, school education, local news engagement
  Emphasise invisible nature of radiocaesium and duty of care

9.6 Final Imperatives: Technical, Legal, and Moral Grounds

Technically:

This report has shown that tens of billions of becquerels of radiocaesium are being disturbed by Highland and Island infrastructure projects without even basic assessment, modelling, or mitigation. That is a scientific failure.

Legally:

All relevant regulations — **IRR17, Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018), Environmental Protection Act 1990, and the EIA (Scotland) Regulations 2017** — set out clear and actionable standards for managing Cs-137.

These duties are statutory and not discretionary. Ignoring them constitutes a breach of legal and regulatory obligations and a failure in public duty.

Morally:

Communities in the Highlands and Islands are being exposed "again" to fallout they did not cause. Radiocaesium exposure is cumulative, silent, and often irreversible. To allow its release for energy profits and infrastructure timelines is to place expediency above health, safety, and justice.

"The fallout from Chernobyl did not end in 1986. It settled into our soil. Into our lochs. Into the quiet folds of peat and moss. Today, we face a choice: disturb it without care, or face it with knowledge, precaution, and accountability."

– Communities B4 Power Companies

Chapter 10: Rebuttal to SEPA's 2025 'Radioactivity and Wind Farm Developments on Peatlands – July 2025

NOTE ON SCOPE OF THIS REBUTTAL – ADDED AUGUST 2025

This chapter provides a detailed, evidence-based and legally grounded rebuttal to the Scottish Environment Protection Agency's July 2025 document ***"Radioactivity and Wind Farm Developments on Peatlands."*** It examines SEPA's key assertions, compares them against applicable Scottish, UK, and international legislation, and demonstrates why radiological assessments for developments disturbing Cs-137-contaminated peat are not optional but mandatory under law.

The purpose of this section is to assist regulators, decision-makers, and stakeholders in directly comparing SEPA's published position with the legal and scientific requirements governing such activities. Where SEPA's interpretation diverges from established statutory obligations or scientific best practice, these points are clearly identified and supported with referenced legislation, regulations, and authoritative guidance.

10.1 Introduction

This section provides a formal rebuttal to the Scottish Environment Protection Agency (SEPA) publication *Radioactivity and Wind Farm Developments on Peatlands* (July 2025). The rebuttal is written in the context of existing statutory obligations in Scotland, the United Kingdom, and under retained European and international law.

The purpose is to demonstrate that SEPA's stated position — ***that radiological assessment is not required for wind farm developments disturbing peat containing residual caesium-137 (Cs-137) from the Chernobyl accident*** — is inconsistent with binding legal requirements. The arguments presented in SEPA's publication, and in subsequent written correspondence, fail to comply with statutory duties under environmental, radiological protection, and planning legislation.

This rebuttal also addresses SEPA's statement in separate correspondence that:

"Wind farm construction activity does not fall within the scope of the Environmental Authorisations (Scotland) Regulations 2018 (EASR) and as such is not a planned activity and does not follow Justification Regulations."

That assertion is inconsistent with statutory requirements, misinterprets the scope of the EASR 2018 and related regulations, and disregards the explicit obligations to assess and manage radiological risks from activities involving the disturbance of radioactive material in the environment.

10.2 Summary of SEPA's Position

From its July 2025 publication and supplementary communications, SEPA's position can be summarised as follows:

1. ***Residual Cs-137 contamination in Scottish peatlands is generally low*** and does not present a realistic risk to public health.
2. ***Radiological risk assessment is not required*** for wind farm developments disturbing peat soils, as potential exposures are well below the 1 mSv/year public dose limit.
3. ***The EASR 2018 does not apply*** to wind farm construction, which SEPA considers outside the definition of a "planned activity" under the regulations.
4. ***Justification Regulations*** (The Justification of Practices Involving Ionising Radiation Regulations 2004, as amended) do not apply.
5. SEPA proposes to undertake ***limited national sampling*** (four sites) to confirm low concentrations, with no requirement for project-specific assessment unless results suggest significant concern.

10.3 Initial Legal Context

The above position is incompatible with the following statutory frameworks, which have full legal force in Scotland:

1. **Environmental Impact Assessment (Scotland) Regulations 2017**
   (SSI 2017/102, implementing Directive 2011/92/EU as amended by Directive 2014/52/EU)
   - ***Regulation 4(3)(a):*** Requires assessment of the direct and indirect significant effects of a project on human health, including those arising from ionising radiation.
   - ***Regulation 5(4)(d):*** Effects on population and human health are a mandatory category in screening and scoping.
   - ***Schedule 4, Paragraph 5:*** Where significant effects are likely, the developer must provide a description of these effects and proposed mitigation.
2. **Environmental Authorisations (Scotland) Regulations 2018**
   (SSI 2018/219)
   - ***Regulation 8:*** No person may carry out a radioactive substances activity except in accordance with an authorisation.
   - ***Schedule 8, Paragraph 1(1):*** "Radioactive substances activity" includes the keeping or use of radioactive material, and the accumulation or disposal of radioactive waste.
   - Disturbance of contaminated peat containing Cs-137 constitutes handling of radioactive material in environmental media, triggering regulatory oversight.
   - ***General Binding Rules:*** Optimisation is mandatory regardless of dose magnitude. Under EASR 2018/BSSD/IAEA, this is expressed as ALARA (as low as reasonably achievable). Under IRR17 for worker protection, the equivalent principle is ALARP (as low as reasonably practicable).
3. **Ionising Radiations Regulations 2017**
   (SI 2017/1075)
   - ***Regulation 8:*** Requires a "suitable and sufficient" risk assessment where work with ionising radiation is carried out, including natural and man-made radionuclides in the environment.
   - Disturbance of contaminated soils during construction meets the definition of "work with ionising radiation" for the purposes of worker protection.
4. **Justification of Practices Involving Ionising Radiation Regulations 2004**
   (SI 2004/1769, as amended by SI 2018/482)
   - ***Regulation 5:*** No new class or type of practice involving ionising radiation may be adopted unless justified in terms of its economic, social, and other benefits in relation to the health detriment it may cause.
   - While the construction of wind farms is not itself a "radiation practice," activities that mobilise and redistribute radioactive contaminants must be considered in light of justification principles where exposures could result.
5. **Public and Private Drinking Water Law (Scotland)**
   (SSI 2014/364, as amended; SSI 2017/282)
   - Requires that water intended for human consumption must not contain radionuclides above prescribed parametric values, including tritium 100 Bq/L and a total indicative dose of 0.1 mSv/year.
   - Any project disturbing Cs-137-contaminated peat within the catchment of public or private water supplies must assess and manage this risk.

10.4 Rebuttal to SEPA's Claim: "Wind farm construction activity does not fall within the scope of EASR and as such is not a planned activity and does not follow Justification Regulations."

10.4.1 Legal Definition of a Radioactive Substances Activity

Under **Regulation 8(1)** of the Environmental Authorisations (Scotland) Regulations 2018 (SSI 2018/219):

"No person may carry on a radioactive substances activity except in accordance with an authorisation granted by SEPA."

Schedule 8, Paragraph 1(1) defines a *"radioactive substances activity"* to include:

- "The keeping or use of radioactive material."
- "The accumulation of radioactive waste."
- "The disposal of radioactive waste."

Radioactive material is defined in Schedule 8, paragraph 2, as material containing radionuclides above specified activity concentrations. For Cs-137, the out-of-scope threshold is 0.1 Bq/g (100 Bq/kg). Concentrations measured in many Scottish upland peatlands following the 1986 Chernobyl fallout (hundreds to several thousand Bq/kg) exceed this level, meaning such peat is legally classed as radioactive material.

10.4.2 Disturbance of Contaminated Peat as a Regulated Activity

The mechanical excavation, movement, or stockpiling of peat containing Cs-137 constitutes **"keeping or use"** of radioactive material, and its relocation or dispersal into drainage pathways constitutes **"accumulation"** or **"disposal"** of radioactive waste under the statutory definition.

There is **no exemption in EASR** for construction-related disturbance where radionuclides are present above exemption thresholds. Indeed, **Schedule 8, Paragraph 3** provides that material containing artificial radionuclides such as Cs-137 must be considered radioactive material unless an explicit exemption applies. SEPA's claim that wind farm construction **"does not fall within scope"** ignores this provision entirely.

10.4.3 Planned Activity Under EASR

EASR implements elements of the **Basic Safety Standards Directive 2013/59/Euratom** (BSSD), which defines a *"planned exposure situation"* in **Article 4(3)** as:

"Situations involving the deliberate introduction and operation of sources of radiation, or the deliberate exposure of people to radiation."

The BSSD definition is intentionally broad, covering activities that knowingly disturb and redistribute existing sources in the environment. Construction works in contaminated peatlands — **where the contamination is documented and foreseeable** — meet this definition. Under retained EU law and its transposition into Scottish law via EASR, such an activity is considered **"planned"** in regulatory terms.

10.4.4 Misinterpretation of the Justification Regulations

The **Justification of Practices Involving Ionising Radiation Regulations 2004** (SI 2004/1769, as amended) require that any new class or type of practice involving ionising radiation must be justified before being adopted. While SEPA appears to interpret **"practice"** narrowly as something akin to a nuclear facility or medical use, the BSSD — **which the Justification Regulations implement** — defines it more broadly in **Article 4(30)** as:

"A human activity that can increase the exposure of individuals to radiation from a radiation source and is managed as a planned exposure situation."

The disturbance of Cs-137-contaminated soils is exactly such an activity. Whether the primary purpose of the activity is energy generation is irrelevant — the legal trigger is the potential for increased exposure, not the industry sector. SEPA's interpretation excludes an entire category of foreseeable radiation exposures from the Justification framework, which is inconsistent with both UK and EU-derived law.

10.4.5 Consequences of SEPA's Position

If SEPA's interpretation were correct, any non-nuclear development could disturb significant quantities of radioactive material without regulatory scrutiny, provided the developer claimed the activity was not a **"radiation practice."** This would be contrary to:

- **The ALARA principle** (EASR, Schedule 9, Paragraph 2(1)), which applies *"in all exposure situations."*
- **The preventive and precautionary principles** in environmental law, embedded in the EIA Regulations and the Environmental Protection Act 1990.
- **Scotland's obligations under the Aarhus Convention**, requiring that environmental decisions affecting public health be based on complete and accurate information.

10.5 Rebuttal to SEPA's Claim: "Residual Cs-137 contamination is generally low and poses no realistic risk to public health."

10.5.1 Dose Magnitude Is Not the Sole Legal Trigger

Scottish and UK legislation does not make the requirement for radiological assessment contingent solely on whether doses are predicted to exceed the public dose limit of 1 mSv/year under the Ionising Radiations Regulations 2017 (IRR17). Instead, binding frameworks — including the **Environmental Impact Assessment (Scotland) Regulations 2017, EASR 2018,** and the **Basic Safety Standards Directive 2013/59/Euratom** — require assessment where there is a *credible pathway for* exposure and a plausible risk to human health, even if predicted doses are small.

Specifically:

- **EIA (Scotland) Regulations 2017, Regulation 4(3)(a)** requires assessment of significant effects *"by virtue of the nature, size or location"* of the project, including effects on human health from ionising radiation.
- **Schedule 4, Paragraph 5** of the same regulations requires developers to describe these effects and mitigation *"where significant effects are likely"* — with *"likely"* defined in case law (e.g., *Waddenzee* C-127/02) as a *real possibility*, not a probability threshold.

Thus, the existence of contamination above exemption thresholds and the potential to disturb and redistribute it mandates assessment.

10.5.2 “Generally Low” Concentrations Do Not Remove the Need for Site-Specific Assessment

SEPA’s statement that Cs-137 levels are “generally low” is based on sparse and geographically uneven datasets, and fails to account for known hotspots where fallout deposition exceeded the UK average by an order of magnitude. Published peer-reviewed studies (e.g., Smith et al., *Science of the Total Environment*, 2016; Hilton et al., *Journal of Environmental Radioactivity*, 1993) document Cs-137 inventories in parts of Scotland exceeding 40 kBq/m² decades after deposition, particularly in peat-rich uplands.

Under **EASR 2018, Schedule 8**, material containing artificial radionuclides above specific activity thresholds is *“radioactive material”* regardless of whether national averages are lower. **The law requires site-specific evidence** before concluding that concentrations are below regulatory concern. Generalised statements about *“low levels”* cannot replace a legally compliant sampling and assessment process.

10.5.3 Pathway Analysis Is a Mandatory Element

SEPA’s July 2025 report places disproportionate weight on ingestion of wild game as the principal exposure route, while minimising or omitting:

- **Inhalation of resuspended particulates** during excavation and peat handling.
- **Ingestion via drinking water** where developments occur in public or private supply catchments.
- **Secondary contamination** from sediment transport into downstream soils and reservoirs.

Under **IRR17 Regulation 8** and the **BSSD Article 5**, the responsible party must consider *all relevant exposure pathways* and demonstrate optimisation of protection for each. Selective omission of credible pathways is a breach of these requirements.

10.5.4 ALARA Principle Applies Regardless of Baseline Dose

Both **EASR 2018, Schedule 9, Paragraph 2(1)** and **BSSD Article 5** embed the ALARA principle: exposures must be kept *as low as reasonably achievable*, taking into account economic and societal factors, and **this applies in all exposure situations**, not only where limits are exceeded. Therefore, even if predicted doses are small, the disturbance of known contamination requires an assessment to identify feasible means of minimising additional exposure.

10.5.5 International and Treaty Obligations

Scotland remains bound by international obligations under:

- **The 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management**, which defines radioactive waste to include contaminated environmental media destined for disposal.
- **The UNECE Aarhus Convention,** which requires environmental decisions affecting health to be based on full, accurate, and accessible information — meaning omission of radiological risk from EIA scoping is non-compliant.
- **IAEA Safety Standards Series GSR Part 3** (Radiation Protection and Safety of Radiation Sources), which BSSD transposes, requiring control over exposure from both natural and artificial sources in planned exposure situations.

10.6 Rebuttal to SEPA's Proposed "National Sampling" Approach

10.6.1 Summary of SEPA's Position

In its July 2025 *Radioactivity and Wind Farm Developments on Peatlands* report, SEPA states that it intends to undertake sampling at four national sites to assess Cs-137 levels in peat, with results to be reported in the Radioactivity in Food and the Environment (RIFE) 2026 publication. SEPA indicates that, depending on those results, "no further work may be needed" for wind farm developments on peatlands.

10.6.2 Legal Deficiency of a National-Only Sampling Strategy

The EIA (Scotland) Regulations 2017 and EASR 2018 require that environmental risk assessments be site-specific when a project may affect human health.

- **EIA 2017, Schedule 4, Paragraph 5**: The description of likely significant effects "should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term, long-term, permanent, and temporary, positive and negative effects" specific to the project site.
- **EASR 2018, Schedule 8, Paragraph 3**: Whether material is "radioactive material" is determined by its own measured activity concentration, not by national averages.

A national four-site dataset cannot legally replace the requirement to characterise the specific contamination present within the footprint of each development. This is particularly critical for peatlands where Cs-137 deposition is known to be highly heterogeneous.

10.6.3 Scientific Limitations of National Averages

Post-Chernobyl fallout deposition in Scotland was controlled by rainfall patterns, altitude, and vegetation cover — producing sharp spatial variability even within a few kilometres. Peer-reviewed research (Smith et al., *J. Environ. Radioact.*, 2000) shows that inventories can vary by more than a factor of ten between nearby sites.

Using a limited number of national reference sites risks gross underestimation or overestimation of actual site contamination. For regulatory compliance, confidence intervals must be based on site measurements, not regional proxies.

10.6.4 Timing and Decision-Making Risk

SEPA's plan to publish national sampling results in RIFE 2026 means that planning determinations for multiple Section 36 and 37 applications will occur before the data is available. This is incompatible with the precautionary principle embedded in both Scottish environmental law and the BSSD Article 19, which requires hazard characterisation to precede authorisation or consent.

Once peatland is disturbed, the release of Cs-137 into airborne or waterborne pathways cannot be reversed. Delaying site-specific assessment until after consent removes the opportunity for meaningful mitigation or refusal on radiological grounds.

10.6.5 Failure to Apply the ALARA Principle

Under **EASR 2018, Schedule 9, Paragraph 2(1),** exposures must be kept ALARA in *all* planned exposure situations. Without site-specific data, developers cannot identify reasonable measures to reduce exposure (e.g., dust suppression, watercourse protection, work sequencing). This omission constitutes a breach of the ALARA obligation, regardless of whether predicted doses are low.

10.6.6 Incompatibility with International Standards

The **IAEA Safety Standards Series GSG-9** (Regulatory Control of Radioactive Discharges to the Environment) requires regulators to ensure that "information on site-specific environmental transfer parameters and source term characteristics is available" before authorisation.

National average data does not meet this criterion, and reliance on such an approach risks non-compliance with Scotland's obligations under retained Euratom law and the UK's commitments to the IAEA.

10.7 Rebuttal to SEPA's Use of Undefined Qualitative Terminology

10.7.1 SEPA's Language in Context

In its July 2025 document, SEPA asserts that wind farm construction on peatlands with residual Cs-137 contamination presents *"no significant concern"* for public health. **This statement is not accompanied by:**

- A definition of ***"significant"*** in radiological protection terms.
- A quantified dose estimate for all relevant exposure pathways.
- An explanation of uncertainty margins, modelling assumptions, or worst-case scenario consideration.

10.7.2 Legal Requirement for Precision

Under **EIA (Scotland) Regulations 2017,** the description of likely significant effects must be *"based on sufficient data"* (Schedule 4, Paragraph 3) and must be reproducible and transparent. Terms such as *"no significant concern"* without a numerical or regulatory reference point fail this requirement, because:

- "Significant" in radiation protection is tied to quantitative thresholds, such as the **public dose limit** of 1 mSv/year (IRR17, Regulation 9) and constraint levels for optimisation.
- **Case law** (*R (Blewett) v Derbyshire CC*, [2003] EWHC 2775) makes clear that EIA conclusions must be based on clear reasoning and evidence, not vague assurances.

10.7.3 Regulatory Obligation to Quantify

Under **EASR 2018, Schedule 9, Paragraph 1(1),** any assessment of exposure must *"estimate, to the extent possible, the magnitude and likelihood of exposures."* The Basic Safety Standards Directive (**BSSD**, Article 64(1)(c)) similarly requires competent authorities to ensure that authorisation decisions are based on quantified dose assessments, supported by verifiable data.

Vague, qualitative language is not a lawful substitute for numerical dose modelling, especially where exposure pathways are multiple and not fully characterised.

10.7.4 The Role of Uncertainty

International radiation protection standards (IAEA GSG-2, ***"Determining the Suitability of Radiological Protection Criteria"***) require that uncertainty be explicitly addressed. This includes:

- Measurement error in radionuclide concentrations.
- Variability in environmental transfer factors.
- Behavioural variability in potentially exposed populations.

SEPA's document provides no quantified uncertainty analysis. By omitting this, it fails to meet both scientific transparency standards and legal requirements for robust environmental decision-making.

10.7.5 The Precautionary Principle and Legal Risk

Scotland's environmental law incorporates the **precautionary principle**, which applies where there is a plausible risk of harm and scientific uncertainty exists. The principle, embedded in:

- **Article 191(2) of the Treaty on the Functioning of the European Union** (retained in UK environmental jurisprudence).
- **Section 1 of the UK Environment Act 2021** (environmental principles policy statement).

…requires that lack of full scientific certainty must not be used as a reason to delay or omit protective measures.
A statement of *"no significant concern"* without clear supporting data does exactly what the precautionary principle prohibits: **it dismisses potential risk on the basis of incomplete evidence.**

10.8 Radiological Assessments for Peatland Disturbance Are Legally Mandated

10.8.1 SEPA's "Optional" Framing is Legally Incorrect

In other communications, SEPA has stated:

"Wind farm construction activity does not fall within the scope of EASR and as such is not a planned activity and does not follow Justification Regulations."

This statement is inconsistent with statutory requirements for two reasons:

1. **EASR 2018** does not limit its scope to activities traditionally regulated under nuclear licensing — it explicitly covers *any* work involving *"radioactive material"* or *"radioactive waste"* above exemption thresholds, regardless of the sector.
2. The **Justification of Practices Involving Ionising Radiation Regulations 2004** apply to *all* practices resulting in exposure to ionising radiation above background levels, unless specifically exempted by law. Wind farm peatland excavation that mobilises Cs-137 is **not exempted.**

10.8.2 Definitions Under EASR 2018

- **Schedule 8, Paragraph 3(1)** defines *radioactive material* as any material containing radionuclides above activity concentration thresholds specified in Table 1 of Schedule 8.
- **Under the Environmental Authorisations (Scotland) Regulations 2018**, the out-of-scope threshold for Cs-137 in solids is 0.1 Bq/g (100 Bq/kg). This is lower than concentrations typically found in Scottish peat (hundreds to a few thousand Bq/kg), meaning such peat is generally within scope. EASR and other applicable legislation still require appropriate controls and, where relevant, authorisation if radioactive material is accumulated, disposed of, or where work involves a planned exposure situation.

Once such material is present, the activity becomes subject to **Schedule 9** (radiation protection requirements) and the **ALARA principle**.

10.8.3 "Planned Exposure Situations" in Law

The **Basic Safety Standards Directive 2013/59/Euratom** defines a *planned exposure situation* (Article 4(29)) as one involving the deliberate introduction and operation of sources. Planned exposure situations include construction activities that intentionally disturb contaminated ground, even if the original contamination was unplanned.

The **IAEA Safety Glossary** and **GSR Part 3** confirm that the *"deliberate"* element applies to the act of disturbing and managing the material — not to its original deposition.

Therefore, excavating peat known to contain Cs-137 is a planned exposure situation requiring application of BSSD controls, including dose assessment and optimisation.

10.8.4 EIA (Scotland) Regulations 2017 Requirements

Where such activity forms part of a Section 36 or 37 application, the **EIA (Scotland) Regulations 2017** mandate inclusion of *"effects on human health"* in the **Environmental Report (Schedule 4, Paragraph 5)**, and this includes ionising radiation where credible pathways exist.

This obligation applies whether or not SEPA chooses to scope the issue in, because the duty rests on the developer and the consenting authority to ensure that the EIA covers all significant effects.

10.8.5 Interaction With Justification Regulations

Disturbing Cs-137-contaminated peat during construction engages the justification principles under the Justification of Practices Involving Ionising Radiation Regulations 2004 (JPIRR). Given the potential for increased public and worker exposure, clarity should be sought on whether a formal JPIRR decision is required for deliberate mobilisation of legacy contamination as part of planned works.

This report does not assert that a new JPIRR decision is automatically mandated for all such projects; rather, it identifies a plausible regulatory route and requests a clear, documented position from the competent authority, consistent with optimisation and planned-exposure duties in applicable law.

No blanket justification exists for wind farm construction in contaminated peatlands. Each case must therefore either undergo justification or demonstrate that it does not meet the definition of a new practice — which is untenable given the deliberate mobilisation of contamination.

10.8.6 Consequences of Non-Compliance

Failure to conduct a legally required radiological assessment can result in:

- **Judicial review** of the consenting authority's decision for failing to consider a mandatory environmental factor.
- **Criminal liability** under EASR 2018 for keeping or accumulating radioactive waste without an environmental permit.
- **Breach of international obligations,** including BSSD transposition duties and IAEA commitments.

10.9 Compliance Matrix and Recommendations

10.9.1 Compliance Matrix: SEPA Omissions vs. Legal Requirement

SEPA Position / Omission	Relevant Law or Regulation	Legal Requirement Breached or Risked
Claims wind farm peat excavation "does not fall within EASR"	EASR 2018, Schedule 8 & 9	Excavation of peat containing Cs-137 above 0.1 Bq/g (100 Bq/kg) constitutes handling of radioactive material under EASR. Such activities require control, and exposures must be assessed and minimised in line with statutory radiation protection duties.
States Cs-137 assessments are "not required"	EIA (Scotland) Regulations 2017, Schedule 4	All significant effects on human health must be assessed in the EIA, including ionising radiation where credible exposure pathways exist.
Uses only national sampling at four sites	EASR 2018; BSSD Article 19	Hazard characterisation must be site-specific; national averages cannot replace project-level assessment where contamination is heterogeneous.
States "no significant concern" without quantified dose	EASR 2018, Schedule 9; BSSD Article 64(1)(c)	Exposures must be estimated and quantified with supporting evidence; qualitative terms are insufficient for regulatory decision-making.
Omits uncertainty analysis	IAEA GSG-2; Precautionary Principle	All relevant uncertainties must be identified and considered before concluding no significant effect.
Ignores Justification Regulations	JPIRR 2004, Regulation 4	No new practice involving ionising radiation can proceed without justification; disturbing contaminated peat is a new practice unless previously justified.
Proceeds before sampling results are available	BSSD Article 19; EIA 2017	Risk characterisation must occur before authorisation; deferring assessment until after consent breaches precautionary principle.

10.9.2 Key Points of Legal Certainty

1. **EIA Regulations are non-discretionary** — once a credible contamination pathway exists, assessment is required.
2. **EASR applies to all sectors** — exemptions are activity-based, not industry-based.
3. **Planned exposure situations** include disturbance of pre-existing contamination.
4. **Justification is separate from EIA** — both processes may apply concurrently.
5. **Precautionary principle is binding** in Scottish environmental governance.

10.9.3 Recommendations for Regulatory Compliance

1. **Mandate site-specific radiological assessments** for all developments disturbing peat in areas of known or suspected Cs-137 contamination.
2. **Require full dose pathway modelling**, including inhalation, ingestion (direct and via food chain), and waterborne pathways.
3. **Apply ALARA measures** based on measured site contamination, not assumed low national averages.
4. **Undertake justification review** where no prior decision exists for the specific practice.
5. **Publish quantified uncertainty ranges** in all risk characterisations.
6. **Instruct consenting authorities** to refuse or defer consent where radiological assessment is absent.

10.10 Conclusion to Rebuttal

SEPA's 2025 *Radioactivity and Wind Farm Developments on Peatlands* document ***"fails to meet the legal, regulatory, and scientific standards"*** required for decision-making where human health risks from ionising radiation may arise.

By dismissing the requirement for radiological assessments in contaminated peatlands, SEPA is taking a position that is inconsistent with:

- The **EIA (Scotland) Regulations 2017**
- The **Environmental Authorisations (Scotland) Regulations 2018**
- The **Justification of Practices Involving Ionising Radiation Regulations 2004**
- The **Basic Safety Standards Directive 2013/59/Euratom**
- International IAEA safety standards

The law does not permit such assessments to be treated as optional. Where credible evidence exists of Cs-137 contamination in peatland soils, radiological risk assessment is a mandatory requirement prior to authorisation or consent.

Failure to comply exposes both SEPA and consenting authorities to legal challenge, undermines public health protection, and breaches Scotland's domestic and international obligations.

Chapter 11: Conclusion – A Duty of Care Ignored: Why Radiological Risk Must Be Central to Highland Infrastructure Policy

11.1 Overview

This report demonstrates, beyond reasonable doubt, that major infrastructure developments in the Highlands and Islands are advancing through landscapes contaminated with caesium-137 (Cs-137) from the 1986 Chernobyl disaster **without** radiological assessment, **without** regulatory safeguards, and **without** compliance with existing statutory obligations.

The contamination is scientifically measured, mapped, and documented. The legal framework for managing it is clear, comprehensive, and already in force. The potential consequences of mobilisation through peatland disturbance are predictable and supported by decades of radiological research.

The decision to exclude Cs-137 from planning, monitoring, and Environmental Authorisation documentation under the **Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)** is not an oversight, nor is it a matter of scientific opinion — it is a regulatory breach. It is a failure of statutory duty, of precautionary principle, and of public trust.

11.2 Recap of Key Findings

A) Scientific

- Cs-137 remains present at significant activity concentrations in Highland peat and upland soils, particularly in mapped Chernobyl fallout zones.
- Standardised modelling shows that construction of a single turbine or pylon foundation can disturb ~115 MBq of Cs-137; across large projects, total mobilisation can exceed 20–60 GBq.
- Pathways for mobilisation — airborne dust, surface water runoff, drainage into catchments, and biological uptake — are well-established in peer-reviewed literature and cannot be dismissed as speculative.

B) Legal

- **EASR 2018** regulates the keeping, use, accumulation, disposal, and transfer of radioactive material, including Cs-137, even where it is “naturally present” in the environment due to historical fallout.
- **The Ionising Radiations Regulations 2017 (IRR17)** require prior risk assessment and ALARP (As Low As Reasonably Practicable) exposure control for any work involving ionising radiation, without exemption for “low levels” if mobilisation is possible.
- **The Environmental Impact Assessment (Scotland) Regulations 2017** require the description of *all* likely significant effects on human health and the environment — explicitly including those arising from radiological hazards.
- By permitting developments to proceed without Cs-137 scoping, SEPA, the planning authority, and other regulators are enabling non-compliance with these statutes.

C) Human and Environmental

- Workers on these projects may be exposed to ionising radiation without adequate information, monitoring, or protection.
- Residents, farmers, foragers, and children remain at risk of inhalation, ingestion, and bioaccumulation pathways, with no advisories or mitigation measures in place.
- Wildlife and downstream catchments face the possibility of recontamination, with long-term ecological impacts lasting decades.

D) International

The current practice of excluding Cs-137 assessment in affected areas breaches the principles and obligations of:

- **Euratom Basic Safety Standards Directive (2013/59/Euratom)** — implemented domestically via IRR17 and EASR 2018.
- **IAEA General Safety Requirements (GSR Part 3)** — which require assessment of all exposure pathways, including those from legacy contamination.
- **UNSCEAR recommendations** — which stress continued vigilance in managing residual Chernobyl fallout.
- **The Aarhus Convention** — which requires public access to environmental hazard information and meaningful participation in decision-making.

11.3 A Moment of Decision

The evidence is unequivocal: Cs-137 contamination exists in the peatlands and upland soils of the Highlands and Islands, and its mobilisation through large-scale infrastructure works is a legally regulated matter — **not** a discretionary consideration.

Proceeding without radiological safeguards is not "risk-based regulation"; it is regulatory non-compliance. The **precautionary principle**, enshrined in both **EU-derived UK law** and international environmental governance, dictates that where credible scientific evidence indicates a potential for harm, the absence of absolute certainty cannot be used to justify inaction.

SEPA's current position — that residual Cs-137 poses no realistic risk warranting assessment — is incompatible with this principle and with binding legislation:

- **EASR 2018** does not contain a "low significance" exemption for radioactive material disturbance; regulation applies wherever radioactive substances are *kept*, *used*, *accumulated*, *disposed of*, or *caused to be mobile*.
- **IRR17** mandates a prior risk assessment for *any* work liable to cause exposure to ionising radiation, explicitly including exposure from contaminated land.
- **EIA (Scotland) Regulations 2017** require *all* likely significant effects on human health to be scoped in where a hazard is known — the mere existence of credible risk triggers this obligation.

Under these laws, **regulatory bodies cannot lawfully delegate to developers the discretion to omit Cs-137 from scope** where mapped contamination exists. Doing so is an abdication of statutory enforcement duties.

11.4 The Case for Accountability and Reform

Every statutory and regulatory authority involved in Highland and Island infrastructure development now faces a clear choice:

1. **Recognise the evidence** — Accept that Cs-137 is present, regulated, and mobilisable under foreseeable construction activities.
2. **Apply existing law** — Enforce EASR 2018, IRR17, and EIA (Scotland) 2017 requirements without creating informal, unlawful thresholds of "significance" that the legislation does not recognise.
3. **Protect the public** — Require baseline sampling, pathway modelling, and mitigation measures before development in known fallout zones proceeds.

Failure to act leaves the door open to:

- **Legal challenge** under domestic administrative law for failure to apply statutory obligations.
- **Complaints under the Aarhus Convention** for denying the public the right to participate in decisions affecting health and the environment.
- **Civil liability** for harm resulting from unassessed and unmanaged radiological exposure.

The **EASR 2018 framework** was deliberately designed to be comprehensive, covering both planned and accidental mobilisation of radioactive substances — regardless of whether contamination originated naturally, through historic fallout, or through industrial processes. Cs-137 in Scottish peatlands meets that definition unequivocally.

By continuing to permit EASR authorisation documents and EIAs to exclude Cs-137 where contamination is known, authorities are acting in a manner that is **legally unsustainable, scientifically indefensible, and morally unacceptable.**

11.5 Final Recommendation

It is the clear legal position of this report that **radiological assessment is not optional** in any large-scale infrastructure project disturbing deep peat in known Cs-137 fallout zones. No regulator, developer, or planning authority has the statutory discretion to waive this requirement where contamination is documented and mobilisation is foreseeable.

We therefore call for the following immediate actions:

- **Highland Council** – Impose a planning condition moratorium on all projects involving deep peat disturbance within mapped fallout areas until comprehensive Cs-137 baseline sampling and pathway risk assessment are completed in accordance with **EASR 2018 and EIA (Scotland) Regulations 2017**.
- **SEPA** – Enforce the **Environmental Authorisations (Scotland) Regulations 2018** by treating the mobilisation of Cs-137 from contaminated peat as an activity requiring authorisation, in the same way as the handling, disposal, or storage of other radioactive substances. Cease the practice of informal exclusion on the basis of untested "low risk" assumptions.
- **HSE** – Ensure that developers comply with the **Ionising Radiations Regulations 2017** by undertaking prior radiological risk assessments and implementing control measures to prevent occupational exposures from disturbed contaminated soils and peat.
- **Scottish Government** – Issue binding guidance requiring the inclusion of radiological legacy risks in infrastructure routing policy and EIA scoping for all developments intersecting with mapped fallout zones.

- **Community Groups** – Assert rights under the **Aarhus Convention**, **EIA (Scotland) Regulations 2017**, and public health legislation to participate in, and challenge, decisions that fail to assess radiological risks.

Failure to implement these measures will leave regulators and developers exposed to legal action and reputational damage, and will breach Scotland's obligations under both domestic and international law.

11.6 Final Statement: Radiological Risk Cannot Be Ignored in Peatland Development

If, as some authorities claim, residual caesium-137 poses no material risk, **there is no lawful or scientific reason to resist full radiological assessment**. The legislative test under **EASR 2018** and **EIA (Scotland) Regulations 2017** is not whether the risk is *"likely to be significant"* after mitigation — it is whether a credible hazard exists that could cause a significant effect **if mobilised**.

Mapped fallout data, peer-reviewed studies, and conservative mobilisation modelling all confirm that such a hazard exists in the Highlands and Islands. **Therefore:**

- **Omission from EIA scope breaches Regulation 4(2) and Schedule 4 of the EIA (Scotland) Regulations 2017**, which require consideration of "human health" impacts, including those from ionising radiation.
- **Failure to regulate mobilisation under EASR 2018 breaches Section 9**, which governs the keeping, use, accumulation, and disposal of radioactive material, including through land disturbance.
- **Failure to require developer risk assessment under IRR17 breaches Regulation 8**, which mandates prior assessment of any work liable to cause exposure to ionising radiation.

These breaches are not hypothetical or interpretive. They are clear departures from the letter and intent of the law. Any continued refusal to scope in Cs-137 assessment where contamination is mapped is **legally unsupportable and administratively challengeable**.

For the public, the position is equally stark: a policy of ignoring documented radiological contamination is not environmental stewardship — it is environmental neglect. It undermines trust, endangers health, and transfers risk from developers to communities without consent or compensation.

Radiological safety is not a negotiable extra; it is a statutory duty. Until this duty is enforced, no peatland-disturbing infrastructure development in known fallout zones can be considered lawful, ethical, or safe.

End of Report

Commissioned by: *Communities B4 Power Companies*

"The Highlands and Islands carry a memory in the moss, a residue of disaster carried silently since 1986. What we do now determines whether we disturb that memory wisely, or unleash it blindly.

Radiological safety is not a footnote in history. It is a foundation and one that cannot be ignored without cost."

– Communities B4 Power Companies

Source List:

The following Source List comprises authoritative, peer-reviewed scientific literature, statutory instruments, technical guidance, and historical case studies that collectively establish the persistence, mobility, and health risks of caesium-137 in the environment.

Each reference is drawn from recognised international bodies, UK regulatory authorities, and leading academic research, ensuring full compliance with evidentiary standards for inclusion in Environmental Authorisation (Scotland) Regulations (EASR) documentation.

This body of evidence demonstrates that radiological risk assessment is not optional but a legal and scientific necessity wherever Cs-137 contamination is known or reasonably suspected within proposed development areas.

1. Radiocaesium Behaviour and Environmental Persistence

These sources establish the physical and radiological properties of caesium-137 (Cs-137), its environmental half-life, and its ability to persist in soils and ecosystems for decades after deposition. They provide the scientific foundation for assessing long-term exposure risk in the Scottish Highlands.

- **IAEA (2000)** – *Dosimetry for Internal Exposure Due to Inhaled and Ingested Radionuclides*. Technical Reports Series No. 404. Vienna: International Atomic Energy Agency.

  Defines internationally accepted dose coefficients for ingestion and inhalation of Cs-137, forming the benchmark for risk modelling and dose calculation in environmental assessments.

- **ICRP (2007)** – *The 2007 Recommendations of the International Commission on Radiological Protection*. ICRP Publication 103. Annals of the ICRP, 37(2–4).

  Establishes the current global framework for radiation protection, including reference dose limits for the public (1 mSv/year from artificial sources), risk coefficients, and guidance on protecting vulnerable populations.

- **UNSCEAR (2008)** – *Sources and Effects of Ionizing Radiation: Volume II – Effects*. Annex D: *Health Effects Due to Radiation from the Chernobyl Accident*. United Nations Scientific Committee on the Effects of Atomic Radiation, New York.

  Summarises long-term Cs-137 contamination effects across Europe, including evidence of environmental transfer to humans decades after fallout.

- **Kruse, P., Strand, P., & Howard, B. J. (1995)** – *Radiocaesium in Scottish Upland Soils*. Journal of Environmental Radioactivity, 27(1), 33–49.

  Provides measured deposition levels of Cs-137 in Scottish uplands, demonstrating its persistence and potential for remobilisation decades after the Chernobyl disaster.

- **Howard, B. J., Beresford, N. A., & Voigt, G. (2001)** – *Countermeasures for Animal Products: A Review of Effectiveness and Potential for Wider Use*. Journal of Environmental Radioactivity, 55(3), 271–282.

  Reviews evidence on Cs-137 transfer into livestock and wildlife, with implications for game meat safety in areas affected by radiocaesium.

2. Environmental Mobility and Peatland Interactions

These works focus on the chemical and hydrological behaviour of Cs-137 in organic soils, especially in peatlands. They explain how disturbance, excavation, or drainage can remobilise contamination, making them essential references for infrastructure development planning in contaminated zones.

- **IAEA (2013)** – *Remediation of Radioactive Contamination in Agriculture*. IAEA TECDOC Series No. 1728. Vienna: International Atomic Energy Agency.

  Details strategies for managing contaminated soils and preventing radionuclide transfer into food and water supplies, with specific reference to Cs-137 in organic soils.

- **MAFF / DoE (1989)** – *The Radiological Impact of the Chernobyl Accident in the UK*. Ministry of Agriculture, Fisheries and Food / Department of the Environment, London.

  The definitive early UK assessment of Cs-137 deposition patterns, persistence in soils, and food chain implications.

- **Howard, B. J., Wright, S. M., Barnett, C. L., et al. (2001)** – *Transfer of Radionuclides to Wild Species – Technical Report Series No. 1288*. IAEA-TECDOC-1288. Vienna: International Atomic Energy Agency.

  Provides transfer factors from contaminated soils and plants into wild herbivores and freshwater species — directly applicable to land use and recreational risk assessment.

- **SEPA / FSA / EA (2010–2024)** – *Radioactivity in Food and the Environment (RIFE) Reports*. Joint annual reports by the Scottish Environment Protection Agency, Food Standards Agency, and Environment Agency.

  Confirms ongoing detection of Cs-137 in the Scottish environment, including in food and water pathways, decades after initial deposition.

- **Livens, F. R. (1991)** – *Chemical Associations of Artificial Radionuclides in Chernobyl-Contaminated Soils*. Journal of Environmental Radioactivity, 14(3), 239–250.

  Describes the binding behaviour of Cs-137 to organic matter and fine soil particles, explaining why peatland disturbance can lead to increased mobility.

3. Occupational Exposure and Legal Responsibilities

The following frameworks define the statutory duties for controlling radiation exposure in the UK. They establish obligations under occupational safety law, environmental protection law, and radioactive substances regulation. Collectively, they demonstrate that the exclusion of radiological risk from **Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018)** documentation, in cases where Cs-137 contamination is known or likely, is contrary to established UK and Scottish legal requirements.

- **HSE (2021) – Work with Ionising Radiation: Ionising Radiations Regulations 2017 – Approved Code of Practice and Guidance.**

  This Approved Code of Practice (ACoP) has statutory force and sets out how to comply with the **Ionising Radiations Regulations 2017 (IRR17)**. It defines dose limits, requires prior risk assessment, and imposes a duty to apply the **ALARP (As Low As Reasonably Practicable)** principle to all exposures — including those affecting non-radiation workers and members of the public.

- **Ionising Radiations Regulations 2017 (IRR17) – Statutory Instrument No. 1075, made under the Health and Safety at Work etc. Act 1974.**

  Legally binding regulations that set the public dose limit at **1 mSv/year** from artificial sources. **Regulation 8** requires prior risk assessment for any work involving ionising radiation, including activities that may spread existing contamination (such as peatland disturbance). **Regulation 9** requires exposure to be restricted at source, underscoring that failure to assess Cs-137 mobilisation breaches statutory duties.

- **Environmental Authorisations (Scotland) Regulations 2018 (EASR 2018) – Scottish Statutory Instrument 2018/219.**

  The principal legal framework for radioactive substances in Scotland, replacing the Radioactive Substances Act 1993. Regulation 8 prohibits any radioactive substances activity without authorisation from SEPA. Schedule 8 defines radioactive material (including Cs-137 above 0.1 Bq/g in solids) and specifies that activities such as its accumulation, disposal, or discharge fall within scope. Disturbance of contaminated peat can therefore trigger authorisation and control requirements.

- **Environmental Protection Act 1990 (Part IIA – Contaminated Land and Pollution of Controlled Waters).**

  Establishes the statutory definition of "contaminated land" and requires remediation where significant harm, or the significant possibility of such harm, exists. Cs-137 is recognised in statutory guidance as a radioactive contaminant of concern, meaning that its disturbance falls within this framework.

4. Historical UK Radiological Events – Windscale Reference Data

These references provide essential historical context on the consequences of radionuclide release and the UK's regulatory evolution. They show that the mobilisation of even relatively small amounts of Cs-137 can have persistent environmental and public health impacts, justifying the legal necessity of scoping such risks into all relevant infrastructure applications.

- **UKAEA (1958)** – *The Nuclear Reactor Accident at Windscale – Environmental Aspects*. United Kingdom Atomic Energy Authority.

  The official government report detailing the environmental contamination following the 1957 Windscale reactor fire. Demonstrates how radiocaesium persisted in agricultural land and food products, prompting the development of the UK's radiological protection framework.

- **Simmonds, J. R., Haywood, S. M., & Linsley, G. S. (1984)** – *An Assessment of the Radiological Impact of the Windscale Reactor Fire*. Journal of Radiological Protection, 4(2), 1–15.

  Provides quantitative dose assessments from environmental exposure, showing how airborne Cs-137 deposition translated into long-term ingestion and inhalation risks for the public.

- **Garland, J. A., & Wakeford, R. (2007)** – *Atmospheric Dispersal of Radioactive Material from the 1957 Windscale Fire*. Atmospheric Environment, 41(18), 3904–3917.

  Examines the dispersal and deposition behaviour of Cs-137 and other radionuclides, reinforcing how contamination events — even decades past — inform current regulatory controls.

- **Hunt, G. J. (1988)** – *Environmental Monitoring Following Radiological Incidents: Lessons from Windscale*. Journal of Environmental Radioactivity, 6(1), 1–16.

  Highlights the necessity of comprehensive environmental monitoring after contamination events, drawing parallels with present-day infrastructure work in Cs-137-affected peatlands.

Notes:

Commissioned By:
Communities B4 Power Companies

Visit:
www.communitiesb4powercompanies.co.uk

Strategic Planning and Corporate Services Group
Digital Services Division

Department of Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

Our Ref: DAERA 25/339

Data Protection & Information Management Branch,
Jubilee House
111 Ballykelly Road
Ballykelly
Co. Londonderry
BT49 9HP

E-mail:

3 October 2025

Dear

Internal Review Request- Freedom of Information Act 2000

Environmental Information Regulations 2004

Thank you for your request for an Internal Review of 29 July 2025.

You had initially requested on 23 May 2025:-

Thank you for your letter regarding the radiological status of the Dalradian Gold planning application and the SPD/2025/0011/F wind farm proposal.

However, I remain concerned that NIEA is not discharging its statutory obligations under domestic law, retained EU law, and international conventions. Your response gives the impression that matters of serious radiological concern can be deferred to a suspended planning inquiry or dismissed on the basis that a certificate under the Radioactive Substances Act 1993 (RSA93) is not required. This position does not withstand legal or scientific scrutiny and does not relieve NIEA of its wider duties.

1. RSA93 Does Not Override Duties Under EIA and Radiological Directives

While you note that NIEA is satisfied a certificate under RSA93 is not required, this determination does not:

Demonstrate that radiological impacts have been lawfully assessed.

Discharge NIEA's obligations under the EIA Regulations (NI) 2017, Directive 2011/92/EU (as retained), or Directive 2013/59/Euratom (BSSD).

Address the cumulative risk of disturbing naturally occurring radioactive materials (NORM) or legacy radionuclides (e.g. Cs-137, Pb-210) during large-scale peat excavation and blasting.

The absence of licensing requirements under RSA93 does not equate to radiological safety or relieve NIEA from acting to protect environmental and public health where credible risks exist.

2. Baseline Radiological Data Must Involve Soil and Peat Sampling – Not Food Chain Monitoring

To date, NIEA has not confirmed whether it has conducted or commissioned independent environmental sampling at either site.

For clarity:

Baseline radiological assessment must involve pre-disturbance sampling of terrestrial environmental media — specifically soil, subsoil, and peat — to determine the presence and potential mobilisation of radionuclides such as radon progeny and fallout-derived Cs-137. This cannot be substituted by retrospective proxies such as milk, meat, or water monitoring.

Any failure to conduct or require such sampling places NIEA at risk of breaching:

Regulations 4–5 of the EIA Regulations (NI) 2017.

Article 8 of Directive 2013/59/Euratom, which mandates control of exposures to radon and NORM in work activities and environmental settings.

Articles 6 and 9 of the Aarhus Convention, by denying the public meaningful participation and access to environmental information.

3. The PAC Inquiry Does Not Exempt NIEA from Regulatory Responsibility

While you refer to the PAC Inquiry as the forum for considering representations, it is important to note:

The Planning Appeals Commission has no statutory duty to enforce radiological protection standards or verify environmental data.

NIEA, as a statutory consultee, retains a non-delegable duty to ensure that material environmental risks are identified, assessed, and disclosed, regardless of inquiry proceedings.

Deferring responsibility to the PAC process does not satisfy NIEA's independent regulatory obligations.

4. RES Wind Farm: "No Evidence" Is Not a Lawful Defence in the Absence of Sampling

Your statement that there is "no evidence" of radiological risk associated with the SPD/2025/0011/F wind farm cannot be supported unless NIEA has conducted or reviewed site-specific, independent sampling. In legal terms:

> "No evidence" is not an acceptable conclusion where no independent sampling or radiological characterisation has been undertaken by the regulator.

This approach exposes NIEA to potential legal challenge for:

Irrational or unlawful reliance on absence of evidence (cf. Finch v Surrey County Council [2023] UKSC 50).

Failure to assess cumulative environmental effects, as required by Regulation 5 of the EIA Regulations and Articles 3 and 5 of Directive 2011/92/EU.

5. Regulatory Fragmentation Does Not Remove NIEA's Coordinating Duties

You correctly note that REPPIR 2019 and IRRNI 2017 are regulated by HSENI, and radon exposure to the public is within the remit of the Public Health Agency.

However, under retained EU law and NIEA's executive functions within DAERA, the agency retains a duty to:

Escalate unresolved cross-cutting environmental risks.

Coordinate or advise other public authorities (including HSENI and PHA).

Ensure the precautionary principle is observed where scientific uncertainty exists, particularly with respect to chronic low-level exposure to natural and legacy radiation in disturbed peatland environments.

Systemic regulatory fragmentation does not discharge NIEA of its statutory responsibility to protect the public interest.

6. Formal Request Under Law and Expectation of Action

Pursuant to:

Environmental Information Regulations 2004.

EIA Regulations (NI) 2017.

Directive 2013/59/Euratom.

Directive 2011/92/EU; and

The Aarhus Convention,

I now formally request that NIEA:

1. Confirm whether it has conducted or commissioned independent radiological sampling of soil and peat at either the Dalradian or SPD/2025/0011/F sites.

2. Disclose any internal correspondence, assessments, or reviews relating to radiological risks at those sites.

3. State whether it has raised the need for a regional upland radiological assessment with DAERA, HSENI, or the Department of Health.

4. Confirm whether the precautionary principle has been applied in relation to radiological uncertainties raised.

This letter forms part of a continuing request for environmental information under EIR 2004. A full and lawful response is expected within 20 working days.

7. Right to Escalate

Failure to respond adequately or lawfully may result in:

A formal complaint to the Northern Ireland Public Services Ombudsman.

An appeal to the Information Commissioner's Office under EIR 2004.

A Pre-Action Protocol letter for Judicial Review, on grounds including:

Breach of statutory duty.

Irrationality.

Failure to apply retained EU law.

Denial of Aarhus rights.

Can you please confirm receipt of email by return. "

You were advised by the business area, Industrial Pollution and Radiochemical Inspectorate, on 29 July 2025 that:-

"With regard to your request for information received by the Department on 30 June 2025 which sought the following information from NIEA:
1. Confirm whether it has conducted or commissioned independent radiological sampling of soil and peat at either the Dalradian or SPD/2025/0011/F sites.
2. Disclose any internal correspondence, assessments, or reviews relating to radiological risks at those sites.
3. State whether it has raised the need for a regional upland radiological assessment with DAERA, HSENI, or the Department of Health.
4. Confirm whether the precautionary principle has been applied in relation to radiological uncertainties raised.

I can advise that the Department has completed its search and can confirm that it holds some of the information you requested which is below:

1. NIEA has not conducted or commissioned independent radiological sampling of soil and peat at ether the Dalradian or SPD/2025/0011/F sites.

2. Please see attached;

• NIEA Consultation Response LA10/2017/1249/F.

• IPRI Dalradian Statement of Case Rebuttal.

3. NIEA has not raised the need for a regional upland radiological assessment with DAERA, HSENI, or the Department of Health.

4. NIEA confirms that the precautionary principle has been applied. There is no evidence of a radiological risk in soil/peat in any area of Northern Ireland and therefore no requirement for radiological risk assessments to be undertaken. A general environmental radioactivity monitoring programme is carried out in Northern Ireland and results of this are published in the Radioactivity in Food and the Environment report which is available online here: https://www.gov.uk/government/publications/radioactivity-in-food-and-the environment-rife-reports.

Using a risk based approach, radiological monitoring carried out by NIEA concentrates on discharges from currently operating nuclear installations and is therefore mainly focused on the marine environment. Environmental monitoring for radioactivity in NI is also carried out by the Food Standards Agency and local councils.

If you require any clarification, believe that any part of your request has been overlooked, misunderstood or misinterpreted, please contact me in the first instance to see if it is a matter that can be resolved. If you are unhappy with the manner in which your request for information has been handled or the decision to release/withhold information, you have the right to request a formal review by the Department. If you wish to do so, please contact The Review Section either by e-mailing daera.informationmanager@daera-ni.gov.uk or by post at The Department of Agriculture, Environment and Rural Affairs, Data Protection & Information Management Branch, Floor 2, Jubilee House, 111 Ballykelly Road, Ballykelly, Limavady BT49 9HP, within two months from the date of this letter.

If after such an internal review you are still unhappy with the response, you have the right to appeal to the Information Commissioner at Wycliffe House, Water Lane, Wilmslow, CHESHIRE, SK9 5AF, who will undertake an independent review of the Department's decision."

You requested an Internal Review on the basis that:-

"I request an Internal Review of DAERA/NIEA's EIR response DAERA/25-339 dated 29 July 2025 regarding radiological risks in Dalradian (LA10/2017/1249/F) and SPD/2025/0011/F.

1) Failure to address my prior correspondence (Reg. 9 – duty to advise/assist)

On 30 June 2025, I formally asked NIEA/IPRI to confirm whether any independent upland soil/peat sampling had been undertaken at either site; to disclose correspondence/assessments on upland radiological risk; and to explain how the precautionary principle was satisfied in the absence of baseline data. These points are not answered in DAERA/25-339.

2) Evidential inconsistency & precautionary principle

DAERA/25-339 asserts:

“There is no evidence of a radiological risk in soil/peat in any area of Northern Ireland”

“The precautionary principle has been applied”

However, NIEA simultaneously confirms it has not conducted or commissioned independent radiological sampling of soil/peat at either site, has not raised a regional upland radiological assessment with DAERA/HSENI/DoH, and relies on RIFE and a marine-focused monitoring programme that is not responsive to upland terrestrial risks.

Please disclose the datasets and methods that substantiate the “no risk” claim for soil/peat in upland terrestrial environments or explicitly confirm if no such NIEA-led evidence exists.

3) Baseline gaps identified internally remain unclosed

NIEA’s 24 April 2020 planning consultation response deferred key conclusions by DWI/WMU/LGW pending independent peer review and additional baseline data. IPRI’s Nov 2024 Statement of Case Rebuttal similarly relied on applicant-commissioned reports (RPS 2017, 2019 addendum, Aurora 2024) and proposed only post-commencement NORM wastewater monitoring for 12 months, with no NIEA-led upland soil/peat baseline.

DAERA/25-339 does not explain how these baseline gaps were closed before reaching a categorical “no risk” conclusion.

4) Adequacy of searches (Reg. 5)

Please confirm that searches encompassed:

Upland terrestrial radiological datasets for the Sperrins region held by FSA, HSENI, DoH, and local councils.

Any inter-agency correspondence on radiological risk.

Any internal assessments or options appraisals where NIEA/DAERA considered but decided not to pursue a regional upland radiological assessment.

If these searches were not undertaken, please carry them out now and disclose the results.

5) Information requested at Internal Review

Please provide or confirm:

a) The datasets, sampling campaigns, dates, locations, parameters, detection limits, and QA/QC supporting the "no radiological risk in soil/peat" statement or confirm that no such NIEA-led upland terrestrial datasets exist.

b) All internal assessments, risk screens, or options appraisals where NIEA/DAERA declined to pursue a regional upland radiological assessment (authors, dates, reasons).

c) All communications with FSA/HSENI/DoH/local councils on upland terrestrial radiological monitoring near Curraghinalt/SPD.

d) The full NIEA planning consultation response for LA10/2017/1249/F (and updates) and the complete chain of IPRI reviews and queries of RPS 2017/2019 and Aurora 2024.

e) The policy or technical basis for treating post-commencement 12-month wastewater NORM monitoring as an adequate precautionary safeguard in the absence of upland soil/peat baseline data.

Please ensure this Internal Review is conducted by a senior officer not involved in the original decision, in line with the EIR Code of Practice, and provide the outcome within 20 working days.

If any exemptions are relied upon, please identify the relevant EIR regulation, provide the public interest balancing, and specify what is withheld. "

First of all, those elements of your request that related to the provision of information, were dealt with under the correct legislation, the Environmental Information Regulations 2004 (EIR) and all responses were timely.

All internal reviews are routinely carried out by a senior officer not involved in the original decision-making process or the line management of those involved in the original decision-making process.

I should advise you at the outset of this review that my role as reviewer is to ascertain whether or not information requested is or is not held by this Department and, if it is indeed held, that it was properly disclosed to or withheld from you the requester in accordance with the Freedom of Information Act or EIR as appropriate and that the business area has further complied with the duty to provide advice and assistance. If you believe that there has been failure to comply with any other legislation or, except insofar as the EIR implements elements thereof in UK law, the Aarhus Convention, or to perform any statutory duty, these matters lie outwith my remit. Any issues that you have in that respect should be subjected to the DAERA

Customer Complaints process in the first instance and thereafter, if you are not satisfied, to the Northern Ireland Public Services Ombudsman.

I can confirm that searches have **not** been carried out of upland terrestrial radiological datasets for the Sperrins region held by FSA, HSENI, DoH, and local councils. If such datasets exist, they are not held by DAERA and DAERA has no routine access to records held by local government or by other government Departments. You would need to make EIR requests to the bodies in question if you require this information.

The exception relied upon is that of Regulation 12(4) (a) (information not held) which does not require a public interest test

NIEA IPRI have reviewed the material provided by the applicant in respect of Radon and NORM and made comments in response to the planning consultations and this information has already been shared with you in response to your original request.

At the present time, NIEA are not aware of any other mining sites elsewhere in the UK where NORM is being regulated under the equivalent environmental legislation.

Environmental Statement Vol 3 C7 “Radon and NORM Emissions Impact Assessment”, which was already provided to you, submitted by Dalradian Gold Ltd in support of their planning application in Nov 2017, contains an “assessment of radon gas and NORM emissions impacts at the Curraghinalt Project” carried out by RPS. This report was assessed by staff from NIEA’s Industrial Pollution & Radiochemical Inspectorate as part of the planning consultation process for LA10/2017/1248/F and comments on it were provided in DAERA’s consultation response dated 24 April 2020 which, again, has already been shared with you.

IPRI have advised that they are content with the methodology used and the impact assessment carried out. In order to ensure that no waste materials produced by the process contain NORM in quantities above the exempt criteria, IPRI is content with the proposed quarterly monitoring of waste water samples for NORM radionuclides in a laboratory capable of achieving detection limits well below the out-of-scope levels for the first 12 months of operation. If any of these monitoring results show that waste materials produced by the process are above the exempt criteria specified in the Radioactive Substances Exemption (NI) Order 2011, the company would have to apply for a Certificate of Authorisation under the Radioactive Substances Act 1993.

I am further advised that there is no evidence to suggest that there is any significant radiological contamination in peatlands or watercourses in this area. A survey some years ago by the British Geological Survey and Geological Survey Ireland suggested a soil concentration of just over 200 Bq/kg Cs137 in the highest areas in Northern Ireland. This is almost 5 times less than the level at which a substance is considered “out of scope” of the Radioactive Substances Act 1993 (1000Bq/kg for Cs137). The radiological impact assessment submitted as part of the Dalradian planning application showed no increased levels of Naturally Occurring Radioactive Material

(NORM) in any of the materials they sampled. As there have been no major incidents of radiological contamination post Chernobyl in either Europe or North America or major geological/seismological events like volcanic eruptions here, and no industries have been established here that made use of radiologically active materials, there is therefore no reasonable justification for the Agency to carry out further baseline surveys or mapping of Cs-137, Sr-90, or U-238 contamination in peatlands or watercourses in Northern Ireland.

HSENI is the competent authority under the Ionising Radiation Regulations (NI) 2017 to regulate occupational health risks from radon to workers. As radon gas released into the atmosphere will be readily dispersed into the air, there was no need for NIEA to consider this risk further in the case of this planning consultation.

You have previously been advised, and seem reluctant to accept, that all relevant information held by DAERA has now been provided to you. I can confirm again that this is the case. The only other material in our possession referencing the topics that you have mentioned are EIR requests by either yourself or other environmental campaigners.

If you remain unsatisfied with this response, you can make a further appeal by writing to the Information Commissioner, FoI/EIR Complaints, Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, CHESHIRE SK9 5AF, who will undertake an independent review.

Yours sincerely

Adeilad y Goron,
Parc Cathays, Caerdydd,
CF10 3NQ

PCAC PEDW
Penderfyniadau Cynllunio ac Amgylchedd Cymru
Planning & Environment Decisions Wales

Crown Buildings,
Cathays Park,
Cardiff, CF10 3NQ

Ein Cyf / Our Ref: DNS/3276735

Ffôn / Tel: 0300 123 1590
Ebost / email:

Dyddiad / Date: 13/11/2025

Derbynwyr | Recipients:

- RWE Renewables UK / RWE Renewable UK
- Cyngor Sir Dinbych / Denbighshire County Council
- Cyngor Gwynedd / Gwynedd Council
- Cyfoeth Naturiol Cymru / Natural Resource Wales
- The Dee Valley Environmental Network
- Bryniau Clwyd a Dyffryn Dyfrdwy AHNE / Clwydian Range and Dee Valley AONB
- Partïon â diddordeb / Interested Parties

(gan ebost / via e-mail)

Annwyl Syr / Madam | Dear Sir / Madam

**** English Text follows the Welsh text, see page 11 onwards****

Deddf Cynllunio Gwlad a Thref 1990 (fel y'i diwygiwyd) ('Deddf 1990') - adrannau 62L(5) & 319B
Rheoliadau Datblygiadau o Arwyddocâd Cenedlaethol (Cymru) 2016 (fel y'u diwygiwyd) ('y Rheoliadau DAC') - rheoliad 13 & 15(2)
Gorchymyn Datblygiadau o Arwyddocâd Cenedlaethol (Gweithdrefn) (Cymru) 2016 (fel y'i diwygiwyd) ('y Gorchymyn Gweithdrefn DAC')
Rheoliadau Cynllunio Gwlad a Thref (Asesu Effeithiau Amgylcheddol) (Cymru) 2017 – rheoliad 24

Rydym yn croesawu gohebiaeth Gymraeg. Cewch ateb Cymraeg i bob gohebiaeth Gymraeg ac ni fydd gohebu yn Gymraeg yn arwain at oedi.

We welcome correspondence in Welsh. Correspondence received in Welsh will be answered in Welsh and corresponding in Welsh will not involve any delay.

Cais gan: RWE Renewable UK
Cyfeiriad y safle: Mae safle'r cais wedi'i leoli tua 9km gogledd-ddwyrain o Bala gyda'r mynediad i'r safle yn union oddi ar yr A494 ger Glan yr Afon.
Datblygiad arfaethedig: Mae'r datblygiad a gynhelir yn cynnwys:
- hyd at naw tŵr gwynt a chubicles trydanol allanol;
- ardaloedd caled ar gyfer crêns a mannau yn agos ar gyfer pob lleoliad tŵr;
- tua 7.5 km o lwybrau mynediad (o'r rhai mae tua 7.3 km yn lwybr newydd a, 0.2 km fydd yn uwchraddio llwybr presennol) a gwaith peirianneg cysylltiedig;
- is-station trydanol a phensaernïaeth rheoli; system gadwraeth egni batri;
- ceblau trydanol tanddaearol ar y safle sy'n cysylltu'r tynwyr â'r is-station ar y safle;
- chwe croesi dŵr a seilwaith cysylltiedig;
- peniau troi cerbydau ar y safle a mannau pasio;
- arwyddo ar y safle;
- goleuadau hedfan;
- cyflenwr batri conctret dros dro a chyfladeiladau adeiladu / storio ar gyfer y fferm wynt, hyd at ddwy gofynnedig a phrosiectau rheoli cynefin.

Caniatâd eilaidd arfaethedig: Cais ganiatâd dan adran 16(1) o Ddeddf y Gymdeithasau 2006 (diddymu cofrestriad a chyfnewid: ceisiadau). Mae arbenigedd yn ofynnol dan adran 38(1) o Ddeddf y Cyffrediniaid 2006 (atal gwaith heb arbenigedd).

Mae'r Arolygydd a benodwyd, sef Declan K Beggan BSc (Anrh) MSc DipTP DipMan MRTPI, wedi gofyn i mi gysylltu â chi ynglŷn â'r cais uchod am Ddatblygiad o Arwyddocâd Cenedlaethol (DNS).

Mae'r llythyr hwn yn hysbysiad swyddogol o faterion pwysig yn ymwneud â'r cais DNS. Darllenwch y wybodaeth isod yn ofalus a chysylltwch â ni os oes unrhyw beth yn aneglur.

1. **Cais am wybodaeth ychwanegol (Rheoliad 15(2) Rheoliadau Datblygiadau o Arwyddocâd Cenedlaethol (Cymru) 2016; Rheoliad 24 Rheoliadau Cynllunio Gwlad a Thref (Asesu Effeithiau Amgylcheddol) (Cymru) 2017)**

Ar ôl adolygu'r wybodaeth a gyflwynwyd hyd yma, gan gynnwys yr holl sylwadau a wnaed yn briodol a'r Adroddiadau ar yr Effaith Leol (LIRau) a gyflwynwyd gan Gyngor Sir Ddinbych a Chyngor Gwynedd, mae'r Arolygydd wedi penderfynu bod angen gwybodaeth ychwanegol gan yr ymgeisydd a Chyngor Sir Ddinbych (DCC). Mae'r wybodaeth sy'n ofynnol yn cynnwys 'gwybodaeth ychwanegol' i'r Datganiad Amgylcheddol y gofynnir amdani at ddibenion y gwrandawiadau yr hysbyswyd partïon â buddiant amdanynt yn flaenorol.

2. **Atal y cyfnod penderfynu dros dro (Adran 62L(5) Deddf Cynllunio Gwlad a Thref 1990)**

Mae'r cyfnod penderfynu ar gyfer y cais hwn yn cael ei atal dros dro drwy hyn am **gyfnod o 15 wythnos** i roi amser i'r ymgeisydd/y Cyngor ystyried cais yr Arolygydd am wybodaeth ychwanegol a rhoi cyfle i bartïon â buddiant gyflwyno sylwadau ychwanegol ar y wybodaeth newydd. Bydd y cyfnod ymgynghori'n para 5 wythnos, a bydd y dyddiadau'n cael eu cadarnhau, maes o law.

Rydym yn croesawu gohebiaeth Gymraeg. Cewch ateb Cymraeg i bob gohebiaeth Gymraeg ac ni fydd gohebu yn Gymraeg yn arwain at oedi.

We welcome correspondence in Welsh. Correspondence received in Welsh will be answered in Welsh and corresponding in Welsh will not involve any delay.

Yn gywir,

Donna Pryce
Swyddog Achos

Atodiad A: Cais am wybodaeth ychwanegol gan yr ymgeisydd

Amodau byw preswylwyr

1. Mae nifer o wrthwynebwyr i'r cynnig yn honni bod y gwerthusiad o effeithiau sŵn yn ddiffygiol gan ei fod yn dibynnu ar hen arweiniad nad yw bellach yn addas i'r diben. Yn hyn o beth, mae'r ddogfen 'Dadansoddiad Sŵn Gaerwen' gan Rwydwaith Amgylcheddol Dyffryn Dyfrdwy (DVEN) yn defnyddio methodoleg wahanol i ganfyddiadau asesiad sŵn yr ymgeisydd. A fyddech cystal ag ymateb i'r sylwadau sy'n honni bod y fethodoleg sŵn a ddefnyddiwyd ar gyfer y Datganiad Amgylcheddol yn hen a'r sylwadau ynglŷn â chanfyddiadau sŵn DVEN, a pherthnasedd ei ystyriaeth o sŵn amledd isel ac is-sain o ran y datblygiad arfaethedig. Mae'r ymateb gan Save This Land (Motvind gynt) hefyd yn gwneud ymholiadau pellach ynglŷn ag ymagwedd yr ymgeisydd at sŵn yn y Datganiad Amgylcheddol – gwahoddir yr ymgeisydd i ymateb.

2. Mae nifer o wrthwynebwyr yn honni bod perygl y gallai cloddwaith sy'n gysylltiedig â'r datblygiad arfaethedig ailgyflwyno halogyddion fel caesiwm i'r amgylchedd, ac nad yw'r mater hwn wedi derbyn sylw yn y Datganiad Amgylcheddol. Eglurwch a oes gan halogiad o'r fath unrhyw oblygiadau i'r asesiad o'r datblygiad arfaethedig.

Mynediad a thrafnidiaeth

3. Ystyriwch y cais am wybodaeth ychwanegol gan Awdurdod Priffyrdd Llywodraeth Cymru sy'n gofyn am gyflwyno lluniadau sy'n cydymffurfio â'r Llawlyfr Dylunio Ffyrdd a Phontydd (DMRB) yn gysylltiedig â'r fynedfa arfaethedig sy'n cysylltu â'r A494.

Yr effaith ar y dirwedd/effaith weledol ac effeithiau cronnol

4. Gwahoddir yr ymgeisydd i ymateb i'r pwyntiau a godwyd gan Cyfoeth Naturiol Cymru (CNC) yn eu llythyr dyddiedig 16 Hydref 2025 sy'n honni y byddai'r datblygiad arfaethedig yn achosi niwed i harddwch naturiol Parc Cenedlaethol Eryri (ENP) a Thirwedd Cenedlaethol Bryniau Clwyd a Dyffryn Dyfrdwy. Fe'u crynhoir fel a ganlyn:

    - Effeithiau niweidiol arwyddocaol ar y golygfeydd a'r amwynder gweledol a brofir gan bobl, gan gynnwys ymwelwyr ar hawliau tramwy cyhoeddus a llwybrau sy'n cael eu hyrwyddo;
    - Effeithiau niweidiol arwyddocaol ar nodweddion golygfaol a chanfyddiadol o'r dirwedd fel adnodd ynddi'i hun;
    - Niwed i nodweddion arbennig y dynodiadau hyn; a,
    - Niwed na ystyrir ei fod yn arwyddocaol at ddibenion Asesu Effeithiau Amgylcheddol (EIA), ond sy'n fwy nag effaith fach serch hynny.

5. O ran niwed, ymhelaethir ar safbwynt CNC yn Atodiad A eu llythyr ac mae'n mynd i'r afael â materion fel: yr effaith ar olygfeydd/amwynder gweledol/cymeriad tirwedd yr ENP,

effeithiau ar ‘nodweddion arbennig’ yr ENP, effeithiau ar ‘awyr dywyll’, yr effaith ar olygfeydd/amwynder gweledol/cymeriad tirwedd yr ENP; a, niwed i Barc Cenedlaethol arfaethedig Glyndŵr.

6. Yn arbennig, tynnir sylw at y sylwadau ynglŷn â lleihau’r niwed yn sgil gostwng uchder y tyrbinau yn sylweddol. Hefyd, nid yw’r Datganiad Amgylcheddol yn cynnwys unrhyw asesiad ystyrlon o effeithiau’r datblygiad arfaethedig ar Barc Cenedlaethol arfaethedig Glyndŵr – mae angen mynd i’r afael â hyn trwy ddiweddaru’r Datganiad Amgylcheddol i ymateb i’r sylwadau gan CNC.

7. Mae’r Adroddiadau ar yr Effaith Leol (LIRau) a baratowyd gan Gyngor Gwynedd (GC) a Chyngor Sir Ddinbych (DCC) yn codi nifer o bryderon. Fe’u crynhoir fel a ganlyn:

    - Egluro p’un a aseswyd effeithiau adeiladu ar gyfer rhai ardaloedd agwedd Gweledol a Synhwyraidd LANDMAP, oherwydd dim ond effeithiau gweithredol yr adroddir arnynt ar gyfer y rhain.
    - Cyfiawnhau casglu rhai ardaloedd agwedd ynghyd mewn grwpiau (e.e., Llethrau Canol Dyffryn Clwyd a Bryniau De Clwyd) yn yr asesiad.
    - Esbonio ymhellach pam yr eithriwyd rhai cymunedau o’r asesiad gweledol er gwaethaf gweledededd damcaniaethol ymddangosiadol.
    - Egluro a chadarnhau’r fethodoleg a ddefnyddiwyd i gasglu nad oes effeithiau arwyddocaol ar nodweddion arbennig tirweddau dynodedig (Parc Cenedlaethol Eryri, Tirwedd Cenedlaethol Bryniau Clwyd a Dyffryn Dyfrdwy, Ardal Tirwedd Arbennig Cefn Gwlad y Bala, Ardal Weithredu Arfordirol Berwyn).
    - Cyfiawnhau ymhellach sawl dyfarniad ynglŷn ag arwyddocâd golygfannau, yn enwedig o fewn tirweddau dynodedig, lle mae’r Cyngor o’r farn y gallai’r effeithiau a ddatganwyd fod yn rhy isel.
    - Esbonio’n fwy eglur yr ymagwedd at effeithiau gweledol cronnol ar gyfer rhai golygfannau (e.e., sut y defnyddiwyd y fethodoleg i ddod i gasgliadau).

8. Ymhelaethir ar y pwyntiau uchod yn yr LIRau unigol – gwahoddir yr ymgeisydd i ymateb i’r pwyntiau a wnaed.

9. Mae Rhwydwaith Amgylcheddol Dyffryn Dyfrdwy (DVEN) wedi cyflwyno ymateb tirwedd i Benderfyniadau Cynllunio ac Amgylchedd Cymru (PCAC) (a ysgrifennwyd gan RML Consultants). Mae’r ymateb hwnnw’n codi nifer o faterion, fel cymhwyso’r graddfeydd maint, sensitifrwydd ac arwyddocâd yn annigonol a thanbrisio effeithiau niweidiol o ganlyniad (cyfeiriwch at adran 4 y ddogfen honno), a digonolrwydd cynigion datgomisiynu (adran 3). Gwahoddir yr ymgeisydd i ymateb i’r sylwadau hyn. Yn ogystal, mae DVEN wedi cynhyrchu ‘Dadansoddiad o Effeithiau Cronnol ar Leoliadau Tirwedd Gwarchodedig’ sy’n nodi’r niwed cronnol – ymatebwch os gwelwch yn dda.

Asedau Treftadaeth

10. Yn eu LIRau unigol, mae'r ddau Gyngor yn amlygu mesurau lliniaru ychwanegol sy'n gysylltiedig ag ased treftadaeth o'r enw 'Hafod'. Mae Cadw yn datgan yn eu llythyr dyddiedig 10 Hydref at PCAC y bydd angen mesurau lliniaru ychwanegol ac maen nhw wedi awgrymu amod, yn hyn o beth. Gwahoddir yr ymgeisydd i ymateb i'r materion treftadaeth gan y Cynghorau a Cadw.

11. Mae DVEN wedi cynhyrchu ymateb i'r datblygiad arfaethedig o ran materion treftadaeth (a ysgrifennwyd gan RML Consultants) ac, i grynhoi, maen nhw'n herio nifer o faterion yn ymwneud â'r asesiad treftadaeth e.e. 'bychanu' effeithiau ar Dirweddau Hanesyddol Cofrestredig Glannau Llyn Tegid/Dyffryn Tanat, y fethodoleg a ddefnyddiwyd o ran cymhwyso rhyngwelededd y cynnig â derbynyddion, cadernid yr asesiad o effeithiau dros dro a'r angen am arolygon geoffisegol. Mae DVEN hefyd wedi codi nifer o bryderon ynglŷn â chadernid yr asesiad o faterion treftadaeth yn y Datganiad Amgylcheddol, fel y nodwyd yn eu hasesiad a ysgrifennwyd gan Andrew Davidson. Gwahoddir yr ymgeisydd i ymateb i'r materion hyn sy'n gysylltiedig â threftadaeth.

Ecoleg ac adareg

12. Ymatebwch i'r pwyntiau a wnaed gan Gyngor Gwynedd (GC) yn eu LIR o ran digonolrwydd y Cynllun Rheoli Cynefin a sut dylid ei gyflawni, a gwelliannau bioamrywiaeth.

13. Ymatebwch i'r pryderon a fynegwyd gan CNC yn ei sylwadau ynglŷn ag effeithiau posibl ar Ylfinirod ac effeithiolrwydd y mesurau lliniaru/digolledu arfaethedig a'r angen am wybodaeth esboniadol ychwanegol.

14. Mynegodd 'Save This Land' nifer o bryderon ynglŷn â methodoleg ac asesiad y datblygiad arfaethedig yn gysylltiedig â Barcudiaid. Gwahoddir yr ymgeisydd i ymateb.

15. O ran ystlumod, ymatebwch i sylwadau CNC ynglŷn â'r canlynol:

    - O ran monitro Cam 2, ystyried monitro ystlumod bob pum mlynedd ar ôl y cyfnod tair blynedd cychwynnol.
    - O ran Cam 3, tybir nad yw'r hyn sy'n gyfystyr ag 'effeithiau arwyddocaol' wedi'i ddiffinio ac na roddwyd ystyriaeth i Reoliad 52 a 53 Rheoliadau Cadwraeth Cynefinoedd a Rhywogaethau 2017 (fel y'u diwygiwyd). Mae'n rhaid egluro hyn yn y Strategaeth Lliniaru a Monitro Ystlumod (BMMS) sydd wedi'i chynnwys yn yr amodau arfaethedig.
    - Yr amodau lliniaru ystlumod awgrymedig.
    - Bod ystyriaeth yn cael ei rhoi yn y Cynllun Rheoli Cynefin Amlinellol, a'r Cynllun Rheoli Cynefin dilynol, i gynnwys nodau, amcanion ac amodau rheoli ynglŷn ag ystlumod.
    - O ran cynnwys ystyriaeth o Statws Cadwraeth Cyfredol (CCS) a Statws Cadwraeth Ffafriol (FCS) ar gyfer ystlumod, y cyngor bod asesiadau statws cadwraeth yn cael eu cynnal ar gyfer pob rhywogaeth ystlumod yr ystyrir ei bod naill ai'n rhywogaeth risg uchel neu gymedrol ac ystyried ystod o raddfeydd gofodol, gan gynnwys lleol.

16. Eglurwch eich ymateb i gyngor CNC y dylid ystyried cynnwys nodau, amcanion ac amodau rheoli ynglŷn â dyfrgwn yn y Cynllun Rheoli Cynefin Amlinellol, a'r Cynllun Rheoli Cynefin dilynol.

17. Yn eu hymateb ynglŷn â materion ecolegol, mae DVEN yn herio dilysrwydd/canfyddiadau gan eu bod yn dadlau bod yr arolygon a gyflwynwyd yn hen (cyfeiriwch at adran 5 dogfen RML Consultants). Ymatebwch i'r pwynt hwn, os gwelwch yn dda.

Mawndir

18. O ran mawndir, ymatebwch i'r pwyntiau a wnaed gan CNC, yn enwedig o ran y diffiniad o fawn yn y Datganiad Amgylcheddol, cyfrifo cyfeintiau mawn (ac unrhyw ailddosbarthiad cynefinoedd mawndir sy'n angenrheidiol), egluro p'un a yw'r ymgeisydd yn bwriadu ceisio osgoi'r holl effeithiau ar ardaloedd a ddosberthir yn bridd mawn ac, os na, p'un a gynigir mesurau lliniaru. Yn ogystal, mae'r Arolygydd yn nodi sylwadau CNC ynglŷn â monitro'r groesfan trac athraidd i gyrraedd tyrbin 7 – ceisir safbwyntiau'r ymgeisydd ar sicrhau monitro o'r fath, fel yr awgrymwyd gan CNC.

Daeareg, Hydroleg a Hydroddaeareg

19. Ymatebwch i sylwadau CNC ynglŷn â'r canlynol:

    - Bod dŵr daear yn cael ei fonitro wrth bob un o'r tyrbinau arfaethedig a bod uchder dŵr daear yn cael ei fonitro gan gofnodwyr data. Byddai'n fuddiol asesu'r data hwn yn erbyn data o fedryddion glaw lleol. Dylai data o'r fath gael ei goladu am flwyddyn o leiaf, er mwyn ystyried newid tymhorol.
    - Mynegwyd pryderon ynglŷn ag asesu amodau sylfaenol yr amgylchedd dŵr y cynigir seilwaith fferm wynt ynddo e.e. eglurder ynglŷn â pha ddarpariaethau sydd ar waith neu ba gamau a fyddai'n cael eu cymryd petai nodweddion y tir a monitro'n awgrymu bod elfen benodol o seilwaith yn achosi mwy o risg i'r amgylchedd nag y disgwyliwyd yn flaenorol.
    - Yr angen am asesiad dad-ddyfrio, oherwydd bod ei natur a'i hyd a lled yn gallu effeithio ar dderbynyddion lleol fel ffynhonnau.
    - Egluro unrhyw ddarpariaethau i sicrhau nad yw'r ffosydd ceblau arfaethedig yn gweithredu fel llwybrau llif blaenoriaethol ar gyfer symudiad dŵr (mae hyn hefyd yn berthnasol i reoli dŵr storm ar y llwybrau mynediad).
    - Dylid darparu'r wybodaeth ychwanegol y gofynnwyd amdani ynglŷn â lleoliad y pwll benthyg yn agos i'r System Batris Storio Ynni (BESS) a'r cyfadeilad is-orsaf. Dylai hyn ddangos na fydd sefydlogrwydd y tir yn cael ei beryglu (gan weithgareddau pwll benthyg) o ran adeiladu'r BESS/is-orsaf a darparu lle digonol i gyfyngu dŵr ymladd tân.
    - O ran y Cynllun Monitro Ansawdd Dŵr Amlinellol, ymateb i safbwynt CNC y dylid monitro'n amlach nag y nodwyd yn y Datganiad Amgylcheddol.

20. Mae'r LIR a baratowyd gan GC a DCC yn amlygu bod yr Asesiad o Ganlyniadau Llifogydd (FCA) a gyflwynwyd yn cyfeirio at yr hen Nodyn Cyngor Technegol yn gysylltiedig â

llifogydd (TAN 15) neu fapiau perygl llifogydd, er y nodir bod y Strategaeth Ddraenio Amlinellol yn cyfeirio at y parthau llifogydd cywir, a bod hyn bellach wedi cael ei ddisodli â fersiwn newydd TAN 15: Datblygu, Llifogydd ac Erydu Arfordirol. Ymatebwch i'r mater hwn a, lle bo angen, diweddarwch y wybodaeth am lifogydd a ddarperir ym mhennod berthnasol y Datganiad Amgylcheddol ac unrhyw ddogfennau ategol.

21. Ar dudalen 16 eu hymateb i'r cynnig, mae 'Save This Land' yn herio agweddau daearegol ar y Datganiad Amgylcheddol a gyflwynwyd – gwahoddir yr ymgeisydd i ymateb i berthnasedd y cyfryw gyflwyniadau.

Rheoli amgylcheddol

22. O ran rheoli amgylcheddol, ymatebwch i'r materion niferus a godwyd gan CNC e.e. darparu asesiadau risg ar gyfer y Cynllun Atal Llygredd a'r Cynllun Rheoli Dŵr Wyneb, monitro ychwanegol yn y Cynllun Rheoli Amgylcheddol Adeiladu, a mesurau y manylir arnynt mewn 'Cynllun Cyfyngu' i atal dŵr tân halogedig rhag achosi llygredd (cyfeiriwch at baragraff 5.2 eu llythyr).

Hawliau Tramwy Cyhoeddus

23. Mae'r ddau LIR yn amlygu materion yn ymwneud â hawliau tramwy cyhoeddus (PRoWau) ac, yn arbennig, effeithiau posibl y datblygiad arfaethedig ar ddiogelwch ceffylau, ac maen nhw'n ceisio cytundeb ar nifer o faterion, yn hyn o beth. Hefyd, mae'r ddau LIR yn cyfeirio at fesurau digolledu a mesurau eraill sy'n gysylltiedig â PRoWau i wrthbwyso unrhyw effeithiau negyddol sy'n deillio o'r datblygiad arfaethedig. Gwahoddir yr ymgeisydd i ymateb.

24. O ran y ceisiadau Adran 16 a 38 sy'n ymwneud â thir comin, nodir ei bod yn ymddangos bod nifer o hawliau tramwy cyhoeddus wedi'u cynnwys o fewn y tir cyfnewid arfaethedig a'r tir arfaethedig a ryddheir (Ffigur 3.12 a Ffigur 3.13 yn y Datganiad Amgylcheddol). O ran y tir cyfnewid, mae'n ymddangos bod llwybr troed cyhoeddus 518/9 a llwybr ceffylau 518/6 yn mynd ar hyd ffin ddwyreiniol y tir. O ran y tir a ryddheir, mae'n ymddangos bod llwybr troed 518/12 yn mynd ar hyd ffin ddwyreiniol y tir. Allwch chi gadarnhau bod unrhyw un (os nad pob un) o'r tri llwybr troed a amlygwyd yn cael eu rheoli gan y Cyngor gan ddefnyddio arian cyhoeddus.

Arall

25. Mae nifer o bartïon e.e.'Save This Land', yn herio cadernid yr adroddiad Ymgynghoriad Cyn-ymgeisio (PAC) a gyflwynwyd gan yr ymgeisydd a faint o wybodaeth a gynhwysir ynddo. Ymatebwch os gwelwch yn dda.

26. Mae DVEN wedi cyflwyno adroddiad ar effaith y datblygiad arfaethedig ar yr economi dwristiaeth leol – gwahoddir yr ymgeisydd i ymateb i'r sylwadau hynny.

27. Darparwch restr o amodau awgrymedig, gan ystyried y rhai a awgrymwyd yn LIRau y Cynghorau a sylwadau cyrff statudol; a, lle bo'n berthnasol, gwnewch sylwadau ar i ba raddau y gallai amodau awgrymedig ddatrys materion penodol a amlinellir yn yr atodiad hwn. Dylai rhestr amodau o'r fath gynnwys y rhesymau dros bob amod a chyfeiriad at bolisïau perthnasol cynllun datblygu'r Cyngor unigol a pholisïau'r cynllun datblygu cenedlaethol. Tynnir sylw'r ymgeisydd at sylwadau'r ddau Gyngor yn eu LIRau ynglŷn â chynnwys unrhyw gytundeb cyfreithiol.

28. Mae nifer o wrthwynebwyr trydydd parti yn honni nad oes bond ariannol i sicrhau gwaith datgomisiynu ar y safle – rhowch eich barn am yr angen am drefniant o'r fath.

29. Gwahoddir yr ymgeisydd i wrthbrofi pwyntiau eraill a godwyd mewn sylwadau os nad yw'n ystyried bod y materion hyn wedi derbyn sylw'n llawn yn y dogfennau a gyflwynwyd ganddo. Dylid cyflwyno'r gwrthbrawf hwn gyda'r wybodaeth uchod fel y gellir rhoi cyhoeddusrwydd iddo ac ymgynghori arno.

Nodiadau:

- Cyn ymateb, dylai'r ymgeisydd geisio archwilio materion perthnasol gydag ymgyngoreion allweddol, ac fe'u hanogir i gydweithio'n brydlon. Fe allai hyn leihau meysydd anghytundeb o ran rhai materion, gan gynyddu effeithlonrwydd yr archwiliad.

- Pan fydd ymgyngoreion yn honni anghysondebau neu'n beirniadu methodoleg yn y dystiolaeth a gyflwynwyd, dylid mynd i'r afael â hyn trwy esbonio neu gywiro'r manylion/dull. Os gwneir cywiriadau, dylid esbonio arwyddocâd y rhain a'u goblygiadau posibl i rannau eraill o'r dystiolaeth.

- Er mwyn eglurder ac osgoi tystiolaeth ailadroddus, dylai unrhyw destun neu ffigurau wedi'u cywiro gael eu hamlygu'n glir, a dylid darparu tabl sy'n crynhoi: diwygiadau i dystiolaeth flaenorol; tystiolaeth sydd wedi'i disodli; a thystiolaeth ychwanegol.

- Os bydd yr ymgeisydd yn dewis peidio â darparu mwy o wybodaeth am y pwyntiau a amlinellir uchod, dylid cadarnhau ac esbonio hyn. Yna, bydd yr Arolygydd yn penderfynu sut i symud ymlaen heb wybodaeth o'r fath ac fe allai godi'r mater mewn gwrandawiad.

Er gwaethaf y cais am y wybodaeth ychwanegol uchod (yr ymgynghorir ar unrhyw ymateb iddi yn ddiweddarach), gwahoddir y partïon canlynol ***yn unig*** i ymateb i fanylion y cais fel y'u cyflwynwyd yn wreiddiol ar y cam hwn:

- NATS
- DIO
- CAA
- JRC
- Arqiva
- Parc Cenedlaethol Eryri

Mae'n rhaid derbyn unrhyw ymateb gan **phob bartï** erbyn **18 Rhagfyr 2025**

**** English text begins on the next page****

Town and Country Planning Act 1990 (as amended) ('the 1990 Act') - sections 62L(5) & 319B
The Developments of National Significance (Wales) Regulations 2016 (as amended) ('the DNS Regulations') - regulations 13 & 15(2)
The Developments of National Significance (Procedure) (Wales) Order 2016 (as amended) ('the DNS Procedure Order')
Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 – regulation 24

Application by: RWE Renewable UK
Site address: The application site is located approximately 9km north east of Bala with the site entrance directly off the A494 near Glan yr Afon.
Proposed development: The proposed development consists of:
- up to nine wind turbines and external electrical cubicles;
- crane hardstandings and adjacent laydown areas for each turbine location;
- approximately 7.5 km of access tracks (of which approximately 7.3 km will be new track and, 0.2 km will be upgraded existing track) and associated ancillary engineering works;
- an electrical substation and control building; battery energy storage system;
- onsite underground electrical cables linking the turbines and the onsite substation;
- six watercourse crossings and associated infrastructure;
- onsite vehicle turning heads and passing places;
- site signage;
- aviation lighting
- temporary concrete batching plant and construction / storage compounds for the wind farm, up to two Borrow pits and habitat management proposals

Proposed Secondary Consent(s): Consent requested under section 16(1) of the Commons Act 2006 (deregistration and exchange: applications). Consent required by section 38(1) of the Commons Act 2006 (prohibition on works without consent).

The appointed Inspector, Declan K Beggan BSc (Hons) MSc DipTP DipMan MRTPI, has asked me to contact you in relation to the above Development of National Significance (DNS) application.

This letter constitutes official notification of important matters related to the DNS application. Please carefully read the information below and contact us if anything is unclear.

1. **Request for further information (Regulation 15(2) of the Developments of National Significance (Wales) Regulations 2016; Regulation 24 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017)**

After reviewing the information submitted thus far, including all duly made representations and the Local Impact Reports (LIRs) submitted by Denbighshire County Council and Gwynedd Council, the Inspector has determined that further information is required from the applicant and Denbighshire County Council (DCC). The required information includes 'further information' to the Environmental Statement requested for the purposes of the hearings which interested parties have been previously notified of.

2. Suspension of the determination period (Section 62L(5) of the Town and Country Planning Act 1990*)*

The determination period for this application is hereby suspended for a **period of 15 weeks** to allow time for the applicant/Council to consider the Inspector's request for further information and to provide interested parties an opportunity to submit further comments on the new information. The consultation period will last 5 weeks, and the dates will be confirmed in due course.

Yours sincerely,

Annex A: Request for further information from the applicant

Residents' living conditions

1. Multiple objectors to the proposal maintain the evaluation of noise impacts is flawed as it relies on outdated guidance which is no longer fit for purpose. In this regard the Dee Valley Environmental Network (DVEN) document 'Noise Analysis Gaerwen' utilises a different methodology to the findings of the applicant's noise assessment. Please respond to the comments that the noise methodology employed for the ES is considered outdated and to the DVEN noise findings, and the relevance of its consideration of low frequency noise and infrasound in regard to the proposed development. Further queries in regard to the applicant's approach to the issue of noise within the ES are also stated in the response from Save This Land (formerly Motvind) – the applicant is invited to respond.

2. Multiple objectors maintain groundworks associated with the proposed development risk remobilisation of contaminants into the environment such as caesium and that this matter has not been addressed within the ES. Please clarify whether such contamination has any implications in terms of the assessment of the proposed development.

Access and transportation

3. Consider the request for additional information from the Welsh Government Highway Authority in relation to their request to submit DMRB-compliant drawings in respect of the proposed access connecting to the A494.

Landscape/visual impact and cumulative impacts

4. The applicant is invited to respond to the points raised by Natural Resources Wales (NRW) in regard to their letter dated 16 October 2025 that the proposed development would cause harm in regard to the natural beauty of the Eryri National Park (ENP) and the Clwydian Range and Dee Valley National Landscape (NL) and summarised as follows:

    - Significant adverse effects on the views and visual amenity experienced by people, including visitors on public rights of ways and promoted routes;
    - Significant adverse effects on scenic and perceptual characteristics of the landscape as a resource in its own right;
    - Harm to special qualities of these designations; and,
    - Harm not considered significant for EIA purposes, but nevertheless greater than minor.

5. In terms of harm, NRW's position is expanded upon in the Annex A of their letter and addresses such matters as: effect on views/visual amenity/landscape character of the ENP, effects on the 'special qualities' of the ENP, 'dark sky' impacts; effect on views/visual amenity/landscape character of the ENP; and, harm to the proposed Glyndwr National Park (NP).

6. In particular, attention is drawn to the comments regarding the harm being reduced by a substantial reduction in turbine height. Also, the ES has not included any meaningful assessment of the effects of the proposed development on the proposed Glyndwr National Park (GNP) – this needs to be addressed with an update to the ES in response to the comments from NRW.

7. The Local Impact Reports (LIR) prepared by Gwynedd Council (GC) and Denbighshire County Council (DCC) raise multiple concerns summarised as follows:

    - Clarification on whether construction effects have been assessed for some LANDMAP Visual and Sensory aspect areas, as only operational effects are reported for these.
    - Justification for grouping some aspect areas (e.g., Central Clwyd Valley Slopes and South Clwyd Hills) in the assessment.
    - Further explanation for excluding some communities from the visual assessment despite apparent theoretical visibility.
    - Clarification and confirmation of the methodology used to conclude there are no significant effects on the special qualities of designated landscapes (Snowdonia National Park, Clwydian Range and Dee Valley National Landscape, Bala Countryside SLA, Berwyn Coastal Action Area).
    - Further justification for several viewpoint significance judgements, especially within designated landscapes, where the Council considers effects may have been understated.
    - Clearer explanation of the approach to cumulative visual effects for some viewpoints (e.g., how the methodology was used to reach conclusions).

8. The above points are expanded upon within the respective LIR's – the applicant is invited to respond to the points made.

9. The Dee Valley Environmental Network (DVEN) have submitted a landscape response to PEDW (written by RML Consultants). That response raises a number of matters such as application of the magnitude, sensitivity and significance scales not being adequate and resultant undervaluing of adverse impacts (refer to section 4 of that document), and the adequacy of decommissioning proposals (section 3). The applicant is invited to respond to these comments. In addition, DVEN have produced an 'Analysis of Cumulative Effects on Protected Landscape Settings' which indicates the cumulative harm – please respond.

Heritage Assets

10. Both Councils in their respective LIR highlight additional mitigation measures related to a heritage asset known as 'Hafod'. Cadw state in their letter dated 10 October to PEDW that further mitigation measures will be required and have suggested a condition in this regard. The applicant is invited to respond to the heritage issues by the Councils and Cadw.

11. DVEN have produced a response to the proposed development in terms of heritage matters (written by RML Consultants) and in summary question multiple matters in terms of the heritage assessment e.g. the 'down playing' of impacts on the Bala Lakeside/Tenant Valley Registered Historic Landscapes, the methodology employed in terms of application of intervisibility of the proposal with receptors, the robustness of the assessment of temporary effects and need for geophysical surveys. DVEN have also raised a number of concerns in regard to robustness of the assessment of heritage matters within the ES as stated in their assessment written by Andrew Davidson. The applicant is invited to respond to these heritage related issues.

Ecology and ornithology

12. Please respond to the points made by GC in their LIR in terms of the adequacy of the Habitat Management Plan and how it should be delivered and biodiversity enhancement.

13. Provide a response to the concerns raised by NRW in its representation in regard to potential impacts on Curlew and the effectiveness of the proposed mitigation/compensation measures and the need for further explanatory information.

14. 'Save This Land' raise a number of concerns related to the methodology and assessment of the proposed development on the Red Kite species. The applicant is invited to respond.

15. In regard to bats respond to NRW's comments related to the following:

    - In terms of the Phase 2 monitoring, consideration of monitoring of bats every five years after the initial three year period.
    - In terms of Phase 3, it is considered there is no definition provided as to what constitutes 'significant effects' and no consideration of Regulation 52 and 53 of the Conservation of Habitats and Species Regulations 2017 (as amended). Clarification on this must be included within the Bat Mitigation and Monitoring Strategy (BMMS) which is included within the proposed conditions.
    - The suggested bat mitigation conditions.
    - That consideration be given within the Outline Habitat Management Plan, and subsequent Habitat Management Plan to include aims, objectives and management prescriptions in relation to bats.
    - That in terms of the inclusion of consideration of Current Conservation Status (CCS) and Favourable Conservation Status (FCS) for bats, the advice that conservation status assessments are undertaken for each species of bat that are considered to be either a high or moderate risk species and consider a range of spatial scales including local.

16. Please clarify your response to NRW's advice that consideration should be given to including aims, objectives and management prescriptions in relation to otters within the Outline Habitat Management Plan, and subsequent Habitat Management Plan.

17. DVEN in their response concerning ecology matters question the validity/findings as they argue the submitted surveys are out of date (refer to section 5 the RML Consultants document). Please respond on this point.

Peatland

18. In relation to peatland, respond to the points made by NRW, particularly in relation to the definition of peat within the ES, calculation of peat volumes (and any necessary reclassification of peatland habitats), clarity as to whether the applicant intends to seek to avoid all impacts on areas classed as peat soil and if not whether mitigation measures are proposed. In addition, the Inspector notes NRW's comments in regard to monitoring of the permeable track crossing to reach turbine 7 – the applicant's views are sought on securing such monitoring as suggested by NRW.

Geology, Hydrology and Hydrogeology

19. Please respond to NRW comments in regard to the following:

    - That groundwater monitoring occurs at each location of the proposed turbines and that groundwater elevation is monitored by data loggers. It would be beneficial to assess this data against data from local rain gauges. Such data should be collated for a minimum of a year, in order to consider seasonal change.
    - Concerns raised in regard to assessing baseline conditions in the water environment within which windfarm infrastructure is proposed e.g. clarity as to what provisions are in place or actions that would be undertaken if ground characterization and monitoring suggest that a particular element of infrastructure poses more of a risk to the environment than previously envisaged.
    - The need for a dewatering assessment as to the nature and extent of it can affect local receptors such as springs.
    - Clarify any provisions to ensure that the proposed cable trenches do not act as preferential flow paths for the movement of water (also relevant to the access tracks stormwater management).
    - The request for further information in relation to the location of the borrow pit in close proximity to the Battery Energy Storage System (BESS) and substation compound should be provided. This should demonstrate that the stability of the ground is not compromised (by borrow pit activities) in relation to constructing the BESS/substation and providing adequate fire-fighting water containment.
    - In terms of the Outline Water Quality Monitoring Plan, respond to NRW's view that monitoring should be carried out more frequently than indicated in the ES.

20. The LIR prepared by GC and DCC highlight the submitted Flood Consequences Assessment (FCA) references the old Technical Advice Note related to flooding (TAN 15) or flood risk maps, albeit it is noted that the Outline Drainage Strategy refers to the correct flood zones, and that this has now been replaced with the new version of TAN 15: Development, Flooding and Coastal Erosion. Please respond to this issue and where

necessary update the flooding information provided within the relevant ES chapter and any supporting documents.

21. ‘Save This Land’ at page 16 of their response to the proposal query geological aspects of the ES submission – the applicant is invited to respond to the relevance of such submissions.

Environmental management

22. In relation to environmental management, please respond to the multiple issues raised by NRW e.g. provision of risk assessments for the Pollution Prevention Plan and Surface Water Management Plan, additional monitoring within the Construction Environmental Management Plan, and measures detailed within a ‘Containment Plan’ to avoid pollution from contaminated firewater (refer to para 5.2 of their letter).

Public Rights of Way

23. Both LIRs highlight matters related to public rights of way (PRoW) and in particular the potential effects of the proposed development on equine safety and seek agreement of a number of matters in this respect. Also, both LIR’s refer to compensatory and other measures related to PRoW’s to offset any negative impacts of the proposed development. The applicant is invited to respond.

24. In regard to the S. 16 & 38 applications related to common land, it is noted that a number of public rights of way appear to be encompassed within the proposed replacement land and release land (ES Fig 3.12 and Fig 3.13). It appears that in terms of the replacement land that public footpath 518/9 and bridle way 518/6 run along the eastern boundary of the land. In terms of the release land, it appears that footpath 518/12 runs along the eastern boundary of the land. Please confirm that any (if not all) three footpaths identified are managed by the Council with public expense.

Other

25. Multiple parties e.g. ‘Save This Land’, question the robustness and level of information submitted for the applicant’s submitted ‘Pre-Application Consultation report (PAC). Please respond.

26. DVEN has submitted a report on the impact of the proposed development on the local tourist economy – the applicant is invited to respond to those comments.

27. Provide a list of suggested conditions, having regard to those suggested in the Councils’ LIRs and in the representations of statutory bodies; and, where relevant, comment on the extent to which suggested conditions might resolve certain matters outlined in this annex. Such a list of conditions should include reasons for each condition and reference to relevant development plan policies of the respective Council and national development plan policies. The applicant’s attention is drawn to the comments of both Council’s in their LIR’s in regard to the contents of the any legal agreement.

28. Multiple third-party objectors maintain that there is no financial bond to secure decommissioning works on the site – please provide your views on the need for such an arrangement.

29. The applicant is invited to provide a rebuttal to other points raised in representations if it considered these matters have not been fully addressed in its submitted documents. This should be submitted alongside the above information so that it can publicised and consulted upon.

Notes:

- Prior to responding, the applicant should endeavor to explore relevant matters with key consultees, who are encouraged to provide timely cooperation. This may narrow areas of disagreement in relation to some matters, assisting the efficiency of the examination.

- Where consultees allege inconsistencies or criticise methodologies in the submitted evidence, these should be addressed by explaining or correcting the details/approach. If corrections are made, the significance of these and potential implications for other parts of the evidence should be explained.

- To aid clarity and avoid repetitious evidence, any corrected text or figures should be clearly identified, and a table provided which summarises: revisions to previous evidence; evidence that is superseded; and additional evidence.

- If the applicant chooses not to provide more information on the points set out above, this should be confirmed and explained. The Inspector will then decide on how to proceed in the absence of such information and may raise the matter at a hearing.

Notwithstanding the request for the above further information (any response consulted upon at a later stage), the following parties ***only*** at this stage are invited to respond to the application details as originally submitted:

- NATS
- DIO
- CAA
- JRC
- Arqiva
- Snowdonia National Park

Any response by **all parties** must be received by **18 December 2025**

Strategic Planning and Corporate Services Group
Digital Services Division

Department of Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

Our Ref: DAERA 25/361

Data Protection & Information Management Branch,
Jubilee House
111 Ballykelly Road
Ballykelly
Co. Londonderry
BT49 9HP

E-mail:

Save The Moat

22 September 2025

Dear Ann-Louise Bresnahan,

Internal Review Request- Freedom Of Information Act 2000

Environmental Information Regulations 2004

Thank you for your request for an Internal Review of 12 August 2025.

You had initially requested on 10 July 2025:-
"I am submitting the following request under the Environmental Information Regulations 2004 (EIR), relating to DAERA's regulatory role and inter-agency activity concerning radiological risks from peatland disturbance — particularly in upland areas such as the Sperrins — for the period 1 January 2020 to the present.

Please provide the following:

1. Internal Assessments or Briefings

Copies of any internal documents, assessments, briefings, reports, memos or scientific reviews held by DAERA or its agencies relating to:

Potential or actual radiological risk from Cs-137 (Caesium-137) contamination in upland peat soils.

Radon gas mobilisation or exposure associated with peatland disturbance, excavation or infrastructure development.

Any reference to public health, watercourse, ecological, livestock or occupational exposure risks relating to the above.

2. Policy or Technical Guidance

Copies of any statutory or non-statutory guidance, policy instructions, technical notes or internal planning advice issued or received by DAERA relating to:

Radiological risk assessments in the context of Environmental Impact Assessments (EIA) or Habitat Regulations Assessments (HRA) where peat soils are present.

Criteria or thresholds used to determine the need for radiological monitoring in land-based (non-marine) environments, including uplands.

DAERA's contribution (if any) to cross-departmental planning protocols or consultation procedures relating to radon or Cs-137 risks.

3. Correspondence With Other Authorities

Copies of any correspondence (emails, letters, meeting notes or minutes) exchanged between DAERA and any of the following bodies on the above topics:

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Health and Safety Executive Northern Ireland (HSENI)

Public Health Agency (PHA)

Northern Ireland Environment Agency (NIEA)

Planning Appeals Commission (PAC)

Derry City and Strabane District Council

This should include any references to:

The Curraghinalt Gold Mine or other proposed developments in the Mullaghclogher Uplands/Sperrins AONB

Any discussion of monitoring obligations, mitigation requirements, or absence of risk due to radiological hazards in peatlands.

4. Records of Scientific Review or Site Designation Consideration

Copies of any records held relating to:

Consideration or rejection of SPA or ASSI designation in the Mullaghclogher Uplands or surrounding peatland habitats based on presence of qualifying species (e.g. golden plover, hen harrier, cloudberry).

Any review process triggered by public or expert submission of ecological or radiological evidence.

Format & Clarifications

I am happy to accept redacted documents where personal data is involved.

I request this information electronically.

If any part of this request is unclear, or may benefit from refinement to assist your search, please contact me without delay.

If this request is deemed complex under Regulation 7(1), I request a formal notice of extension and justification within 20 working days."

You were advised by the business area, Industrial Pollution and Radiochemicals Inspectorate, on 11 August 2025 that:-

"With regard to your requests for information received by the Department on 10 July 2025 which sought the following information:
Internal Assessment or Briefings - Copies of any internal documents, assessments, briefings, reports, memos or scientific reviews held by DAERA or its agencies relating to:
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Ireland (HSENI), Public Health Agency (PHA), Northern Ireland Environment Agency (NIEA), Planning Appeals Commission (PAC), Derry City and Strabane District Council. This should include any references to:
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9. Any review process triggered by public or expert submission of
a) ecological or
b) radiological evidence.

I can advise that the Department has completed its search and can confirm that it holds some of the information falling within the scope of your request.
1. Under Regulation 12(4)(a) the Department is excepted from the duty to disclose the information on the grounds that the information sought is not held.
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If you require any clarification, believe that any part of your request has been overlooked, misunderstood or misinterpreted, please contact me in the first instance to see if it is a matter that can be resolved."

You then sought an internal review on the basis that:-
"**Please treat this as a formal request for an internal review under the Environmental Information Regulations 2004 in respect of DAERA's response dated 11 August 2025 (Ref: DAERA/25-361), submitted in my name on behalf of Save the Moat.**

As detailed below, DAERA's reliance on Regulation 12(4)(a) ("information not held") for multiple items is unsustainable. Clear evidence exists of relevant records held by DAERA/NIEA/IPRI that fall within the scope of my request, including:

NIEA Consultation Response LA10/2017/1249/F (24 April 2020) – NIEA/IPRI's detailed technical review of the Radon and NORM Emissions Impact Assessment (2017 and 2019 designs), including monitoring recommendations and statutory planning correspondence.

IPRI Dalradian Statement of Case Rebuttal (15 November 2024) – Internal analysis of radon and NORM risks, referencing the Aurora Health Physics Services May 2024 report and confirming continued reliance on earlier assessments.

Radioactive Contaminated Land Regulations (NI) 2006 – Guidance (November 2023) – Statutory guidance establishing DAERA's duties in assessing radiological risks in upland peat contexts.

These documents clearly fall within the scope of my original EIR request of 10 July 2025 (items 1–4, 6, 7, and 9a) yet were omitted under a "not held" claim. This raises serious concerns about the adequacy of DAERA's searches, the application of exemptions, and compliance with Regulations 5(1) and 9(1).

Given the strong public interest in the environmental and public health matters raised — and the potential implications of any misleading or incomplete responses to statutory information requests — I reserve the right to share the details of this case with press and media outlets. This is not only to inform the affected communities in the Sperrins but to ensure transparent public scrutiny of DAERA's performance and decision-making in matters of significant environmental risk.

I request that DAERA now:

1. Conduct a full and fresh search across all relevant custodians (NIEA/IPRI, Water Management Unit, Natural Environment Division, Drinking Water Inspectorate, and relevant policy teams).

2. Disclose all responsive documents from 2017–2025, including drafts, internal communications, notes, and attachments.

3. Provide a document schedule, specific exemptions, and a public interest test where applicable.

4. Explain the search methodology and clarify how the terms in my request were interpreted.

If DAERA maintains reliance on 12(4)(a), please explain precisely why the above records were not considered responsive and identify where they are held if not within DAERA's custody.

Merged evidence bundles PDF containing the above documents is attached for ease of reference.

If a satisfactory and lawful response is not received within the statutory timescale, I will refer this matter to the Information Commissioner's Office."

First of all, your request was dealt with under the correct legislation, the Environmental Information Regulations 2004 (EIR) and all responses were timely.

I should advise you at the outset of this review that my role as reviewer is to ascertain whether or not information requested is or is not held by this Department and, if it is indeed held, that it was properly disclosed to or withheld from you the

requester in accordance with the Freedom of Information Act or EIR as appropriate and that the business area has further complied with the duty to provide advice and assistance. If you believe that there has been failure to comply with any other legislation or, except insofar as the EIR implements elements thereof in UK law, the Aarhus Convention, or to perform any statutory duty, these matters lie outwith my remit. Any issues that you have in that respect should be subjected to the DAERA Customer Complaints process in the first instance and thereafter, if you are not satisfied, to the Northern Ireland Public Services Ombudsman.

.
My staff have carried out an independent search of the Department's records management databases and can confirm that, other than the material already provided to you, no information is held in respect of the risk of radiological contamination in the Sperrin uplands and the limited amount of information held on the issues surrounding the Carriganalt Gold Mine and the legislation around radiological contamination had already been forwarded to you. I can confirm that the business area responses that no information was held were truthful and accurate and that accordingly Regulation 12(4)(a) of the EIR properly applied.

The cost of enumerating every database and shared drive within DAERA and running tracked searches would be well in excess of the £600 cost limit and would be in any case pointless as DAERA does not consider there to be any issue of radiological contamination in the Sperrins upland areas and therefore no correspondence or other documentation is likely to exist.

.
If you remain unsatisfied with this response, you can make a further appeal by writing to the Information Commissioner, FoI/EIR Complaints, Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, CHESHIRE SK9 5AF, who will undertake an independent review.

Yours sincerely

Strategic Planning and Corporate Services Group
Digital Services Division

Department of Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

Our Ref: DAERA 25/361

Data Protection & Information Management Branch,
Jubilee House
111 Ballykelly Road
Ballykelly
Co. Londonderry
BT49 9HP

E-mail:

Save The Moat

22 September 2025

Dear Ann-Louise Bresnahan,

Internal Review Request- Freedom Of Information Act 2000

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First of all, your request was dealt with under the correct legislation, the Environmental Information Regulations 2004 (EIR) and all responses were timely.

I should advise you at the outset of this review that my role as reviewer is to ascertain whether or not information requested is or is not held by this Department and, if it is indeed held, that it was properly disclosed to or withheld from you the

requester in accordance with the Freedom of Information Act or EIR as appropriate and that the business area has further complied with the duty to provide advice and assistance. If you believe that there has been failure to comply with any other legislation or, except insofar as the EIR implements elements thereof in UK law, the Aarhus Convention, or to perform any statutory duty, these matters lie outwith my remit. Any issues that you have in that respect should be subjected to the DAERA Customer Complaints process in the first instance and thereafter, if you are not satisfied, to the Northern Ireland Public Services Ombudsman.

.
My staff have carried out an independent search of the Department's records management databases and can confirm that, other than the material already provided to you, no information is held in respect of the risk of radiological contamination in the Sperrin uplands and the limited amount of information held on the issues surrounding the Carriganalt Gold Mine and the legislation around radiological contamination had already been forwarded to you. I can confirm that the business area responses that no information was held were truthful and accurate and that accordingly Regulation 12(4)(a) of the EIR properly applied.

The cost of enumerating every database and shared drive within DAERA and running tracked searches would be well in excess of the £600 cost limit and would be in any case pointless as DAERA does not consider there to be any issue of radiological contamination in the Sperrins upland areas and therefore no correspondence or other documentation is likely to exist.

.
If you remain unsatisfied with this response, you can make a further appeal by writing to the Information Commissioner, FoI/EIR Complaints, Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, CHESHIRE SK9 5AF, who will undertake an independent review.

Yours sincerely

Northern Ireland Environmental Agency
Industrial Pollution and Radiochemical Inspectorate.

Department of
Agriculture, Environment and Rural Affairs
An Roinn
Talmhaíochta, Comhshaoil agus Gnóthaí Tuaithe
Depairtment o'
Fairmin, Environment an' Kintra Matthers
www.daera-ni.gov.uk

Your reference: "EIR Request – Internal Assessments, Guidance, and Inter-Agency Correspondence on Cs-137 and Radon Hazards in Upland Peatlands (2020 – 2025)", 10 July 2025.

Our reference: DAERA/25-361

Ann-Louise Bresnahan via email

Industrial Pollution and Radiochemical Inspectorate.
Northern Ireland Environmental Agency.
17 Antrim Road
Lisburn
BT28 3AL

Email:

11th August 2025

Dear Ann-Louise Bresnahan

Environmental Information Regulations 2004

With regard to your requests for information received by the Department on 10 July 2025 which sought the following information:

Internal Assessment or Briefings - Copies of any internal documents, assessments, briefings, reports, memos or scientific reviews held by DAERA or its agencies relating to:

1. Potential or actual radiological risk from Cs-137 (Caesium-137) contamination in upland peat soils.
2. Radon gas mobilisation or exposure associated with peatland disturbance, excavation or infrastructure development.
3. Any reference to public health, watercourse, ecological, livestock or occupational exposure risks relating to the above.

Policy or Technical Guidance - Copies of any statutory or non-statutory guidance, policy instructions, technical notes or internal planning advice issued or received by DAERA relating to:

4. Radiological risk assessments in the context of Environmental Impact Assessments (EIA) or Habitat Regulations Assessments (HRA) where peat soils are present.
5. Criteria or thresholds used to determine the need for radiological monitoring in land-based (non-marine) environments, including uplands.
6. DAERA's contribution (if any) to cross-departmental planning protocols or consultation procedures relating to radon or Cs-137 risks.

Correspondence With Other Authorities - Copies of any correspondence (emails, letters, meeting notes or minutes) exchanged between DAERA and any of the following bodies on the above topics:

7. Department for Infrastructure (DfI), Health and Safety Executive Northern Ireland (HSENI), Public Health Agency (PHA), Northern Ireland Environment Agency (NIEA), Planning Appeals Commission (PAC), Derry City and Strabane District Council.

This should include any references to:

- The Curraghinalt Gold Mine or other proposed developments in the Mullaghclogher Uplands/Sperrins AONB
- Any discussion of monitoring obligations, mitigation requirements, or absence of risk due to radiological hazards in peatlands.

Records of Scientific Review or Site Designation Consideration - Copies of any records held relating to:

8. Consideration or rejection of SPA or ASSI designation in the Mullaghclogher Uplands or surrounding peatland habitats based on presence of qualifying species (e.g. golden plover, hen harrier, cloudberry).
9. Any review process triggered by public or expert submission of a) ecological or b) radiological evidence.

I can advise that the Department has completed its search and can confirm that it holds some of the information falling within the scope of your request.

1. Under Regulation 12(4)(a) the Department is excepted from the duty to disclose the information on the grounds that the information sought is not held.
2. Under Regulation 12(4)(a) the Department is excepted from the duty to disclose the information on the grounds that the information sought is not held.
3. Under Regulation 12(4)(a) the Department is excepted from the duty to disclose the information on the grounds that the information sought is not held.
4. Under Regulation 12(4)(a) the Department is excepted from the duty to disclose the information on the grounds that the information sought is not held.
5. Please see attached:

- Radioactive Contaminated Land Regulations (Northern Ireland) 2006 Guidance

6. Under Regulation 12(4)(a) the Department is excepted from the duty to disclose the information on the grounds that the information sought is not held.
7. Please see attached;
   - NIEA Consultation Response LA10/2017/1249/F.
   - IPRI Dalradian Statement of Case Rebuttal.
8. Under Regulation 12(4)(a) the Department is excepted from the duty to disclose the information on the grounds that the information sought is not held.
9. a) Under Regulation 12(4)(a) the Department is excepted from the duty to disclose the information on the grounds that the information sought is not held.
   b) Please see attached;
   - NIEA Consultation Response LA10/2017/1249/F.
   - IPRI Dalradian Statement of Case Rebuttal.

I refer you to the response to your previous EIRs, **DAERA/25-266** and **DAERA/25-299,** for further information.

The Radioactive Contaminated Land Regulations (Northern Ireland) 2006 Guidance is an internal guidance document issued by the Department to the Chief Radiochemical Inspector of NIEA and provides guidance on the application of *The Radioactive Contaminated Land Regulations (Northern Ireland) 2006* as amended. Regulation 3(1) of these regulations require the Chief Inspector to carry out an investigation "where there are reasonable grounds to believe that such land is causing lasting exposure". In the case of the Sperrin uplands, there is no evidence to suggest that there are reasonable grounds for believing that land may meet the criteria to be considered radioactive contaminated land.

If you require any clarification, believe that any part of your request has been overlooked, misunderstood or misinterpreted, please contact me in the first instance to see if it is a matter that can be resolved.

If you are unhappy with the manner in which your request for information has been handled or the decision to release/withhold information, you have the right to request a formal review by the Department.

If you wish to do so, please contact The Review Section either by e-mailing or by post at The Department of Agriculture, Environment and Rural Affairs, Data Protection & Information Management Branch, Floor 2, Jubilee House, 111 Ballykelly Road, Ballykelly, Limavady BT49 9HP, within two months from the date of this letter.

If after such an internal review you are still unhappy with the response, you have the right to appeal to the Information Commissioner at Wycliffe House, Water Lane, Wilmslow, CHESHIRE, SK9 5AF, who will undertake an independent review of the Department's decision.

Yours sincerely,

Department of
Agriculture, Environment
and Rural Affairs
www.daera-ni.gov.uk

Radioactive Contaminated Land Regulations (Northern Ireland) 2006

Guidance

Contents

This guidance is issued by the Department of Agriculture, Environment and Rural Affairs (DAERA) and provides guidance to the Chief Inspector of the Industrial Pollutions and Radiochemical Inspectorate (IPRI) on the application of *The Radioactive Contaminated Land Regulations (Northern Ireland) 2006* as amended.

Any queries on this guidance should be addressed to:

Radioactivity Policy Team, Natural Environment Policy Division, Department of Agriculture, Environment and Rural Affairs, Klondyke Building, Cromac Avenue Gasworks Business Park, Lower Ormeau Road, Belfast BT7 2JA

Introduction

1. *The Radioactive Contaminated Land Regulations (Northern Ireland) 2006 (SR (NI) 2006 No 345)*[1], came into operation on 22nd September 2006. In 2016, the Department of the Environment was dissolved by section 1(9) of the Departments Act (Northern Ireland) 2016 and, by virtue of Article 8(1)(c) of the Departments (Transfer of Functions) Order (Northern Ireland) 2016, its functions for the purposes of these regulations were transferred to the Department of Agriculture, Environment and Rural Affairs.

2. The regulations provide a legal framework for dealing with radioactive contaminated land in Northern Ireland for the protection of the health of workers and the general public against the dangers arising from ionising radiation in so far as they relate to radioactively contaminated land. In drafting this guidance, cognisance has been taken of relevant documentation issued by the IAEA, specifically Principle 10 of IAEA Safety Standards Series No.SF-1 Fundamental Safety Principles, Protective actions to reduce existing or unregulated radiation risks, Requirements 47 – 49 of IAEA Safety Standards Series No GSR Part 3, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards (2014) and IAEA General Safety Guide No. GSG-15 Remediation Strategy and Process for Areas Affected by Past Activities or Events (2022).

3. The regulations place a range of duties on the Chief Inspector on behalf of the Department of Agriculture, Environment and Rural Affairs (DAERA). The Chief Inspector appointed under section 4 of the Radioactive Substances Act 1993, is the Chief Radiochemical Inspector of the Industrial Pollution and Radiochemical Inspectorate (IPRI), DAERA.

4. The radioactive contaminated land regime and therefore this Guidance only cover land where radioactivity is present because of a past activity or due to the after-effects of an emergency. It does not apply to current practices and natural background radiation[2], land containing radionuclides present only because of natural processes are therefore excluded from the provision of the regulations.

1 S.R. 2006 No. 345 as amended by S.I. 2007/3236, S.I 2010/2145, SR 2018/116, SR 2019/185 and SI 2019/24
2 This limit arises by virtue of the definition of "substance" in Regulation **(2)(2**) of The Radioactive Contaminated Land Regulations (Northern Ireland) SR 2006/345

Section 1: Objective of the Northern Ireland radioactive contaminated land regime

1.1 The objective of the Northern Ireland radioactive contaminated land regime, under *The Radioactive Contaminated Land Regulations (Northern Ireland) 2006*, is to provide a system for the identification and appropriate intervention of land where radioactive contamination is causing the threshold for harm to human health to be exceeded to manage contaminated land. This guidance complements the regulations and assists the Chief Inspector in performing their duties under the radioactive contaminated land regime. The guidance applies only to the Chief Inspector.

1.2 The Northern Ireland radioactive contaminated land regime (made up of the Radioactive Contaminated Land Regulations (Northern Ireland) 2006 (as amended) and this associated guidance) forms part of the UK's optimised protection strategy for managing radioactively contaminated land that falls within the scope of this guidance. As such this provides one means of implementing GSR Part 3, Requirement 47: Responsibilities of the government specific to existing exposure situations, paragraph 5.4 to establish a protection strategy that includes objectives and appropriate reference levels, to ensure the appropriate management of contaminated land in line with the risks and with the effectiveness of protective measures. The Northern Ireland radioactive contaminated land regime also implements GSR Part 3, Requirement 49: Responsibilities for remediation of areas with residual radioactive material, paragraph 5.10 in assigning responsibility for implementation of a management strategy and coverage of the elements listed.

1.3 In the context of the radioactive contaminated land regime, a "reference level", is "the level of dose or the level of risk above which it is judged to be inappropriate to plan to allow exposures to occur and below which the optimization of protection and safety is implemented". A range of reference levels will be used as part of an intervention strategy once land has been determined as radioactive contaminated land. The aim would be to reduce exposure so that doses are below the harm threshold (i.e., the value of 3 millisieverts per annum or equivalents described in section 6.3) unless the Chief Inspector considers that this is not practicable or reasonable [see also paragraphs 3.8 – 3.15 and 6.5 – 6.15 of General Safety Guide No. GSG-15 for information]. The radioactive contaminated land regime already embeds the concepts of justification and optimisation required by GSR Part 3, Requirement 48: Justification for protective actions and optimization of protection and safety [see also paragraphs 3.16 – 3.33 of General Safety Guide No.GSG-15 for information].

1.4 The radioactive contaminated land regime applies to the after-effects of an emergency but would only usually be brought to bear in practice after all other emergency action taken under the *Radiation (Emergency Preparedness and Public Information) Regulations (Northern Ireland) 2019* [SR 2019/185] (REPPIR) or action taken by the Strategic Co-ordinating Group and Recovery Co-ordinating Group as part of the implementation of Recovery Guidance, had been exhausted The regulations specifically do not apply if action is required to be taken by HSE(NI) under Regulation 16(3) of REPPIR 2019.

Section 2: Identification of radioactive contaminated land

2.1 The Chief Inspector has the sole responsibility for identifying whether any land appears to be radioactive contaminated land. They cannot delegate this responsibility, although in discharging it the Chief Inspector can choose to rely on information or advice provided by another body such as councils or by a consultant appointed for that purpose.

2.2 Before making any identification, the Chief Inspector should:

- carry out an appropriate, scientific and technical assessment of the circumstances of the land, using all of the relevant and available evidence. The Chief Inspector should then identify whether any of the land appears to them to meet the definition of radioactive contaminated land and requires intervention (see Sections 3 – 6 below).

- Inform the owners and occupiers of the land and any other person who appears to be liable to pay for intervention of their intention to identify the land as radioactive contaminated land (to the extent that the Chief Inspector is aware of these parties at the time) unless the Chief Inspector considers there is an overriding reason for not doing so.

- The Chief Inspector should also consider,

  (a) Whether to give such person's time to make representations (for example, to seek clarification of the grounds for the identification, or to propose a solution that might avoid the need for formal identification) taking into account: the broad aims of the regime; the urgency of the situation; any need to avoid unwarranted delay; and any other factors the Chief Inspector considers to be appropriate.

(b) Whether to inform other interested parties as they consider necessary, for example, owners and occupiers of neighbouring land. [See also paragraphs 2.51 – 2.60 of IAEA General Safety Guide No.GSG-15 for information].

2.3 The Chief Inspector may postpone identifying land as radioactive contaminated land if the owner or some other person undertakes to deal with the problem without formal identification, and the Chief Inspector is satisfied that the intervention will happen to an appropriate standard and timescale. If the Chief Inspector chooses to do this, any agreement they enter should not affect their ability to identify the land as radioactive contaminated land in future (e.g, if the person fails to carry out the intervention as agreed).

2.4 The Chief Inspector may postpone identification of radioactive contaminated land if a significant contaminant linkage would only exist if the circumstances of the land were to change in the future within the bounds of the current use of the land as described in paragraph 5.4 of this Guidance (e.g, if a temporary interrupted pathway were to be reactivated). If the Chief Inspector chooses to do this, they should keep the status of the land under review and take reasonable measures to ensure that the postponement does not create conditions under which significant risks could go unaddressed in future. Alternatively, the Chief Inspector may decide to identify the land as contaminated but postpone intervention.

2.5 The Chief Inspector may need to decide whether and how to act in situations where such decisions are not straightforward and where there may be unavoidable uncertainty underlying some of the facts of each case. In doing so, the Chief Inspector should use their judgement to strike a reasonable balance between: (a) dealing with risks raised by radioactive contaminants in land and the benefits of intervention to remove or reduce these risks; and (b) the potential impacts of taking action including financial costs to whoever will pay for intervention (including the taxpayer where relevant), health and environmental impacts of any protective or intervention measures, property blight, and burdens on affected people. The Chief Inspector should take a precautionary approach to the risks raised by radioactive contamination, whilst avoiding a disproportionate approach given the circumstances of each case. The aim should be to consider the various benefits and costs of taking action with a view to ensuring that the regime produces net benefits, taking account of local circumstances.

Section 3: Preliminary Evaluation

3.1 If the Chief Inspector considers there are reasonable grounds for believing land may be radioactive contaminated land, they should investigate the condition of the land to obtain sufficient information to decide whether it is radioactive contaminated land having regard to Section 5 of this Guidance.

3.2 The Chief Inspector will have such reasonable grounds where they have knowledge of relevant information relating to (a) a former historical land use, past practice, past work activity or emergency, capable of causing lasting exposure giving rise to the radiation doses set out in paragraph 6.3 below; or (b) levels of contamination present on the land arising from a past practice, past work activity or emergency, capable of causing lasting exposure giving rise to the radiation doses set out in paragraph 6.3 below [see also paragraphs 5.1 – 5.18 of General Safety Guide No.GSG-15 for information]. The information gathered in the preliminary evaluation should be documented.

3.3 Where information is already available, or will become available, the Chief Inspector needs to consider whether the information provides, or would provide, a sufficient basis on which they can determine whether or not the land appears to be radioactive contaminated land and if so whether intervention might be justified. If this indicates a clear need for intervention without further justification, then the Chief Inspector should proceed on this basis.

3.4 Areas where the estimated dose to the public is less than that set out in paragraph 6.3 below might be released for unrestricted use.

Section 4: Detailed Evaluation

4.1 Where the preliminary evaluation indicates that intervention might be justified, the Chief Inspector should carry out a detailed investigation to determine whether or not the intervention is justified and if so, provide the necessary information to determine what action is required under an intervention notice.

4.2 Investigation may include any or all of the following:

a) the collation and assessment of documentary information, or other information from other bodies;

b) a visit to the particular area for the purposes of visual inspection and, in some cases, limited sampling (for example of surface deposits); or

c) intrusive investigation of the land (for example by exploratory excavations) [see also paragraphs 6.1 – 6.3 of General Safety Guide No. GSG-15 for information].

4.3 The Chief Inspector should consult the landowner before inspecting the land unless there is a particular reason why this is not possible, for example because it has not been possible to identify or locate the landowner. Where the landowner refuses access, or the landowner cannot be found, the Chief Inspector should consider using statutory powers of entry. Section 31 of the Radioactive Substances Act gives the Chief Inspector the rights of entry and inspection.

4.4 If the Chief Inspector intends to carry out an inspection using statutory powers of entry, they should first be satisfied that there is a reasonable possibility that a significant contaminant linkage may exist on the land. The Chief Inspector should not use statutory powers of entry to undertake intrusive investigation, including the taking of sub-surface samples, if:

a) They have already been provided with detailed information on the condition of the land, which provides an appropriate basis upon which the Chief Inspector can determine whether the land is contaminated land in accordance with the requirements of this guidance; or

b) a relevant person (e.g the owner of the land, or a person who may be liable for the contamination) offers to provide such information within a reasonable and specified time, and then provides such information within that time.

4.5 The Chief Inspector should carry out any investigation in accordance with appropriate good practice technical procedures for such investigations, for example, Radioactively Contaminated Land Exposure Assessment (RCLEA) Methodology Technical Report No. CLR -14, Version 1.2 (2011) (Defra). If at any stage, the Chief Inspector considers, on the basis of information obtained from investigation activities, that there is no longer a reasonable possibility that a particular contaminant linkage exists on the land, the Chief Inspector should not carry out any further investigation in relation to that linkage.

4.6 In some cases, the information obtained from an inspection may lead the Chief Inspector to the conclusion that, whilst the land does not appear to be

radioactive contaminated land on the basis of the information assessed it is still possible that the land is radioactive contaminated land. In cases of this kind, the Chief Inspector will need to consider whether to carry out further inspections or pursue other lines of enquiry to enable them to either discount the possibility that the land is radioactive contaminated land, or to conclude that the land does appear to be radioactive contaminated land. In the absence of any such further inspection or enquiry the Chief Inspector will need to proceed to make their determination on the basis that they cannot be satisfied that the land falls within the definition of radioactive contaminated land.

4.7 In other cases, an inspection may yield insufficient information to enable the Chief Inspector to determine whether or not the land appears to be radioactive contaminated land and intervention is justified. In such cases, the Chief Inspector will need to consider whether carrying out further inspections (for example, taking more samples) or pursuing other lines of enquiry (for example, carrying out or commissioning more detailed scientific analysis of a substance or its properties) would be likely to provide the necessary information. If it is not possible to obtain the necessary information, the Chief Inspector will need to proceed to make their decision on the basis that they cannot be satisfied that the land falls within the definition of radioactive contaminated land.

Section 5: Risk Assessment

5.1 *The Radioactive Contaminated Land Regulations (Northern Ireland) 2006* take a risk-based approach to defining radioactive contaminated land. For the purposes of this guidance "risk" means the combination of: (a) the likelihood that harm will occur as a result of contaminants in, or under the land; and (b) the scale and seriousness of such harm if it did occur.

5.2 The Chief Inspector should have regard to good practice guidance on risk assessment and they should ensure that they undertake risk assessment in a way which delivers the results needed to make robust decisions in line with the Regulations and this Guidance.

5.3 Risk assessments should be based on information which is: (a) scientifically based; (b) authoritative; (c) relevant to the assessment of risks arising from the presence of contaminants in soil; and (d) appropriate to inform regulatory decisions in accordance with the Regulations and this Guidance.

Current Use

5.4 Risks should be considered only in relation to the current use of the land. For the purpose of this Guidance, the "current use" means:

(a) The use which is currently being made of the land.

(b) Reasonably likely future uses of the land that would not require a new or amended grant of planning permission.

(c) Any temporary use to which the land is put, or is likely to be put, from time to time within the bounds of current planning permission.

(d) Likely informal use of the land, for example children playing on the land, whether authorised by the owners or occupiers or not.

(e) In the case of agricultural land, the current agricultural use should not be taken to extend beyond the growing or rearing of the crops or animals which are habitually grown or reared on the land.

5.5 In assessing risks, the Chief Inspector should disregard receptors which are not likely to be present given the current use of the land or other land which might be affected. In considering the timescale over which a risk should be assessed the Chief Inspector should take into account any evidence that the current use of the land will cease in the relevant foreseeable future (e.g., within the period of exposure assumed for the receptors in a contaminant linkage).

5.6 When considering risks in relation to any future use or development which falls within the description of a "current use", the Chief Inspector should assume that the future use or development would be carried out in accordance with any existing planning permission. In particular, the Chief Inspector should assume:

(a) That any intervention which is the subject of a condition attached to that planning permission, or is the subject of any planning obligation, will be carried out in accordance with that permission or obligation.

(b) Where a planning permission has been given subject to conditions which require steps to be taken to prevent problems which might be caused by contamination, and those steps are to be approved by the local Council, that the local Council will ensure those steps include adequate intervention.

Contaminant Linkages

5.7 For a relevant risk to exist there needs to be one or more contaminant-pathway-receptor linkage(s). In other words, for a risk to exist there must be contaminants present in, on or under the ground in a form and quantity that poses a hazard, and one or more pathways by which they might harm people.

5.8 For the purposes of this Guidance:

(a) A “contaminant” is limited to any substance containing radionuclides, in, on or under the land, which have resulted from the aftereffects of an emergency or have been processed as part of a past practice or past work activity.

(b) A “receptor” is something that could be adversely affected by a contaminant. Under the radioactive contaminated land regime this is limited to human beings only.

(c) A “pathway” is a means by which a receptor is or might be affected by a contaminant.

(d) A “significant contaminant linkage” is a linkage which gives rise to a risk sufficient to justify a piece of land being determined as radioactive contaminated land.

5.9 In considering contaminant linkages, the Chief Inspector should consider whether:

(a) The existence of several different potential pathways linking one or more potential contaminants to a particular receptor, may result in a significant contaminant linkage.

(b) There is more than one significant contaminant linkage on any land. If there are, the authority should consider whether each should be dealt with separately, since different people may be responsible for intervention to address individual contaminant linkages.

Section 6: Determination of Harm

6.1 This section of the Guidance sets out the basis on which the Chief Inspector should determine that harm is being caused and therefore the land is radioactive contaminated land. In particular, it sets out the dose criteria that should be used to determine whether harm is being caused. In assessing harm, the Chief Inspector should act in accordance with the advice on risk assessment in Section 5 and the guidance in this section.

6.2 Under the *Radioactive Contaminated Land Regulations (Northern Ireland) 2006:*

- Regulation 2A defines “contaminated land” (referred to as radioactive contaminated land in this Guidance) as land which the Chief Inspector has identified as being in such condition by reason of substances in, or under the land that lasting exposure to any person (a) is being caused; or (b) is likely to be caused;

- Regulation 2(2) defines “harm” as meaning lasting exposure to any human being resulting from the after-effects of an emergency, past practice or past work activity;

- Regulation 2(2) defines “substances” as meaning, whether in solid or liquid form or in the form of a gas or vapour, any substance containing radionuclides which have resulted from the after-effects of an emergency or have been processed as part of a past practice or past work activity.

6.3 The Chief Inspector should regard harm as being caused to human health where lasting exposure gives rise to doses that exceed one or more of the following: (a) an effective dose of 3 millisieverts per annum; (b) an equivalent dose to the lens of the eye of 15 millisieverts per annum; or (c) an equivalent dose to the skin of 50 millisieverts per annum. The skin limit shall apply to the dose averaged over any area of 1cm^2, regardless of the area exposed.

6.4. For the estimation of an effective and equivalent dose, the appropriate standard values and relationships should be used. For external radiation, the operational quantities defined in section 2.3 of ICRP Publication 116 should be used. [see also paragraphs 3.8 – 3.14 of of General Safety Guide No. GSG-15 for information]. The estimation of an effective or equivalent annual dose should not include the local background level of radiation from the natural environment.

6.5. The Chief Inspector should determine that land is radioactive contaminated land on the basis that such harm is being caused where: (a) they have carried out a scientific and technical assessment of the dose arising from the pollutant linkage, according to relevant, appropriate, authoritative and scientifically based guidance on such assessments; (b) that assessment shows that such harm is being caused; and (c) there are no suitable and sufficient risk management arrangements currently in place to prevent such harm.

6.6 To simplify such an assessment of dose, the Chief Inspector may use authoritative and scientifically based guideline values for concentrations of the potential contaminants in, on or under the land in contaminant linkages of the type concerned.

6.7 Where the conditions in paragraph 6.3 are not met, the Chief Inspector should consider the possibility of harm causing lasting exposure on a case per case basis. In determining the level of harm, the Chief Inspector should take into account relevant information concerning: (a) the potential annual effective does; (b) any non-linearity in the dose-effect relationship for stochastic effects; (c) the potential annual equivalent dose to the skin and to the lens of the eye; (d) the nature and degree of any deterministic effects associated with the potential

annual dose; (e) the probability of the dose being received; (f) the duration of the exposure and timescale within which the harm might occur; and (g) any uncertainties associated with (a) to (f) above. "Relevant information" means information, which is appropriate, scientifically based and authoritative. Where different reference levels are applied, these should be periodically reviewed by the Chief Inspector to ensure they remain appropriate in light of the prevailing circumstances. [See also paragraphs 6.5 – 6.22, General Safety Guide No.GSG-15, for information].

Record of the identification of radioactive contaminated land

6.8 The Chief Inspector should prepare a written record of any identification that land is radioactive contaminated land, including their assessment as to whether intervention is justified. The record should clearly and accurately identify the location, boundaries and area of the land in question, making appropriate reference to Ordnance Survey grid references and/or Global Positioning coordinates. The record should be made publicly available by means to be decided by the Chief Inspector.

6.9 The record should explain why the land has been identified as radioactive contaminated land, including a summary of the relevant assessment of evidence and why the Chief Inspector considers that the requirements of relevant sections of the Guidance have been satisfied.

6.10 The Chief Inspector should seek to ensure (as far as reasonable) that all aspects of the record of land identified as radioactive contaminated land are understandable to non-specialists, including affected members of the public.

Section 7: Intervention of Radioactive Contaminated Land

7.1 Where any land has been determined as being radioactive contaminated land, the Chief Inspector has a duty to require appropriate Intervention. A graded approach should be applied to the intervention process such that the level of effort applied is commensurate with the magnitude and likelihood of exposures. [See also paragraphs 7.2 – 7.28, General Safety Guide No.GSG-15 for information].

7.2 The Chief Inspector as the enforcing authority should have regard to this guidance when they are:

a) deciding what intervention action, they should specify in an intervention notice as being required to be carried out;

b) satisfying themselves that appropriate intervention is being, or will be, carried out without the service of an intervention notice; or

c) deciding what intervention action, they should carry out themselves.

7.3 This guidance does not attempt to set out detailed technical procedures or working methods. In considering such matters, the Chief Inspector may consult relevant technical documents (e.g., those produced by other professional and technical organisations). They may also act on the advice of a suitably qualified experienced practitioner.

7.4 The broad aim of intervention should be:

a) to remove identified contaminated linkages, or permanently disrupt them to ensure the risks are reduced to below an acceptable level; and/or

b) to take reasonable measures to remedy harm that has been caused by a contaminant linkage.

7.5 Intervention may involve a range of treatment, assessment and monitoring actions, sometimes with different intervention actions being used in combination or sequentially to secure the overall intervention of the land.

7.6 In the case of radioactive contaminated land, it is necessary to ensure compliance with Regulation 3 of the Radioactive Contaminated Land Regulations (Northern Ireland) 2006. This means that intervention must, if necessary, and to the extent of the lasting exposure risk involved, include ensuring that:

a) the radioactive contaminated land and any other affected adjoining or adjacent land is demarcated;

b) arrangements for the identification of affected members of the public are made;

c) arrangements for monitoring of exposure are made;

d) assessments of the means available to the affected members of the public for controlling their own exposure are made;

e) any appropriate intervention is implemented; and

f) access to or use of land or buildings situated in the demarcated area is regulated.

7.7 In cases where the aim of intervention is to remove or permanently disrupt contaminant linkages, intervention treatment should involve demonstrable disruption or removal of the contaminant linkage(s) that led to land being identified as radioactive contaminated land, in order to reduce or remove unacceptable risks to receptors. This might involve one or more of the following:

a) Reducing or treating the contaminant part of the linkage (e.g., by physically removing contaminants or contaminated soil, or by treating the soil to reduce levels of contaminants).

b) Breaking, removing or disrupting the pathway parts of the linkage (e.g., a pathway could be disrupted by removing or reducing the chance that receptors might be exposed to contaminants, for example by sealing a site with a material such as clay or concrete).

c) Protecting or removing the receptor. For example, by changing the land use or restricting access to a site it may be possible to reduce risks to below an unacceptable level. Changing the land use may, if appropriate, included imposing restrictions on living conditions (e.g., the growth of food plants) in such sites.

7.8 Assessment, monitoring or demarcation actions may also be required as part of intervention. For example, assessment actions may be needed to characterise the nature of significant contaminant linkage(s) to help the Chief Inspector decide what intervention should involve. Assessment may also be needed whilst other intervention actions are being carried out, or after other actions have been carried out (e.g., to assess the effectiveness of the other measures, or to inform the need for possible further intervention actions). Monitoring actions may be needed after intervention has taken place (e.g., to check whether intervention action has been successful, or whether there is a need for further assessment or action). Demarcation may be appropriate to limit access to a contaminated area.

7.9 Assessment and monitoring action should not be required for any purpose other than the intervention of the land in relation to the reason why it was identified as radioactive contaminated land. [See also paragraphs 8.1 – 8.21, General Safety Guide No. GSG-15 for information].

7.10 Appropriate arrangements should be put in place for the safe and effective management and disposal of radioactive waste arising from intervention of radioactive contaminated land [see also paragraphs 9.7 – 9.34, General Safety Guide No. GSG-15 for information].

Phased intervention

7.11 Intervention may require a phased approach, with different intervention actions being carried out in sequence or in parallel.

7.12 In some cases, it may not be possible or reasonable for a single intervention notice to specify all the intervention actions which might eventually be needed. In such cases, the Chief Inspector should specify in the notice the intervention action(s) which they consider to be appropriate at the time, and further intervention notices may need to be issued later regarding further phases of action.

7.13 If a phased approach is taken to intervention, before serving a further intervention notice, the Chief Inspector should be satisfied that previous action has not already achieved the intervention of the land (i.e. to a standard to which intervention can reasonably be required, having regard to the advice below), and that further action is still necessary to achieve the intervention of the land in question.

Remediation of multiple significant pollutant linkages

7.14 Where one or more significant contaminant linkage has been identified on the land, the Chief Inspector should consider whether reasonable actions for addressing each linkage individually would result in the optimum approach for achieving the overall remediation of the land. If a more integrated approach would be more practicable and more cost effective whilst still delivering the same (or better) overall standard of intervention, the Chief Inspector should generally favour this approach. However, in cases where more than one party has been found responsible for linkages, the Chief Inspector should not impose an approach which is more costly for any responsible party than addressing the

linkages separately. Where intervention measures are involved, the Chief Inspector will need to ensure compliance with the principles of justification and optimisation.

Securing intervention without an intervention notice

7.15 Wherever practicable, intervention should proceed by agreement rather than by formal action. In this context, the Chief Inspector and the responsible person who will carry out the intervention may identify by mutual agreement the particular intervention actions which would achieve intervention to the necessary standard.

7.16 The Chief Inspector may not serve an intervention notice if it is satisfied that appropriate measures are being taken by way of intervention without the serving of an intervention notice. The Chief Inspector should assume that appropriate measures are being taken if:

a) They are satisfied that steps are being taken that are likely to achieve a standard of intervention equal to, or better than, what the Chief Inspector would otherwise have specified in an intervention notice; and

b) the Chief Inspector is satisfied that the timescale in which intervention is planned to take place is appropriate.

7.16 Even if the Chief Inspector is not satisfied the proposed intervention is appropriate, they may be able to persuade the person who made the proposals to bring forward a revised and satisfactory intervention.

7.17 The Chief Inspector should actively consider the merits and likelihood of achieving intervention without recourse to an intervention notice, before issuing an intervention notice. However, where appropriate intervention is not being carried out, or where agreement cannot be reached on the intervention actions required, the chief inspector has a duty to serve an intervention notice. Any such notice must specify particular intervention actions to be carried out and the times within which they must be carried out.

Serving an intervention notice

7.18 If the Chief Inspector is not satisfied, at this stage, that appropriate intervention is being, or will be, carried out without an intervention notice being served, they need to consider who might be served with such a notice.

7.19 The Chief Inspector may, by serving an intervention notice on the responsible person, require the responsible person to carry out the necessary intervention actions.

7.20 If no responsible person is identified, then the Department shall undertake the necessary intervention action.

Standard of intervention

7.21 The Chief Inspector as the enforcing authority may only require (or undertake themselves in cases where direct enforcing authority activity is deemed necessary) actions in an intervention notice which are reasonable with regard to the cost and seriousness of the harm.

7.22 Where the Chief Inspector considers that it is not practicable or reasonable to remediate land to a degree where it stops being radioactive contaminated land, the Chief Inspector should consider whether it would be reasonable to require intervention to a lesser standard. The recommended range of reference levels for existing exposure situations is 1-20 mSv per year and in particular any national reference level which will apply during the emergency and the transition from an emergency exposure to an existing exposure situation. It should be noted that, for emergencies affecting large areas, management of the response may need to deal simultaneously with different exposure situations (i.e, emergency and existing exposure situations) affecting different geographical areas, each with their own reference level. Where the land has been identified and designated as radioactive contaminated land, and the contamination has resulted from the after-effects of an emergency, the Secretary of State may decide to issue further Statutory Guidance on the standard of remediation which may include setting the appropriate reference level taking account of relevant IAEA standards and ICRP publications. The additional principles described below including justification and optimisation, must also be taken into account.

7.23 In cases where the purpose of intervention is to remedy harm that has already been caused, the Chief Inspector should decide what is a suitable standard of

intervention having regard to reasonableness, including the tests of justification and optimisation, below.

Reasonableness of intervention

7.24 The Chief Inspector may only require intervention action in an intervention notice if they are satisfied that those actions are reasonable. In deciding what is reasonable, the Chief Inspector should consider various factors, having particular regard to:

a) the practicability, effectiveness and durability of intervention;

b) the health impacts and social costs of the chosen intervention options;

c) the financial cost which is likely to be involved;

d) the benefits of intervention with regard to the seriousness of the harm in question and

e) whether the principles of justification and optimisation are met where intervention of harm occurs.

7.25 The paragraphs below explain how the Chief Inspector should consider these factors in reaching a judgement on what is reasonable. The Chief Inspector should regard an intervention action as being reasonable if they are satisfied that the benefits of intervention are likely to outweigh the costs of intervention. Where harm requires an intervention, the Chief Inspector is required to have regard to a broader set of potential adverse impacts under the principle of justification and to ensure the net benefit of the intervention is maximised under the principle of optimisation.

7.26 In some cases, it might be that there is more than one potential approach to intervention that would be reasonable. In such cases the Chief Inspector should choose what they consider to be the “best practicable technique” having regard to the factors above. Unless there are strong grounds to consider otherwise, the best practicable technique in such circumstances is likely to be the technique that achieves the required standard of intervention in the appropriate timescale, whilst imposing the least cost on the persons who will pay for the intervention. Where harm requires an intervention, the Chief

Inspector is required to choose the option that maximises the net benefit of the intervention.

Practicability, effectiveness and durability of intervention

7.27 The Chief Inspector should ensure that any requirement they make in regard to intervention is practicable and effective – i.e., it should be possible, within reasonable limits, for the person to undertake the required actions, and the actions should be effective in addressing the problem at hand. This applies both to the intervention as a whole and the individual intervention actions of which it is comprised.

7.28 In assessing the practicability of any intervention, the Chief Inspector should consider, in particular:

a) technical constraints, such as whether the technical capacity and resources needed to undertake the work exist, and could reasonably be made available;

b) site constraints, such as access to the relevant land, the presence of buildings or other structures in, on or under the land;

c) time constraints, such as whether it would be possible to carry out the intervention within the required time period; and

d) regulatory constraints, such as whether the intervention can be carried out within relevant statutory or similar controls, for example, the legal disposal of wastes arising.

7.29 The Chief Inspector should consider the durability of intervention. In some cases, it will be reasonable to require (or otherwise ensure) a permanent solution to the problem. In other cases, this may not be possible or reasonable, in which case the Chief Inspector should consider how to ensure a reasonable standard of durability. The aim should be to ensure (as far as practical and reasonable) that the intervention as a whole would continue to be effective during the time over which the significant contaminant linkage would continue to exist or recur.

7.30 In considering durability, the Chief Inspector should consider whether it is likely that some other future action (such as redevelopment) will resolve or control

the problem. If the Chief Inspector feels that such action is likely to occur within a reasonable timescale, the Chief Inspector may consider whether it would be appropriate to require intervention of limited durability, pending a more durable solution later.

7.31 Where the intervention cannot reasonably and practicably continue to be effective during the whole of the expected duration of the problem, the Chief Inspector should require the intervention to be effective for as long as can reasonably and practicably be achieved. In such circumstances, additional monitoring actions may be required.

7.32 Where an intervention method requires on-going management and maintenance in order to continue to be effective (for example, the maintenance of gas venting or alarm systems), these on-going requirements should be specified in any intervention notice (or similar intervention agreement if intervention is being taken forward without such a notice) as well as any monitoring actions necessary to keep the effectiveness of the intervention under review.

Financial cost of intervention

7.33 In considering the costs likely to be involved in carrying out any intervention action, the Chief Inspector should take into account the direct financial costs likely to be caused by intervention. This would include:

(a) The cost of preparing for intervention to take place (e.g, feasibility studies, design of remediation actions, management costs, and the cost of relevant assessment actions).

(b) The cost of undertaking the intervention actions and making good afterwards, including any tax payable.

(c) The cost of managing the land after the main intervention action has been taken (e.g. on-going requirements to manage or maintain the intervention action, and the cost of any monitoring or assessment action).

(d) Relevant disruption costs (e.g. depreciation in the value of the land or other interests, or other loss or damage which is likely to result from the carrying out of the intervention action in question).

(e) The above costs relative to any estimated increase in the financial value and utility of the land as result of intervention, and whether such increase

in value and utility would accrue to the person(s) bearing the cost of the intervention.

(In the case of a protective or remedial measure, other costs may need to be weighed in the balance – see paragraphs 7.40 – 7.44 below.

7.34 The identity or financial standing of any person who may be required to pay for an intervention action are not relevant to the consideration of whether the costs of an intervention action are reasonable (although they may be relevant in deciding whether the cost of intervention can be imposed on such persons).

Benefits of Intervention

7.35 In considering the benefits of intervention, the Chief Inspector should consider:

a) the seriousness of any harm and the various factors that led the land to be identified (e.g. the scale of harm that might already be occurring; or the likelihood of potential future harm and the likely impact if it were to occur);

b) the context in which the effects are occurring or might occur; and

c) any estimated increase in the financial value and utility of the land as a result of intervention, and who would benefit from such an increase. In considering such benefits it is for the Chief Inspector to decide whether or not to describe such benefits (whether direct or indirect) in terms of monetary value or whether to make a qualitative consideration.

Health and environmental impacts of intervention

7.36 In considering the costs of intervention and the seriousness of harm, the Chief Inspector should also consider other costs and impacts that may, directly or indirectly, result from intervention. This should include consideration of:

a) potential health impacts of intervention; and

b) environmental costs of intervention.

In considering such impacts it is for the Chief Inspector to decide whether or not to describe such costs in terms of monetary value or whether to make a qualitative consideration.

7.37 The Chief Inspector's consideration of potential health impacts of intervention should include:

a) direct health effects (e.g. resulting from contaminants being mobilised during intervention, and worker safety); and

b) indirect health effects such as stress related effects that may be experienced by affected people, particularly local residents.

In making this consideration the Chief Inspector should also be mindful of the health benefits of intervention and the potential health impacts not carrying out intervention would have.

7.38 With regards to environmental impacts of intervention, the Chief Inspector should consider whether intervention can be carried out without disproportionate damage to the environment, and in particular:

a) Without unacceptable risk to water, air, soil and plants and animals;

b) Without causing a nuisance through noise or odours;

c) Without adversely affecting the countryside or places of special interest; and

d) Without adversely affecting a building of special architectural or historic interest.

7.39 The Chief Inspector should strive to minimise impacts of remediation on health and the environment (and comply with any relevant regimes that might require this, for example the planning and licensing regimes). If the Chief Inspector considers that health or environmental impacts of a particular intervention approach are likely to outweigh the likely benefits of dealing with the risk posed by the contamination, they should consider whether an alternative approach to remediation is preferable, even if it may deliver a lower standard of intervention than other techniques.

Intervention involving the implementation of a protective or remedial measure: applying the principles of justification and optimisation.

7.40 Where the proposed intervention involves the implementation of a protective or remedial measure, the Chief Inspector must apply the principles of justification

and optimisation: they must ensure that any protective or remedial measure is both justified and optimised. These principles are laid down in GSR Part 3, Principle 48: Justification for protective actions and optimization of protection and safety and given effect in regulation 3(3)(b) and (c) of the Radioactive Contaminated Land Regulations (Northern Ireland) 2006. [See also paragraphs 3.16 -3.33 of IAEA General Safety Guide No. GSG-15 for information].

7.41 The assessment of whether a potential protective or remedial measure is justified and optimised should include the preparation of:

a) An estimate of the financial costs of the intervention (taking into account the guidance in paragraph 7.33 and 7.34;

b) A statement of social costs and adverse effects (see paragraphs below) associated with the intervention and

c) A statement of the benefit (e.g reduction in radiation exposure) likely to result from the remediation.

7.42 In making an assessment of whether the intervention is justified or optimised the Chief Inspector should:

a) Consult publications of international bodies, including the International Atomic Energy Agency;

b) If appropriate, apply the approaches of multi-attribute analysis in assessing the balance between the various factors that need to be taken into consideration and the weighings which may be appropriate to assign to the various attributes; or alternatively, some other recognised options assessment approach;

c) Consult with relevant stakeholder grounds to understand their perceptions of the relative importance of different attributes; and

d) Consider quantitative and qualitative methods as a decision-aid in helping to reveal the key issues and assumptions and allowing an analysis of the sensitivity to various assumptions.

7.43 The type of social costs and adverse effects to be considered as arising from an intervention may, for example, include:

a) social disruption such as vacating property, or limiting is use, or restricting access to it;

b) heavy traffic from vehicles, associated with the intervention;

c) the health impacts of the intervention (discussed in paragraphs 7.36 – 7.37 above), including those arising from doses to remediation workers;

d) the environmental impacts of the intervention (also discussed in paragraphs 7.38 – 7.39 above) including risks:
   (i) to water, air, soil and plants and animals,
   (ii) of nuisance through noise or odours,
   (iii) to the countryside or places of special interest, and
   (iv) to a building of special architectural or historic interest or a site of archaeological interest; and

e) the generation of waste and, where relevant, the transport and disposal of such waste.

7.44 The Chief Inspector should consider both the seriousness of impacts of any social costs and also the likely duration of any impact.

Revision of intervention notices

7.45 The Chief Inspector should consider revising an intervention notice if they consider it is reasonable to do so. In particular this would apply to cases where new information comes to light which calls into question the reasonableness of an existing intervention notice. For example, this might be the case where information that comes to light during intervention shows that some intervention actions are no longer necessary, or that additional or alternative actions are necessary.

7.46 If the Chief Inspector has issued an intervention notice but the person concerned later proposes an alternative intervention, the Chief Inspector should consider whether to revise the intervention notice. It is for the Chief Inspector to decide the degree of consideration it gives to such a proposal. If the Chief Inspector decides to do this, they should be satisfied that the standard of intervention and the timescale in which it would take place are acceptable.

7.47 If a determination is changed , the Chief Inspector should record their reasons for doing so and ensure that interested parties are informed of the decision and reasons for it, including the owner of the land; any person who appears to the Chief Inspector to be in occupation of the whole or any part of the land; and person who was previously identified by the Chief Inspector as the responsible person.

Verification

7.48 Any intervention treatment action should include appropriate verification measures. In arranging for such measures, the Chief Inspector should ensure that the person responsible for verification is a suitably qualified experienced practitioner.

Section 8: Liability

8.1 As part of the process of identifying that the land is radioactive contaminated land (see Sections 4 and 5), the Chief Inspector will have identified at least one significant contaminant linkage (contaminant, pathway and receptor), resulting from the presence of at least one significant contaminant.

8.2 Where there is a single significant contaminant linkage:

a) The Chief Inspector should identify the polluter(s) who would be responsible for paying for any intervention action relevant to the contaminant which forms part of the significant contaminant linkage. To achieve this, the Chief Inspector should make reasonable enquiries to find all those who have caused or knowingly permitted the contaminant in question to be in, on or under the land.;

b) If the polluter(s) cannot be identified, the Chief Inspector should identify all the current owners or occupiers of the radioactive contaminated land in question;

c) If neither the polluter(s), nor owners or occupiers cannot be identified in respect of a significant contaminant linkage, this should be treated as an “orphan linkage”.

d) Regulation 4(2) of the Radioactive Contaminated Land Regulations (Northern Ireland) 2006 provides that “in relation to any land contaminated by a nuclear occurrence, the Secretary of State is deemed to be the “responsible person”.

8.3 Where there are two or more significant contaminant linkages, the Chief Inspector should consider each significant contaminant linkage in turn, carrying out the steps set out in paragraph 8.2 above, to identify who is liable for each of the linkages.

8.4 Each intervention action will be carried out to achieve a particular purpose with respect to one or more defined significant contaminant linkages. Where there is a single linkage, all intervention action will apply to that linkage and the polluter(s) or owner(s) or occupier(s) will bear the full cost of carrying out any intervention action.

8.5 Where there are two or more significant linkages, the Chief Inspector should establish whether each intervention action is:

a) referable solely to the significant contaminant in a single significant contaminant linkage (a “single-linkage action”); or

b) referable to the significant contaminant in more than one significant contaminant link (a “shared action”).

8.6 Where an intervention action is a shared action, there are two possible relationships between it and the significant contamination linkages to which it is referrable. The Chief Inspector should establish whether the shared action is:

a) A “common action” – i.e, an action which addresses together all of the significant contaminant linkages to which it is referrable, and which would have been part of the intervention package for each of those linkages if each of them had been addressed separately.

b) A “collective action” – i.e, an action which addresses together all of the significant contaminant linkages to which it is referable, but which would not have been part of the intervention package for every one of those linkages if each of them had been addressed separately, because:

(i) The action would not have been appropriate in that form for one or more of the linkages (since some different solution would have been more appropriate);
(ii) The action would not have been needed to the same extent for one or more of the linkages (since a less far-reaching version of that type of action would have sufficed); or
(iii) The action represents a more economic way of addressing the linkages together which would not be possible if they were addressed separately.

8.7 A collective action replaces actions that would have been appropriate for the individual significant contaminant linkages if they had been addressed separately, as it achieves the purpose which those other actions would have achieved.

8.8 Where the linkage is an orphan linkage, the Chief Inspector is required to exercise their powers to carry out the intervention at the Department's own costs (although it may obtain a contribution to its costs from the Secretary of State in certain circumstances). Where the linkage arises from a nuclear occurrence, the Chief Inspector is also required to carry out the intervention, but the Secretary of State (as the responsible person) will bear the cost.

8.9 In making any cost recovery decisions, the Chief Inspector should have regard to the following principles:

a) The Chief Inspector should aim for an overall result which is fair and equitable as possible to all who may have to meet the costs of intervention.

b) The "polluter pays" principle should be applied with a view that, where possible, the costs of remediating pollution should be borne by the polluter. The Chief Inspector should therefore consider the degree and nature of responsibility of the relevant responsible person(s) for the creation, or continued existence, of the circumstances which lead to the land in question being identified as radioactive contaminated land.

c) In general, the Chief Inspector should seek to recover all its reasonable costs.

Section 9: Post Intervention Monitoring

9.1 An appropriate monitoring programme should be established for remediated areas to verify the long-term effectiveness of remediation. The monitoring programme should be subject to periodic review. The extent of monitoring should be based on the risks relating to the area, level of uncertainty and other relevant conditions. The results should be documented and made available to interested parties [See also paragraphs 10.10 – 10.12 of IAEA General Safety Guide No. GSG-15 for information].

NIEA Industrial Pollution & Radiochemical Inspectorate – Dalradian Gold Mine Statement of Case Rebuttal

Statement Number:	SoC Nos 5, 7, 16, 39, 41, 43, 44, 49, 57, 69, 73, 79 and 82
Date of Rebuttal:	15/11/24
Rebuttal Author:	
Issues Identified:	Radon Naturally Occurring Radioactive Material (NORM)

1. Statement 1: Radon

1.1 Several of the SoC (Nos 5, 7, 16, 39, 41, 43, 44, 49, 57, 69, 73 and 82) referenced the potential for radon gas released by the mining process to impact public health through either releases to air or to water.

1.2 Radon is a colourless, odourless radioactive gas that is formed by the radioactive decay of elements that naturally occur in rocks and soils. Exposure to radon gas can lead to the development of lung cancer.

1.3 Raised radon levels in air may often be found in mines and other underground workplaces and this would be regulated as an occupational health and safety issue by the Health and Safety Executive Northern Ireland under the Ionising Radiation Regulations (Northern Ireland) 2017.

1.4 NIEA has no role in regulating occupational radiological risks associated with radon.

1.5 Radon levels in drinking water from both public and private supplies are monitored under the Water Supply (Water Quality) Regulations (Northern Ireland) 2017. NIEA is responsible for monitoring private water supplies.

1.6 Monitoring results presented in the Dalradian SoC (in the Aurora Health Physics Services Ltd "Technical Report - NORM and Radon Gas for the Curraghinalt Project", May 2024) demonstrate that the mining process is very unlikely to result in any significant increase in radon in water discharged from the site.

2. Statement 2: Naturally Occurring Radioactive Material

2.1 Two of the SoC (49 and 79 – Save our Sperrins) referenced the potential for Naturally Occurring Radioactive Material (NORM) to be produced by the mining process and the potential for this material to impact on human health.

2.2 Mining activities have the potential to concentrate naturally occurring radioactive material from the bedrock and overlying soils in mine emissions. NORM generated from “mining and processing of ores other than uranium ore” is regulated under the

Radioactive Substances Act 1993 (RSA93) if it contains concentrations of naturally occurring radionuclides above specified levels. NORM waste can be either:

- Below “out of scope” values so it is not regulated under RSA93 due to the very low risk of this material;
- Above “out of scope" values but below “exemption” values so it does not require authorisation under RSA93 but the operator does have to comply with some conditions (set out in the Radioactive Substances Exemption (NI) Order 2011);
- Above “exemption” levels so that a Certificate of Authorisation under RSA93 is required for its accumulation and disposal.

2.3 During the application process for a Certificate of Authorisation, the applicant is expected to demonstrate that the best practicable means will be used to minimise the creation of radioactive waste and to minimise the activity in any waste to be disposed of. The use of appropriate disposal routes would also need to be demonstrated and discharge limits would be applied to any gaseous or liquid discharges.

2.4 Environmental Statement Vol 3 C7 “Radon and NORM Emissions Impact Assessment”, submitted to Dalradian Gold Ltd in support of their planning application in Nov 2017, contains an “assessment of radon gas and NORM emissions impacts at the Curraghinalt Project” carried out by RPS. This report was assessed by staff from NIEA’s Industrial Pollution & Radiochemical Inspectorate as part of the planning consultation process for LA10/2017/1248/F and comments on it were provided in our consultation response dated 24 April 2020.

2.5 Our comments on the planning consultation were: *Appendix C7 (Radon and NORM Emissions Impact Assessment) from the “2017 design” documents and the Addendum to the Assessment of Radon Gas and NORM Emission Impacts from the “2019 update” documents have been reviewed. IPRI is content with the methodology used and the impact assessment carried out. In order to ensure that no waste materials produced by the process contain NORM in quantities above the exempt criteria, IPRI is content with the proposed quarterly monitoring of waste water samples for NORM radionuclides in a laboratory capable of achieving detection limits well below the out of scope levels for the first 12 months of operation (refer to Informative 5). If any of these monitoring results show that waste materials produced by the process are above the exempt criteria specified in the Radioactive Substances Exemption (NI) Order 2011, the company should apply for a Certificate of Authorisation under the Radioactive Substances Act 1993, (refer to Informative 6).*

- *Informative no 5: Quarterly monitoring of waste water samples for NORM radionuclides should be carried out for the first 12 months of operation in a laboratory capable of achieving detection limits well below the out of scope levels specified in the the Radioactive Substances Act 1993 (Amendment) Regulations (Northern Ireland) 2011.*
- *Informative no 6: If any waste materials produced by the process contain naturally occurring radioactive materials (NORM) in quantities above the exempt criteria specified in the Radioactive Substances Exemption (NI) Order 2011, the operator will have to apply for a Certificate*

2.6 NIEA have recently reviewed that report and remain content with the contents and the monitoring carried out.

2.7 NIEA have also reviewed the updated report from Aurora submitted by Dalradian in their SoC (Aurora Health Physics Services Ltd "Tecnical Report - NORM and Radon Gas for the Curraghinalt Project", May 2024). We note that additional analysis of rock samples from deeper underground was carried out and as expected the NORM levels in these samples did not differ significantly from the previous samples taken from closer to the surface.

2.8 NIEA is content that the reports submitted have comprehensively assessed the risk of NORM from the process. The reports show that any NORM produced is likely to be below the “out of scope” values in the regulations and as such the process will not require regulation by NIEA.

Department of Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk

Planning Response Team
Klondyke Building
Gasworks Business Park
Cromac Avenue
Malone Lower
Belfast
BT7 2JA
Tel: 028 9056 9604

Date:24 April 2020

Email:

Dear Sir/Madam

Planning Application Ref.:	LA10/2017/1249/F
Location:	Lands NW Of Greencastle E Of Rouskey N Of Crockanboy Rd W Of Mullydoo Road N And S Of Camcosy Rd Including Lands 165m W Of No. 45 Camcosy Road To The Junction Of Camcosy Rd And Crockanboy Rd And Lands 47m To The SE Of 73 Crockanboy Rd
Proposal:	Underground valuable minerals mining and exploration, surface level development including processing plant and other associated development and ancillary works, Greencastle, County Tyrone. Please see application form P1, sheet 1 for full project description. (Revised description and amendments to the planning application, receipt of Further Environmental Information (FEI), other information and updates to the Waste Management Plan (WMP), supporting documents and provision of new and amended drawings).

Thank you for your consultation on the above which was received by DAERA on 07/10/2019

We have reviewed the information provided and our environmental records in the vicinity of the proposed development.

Our comments are summarised below. Where provided, please also refer to additional details attached.

Drainage and water

The Drinking Water Inspectorate (DWI) has considered the application in relation to private water supplies used in the supply of drinking water. DWI notes the information provided in the applicant's Further Environmental Information (FEI) returns in October 2019 and has as-sessed this information against our consultation response issued on the 05/10/2018. On the basis of the additional information provided, DWI have provided a number of further explana-tory notes. DWI is unable to provide its substantive response until a peer review by an independent expert has been completed, which is to progress once funding has been confirmed by the Planning Authority.

Water Management Unit (WMU) has considered the impacts of the proposal on the surface water environment. However, at this stage, WMU is currently unable to determine if the development has the potential to adversely affect the surface water environment.

Land, Soil and Air

The Industrial Pollution and Radiochemical Inspectorate advises that as no Part A or Part B PPC activities have been proposed in the "2019 update", no application for a Part A or Part B PPC permit is required.

Regulation Unit (Waste Licensing Team) was consulted on the waste management impacts of the proposal and provides comment that NIEA is not the competent authority with regard to the Mining Waste Management for this proposed facility. This is regulated by the Planning Authority.

Regulation Unit (Land and Groundwater Team (LGW)) has considered the impacts of the proposal on the groundwater environment. On the basis of the information provided LGW is unable to provide its substantive response until the outcome from the DfI consultancy procurement process has been completed and reported.

Natural Heritage and Conservation Areas

Natural Environment Division (NED) has only carried out a desktop assessment for designated sites assessment and other natural heritage considerations, however the protected landscapes assessment included an actual site visit and assessment from viewpoints around the site and surroundings. Further information will need to be submitted to enable NED to carry out a full assessment of this proposal.

If you wish to discuss anything raised in our response, please do not hesitate to contact Planning Response Team (details above).

Kind regards

Planning Response Team

On behalf of DAERA

Drainage & Water

Section Reference:

WMU/PC/ 28851-2

Considerations:

Water Management Unit (WMU) has considered the impacts of the proposal on the surface water environment. However, at this stage, WMU is currently unable to determine if the development has the potential to adversely affect the surface water environment.

Explanatory Note:

All DAERA Standing advice referred to in this response unless otherwise stated can be found at the following link www.daera-ni.gov.uk/water-environment-standingadvice

1. The impact of this development upon the water environment (quality and resource) and therefore the impact upon the designated sites and associated features cannot be fully determined until:

    - The outcome from the Department of Infrastructure (DfI) consultancy procurement process (including the Mine Waste Management Plan) has been completed, reported, and considered.
    - Environmental authorisations, namely Discharge Consents and Abstraction Licences, have been applied for by the applicant and determined by NIEA, supported by Habitats Regulation Assessments.
    - Once the outcomes from these identified areas of work are known, WMU / Water Regulation Unit will be in a position to make a fully informed substantive response to this planning application.

    (Please note this response makes reference to a number of possible conditions that WMU / Water Regulation Team would request be inserted in any decision notice in event this application be approved. WMU makes these comments without prejudice and these should not be construed as WMU being content with the application as the full impact of the development on the surface water environment cannot be made until the results of the independent review have been received, reviewed and assessed).

    WMU has considered the Updated Environmental Statement (2019) (FEI) and further clarifications on the FEI provided to WMU by the applicant / agent received 26th February 2020 and would provide the following advice.

2. Modification of Waterways

2.1 With regard to the clarification provided in relation to the modification of waterways this project would require, WMU notes the Drainage Figure in section 2.5.26 of Vol 2 of the FEI has identified that a substantial length of waterway (approx. 1.1 km of stream channel and 5 km of drains) will be impacted / removed as part of this proposal.

2.2 The NI Planning Case Officer should note that where artificial modification of a waterway is proposed they must consider if this complies with Planning Policy Statement (PPS) 15 FLD 4.

2.4 WMU consider the definition of a 'waterway' to be as defined by the Water Order:

"Waterway" includes any river, stream, watercourse, inland water (whether natural or artificial) or tidal waters and any channel or passage of whatever kind (whether natural or artificial) through which water flows

In this Order any reference to a waterway includes a reference to the channel or bed of a waterway which is for the time being dry.

2.5 The applicant may find the following documents useful:

- DAERA Standing Advice - Culverting
- A hydromorphology guidance booklet titled Surface Water Alterations Handbook can be downloaded from the following webpage: https://www.daerani.gov.uk/publications/surface-water-alterations-handbook

3 Oil Separators

3.1 WMU notes the clarification provided by the applicant relating to the type, class and size of oil separators that are to be used at various outfall locations. The applicant must ensure that all separators are of a size, type and class suitable for the local circumstances and risk factors in line with the advice contained in Pollution Prevention Guideline (PPG) 3 which can be found at the NetRegs website www.netregs.org.uk/

Including:

- The discharge point of the proposed separator
- The environmental sensitivity of the location and any discharge point
- Activities on the site including the details of any oils / fuels to be stored in the area the separator will service

3.2 Where appropriate these separators should be fitted with a closure device and should also be fitted with alarms.

3.3 It is essential that these separators are regularly inspected, maintained, and used within manufacturing guidelines to ensure effective performance. Should this application be approved the applicant will be required to draw up a suitable inspection and maintenance regime for agreement with NIEA and to keep a detailed log of when the separator is inspected, maintained, emptied and serviced and also keep a log of specific events relating

to the separator system such as cleaning, repairs, accidents and incidents available for inspection at all times.

4 Wheel Washes

4.1 WMU notes the clarification that wheel washes will be temporary closed-circuit systems with the exception of a wash on the DSF access road during operation whose drainage will be captured and treated. The treatment and disposal of the operational wash effluent will need to be considered as a component of the discharge consent application. Should the applicant decide to use non closed-circuit washes during the construction phase this would need to be agreed in advance by WMU.

5 Outline CEMP (FEI Appendix B2)

WMU have considered the above document and would provide the following advice.

5.1 Section 2.3 and 3.4.8 proposes the use of waste rock as aggregate for construction of noise berms, in early construction and placed in the DSF as part of the toe drain. The applicant should note there is a significant risk of the escape of fines from this waste rock during its storage and use. The surface water management will need to be rigorously designed and put in place in order to address this issue and prevent the entry of suspended solids into any waterway.

5.2 Section 3.2 details potential sources of pollution and associated concerns, with the undertaking to adhere to best practice. There is also an undertaking displayed to agree with NIEA WMU in advance re planning, design, managing and monitoring of silt control, spill mitigation, prevention, and response measures. WMU welcomes this undertaking and should this application be approved WMU would envisage formalising this by way of a suitable condition. The applicant should note that while WMU is content to advise and agree measures it is still the responsibility of the applicant and their appointed contractors to ensure that no pollution occurs if these works are to be undertaken.

5.3 With regard to adherence to best practice, the applicant must note the following. The CEMP references, in section 3.2, a number of key environmental guidance documents that will be adhered to during all the construction works. The applicant has quoted three PPG's / GPP (Guidance for Pollution Prevention) documents. While these documents are appropriate there are also a number of other PPG GPP documents that are applicable to these works. These documents should also be included in any finalised CEMP and must be adhered to.

5.4 A number of documents relating to best practice especially with regard to CIRIA guidance are out of date or have been superseded. For example, the CIRIA Report C697 – The SuDS Manual quoted has been replaced by C753 SuDS Manual. While noting guidance is continually evolving it is essential that any best practice guidance that is to be adhered to during this project is the most relevant and up to date available, any future documents forwarded for agreement with WMU (such as a final CEMP for the project) must also reflect the most relevant and up to date guidance.

5.5 Section 3.2 refers to the timing of works likely to generate silt and those works close to / adjacent to waterways that are to be timed to avoid extreme spells of wet weather. WMU support this approach however this alone does not go far enough to protect environmental receptors. These works must be effectively designed, with managed surface water control in order to minimise the generation and mobilisation of silt laden water. Consideration of the establishment of suitable buffer zones to watercourse must be given. It should be noted that not all buffer zones will be the same and cognisance must be given to all factors such as slope of ground. The applicant must be confident that the size of any buffer strip chosen must be suitable for the task. All works in, near or liable to impact waterways must be planned to minimise impact and the methodologies for doing so agreed with WMU in advance. This includes all works whether temporary or permanent and all diversion or culverting works.

5.6 Section 3.3.1 and 3.4.13, drainage ditches are depicted in the Hoy Dornan Drawings. Consideration must be given to the design of these. With reference to lining and check dams, schematic drawing in 4.1 in the OCEMP, indicates lined ditches with straw bales as check dams. Experience has shown that straw bales are difficult to manage and might not be as effective as constructed check dams. (If using varying grades of aggregate this should be washed stone in the first instance). Lining the straw bales can help if the constructor insists on using this method instead of constructed check dams.

5.7 Section 4.1 and 4.3.1 reference PED ditches. These should be effectively designed to minimise the risk of suspended solid generation and mobilisation to promote settlement. Use of straw bales is again proposed for the use of check dams.

5.8 Section 4.1 indicates the use of detention ponds with silt busters rather than the design and use of adequately sized settlement ponds. Attenuation ponds can fill quickly, and levels can become difficult to manage. Silt busters have to be used within manufacturer's specifications and may not be capable of treating sufficient volumes to discharge and therefore may not be effective in managing pond levels. The applicant should give consideration if there is the scope for settlement features aided by silt busters instead of, or to compliment, attenuation ponds.

5.9 Figure 3-1: Proposed Drainage Management Plan Construction Phase, suggests discharge over land. WMU would have concerns that this will promote the generation of suspended solids if this is not responsibly managed, maintained and monitored.

5.10 Section 3.4.14 "Dewatering of the west pond is likely to be required." Dewatering activities need to be managed and monitored in a way to prevent the escape of pollutants to the environment. All pumping activities must be supervised, and water treated prior to discharge. Silt busters are proposed and WMU would have some concerns with the use of these as the volumes to be processed may be significant. If dewatering is not managed properly and responsibly including any overland flow, there is the risk of the generation of suspended solids at the discharge point.

5.11 Section 3.1.14, silt build up within ponds must be monitored and managed in order to ensure effective functioning. The applicant must ensure the positioning of conveyance pipes between ponds and the outlet pipe is correct in order to promote settlement.

5.12 Section 3.4.18, indicates the use of DSF cell one as a laydown area for equipment etc. The applicant will need to consider at what stage of the construction of the DSF this will take

place. WMU would have concerns if this were before the impermeable membrane was in place and the drainage from the cell was transferred to the wastewater treatment plant, particularly if there is the intention to store any fuels / oils.

5.13 Appendix A of the OCEMP in section 3 contains a number of proposals and methods for the management of contaminated site run off including from haul roads. These methods would need to be fully addressed and implemented.

5.14 Section 3.4.21 and 4.4.1 - Stockpiles must be created and maintained in accordance with industry best practice. Consideration should be given to the following:

- Lining of stockpiles
- Re-vegetation
- Use of Silt Fencing

5.14 In appendix A of the OCEMP, Section 5, mention is made of the use of flocculants. The applicant must note that the use of any flocculants must be agreed with NIEA WMU prior to their use.

6 Statutory Permissions

6.1 Should this application be approved this development will require a number of Environmental Authorisations relating to the water environment from NIEA.

6.2 Discharge Consent, issued under the Water (Northern Ireland) Order 1999, is required for any discharges to the aquatic environment and depending on circumstances may be required for site drainage during the construction phase and will be required for a number of discharges during the operational phase of the development. Any proposed discharges not directly related to the construction of the development, such as from septic tanks or wash facilities, will also require separate discharge consent applications. The applicant must refer and adhere to all the relevant precepts contained in DAERA Standing Advice - Discharges to the Water Environment.

6.3 WMU notes the clarification received in FEI Volume 2, 5.15 Drainage outfall information – FEI Ref 2.6 regarding the number and type of proposed discharges from the site. At the time of this response WMU consider that the discharges listed may require discharge consent issued under the Water (Northern Ireland) Order 1999. The applicant should also consider if they will require any “temporary” discharge consents for site drainage during the construction phase and consent for foul sewage before the sewage treatment plant (STW) is established. (If the applicant intends using chemical toilets during this phase, they should note that the waste from these will need to be removed by a licensed waste carrier). The discharge of water associated with dewatering may also require Discharge Consent under the terms of the Water (Northern Ireland) Order 1999.

6.4 WMU can only process a discharge consent application once it has been deemed complete (a completed application form, all necessary accompanying information required to determine the application and the associated fee). The applicant should note the minimum

processing time to obtain a discharge consent under the terms of the Water (Northern Ireland) Order 1999, if successful, is 4 months for industrial applications. For complex applications, the processing time may be longer.

6.5 Given the above, WMU recommends the applicant contact the consenting officer at their earliest convenience to discuss all the consents this project may require. Industrialconsents@daera-ni.gov.uk

6.6 When formulating discharge consent conditions, the Department must ensure that the consented discharge is environmentally sustainable, taking into account the composition and volume of the proposed discharge, available dilution, and the relevant EU Directive and national requirements for the quality of the receiving waterway.

6.7 The applicant should be aware the granting of Water Order consent is therefore not guaranteed. No two locations or proposals are the same and where the site and/or the receiving medium (waterway or soil) prove unsuitable then the consent application will be refused.

6.8 WMU notes that it has received an application for discharge consent for Outfall 5 (Piped Outfall / WTP and Clean Water Pond Overspill Culvert) at the proposed site on the Pollanroe and an application for a new consent / review of the existing consent at the current site on the Curraghinalt. (These two discharges will be referred to as the main outfalls for the remainder of this response).

6.9 As part of the Environmental Statement the applicant has suggested proposed discharge consent conditions for these two main outfalls along with supporting information in the form of relevant types of environmental standards used to formulate these proposed conditions along with baseline information on the water quality baseline in the Pollanroe / Owenreagh and Curraghinalt / Owenkillew and predicted changes as a result of these proposed discharges.

6.10 With regard to the proposed main outfall discharge consent conditions, the applicant should make no assumptions based on these proposals (for example the required treatment standards and the purchase of any treatment plant / equipment required to meet these proposed standards) and that these proposed conditions are acceptable to WMU. WMU will only be in a position to ascertain if a feasible method of “effluent” disposal is available at these outfalls and the associated discharge conditions that would be required, once it has all the information it requires to consider the application i.e. the application for discharge is deemed complete. The applicant should note that this may include information over and above that presented in the Environmental Statement.

6.11 With regard to the proposed conditions, baseline information and predicted changes WMU would make the following comments.

6.12 The applicant has quoted the driving factor for the consent condition for Nitrate as being compliance with the Drinking Water Standard of 0.22 mg/l/N. The Drinking Water Standard is 0.50mg NO2 /l at consumers’ taps. When converted to mg/l/N this is 0.152 mg/l/N. (The applicant appears to have used the conversion factor for Nitrate instead of Nitrite).

6.13 Cadmium. The applicant has quoted WFD annual mean standard as 0.00008 mg/l and 0.45 mg/l for the WFD max allowable concentration. However, the figure quoted for WFD max is incorrect, it should be 0.00045 mg/l.

6.14 The applicant has quoted a Water Framework Directive (WFD) Standard for Silver of 0.0005 mg/l Annual Mean and 0.001mg/l Maximum as a %ile. Water Management Unit is unaware of any WFD standard for silver being adopted.

6.15 With regards to Cyanide, given that it is no longer proposed to utilise it as part of the processing of the ore it is unclear if the proposed consent conditions and predicted water quality results are still valid.

6.16 With regard to predicted water quality results it is not clear how the applicant has calculated the predicted concentrations for Chromium III and VI as greater than the predicted (combined) concentration for Total Chromium.

6.17 A number of the WFD standards quoted are for bioavailable metals. It is not clear if the suggested consent conditions or the baseline concentrations are for the total portion of the metals or are for the bioavailable concentration.

6.18 Surface Water Impact Assessment Table 4-9: Baseline Water Quality in the Owenreagh River and Pollanroe Burn and Table 4-10: Baseline Water Quality in the Owenkillew River and Curraghinalt Burn: These are annotated "Italics are below detection limit, shown as half detection limit" however some of the concentrations have some of their figures in a mixture of italics and normal font e.g. Table 4.10 shows the average concentration for mercury in the Curraghinalt *0.*000037, it is not always clear if the value is in fact below the detection level or not (although in this particular case it appears from other values that this is above the detection limit). In a similar vein Table 4.9 reports the concentration of Uranium in the Pollanroe to be an average of *0.0025* and the max as 00025, if the figure in italics is half of the detection limit it is not clear how a figure for the maximum concentration can be reported.

6.19 It is normal practice to report concentrations as below the reporting limit (limit of quantification) as opposed to below the detection limit therefore it is not clear where values are reported to be just above the detection limit whether in fact they are reliable.

6.20 The applicant has proposed a temperature condition of 20^0C for the proposed consents. While noting that the WFD Absolute Temperature Standard for Rivers for cold water species in a High Class waters is 20^0C, consideration will need to be given to whether this condition would be more appropriate as a temperature rise in the receiving waterway after the mixing zone.

6.21 The applicant has provided predicted concentrations (at 50 and 90 %iles) and for different flows in the receiving waterway (mean and low flows). It should be noted that with regard to the two main outfalls the Department may consider it necessary for the consent to include a condition relating to the rate of flow of the discharge and the flow in the receiving waterway. Should that be the case then the applicant will need to consider the installation of a suitable flow monitoring device / system.

6.22 The applicant should note that all consents will include a condition that suitable facilities are available at all times to allow the Department to sample any outfall or (where an appropriate condition exists) to measure any flow.

6.23 Anyone who does not obtain consent under the terms of the Water (Northern Ireland) Order for any discharge of trade or sewage effluent (including site drainage liable to contamination) arising from a development, and subsequently makes any such discharge, will be liable to enforcement action under the Water Order for discharge without consent. WMU notes and

welcomes the commitment displayed in Chapter 4 of the original ES that the construction phase of the project will not commence until all relevant approvals and agreements are in place.

6.24 In accordance with the Water Abstraction and Impoundment (Licensing) Regulations (Northern Ireland) 2006, it is a mandatory requirement that upon the abstraction and/or diversion and/or impoundment of water from a natural river channel/lake, coastal or groundwater source, an abstraction/impoundment licence should be obtained unless the operations specified are Permitted Controlled Activities (PCA). For further guidance on PCA please see the link below:

https://www.daera-ni.gov.uk/publications/water-abstraction-and-impoundment-licensingregulations-northern-ireland-2006-permitted

6.25 WMU recommends that developers should apply for the required statutory permissions prior to, or at the same time as, applying for planning permission. As previously stated WMU notes and welcomes the commitment displayed in Chapter 4 of the original ES that the construction phase of the project will not commence until all relevant approvals and agreements are in place.

6.26 There are a number of authorisation types that may be granted under the Abstraction and Impoundment Licensing (AIL) Regulations (Northern Ireland) 2006, the type of authorisation will be determined by the volume of water abstracted as detailed below:

- Less than 10m3 per day - authorisation is subject to activities complying with PCA conditions and no contact with NIEA is required.
- Between 10m3 to 20m3 per day - authorisation is subject to notification to NIEA and compliance with the PCA conditions.
- Between 20m3 to 100m3 per day - authorisation is subject to submission of an application to NIEA and the issue of a formal “simple” licence which may have conditions.
- More than 100m3 per day - authorisation is subject to submission of an application to NIEA and issue of a formal “complex” licence which may have conditions.

6.27 The applicant should refer and adhere to the precepts contained in DAERA Standing Advice - Abstractions & Impoundments.

6.28 At the time of this response the Department currently considers that this development if approved will require at least two licences, one for dewatering to the mine and one for the impoundment of surface water relating to the drainage system to be used on site. It is also noted that the applicant may need to dewater a pond (West pond as outlined in FEI Appendix B2 section 3.4.14) as part of the construction works. Water may also be required for irrigation and dust suppression. Depending on circumstances, these processes may also require licences.

6.29 Given the above, WMU recommends the applicant contact the Licencing officer at their earliest convenience to discuss all the licences this project may require. AIL@daera-ni.gov.uk

6.30 It should also be noted that WMU can only process an Abstraction / Impoundment Licence application once it has been deemed complete (a completed application form, all necessary accompanying information required to determine the application and the associated fee). The applicant should note the minimum processing time to obtain a licence, if successful, is 4 months. For complex applications the processing time may be longer.

6.31 When Licence applications are received, the Department must ensure that the proposed activity is environmentally sustainable, no two proposals are the same and where the activity proves to be unsuitable then a licence application will be refused.

6.32 To date WMU has not received any applications for Abstraction / Impoundment licences in relation to this project.

6.33 In our previous response WMU requested information on the following. “During drought conditions, production at the mine will be able to be supported by groundwater pumped from the underground mine and water stored in the Clean Water Pond. In the event that more water is required it would be possible to truck water to the site, but given the rate of groundwater inflow to the underground workings there is expected to be a source of water on site to allow production to continue during drought conditions”. Can the applicant clarify what the source of this water would be and the maximum quantity that would be required?” In reply the applicant did not identify a source of water but instead responded that it was unlikely that an additional source of water would be required. The applicant should note that in a significant time of drought the WMU would consider the granting of an abstraction licence to be highly unlikely. The applicant may need to consider an alternative source in such a circumstance. WMU notes the intention to obtain a mains water source from NIW.

7 Peat Management

7.1 WMU notes the clarification regarding peat storage and management. Should this application proceed WMU will be requesting by way of a condition inserted in the decision notice that requires the applicant to submit full details of the timing of peat works during the construction stage, containment measures, drainage features and any associated treatment for the drainage for both the peat to be stored in the rehabilitation area and the DSF. (This can be supplied as part of the final CEMP.

8 Reporting of Results

8.1 WMU notes the clarification provided relating to LOD’s / LOQ’s blank contamination and would make the following comments.

8.2 WMU is not clear what the applicant means with regard to the limit of reporting (LOR) and its relationship to LOD. (For the baseline concentrations the applicant states the LOD and LOR are the same). While the laboratory is correct that the LOQ is the LOD plus an uncertainty it is not clear why the laboratory cannot provide LOQ. The confusion may be due to the definitions used by WMU and the laboratory for each of the terms.

8.3 WMU notes the comments relating to the contamination of field blanks and acknowledges that glove type can be a potential source of contamination. It is essential that all contamination relating to blanks is thoroughly investigated. WMU in discussions with the applicant has learnt that currently they are only utilising trip blanks for organic parameters. The use of trip blanks for all parameters may help the applicant narrow down the cause of some of these blank failures.

8.4 Should this application be approved WMU will be requesting a condition be inserted in the decision notice relating to ongoing monitoring / sampling. This will need to be agreed with NIEA prior to works commencing. Given the above this plan will have to include a number of stipulations including:

- Agreement on how results will be reported in relation to LOD / LOQ/ LOR.
- Agreement how non-conforming blanks / samples will be identified and reported.
- Agreement on how non-conforming samples will be investigated.

9 Water Framework Directive

9.1 The Water Framework Directive (WFD) requires us to protect the status of water bodies from deterioration, and where necessary and practicable, to restore water bodies to good status/good ecological potential.

9.2 The applicant will need to ensure that any emissions both from the construction and associated surface level works and during the operational phase do not cause any deterioration or affect the possibility of achieving Good Status, or High Status for individual elements where appropriate, in the river water body and any other receiving water bodies downstream.

9.3 Mitigation measures must be in place to protect the water body and surrounding water bodies from any discharge into them that may damage ecological status. Measures must be in place to ensure that the WFD Objectives for the water body are not compromised nor the WFD Objectives in other downstream water bodies in the same and other catchments.

9.4 Should this application be approved WMU will require, by way of suggested Condition, that all the mitigation measures identified within the Environmental Statement, and associated documents, be implemented and adhered to. To achieve this, NIEA will request a standalone document be created by the applicant as a Schedule of all Mitigation, to include additional mitigation proposed by consultees.

10 General

10.1 Should the determination of the planning application for this development be protracted, WMU would request the applicant make provision for the ongoing collection of baseline data.

10.2 New data should be jointly interpreted with the existing baseline data to verify that baseline conditions have not changed considerably. For parameters where verification fails, models and impact assessments will need to be reviewed and updated.

10.3 In our previous response WMU provided clarification to the following statements in the Environmental Statement:

- The stretch of the Owenkillew adjacent to the application site is currently of Good status although the 2021 and 2027 objectives reduce to Moderate. This reduction in objective in unexplained. The upstream stretch of the Owenkillew River and the Coneyglen Burn are both currently of Moderate status".

- "Below the confluence of the Owenkillew and Owenreagh, the Owenkillew (Gortin stretch) is of Moderate status with both 2021 and 2027 objectives remaining as Moderate. The downstream Killymore stretch returns to Good status although again the 2021 and 2027 objectives are both Moderate. This reduction in objective in unexplained".

10.4 WMU clarified "This statement has brought to light some errors in the information as presented on the NIEA webmapper. These are currently being investigated but are understood to affect only a very small number of water bodies. Due to the construction of the NIEA webmapper, it may not be possible to amend the data, in which case WMU will seek to have an erratum note added to the welcome page.

10.5 WMU can therefore confirm and the applicant should note that the information regarding the downgrading of objective for the Owenkillew is incorrect. All objectives for the Owenkillew are good for 2021."

10.6 WMU are therefore disappointed that the FEI has chosen to reiterate these remarks in the supplied Shadow HRA in section 2.2.

10.7 The applicant should be informed that it is an offence under the Water (Northern Ireland) Order 1999 to discharge or deposit, whether knowingly or otherwise, any poisonous, noxious or polluting matter so that it enters a waterway or water in any underground strata. Conviction of such an offence may incur a fine of up to £20,000 and / or three months imprisonment.

10.8 The applicant should ensure that measures are in place to prevent pollution of surface or groundwater as a result of the activities on site, both during construction and thereafter.

Planning Reference No.: LA10/2017/1249/F [Dalradian]

Section Reference: GQ558

Considerations:

1. Private Water Supplies

The Drinking Water Inspectorate (DWI) has considered the application in relation to private water supplies used in the supply of drinking water. DWI notes the information provided in the applicant's Further Environmental Information (FEI) returns in October 2019 and has assessed this information against our consultation response issued on the 05/10/2018. On the basis of the additional information provided, DWI have provided a number of further explanatory notes. DWI is unable to provide its substantive response until a peer review by an independent expert has been completed, which is to progress once funding has been confirmed by the Planning Authority.

2. Public Water Supplies

DWI Response Section Ref GQ311 issued 05/10/2018 stated: In relation to the **public drinking water supply**, the applicant is required to consult with Northern Ireland Water (NI Water), who are the statutory water undertaker, to allow an assessment of any potential risks to drinking water supplies. NI Water has a regulatory obligation, under regulation 30 of The Water Supply (Water Quality) Regulations (Northern Ireland) 2017, to undertake risk assessments of all aspects of its drinking water supply systems from catchment through to consumers' taps. The applicant should provide all necessary data and models to allow NI Water to assess these within its risk assessments in relation to any potential impact on the management of its drinking water abstractions. The proposed development should not adversely impact on Drinking Water Protected Areas established under Article 7 of the Water Framework Directive, DWI could not find any specific reference to an assessment of these designations within the report.

Applicants Response: The Project area or potential groundwater impact area does not contain any public water supplies or intersect any source protection zones (appendix C6 section 4.5). However, all groundwater bodies in NI are designated as Drinking Water Protected areas under Article 7 of EFD (20060/EC). The model files for the groundwater and surface water models are provided as Appendix D3. Private water abstraction data is provided as Appendix D4.

DWI Comments: DWI notes NI Water's written response to the planning application on the 05/04/2019 and subsequent follow-up on the 28/10/2019, and is aware in liaison with NI Water that a further response is to issue. The applicant should address the points raised within NI Water's consultation responses in relation to any potential risk to the public water supply. The response within the FEI to the above query references Appendix C6 Section 4.5 which relates to groundwater, and also Appendix D3 for model files for surface water, DWI were unable to locate a summary of any assessment made on Drinking Water Protected Areas [designated bodies under Water Framework Directive 2000/60/EC Article 7].

Drainage & Water

NI Water in their correspondence on the 05/04/2019 have stated *'the proposed development is within the drinking water catchment area for Derg WTWs'* the applicant should engage with NI Water on its current and any future responses in considering the locations and potential impacts on surface water sources used for abstracting the public water supply. A development should not impact on the quality or sufficiency of the public water supply

DWI will continue to engage with NI Water to provide an independent assurance on the safety of the public drinking water supply.

Explanatory Note:

The statements raised within DWI response **Section Ref GQ311** issued 05/10/2018 are referred to below.

Environmental Statement – Volume 3 – C3 Surface Water Baseline Report

EN 01: Section 3.3 Water Quality – at the time of the report the drinking water quality regulations quoted were from 2007 (as amended). Since the publication of the report new regulations are now in place from October 2017, which can be viewed at:

The Water Supply (Water Quality) Regulations (Northern Ireland) 2017
http://www.legislation.gov.uk/nisr/2017/212/contents/made

The Private Water Supplies Regulations (Northern Ireland) 2017
http://www.legislation.gov.uk/nisr/2017/211/contents/made

These new regulations do not change the drinking water quality standards but should be quoted in future reports for consistency.

DWI Comment EN 01: FEI still refers to previous regulations therefore point remains valid, although the 2017 regulations do not change the drinking water quality standards they should be quoted in future reports for consistency.

EN 02: Table 3-29 details project guideline values. These guidelines are considered against the regulatory drinking water standards, where there is no regulatory standard for a parameter under assessment then consideration should be given to the use of the World Health Organisation Guideline values for Drinking Water e.g. for barium a value of 1.3 mg/l should be considered www.who.int/water_sanitation_health/water-quality/guidelines/chemicals/barium-background-jan17.pdf?ua=1

DWI Comment EN 02: The above statement remains valid where applicable in the consideration of project guideline values.

EN 03: When assessment is made of potential limits on outputs from the site suitable warning or trigger values should be used in the management of monitoring programmes and to ensure actions are implemented in advance of any potential threat to drinking water quality. A threat to drinking water quality is considered as being where the outputs from the site would breach Article 7 of the Water Framework Directive. Consideration should be given to any potential increase of chemical loadings over time against the current background levels. The Company should engage with NI Water and NIEA on the established Drinking Water Protected Areas (DWPAs) to gather information on baseline levels for these parameters and to ensure the processes and any discharges from the site will not impact negatively on the water quality within these catchments.

In developing monitoring plans cognisance should be given, in the first instance, to the regulatory drinking water standards (see above) and secondly to the drinking water standards set within the World Health Organisation Guideline values for Drinking Water: http://www.who.int/water_sanitation_health/publications/drinking-water-quality-guidelines-4-including-1st-addendum/en/ or any subsequent amendments or revisions.

DWI Comment EN 03: The above statement remains valid, where applicable.

EN 04: Note table 3-29 (Page 70) has a project guideline level of 730 mg/l for molybdenum, this would seem to be a typo and should read 0.073 mg/l as detailed in CCME, this equates to WHO guideline level of 0.07 mg/l.

Applicants Response EN 04: It is a typographic error. Table amended to the correct value of 0.073 mg/L stated in the CCME guideline for Molybdenum. The value of 730 should have been expressed as micrograms per litre. Please note that the correct value is used in ES V3 C4 – Surface Water Impact Assessment. Refer to ES, 2017 Appendix C3 Surface Water Baseline Report.

DWI Comment EN 04: DWI is content with the above response.

EN 05: The applicant should future proof against potential changes to drinking water standards and note the current European Commissions consultation on the Recasting of the Drinking Water Directive which is currently ongoing. The consultation document can be accessed at:
https://ec.europa.eu/info/law/better-regulation/initiatives/com-2017-753_en Of particular relevance in the consultation is the consideration to reducing the lead standard from 10 µg/l to 5 µg/l.

DWI Comment EN 05: The above statement remains valid, where applicable.

Groundwater Impact assessment (SRK Consulting) – U6193 Hydrogeology Impact Assessment

EN 06: 4.1.2 Private Abstractions – Notes 61 private abstractions in the potential piezometric drawdown radius with 16 of these within layer 5 of the groundwater model. DWI was unable to fully determine from the report that the proposals would not have a negative impact on either quality or sufficiency of private water supplies used as drinking water supplies (as defined under the Drinking Water Directive 1998) i.e where it used for domestic purposes; in food production, where the quality of the water would impact on the final product; or where the water is made available as drinking water to the public. A summary table should be provided to DWI to indicate the private abstractions used as drinking water supplies which have been risk assessed by the developer, to include details on; location (Grid Reference, address, and a shapefile of these supplies); the type of supply (including use); the risk assessment undertaken; where risks have been established details of these and the proposed mitigations; where no risk has been established a statement confirming this; and where further information has to be established a plan to obtain this information. Details of monitoring programmes (location, frequency, and scope) to monitor and confirm drinking water quality (to include baseline monitoring of relevant drinking water standards), and in confirming the sufficiency of supplies. Trigger levels for action should also be included within the monitoring plan to ensure any remedial measures are undertaken in a timely manner to prevent a deterioration in drinking water quality or sufficiency of supplies. If not already in the risk assessment programme the following private water supplies which are registered with DWI under

the Private Water Supplies Regulations (Northern Ireland) 2017, in Table 1, should as a minimum be included in this.

Table 1

DWI Site ID	Grid Reference
FO012Y	258694E 384453N
FO013Y	260071E 385327N
FO017	259842E 382896N

Applicants Response EN 06: The relevant details from the survey of private abstractions is provided at Table 1 at Appendix D4 and in GIS shapefile provided at the same location. This includes grid reference rounded to 100m and type of supply. Address and supply owner are not available due to data privacy. Table 1 (Appendix D4) contains the results of the risk assessment for each abstraction. The risk assessment undertaken for private abstractions is for groundwater level and groundwater quality. For groundwater level this assessment was undertaken for all abstractions within an area of interest defined by the largest cone of groundwater depression in the groundwater model for the EIA. For groundwater quality this was undertaken for abstractions down gradient of the DSF or in the area of influence of the underground mine workings. An overview of the relevant receptor linkages is defined in Table 5-2 of the Groundwater Risk Assessment (Appendix C6 of the ES, 2017). The results of the risk assessment in respect of where drawdown impacts were predicted at private abstractions is consistent with the results presented in Figure 6-5 and Table 6-3 of the Groundwater Risk

DWI Comments EN 06: DWI notes the information provided in Appendix D4 and has received the GIS shapefile as detailed [File Ref: 20190801_PrivateWaterSupplies.rar]. DWI notes water level impacts have yet to be determined on a number of wells and further information is needed on well depths, this should be determined and reported in an updated Appendix D. A mitigation measure offering a replacement source should only be offered where there is no breach of the Groundwater Regulations (Northern Ireland) 2009 (as amended), and on prior agreement with the owner of the private water supply. DWI notes information provided in Appendix D4 (footnote) which states 'The groundwater model used for these predictions incorporates *the 2017 EIA mine design. The 2019 underground mine design is larger in the west of the extraction area, therefore predicted impacts to supplies ID 11 and 56 are expected to increase'* appropriate monitoring and mitigations should be put in place to limit any impacts on these supplies. DWI acknowledge that monitoring and action plans have been provided within *'Draft Surface Water and Groundwater Environmental Monitoring and Action Plan, Curraghinalt project, County Tyrone'* [Appendix D2 issued July 2019]. This plan will require further review on completion of the independent peer review of the groundwater and surface water modelling. DWI would request clarification on what proposals are to be put in place for baseline monitoring programme at private water supplies before commencement of work on-site.

EN 07: Table 6-10 (page 80) Prediction concentrations for separated paste and waste risk with 5% binder – Note the column NI Drinking Water Guideline Values are not all based on the standards within the 2017 drinking water quality regulations (e.g. As is given as 0.05mg/l whereas the drinking water standard is 0.01mg/l). The company should review, where appropriate, its use of drinking water guideline values to ensure they are comparable to those contained in the current legislation.

Applicants Response EN 07: The use of an arsenic drinking water standard of 0.05mg/L was a typographic error in this section of the ES and table 6-10 of the Groundwater Impact assessment. Elsewhere in the report (i.e., ES, 2017 Appendix C4 – Surface Water Impact Assessment and both the baseline reports for surface water and groundwater) the correct arsenic standard (0.01mg/L) was stated. This value is not used in the groundwater risk assessment as a target concentration, therefore the typo is not of consequence to the assessment.

DWI Comment EN 07: DWI is content with the above response.

EN 08: Further details are required in the form of assessments and models, to demonstrate the activities undertaken during all stages of this development will not negatively impact on drinking water catchments (Drinking Water Protected Areas) and abstractions through a reduction in the established water quality. If there are potential risks identified then suitable mitigation measures should be proposed, along with monitoring (including baseline monitoring) where this is appropriate. The Drinking Water Inspectorate was unable to find such assessments within the current Environmental Statements. The applicant should provide all necessary data and models to allow NI Water to assess these within its risk assessments in relation to any potential impact on the management of its drinking water abstractions. The proposed development should not adversely impact on Drinking Water Protected Areas established under Article 7 of the Water Framework Directive, DWI could not find any specific reference to an assessment of these designations within the report.

Applicants Response EN 08: See responses to 1.2 [See Applicants Response: **Considerations** Point 2 Public Water Supplies] and 1.8 [See Applicants Response: EN 06] above. Data and models are provided to DWI through FEI requests 2.3 (WMU) and 5.2 (NIEA RU – L&G). Further information on private abstractions is provided under FEI request 1.8 (DWI).

DWI Comment EN 08: See DWI Comments within **Considerations** Point 2 Public Water Supplies.

DWI Comments General: In order to save on repetition of issues to be addressed, DWI endorses the Regulation Unit's, Land and Groundwater Team's Response **[Section Ref: AE1/19/969465]** and clarifications should be addressed in relation to private water supplies as highlighted within that response.

On completion of the peer review, clarification on the points above, and satisfactory engagement with NI Water, DWI will review any conditions in relation to the application.

Land, Soil & Air

Planning Reference: LA10/2017/1249/F

Section Reference: AE1/20/321141

Considerations

Regulation Unit (Waste Licensing Team) was consulted on the waste management impacts of the proposal and provides comment that NIEA is not the competent authority with regard to the Mining Waste Management for this proposed facility. This is regulated by the Planning Authority.

Regulation Unit (Land and Groundwater Team (LGW)) has considered the impacts of the proposal on the groundwater environment. On the basis of the information provided LGW is unable to provide its substantive response until the outcome from the DfI consultancy procurement process has been completed and reported.

Explanatory note

The comments below are not exhaustive but serve to capture key points in support of the Regulation Unit's (RU) position outlined above. These comments are made on consideration of:

A. SRK Consulting: Curraghinalt Gold Project Addendum to Environmental Statement, Prepared for Dalradian Gold Limited; dated July 2019;
B. SRK Consulting: Curraghinalt Project County Tyrone; Prepared for Dalradian Gold Limited, An Addendum to the Hydrogeology Baseline Report for the Curraghinalt Gold Project, Northern Ireland; dated July 2019;
C. SRK Consulting: Curraghinalt Project County Tyrone; Prepared for Dalradian Gold Limited, Draft surface water and groundwater environmental monitoring and action plan, Curraghinalt Project, Northern Ireland; dated July 2019;
D. SRK Consulting: Environmental Emergency Preparedness and Response plan protocol for the Curraghinalt Project, County Tyrone, Northern Ireland; Prepared for Dalradian Gold Limited; dated July 2019
E. SRK Consulting: Letter entitled "RE: UK7511 – Clarifications to the Environmental Statement Addendum – DAERA Land and Groundwater Team"; Dated 06 April 2020. Clarification Questions Ref no. 1 – 5.

The Land and Groundwater Team, Regulation Unit, have reviewed the Clarifications to the Environmental Statement Addendum, dated 06 April 2020. The team find the clarifications reasonable in relation to the protection of the groundwater environment, if fully implemented through future conditions and reviewed by an independent peer review.

<u>Need for Independent peer review of Groundwater Modelling</u>

A number of Groundwater models have been used to assess the potential environmental impacts of the proposed developments on groundwater flows, geochemistry and water balance. These models include (list not exhaustive):

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- Modflow including FlowSource extension: To model the dewatering of the mine, the extent of the cone of drawdown and impact on potential receptors (private wells, baseflow to streams, peat).
- PHREEC + Excel: To model seepage from DSF (dry stack facility) and associated ponds during operation and closure; as well as seepage from the backfilled underground mine following closure and groundwater rebound.

To support NIEA's substantive advice to Planning, it is necessary for an Independent Peer review of the Groundwater Modelling to be undertaken.

In the absence of this Independent peer review the Regulation Unit is not able to comment further on the proposed application including the backfilling of the mine utilising tailings; and impacts on groundwater geochemistry and groundwater resources (i.e. levels).

Risks of major accidents and/ or disasters

The Land and Groundwater Team are content with the Environmental Emergency Preparedness and Reponses plan protocol which has been provided. A condition will be recommended to the Planning Authority relating to its submission will be provided on completion of the peer review.

Potential impact on sensitive receptors, especially private water supplies

The applicant has used the Modflow software and model to assess the potential impacts resulting from dewatering operations of the mine. The input parameters and model outputs require further review of assessment through the independent review of model.

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LA10/2017/1249/F

Section Reference: P0572/18A

Considerations
The proposed development is for underground valuable minerals mining and exploration, surface level development including processing plant and other associated development and ancillary works, Greencastle, County Tyrone.

The following documents, which were received as part of the package of Further Environmental Information (FEI), have been considered:

- Guide to the Planning Application Addendum – July 2019
- Addendum to Environmental Statement – July 2019 including:
    - Appendices A1-3;
    - Appendices B1-3, B7-9 and B11/12;
    - Appendices C3, C5, C7-10, C12-14, C16-23;
    - Appendices D1-6;
- Non-Technical Summary for the Addendum to Environmental Statement Curraghinalt Gold Project – July 2019; and
- Waste Management Plan for the Curraghinalt Project, County Tyrone, Northern Ireland – July 2019

The "***2019 update***" to the proposed development (i.e. the "***2017 design***") is understood to be as follows:

- Changes in infrastructure linking mine operations to surface operations;
    - Relocation of primary (first-stage) crushing underground;
    - Introduction of ore-sorting equipment underground;
    - Introduction of a conveyor to be used as the primary method to transport material from the underground mine to surface;
    - Change in the orientation of the portal to accommodate the conveyor system;
- Process and product changes;
    - Simplified ore processing resulting in the removal of cyanide from the process and consequent change in product;
    - Transportation of concentrate off site and out of Northern Ireland;
    - Changes to tailings and paste backfill;
- Optimisation of the mine design and changes in the mine waste management; and
- Changes to construction management.

As cyanide is not used in the "***2019 update***" of the proposed development a Hazardous Substances Consent is not required, (refer to Informative 1). IPRI understands that the Hazardous Substances Consent application for the handling, storage and use of cyanide for the "***2017 design***" has been withdrawn by the applicant.

On 9th September 2019 the applicant withdrew the application for a Part A PPC permit associated with the "***2017 design***" for the following prescribed activities:

- Crushing, grinding and other size reduction activities, Schedule 1 - 3.5 Part B (a), (pre-treatment of ore containing gold and silver);
- Production of non – ferrous metals (gold and silver) from ore by metallurgical chemical or electrolytic activities, Schedule 1 - 2.2 Part A (a) (cyanide leaching and electro winning);
- Disposal or recovery of hazardous waste with a capacity >10 tonnes per day by physio –chemical treatment activities, Schedule 1 - 5.3 Part A (ii) (detoxification of cyanide tailings); and

- Melting non-ferrous metals in a furnace with a capacity of <10 tonnes per day and a holding capacity <0.5 tonnes, Schedule 1 - 2.2 Part C (a) (producing Gold and Silver).

Although the proposed design changes in the FEI, (i.e. the "***2019 update***" as detailed in the above documents), removed the above Part A and Part C PPC activities, the "***2019 update***" will have underground and above ground crushing, grinding and other size reduction activities that potentially require permitting as a Part B PPC installation under the Pollution Prevention and Control (Industrial Emissions) Regulations (NI) 2013 (The PPC Regulations) prior to being operated. However, neither of these crushing, grinding and other size reduction activities should be regulated as Part B PPC installations for the following reasons:

- The underground crushing, grinding and other size reduction activities, Schedule 1 - 3.5 Part B (a), (pre-treatment of ore containing gold and silver), is excluded as a PPC Part B prescribed activity as "***Nothing in this Part applies to any activity carried out underground***".
- The above ground crushing, grinding and other size reduction, Schedule 1 - 3.5 Part B (a), (pre-treatment of ore containing gold and silver), is exempt as it is a wet* and enclosed process that produces a damp ore concentrate and "***unlikely to result in the release into air of particulate matter***".

[Notes *
"*The ore will be milled in the semi autogenous grinding (SAG) mill as described in the 2017 design and then in the newly proposed ball mill.*" - Section 2.4.1 of the 2019 Addendum to the Environmental Statement.
"There will be a single stage grinding process using a Semi-Autogenous Grinding (SAG) mill in closed circuit. The mill uses grinding media (steel balls) and water to grind the feed into a slurry of finer particles." - Section 4.6.2 of Chapter 4:Project Description for the "***2017 design***" Environmental Statement.]

As no Part A or Part B PPC activities have been proposed in the "***2019 update***", (other than any potential specified waste management activities referred to Informative 2), no application for a Part A or Part B PPC permit is required, (refer to Informatives 3 and 4).

If any waste materials produced by the process contain naturally occurring radioactive materials (NORM) in quantities above the exempt criteria specified in the Radioactive Substances Exemption (NI) Order 2011, the company will have to apply for a Certificate of Authorisation under the Radioactive Substances Act 1993. During the application process for a Certificate of Authorisation, the applicant is expected to demonstrate that the best practicable means will be used to minimise the creation of radioactive waste and the activity in (and volume of, where appropriate) radioactive waste to be disposed of. The use of appropriate disposal routes would also need to be demonstrated and discharge limits would be applied to any gaseous or liquid discharges.

Appendix C7 (Radon and NORM Emissions Impact Assessment) from the "2017 design" documents and the Addendum to the Assessment of Radon Gas and NORM Emission Impacts from the "2019 update" documents have been reviewed. IPRI is content with the methodology used and the impact assessment carried out. In order to ensure that no waste materials produced by the process contain NORM in quantities above the exempt criteria, IPRI is content with the proposed quarterly monitoring of waste water samples for NORM radionuclides in a laboratory capable of achieving detection limits well below the out of scope levels for the first 12 months of operation (refer to Informative 5). If any of these monitoring results show that waste materials produced by the process are above the exempt criteria specified in the Radioactive Substances Exemption (NI) Order 2011, the company should apply for a Certificate of Authorisation under the Radioactive Substances Act 1993, (refer to Informative 6).

Any transport of material off site which contains NORM above the exemption levels specified by the Carriage of Dangerous Goods and Use of Transportable Pressure

Equipment Regulations (Northern Ireland) 2010 will need to be done in compliance with those regulations, (refer to Informative 7).

Informatives

1. **The operator will be required to apply for and obtain a Hazardous Substances Consent prior to handling, storing or using cyanide.**
2. **NIEA-Waste Management should be consulted about the potential for any Part A Specified Waste Management Activity prescribed in Schedule 1, Chapter 5, Sections 5.2 to 5.5 of the Pollution Prevention and Control (Industrial Emissions) Regulations (NI) 2013.**
3. **The operator will be required to apply for and obtain a Part A Pollution Prevention and Control permit (PPC permit) prior to operating an installation with cyanide. The operator will be required to apply for and obtain a Part B Pollution Prevention and Control permit (PPC permit) prior to operating an installation with an above ground crushing, grinding and other size reduction activity if that activity is likely to result in the release into the air of particulate matter.**
4. **Fermanagh and Omagh District Council should be consulted about the potential for any Part C Pollution Prevention and Control permits for the bulk cement activity or medium combustion plant and specified generators prescribed in Schedule 1 of the Pollution Prevention and Control (Industrial Emissions) Regulations (NI) 2013.**
5. **Quarterly monitoring of waste water samples for NORM radionuclides should be carried out for the first 12 months of operation in a laboratory capable of achieving detection limits well below the out of scope levels specified in the the Radioactive Substances Act 1993 (Amendment) Regulations (Northern Ireland) 2011.**
6. **If any waste materials produced by the process contain naturally occurring radioactive materials (NORM) in quantities above the exempt criteria specified in the Radioactive Substances Exemption (NI) Order 2011, the operator will have to apply for a Certificate of Authorisation under the Radioactive Substances Act 1993.**
7. **Any transport of material off site which contains NORM above the exemption levels specified by the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (Northern Ireland) 2010 will need to be done in compliance with those regulations.**

Natural Heritage

Section Reference: CB25686-2

Planning Application number: LA10/2017/1249/F

Summary

Natural Environment Division (NED) has only carried out a desktop assessment for designated sites assessment and other natural heritage considerations, however the protected landscapes assessment included an actual site visit and assessment from viewpoints around the site and surroundings. Further information will need to be submitted to enable NED to carry out a full assessment of this proposal.

Designated Sites

There are two SACs in the vicinity of the development:

1. Owenkillew River SAC, designated for woodlands, *Ranunculus* communities, and Freshwater Pearl Mussels: https://www.daera-ni.gov.uk/sites/default/files/publications/doe/land-information-reasons-for-designation-special-area-of-conservation-river-foyle-and-tributaries-2006_0.pdf

2. River Foyle and Tributaries SAC, designated for *Ranunculus* communities and Atlantic Salmon: https://www.daera-ni.gov.uk/sites/default/files/publications/doe/land-information-reasons-for-designation-special-area-of-conservation-river-foyle-and-tributaries-2006_0.pdf

Areas of Special Scientific Interest (ASSIs)

1. Owenreagh ASSI, designated for Freshwater Pearl Mussels and *Ranunculus* communities: https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Owenreagh%20River%20ASSI%20Citation%20and%20map.pdf

The Owenkillew SAC Freshwater Pearl Mussel feature has been assessed by Natural Environment Division (NED) as being in unfavourable condition (date of last assessment September 2011). This has been attributed to suboptimal water quality, including eutrophication of the river from elevated nitrogen and phosphorus levels, and also high sediment contamination. The river features are also assessed as being in unfavourable condition (date of last assessment September 2011), due to impacts from organic enrichment. Existing pressures on water quality within the river have been attributed to diffuse surface water pollution from agricultural and forestry activities, household sewage and waste waters and diffuse groundwater pollution from agricultural and forestry activities. Owenreagh ASSI was declared in March 2018 and has not been assessed as part of the Natural Environment Division monitoring programme.

NED has reviewed the responses and updated documentation provided with the Further Environmental Information, submitted to the Department of Infrastructure in July 2019, and has the following comments to make:

1. Throughout the documentation, NED have noted that standards for water to be re-introduced into the environment are set to meet agreed drinking water standards. With regards to the Reverse Osmosis Plant and any water managed from the development, which will eventually be discharged from the site into the receiving streams, it should be treated to the appropriate standards required for the two protected rivers within the vicinity of the development. These standards should be based on the conservation objectives of the site. Due to the sensitivity of freshwater pearl mussels (a feature of both rivers) and their current population status and recognised pressures on the population, NED would advise the applicant the agreed water quality standards as set out in the draft INTERREG Sub Basin Management Plan for the Owenkillew River SAC, are used for any relevant parts of the project. Although this is a draft document, it is widely acknowledged water quality standards in this document are the accepted approved levels for sensitive receptors, such as Freshwater Pearl Mussel and Atlantic Salmon, which have spawning records in the rivers downsteam of the development. These should be adopted as part of the project plan as appropriate, to ensure highest standards are met during the relevant phases of the project and form part of an adaptive monitoring plan.

   A precautionary approach should be taken towards any treated water introduced to the catchment, to avoid adding any additional loading to the rivers, which are currently in unfavourable condition. NED would advise that monitoring is put in place to ensure the relevant standards are met and to ensure adaptation where required, based on the flow in the receiving stream, the river body and any long term data results. This is an iterative process and if the applicant proceed with such a plan, this should also be reflected in the HRA throughout the process and any separate protected sites assessment. It is advised, if there are proposed deviations from these standards, then it is expected full justification and reasoning is provided within the appropriate sections of the ES and the HRA assessment and if a planning permission is granted based on other standards, the applicant should be able to demonstrate that whatever standards are met for water managed across the site, will not have an adverse impact on the site features.

   Section 6.5.35 in the FEI provides a response to commentary by NED on the Total Suspended Solids (TSS) standards to be reached and although NED appreciate the clarification provided and note the modelling and monitoring that will be implemented as part of the scheme, NED would suggest the applicant should be able to demonstrate that this (albeit what they consider a low level) increase of TSS will not lead to an indirect impact on the protected features of the rivers via a long term sustained increase of TSS. Also, if further discharge points will contribute to the increasing TSS in either the Owenreagh or the Owenkillew River, an assessment should be made to consider whether there is an additive and/or synergistic effects. Any consideration of standards to be met for the project, should take account of all phases including construction and operation phases of the project

2. NED note the response to the query FEI Response Section 6.5.6 and consider this element of the project will require further consideration, in the appropriate phase. NED expect that any decommissioning plan will involve prior engagement, to ensure relevant monitoring plans are put in place, to safeguard the protected rivers in the vicinity of the development. NED would also expect the mine closure plan written to achieve the highest standards of environmental protection and therefore ensure the conservation objectives of the protected rivers are maintained through the de-commissioning phase of the project.

3. FEI Response Section 6.5.7 and 6.5.8 deal with impacts of flow on protected rivers and the response indicated that flow rates are expected to increase during and after operations, but it is not clear from the documentation provided to date (including the shadow HRA) if this has been considered fully in relation to potential changes or impacts on the rivers in relation to baseline conditions for the designated features of the rivers and ensuring there is no significant deviation from these existing baseline levels. Alteration of natural hydrological regime can have significant effect on freshwater pearl mussel. The applicant should ensure this is considered as part of the final environmental monitoring package and assessed appropriately through the HRA process. It is recognised the HRA assessment can be difficult due to the potential for other activities to have indirect effects on the species and their habitats, however, there is a high risk noted in the documentation from potential erosional impacts and/or morphological changes. Detailed studies of potential hydrological and morphological impacts and changes (Including monitoring) are expected as part of the project plan. This should be an iterative process.

4. NED note the updated Peat Management Plan and Peat Landslide Hazard Risk Assessment document, and have some comments to make in terms of the risk of a peat slippage to the freshwater environment. Firstly (and based on windfarm guidance for FWPM), stacks should be avoided on slopes greater than 15 % and level areas draining onto slopes greater than 15 % because of the risk from sediment run off and increased nutrient run off to the freshwater environment. Removal of blanket bog can also have negative impacts due to the change (increase) of evapotranspiration. Sub-surface/shallow groundwater flows to rivers help maintain oxygen levels in the substratum and influences sediment mobilisation and deposition, thus contributing to favourable juvenile freshwater pearl mussel habitat condition. High evapotranspiration can mean a reduction of groundwater flow to the river, which influences the near flow velocity of the river. Similarly new drains and roads can pose higher risks because of the alteration of the flow and risk of higher run-off, especially in high peat areas. Any new drains and roads must only be constructed, if it can be demonstrated there is no likelihood of a significant risk to the protected rivers. Finally, NED would also like to outline that the seepage from the DSF should be monitored at all times and any seepage from the DSF liner is considered appropriately in the final calculations of potential impacts on the protected sites.

5. The updated AQIA and the assessment on protected sites is noted. Table 16 of Section 5.4 of the EIA (2017) refers to results of an Air Quality Impact Assessment carried for NOx emissions in relation to the following designated sites: Owenkillew River SAC/ASSI, Drumalea & Mullan Woods ASSI and Owenreagh River ASSI, which fall

within the zone of influence. For each of these sites the Process Contribution has been calculated as <1% of the Critical Level. This is in line with DAERA's operational protocol. The applicant, however, has not provided justification for the results stated in Table 16, such as output data from the model in the form of annual predicted levels, from which the final PC value for each site has been derived and the co-ordinates used to model source and receptor to the nearest point of each designated site. NED would request these details are provided.

6. NED note the response 6.5.13 in the FEI to the original comment on the power line and would consider this aspect of the project is interdependent with the main planning proposal and should be considered for its effects either alone or in-combination with other projects or plans, which will include the current proposed planning application, assuming it has not yet started. If the project has started then the effects will form part of the background baseline and either way the combined effects of the current planning proposal and the transmission power line should be considered.

7. NED note in response to FEI 6.5.14, this is not a request for further environmental information, however, the main points still stand in that any water to be discharged (planned or unplanned) from the site that has undergone acidification, should ensure it does not impact upon the features of the protected sites and the standards of the water entering the tributaries should factor this requirement in. If modelling is predicting that acidification will not lead to an impact on the protected rivers, NED would expect adaptive management/monitoring to verify such modelling, relevant for all phases of the project.

8. In relation to the commentary on vibration impacts on Atlantic Salmon, NED would suggest that an iterative monitoring plan is put in place to ensure the receptors and monitors are adequately picking up any potential impacts on sensitive receptors in the river especially salmon and otter. NED acknowledge in a face to face meeting, the applicant outlined that the Alaskan Standards to be met, were what they applicant has considered as accepted industry levels. NED would note that the applicant should ensure the appropriate noise levels as used in these studies are not breached. Monitoring should ensure these standards are met, but this should also be reflected appropriately in the HRA. NED have also noted there appears to be a discrepancy between the noise levels outlined in the HRA (possibly expected levels) and the levels noted in the FEI response. In addition, as outlined previously, consideration should be given to the timing of works to avoid potentially impacting spawning Salmon.

9. NED acknowledge the OCEMP has been updated in 2019 and provided with the suite of Further Environmental Information, in order to provide clarification on certain points raised by NED. While it is noted the CEMP is an outline phase, it is expected a final CEMP will be provided if a final permission is granted. Also, it is noted in the CEMP, that the mitigation methods will be utilised and adapted as required and while NED are aware this may need to be the case in some situations, any necessary mitigation should be in place before any discharge takes place from the water management ponds and it should be ensured they are functioning properly before any activity commences. The reporting mechanism should also include a format to involve informing NED if an

incident occurs, which may potentially lead to impacts on protected sites. NED would request the final CEMP is provided before any works begin.

Please also note, the impact of this development upon the water environment (quality and resource) and therefore the impact upon the designated sites and associated features cannot be fully determined until:

- The outcome from the DfI consultancy procurement process has been completed and reported;
- Environmental authorisations, namely Discharge Consents and Abstraction Licences, have been applied for by the applicant and determined by NIEA, supported by Habitats Regulation Assessments.

Once the outcomes from these identified areas of work are known, NED will be in a position to make a fully informed substantive response to this planning application

Other Natural Heritage Considerations

Considerations

NIEA Natural Environment Division (NED) has assessed the impacts to non-designated Natural Heritage features within the site.

On the basis of the further environmental information provided, NED now has no concerns, but as stated in our previous response, some features will require conditions to be included in the final decision notice to ensure that these features are not adversely impacted. NED will provide these conditions in the final DAERA response.

Explanatory note

NED acknowledges the receipt of Curraghinalt Gold Project Addendum to Environmental Statement, July 2019, which has been submitted in response to NED's request for more information made on the 5th October 2018.

NED's previous response of the 5th October 2018 provides an assessment of the features of the site, this response deals solely with regard to the further ecological information submitted in the above document.

Addendum to Environmental Statement

This document provides more information in relation to the NED's consultee response made on 5th October 2018. Specifically, section 6.4 of chapter 5 ref numbers 6.6.1 – 6.6.3.

- 6.6.1 addresses NED's request for clarification in regard to mapping and definition of the fen habitat.
    - NED are satisfied with the domin values for the species composition of the quadrats taken at the valley mire presented in Annex C – Phase 1 habitat and Phase 2

vegetation survey report at appendix 04 of the Ecological Impact Assessment (EcIA) as submitted under appendix C8 of the ES.
    - NED are content that the valley mire supports the NI Priority Habitat of Fen (poor fen) and not as previously assessed as Upland Flushes, Fens and Swamps and that defining the Valley Mire as poor fen does not alter the ecological evaluation of these features and the overall assessment of effects and the significance of the mine development as presented in the Ecological Impact Assessment (EcIA).
    - NED are content that there is potential to create fen habitat within management units 4 and 5 as detailed in Annex Q – Ecological Mitigation and Management Plan (EcMMP) of the Ecological Impact Assessment (EcIA).
- 6.6.2 addresses NED's request for further information in regard to loss of headwaters at the Pollanroe burn and compensation.
    - NED are satisfied that the Pollanroe Burn does not meet the criteria of a headwater and due its highly modified current state and are content that to the extent possible the watercourses will be naturalised after the operational phase in accordance with the conceptual Closure Plan Appendix B5 and the Landscape Restoration Plan.
- 6.6.3 addresses NED's request for further information in regard to loss of and compensation for Hedgerows.
    - NED are satisfied that the proposed loss of Hedgerows do not qualify as NI Priority Habitat and that the compensatory measures detailed within the Landscape Plan presented at Appendix C17 of the Environmental Statement, that allows for the planting of native woody species, represents adequate compensation.

<u>Protected Landscapes</u>

Considerations:

These can be separated out as:-

1. *The impact of the proposal on the visual amenity and landscape character of the area*; and
2. *The impact of the proposal on the Sperrin AONB*.

1. The impact of the proposal on the visual amenity and landscape character of the area

There are a number of issues we would like clarity on from the Agent's Landscape Architect relating to the landscape and visual assessment of the proposal. These are as follows:-

i. The proposal will entail the creation of an extensive raised platform-like hill in order to facilitate the DSF, as shown in Figure 9.1 (which indicates the contours at year 20). This will appear as a separate hill on the side of Crocknamoghil hillside. Some of the original 2017 photomontages such as in Figure 9.1d and 9.7c (Full extent DSF at Year 20) show how steep and angular the proposed hill will be. Figure 9.7c (Removal of componentry and post closure DSF) whilst showing that the profile would not break the skyline looks like an incongruous intrusion into the landscape.

   This is contrary to Volume 3 of the original ES(C16 LVIA) which states in para 7.9 ' Construction Phase Mitigation ' that "Regular looking engineered profiles will be avoided

where practical. Irregular concave and convex slopes mimicking existing contours, which match the scale of the existing hill slopes, will be created as far as possible during construction of the DSF and other necessary ground works for process plant componentry of the project."

The FEI confirms that the DSF feature has not altered. Looking at the photomontages and model view imagery, the straight lines and relatively sharp angles of the platform-like hill are still in evidence. We would recommend that the contours of both the existing receiving landscape and the profiling of the proposal should be considered again in order to try to blend the two together in a more appropriate degree.

We would also recommend that the restoration proposals should be re-considered in order to lessen the visual impact and better visually integrate the proposal into the landscape. Factors that should be further considered are as follows:-

- The existing field pattern;
- The colours of the landscape on and around the site – there is very little in terms of homogenous colours in the receiving landscape;
- The texture of the landscape – again there are a blend of textures on and around the site;
- The generally scattered vegetation pattern (including native species woodland pockets, hedgerows, scrub vegetation, Individual boundary trees etc);

ii. Although we have noted the contents of Vol 3 – App B11 – Lighting Specifications – received 06.09.2019, there are a number of concerns which we would have in terms of the impact on landscape character. These are as follows:-

- What guarantees are there in terms of the impact of lighting on the landscape character of the area during the operational phases of the proposal? The proposal would undoubtedly be introducing lighting to the hillside above Greencastle and the effects on tranquillity and sense of remoteness should be fully assessed.

- What evidence is there to suggest that the impact of the lighting will be as suggested in para 3.8 of Appendix C.16 in the FEI: 'Addendum to the LVIA and Visualisations' ie:- that the proposal will be " experienced in a context where views of subdued lighting associated with housing and farms along Camcosy Road are already apparent."

- Mid Ulster Council have approval for a Dark Skies Observatory which is to be located approximately 10 miles away in Darvagh Forest. Any additional lighting to the hillsides around this observatory should be minimised or avoided.

iii. We would recommend that additional visuals/photomontages should be submitted to show the proposal at the end of years 4 and 8 (as opposed to baseline and Year 20 photomontages). This is necessary in our view in order to assess the impact of the proposal at these junctures in the operational phasing.

iv. We are uncertain as to whether or not drawing LUC_6335_LP_PLN_002 Issue D still applies within the documents for the application? If it does Ash would need to be omitted from the planting proposals due to our concern over Ash Dieback in NI. The key to this drawing shows a symbol for ‘ Ash Woodland and Understorey ’ but the symbol doesn’t seem to match up with any of the graphics on the plan.

2. *The impact of the proposal on the Sperrin AONB*.

We would broadly agree with the findings of the updated LVIA in the FEI in terms of the impact of the proposal on the Sperrin AONB. There would undoubtedly be significant landscape and visual impacts, including substantial land modelling as evidenced in the photomontages, particularly during the construction and operational phases. It will be essential therefore for the applicant to fully demonstrate that all appropriate steps have been taken to minimise and mitigate all landscape and visual impacts associated with the proposal.

Our position is that whilst we would maintain that the proposal, by its nature, would not be in-keeping with the character of the Sperrin AONB in this locality, the impact would not undermine the rationale for the whole AONB designation.

18. Mapping the terrestrial gamma radiation dose

David Beamish[1]

How to cite this chapter:

Beamish, D., 2016 'Mapping the terrestrial gamma radiation dose' in M.E. Young (ed.), *Unearthed: impacts of the Tellus surveys of the north of Ireland*. Dublin. Royal Irish Academy.

DOI:10.3318/978-1-908996-88-6.ch18

The Tellus airborne radiometric data have enabled assessments of environmental radioactivity levels in unprecedented detail across the north of the island of Ireland. Both the natural (geological) and man-made (industrial) contributions to public exposure from ionising terrestrial gamma radiation are considered. Over much of the area the gamma-ray flux is significantly attenuated by peat and organic soil but relatively highly radioactive rocks are exposed in places, notably in the south-east of the surveyed area. The results indicate that across the area the effective dose from terrestrial gamma radiation is everywhere within the acceptable level, subject to the inherent spatial averaging of the measurements. The airborne survey also revealed areas where industry has concentrated or exposed naturally occurring radioactive material, including quarries and fly-ash piles.

Introduction

Since the days of Marie Curie it has been appreciated that exposure to ionising radiation may be hazardous to health. The first definition of a unit of radiation was made in 1928. Units of absorbed dose, the actual energy absorbed in the tissue being irradiated, are now used and are given as 1 J kg^{-1} or 1 gray (Gy). The gray can be used for any type of radiation but it does not express the biological effects from different types of radiation. The absorbed dose rate in air (nGy h^{-1}) is used to indicate the gamma ray intensity in the air from radioactive materials in the earth and atmosphere. *Equivalent* dose rate relates the absorbed dose in human and biota tissue and organs to the effective biological damage. The current SI unit of equivalent dose is the Sievert (Sv). The Tellus airborne radiometric data sets provide estimates of the absorbed dose rate in air (nGy h^{-1}); these may then be converted to equivalent annual dose rate estimates.

Terrestrial gamma radiation (the natural flux from rocks and soils) accounts for approximately 16% of the total annual dose of natural ionising radiation to which the population is exposed (Watson *et al.*, 2005). This terrestrial component arises due to primordial radionuclides that were synthesised during the creation of the planet, and has always accompanied life on Earth. Both humans and biota are exposed to an annual dose rate. The average annual dose to the UK population is estimated to be 2.7 mSv, with 2.2 mSv of this

[1] British Geological Survey, Keyworth.

coming from natural radiation (Hughes *et al.*, 2005). According to Watson *et al.* (2005), the annual UK exposure from terrestrial gamma radiation is about one third that from the inhalation of radon gas (see Appleton and Hodgson, Chapter 20, this volume; Hodgson and Young, Chapter 2, this volume). The data considered here do not assess the potential exposure from terrestrial radon.

Since the natural flux is largely determined by soil and associated parent geological material, personal annual exposure to terrestrial gamma radiation is determined by the home location, the localities visited and the amount of time spent indoors and outdoors, within a geological framework. The annual exposure of the UK population from all natural and artificial sources is further evaluated in Watson *et al.* (2005).

Terrestrial gamma dose rates largely reflect the natural variation of potassium, uranium and thorium across the environment. The high spatial resolution airborne surveys, and their continuous local to regional scale, allow assessments of both the geological background and its spatial variability together with localised concentrations due to industrial/technological processes. The data sets provide a basis for studies of dose rates derived from both NORMs (naturally occurring radioactive materials) and TENORMs (technologically enhanced naturally occurring radioactive materials). Watson *et al.* (2005) discuss both subjects in relation to UK assessments.

Materials and methods

Estimates of radioelement concentrations are available from the Tellus airborne surveys and the ground geochemistry. The geochemical soil-sample estimates are referred to here as 'in-soil' and the airborne estimates as 'in-air'. The latter provide a measure of the air-absorbed dose rate directly above the ground surface. Radium (^{226}Ra) is the fifth daughter decay product of uranium (^{238}U) and is the parent of the natural gas radon (^{222}Rn), responsible for radon exposure of the population (i.e. at locations where radon gas may build up). An airborne radiometric survey includes measurements that are used to minimise the potential radon contributions in the air-column. When effective, the airborne data then provide estimates of the ground concentration of the radium–radon parent uranium. Airborne measurements of uranium levels can then be used as one of the supporting techniques in the estimation of indoor radon levels alongside indoor radon measurements and digital geological maps (Appleton *et al.*, 2008; Appleton and Hodgson, Chapter 20, this volume).

The present study considers air absorbed dose (AAD) defined, using the airborne ground concentration estimates (IAEA, 2010), as:

$$\mathbf{AAD\ (nGy\ h^{-1}) = 13.078 \times \%K + 5.675 \times eU + 2.494 \times eTh}$$

where radionuclide equivalent concentrations, eU and eTh, are in ppm. %K is percentage potassium. The combined dose measurement covers the energy range from 1.37 to

2.81 MeV and excludes contributions from artificial (man-made) sources. The airborne absorbed dose rate values may be converted into units of Bq kg^{-1} if comparison with international and UK legislation is required. A range of radionuclide conversion factors have been reported in the literature over the years and these are summarised by Beamish (2014).

Effective dose is a sum of multiples of equivalent doses in separate human organs each with a specific weighting factor. As noted in UNSCEAR (2000), to estimate annual *effective* doses, account must be taken of (a) the conversion coefficient from absorbed dose in air to effective dose and (b) the indoor–outdoor occupancy factor. The average numerical values of those parameters vary with the age of the population and the climate at the location considered. The UNSCEAR committee used 0.7 Sv Gy^{-1} for the conversion coefficient from absorbed dose in air to effective dose received by adult organs and 0.8 for the indoor occupancy factor, i.e. the fraction of time spent indoors and outdoors is 0.8 and 0.2, respectively. The annual effective dose rate (AEDR) in mSv y^{-1} may be calculated from the AAD rate using the above factors to give:

$$\mathbf{AEDR\ (mSv\ y^{-1}) = AAD\ (nGy\ h^{-1}) * 8760\ (h) * 1.0 * 0.7\ (Sv\ Gy^{-1}) * 10^{-6}}$$

The factor of 8760 represents the number of hours (h) in a year and an occupancy of unity (meaning totally indoors) has been applied. The conversion indicates that the airborne dose rate values of 10, 100 and 1000 (nGy h^{-1}) produce equivalent annual effective dose estimates of 0.061, 0.61 and 6.1 mSv, respectively. The statutory UK limit on the amount of radiation to which the general public may be exposed, in excess of natural background and excluding medical exposure, is 1 mSv per annum (Watson *et al.*, 2005).

Results

Previous studies of dose rates across the UK noted the remarkable skew (to low values) of the original Tellus radiometric data set (Beamish, 2013). The composite Tellus radiometric data used here have had water bodies (areas > 5 km^2) removed. The unusually extensive areas of reduced radioactivity result from the attenuation of the signal by peat bogs, which cover some 17% of Northern Ireland (Beamish, 2013). However, when considering dose rates it is usually the high value end of the distribution that has most relevance to both NORM and TENORM investigations.

NORM contributions

Figure 18.1 summarises the low and high values of the observed distribution of dose rates obtained from the two Tellus surveys. The low values (<8 nGy h^{-1}) are shown in black–grey and the high values (>60 nGy h^{-1}) are shown in yellow–red. The widely distributed low values display a high spatial correspondence with areas of peat. At the scale shown, it is evident that high values are associated with a subset of the granite outcrops shown in pink.

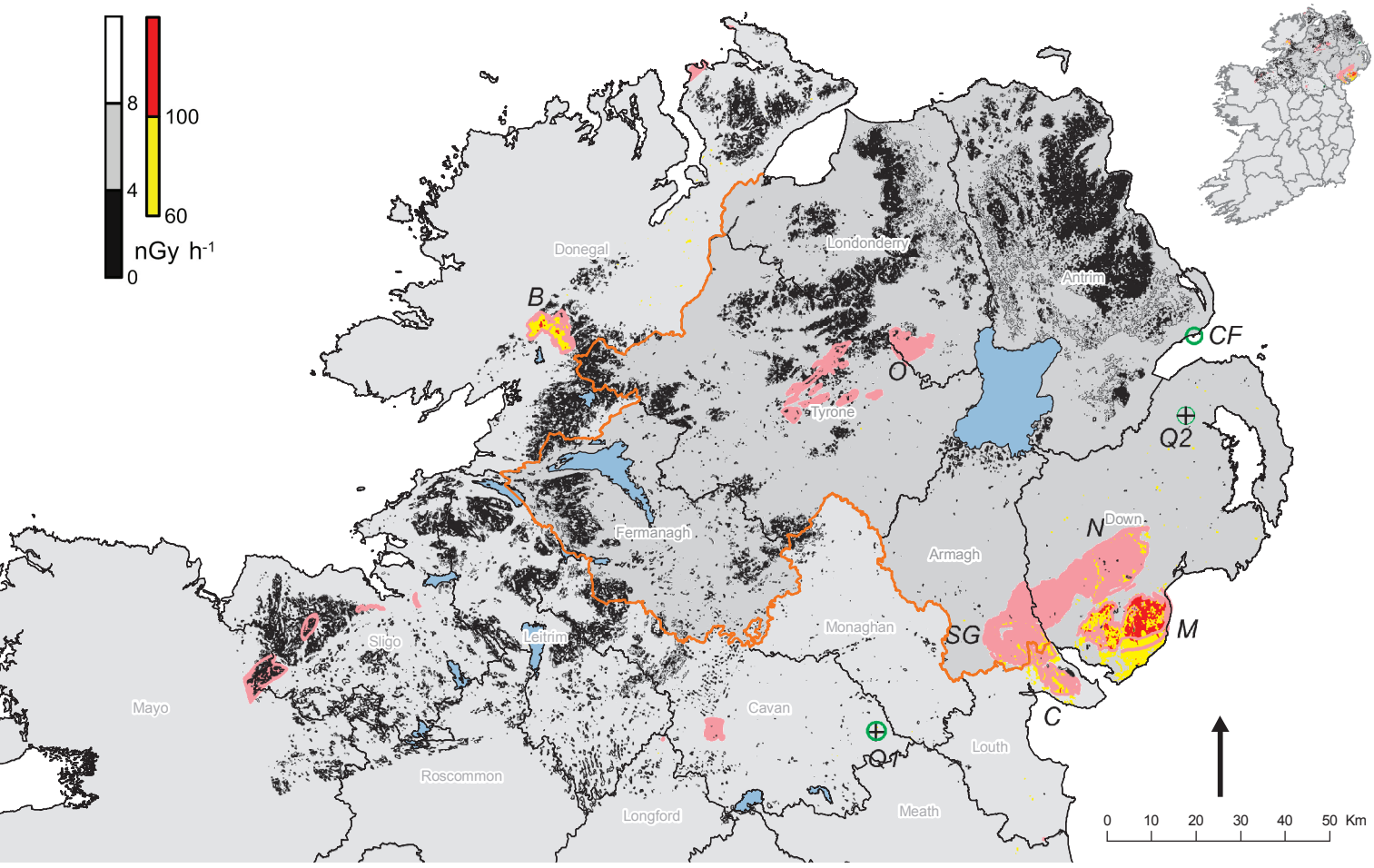

Figure 18.1. Air absorbed dose rate estimates obtained by the Tellus surveys. Low value amplitudes (<8 nGy h^{-1}) in grey scale, high amplitudes in yellow–red (>60 nGy h^{-1}). Pink areas are granite outcrops (B = Barnsmore, C = Carlingford, M = Mournes, N = Newry, O = Ordovician, SG = Slieve Gullion). Q1 and Q2 are locations of two quarries discussed in the text. CF = Carrickfergus.

The most spatially persistent set of high values are found in the eastern Mourne Mountains granite complex with other, less extensive zones being found within the Slieve Gullion, Carlingford and Newry granites. The Caledonian Barnesmore granite (B) in southern Donegal also displays a persistent zone of high values, largely confined to the western margins. The Ordovician granites (O) within the Midland Valley terrane are not associated with high values despite the absence of peat.

The maximum dose values within the data set occur in the eastern Mourne Mountains and range from 267 to 320 nGy h^{-1}; the precise value depends on factors applied with merging of the Tellus survey data sets. In order to assess the spatial behaviour of the dose rate values, it is useful to additionally consider soil and water information. Figure 18.2 shows an area centred on the outcrop of Mourne granite complex (the inner polygon in grey) with coloured contours of high dose rate (>150 nGy h^{-1}). Areas of peat are shown using transparent brown and water bodies are in blue. The high values are largely confined to the outcrop although it can be noted (Fig. 18.1) that values > 60 nGy h^{-1} extend to the south of the outcrop. The locations of the zones of high values are spatially complex and it is probable that the areas of extensive peat modify (attenuate) the flux pattern observed. It is worth noting that the granitic responses noted in Fig. 18.2 also have a concomitant elevated response in uranium values.

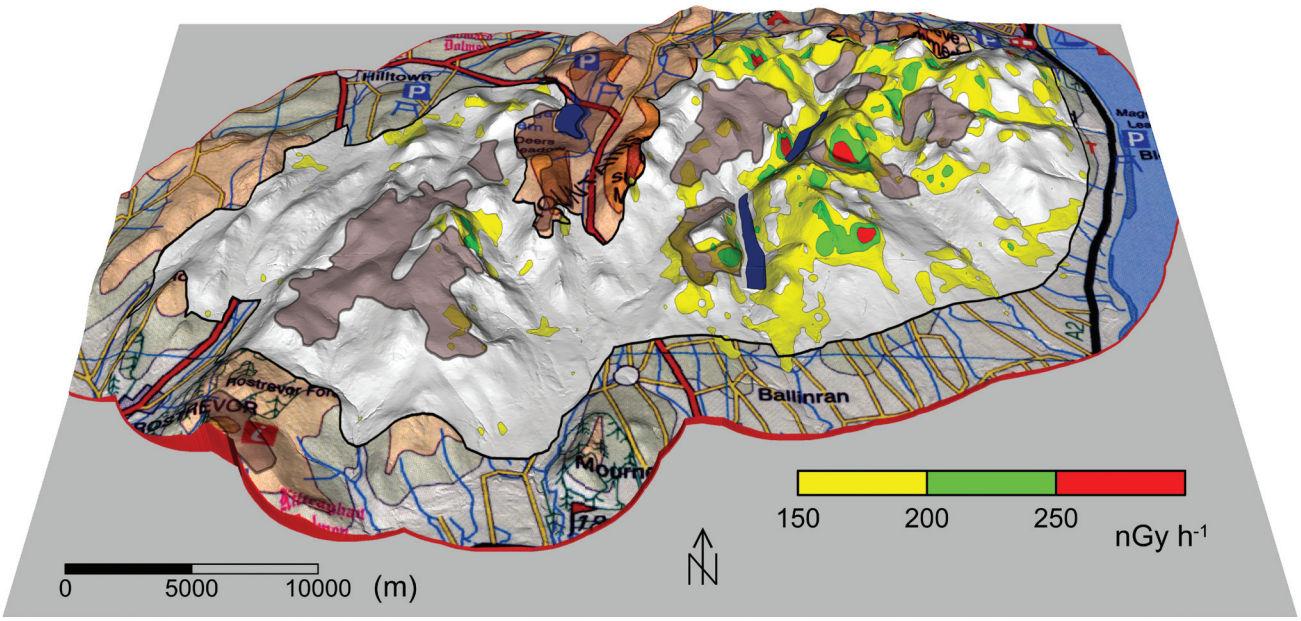

Figure 18.2. 3D perspective view (see north arrow) showing area of Mourne Mountains granite outcrop (in grey), with a 2 km extension showing base map, and draped on a base digital terrain model (DTM). Colour contours of high values of dose rate in yellow–green–red. Peat areas in brown, water bodies in blue.

The bedrock geology across the survey area is complex and any assessment of the radiometric response is complicated by the soil modification to the flux. The environmental component of annual dose rate is undoubtedly related to the main place of residence of each individual. It is possible to exploit the uniform coverage of the airborne survey data to provide estimates of city and town dose rates. When the complexities of the geological and soil responses are fixed (as would be expected at the housing-district scale), a more direct, population-related assessment can be undertaken. Given a spatial database of defined local authority areas, it is possible to conduct the analysis by size of population or by area; here we use the former. The analysis was conducted using areas with a population > 5000 individuals (2001 census).

Statistical analysis of the dose rates within 37 population centres of Northern Ireland is summarised in the box-whisker plot of Fig. 18.3, which is arranged in decreasing population size (from 276,705 to 5076). The majority of towns have dose rates below 50 nGy h^{-1}. Thirteen locations with higher dose rate levels are identified in red. These areas are predominantly underlain by granitic bedrock but there are additional contributions from the variable ground cover, so the method is effective in distinguishing the actual 'at-home' terrestrial gamma exposure levels experienced by the population. A similar analysis conducted using the Tellus Border data, where granitic areas are less extensive, revealed that the central values were all < 50 nGy h^{-1}. The high value tails of the distributions are also significant, since these reveal more localised high exposure values. The behaviour of the Carrickfergus distribution is very distinctive and is discussed further below.

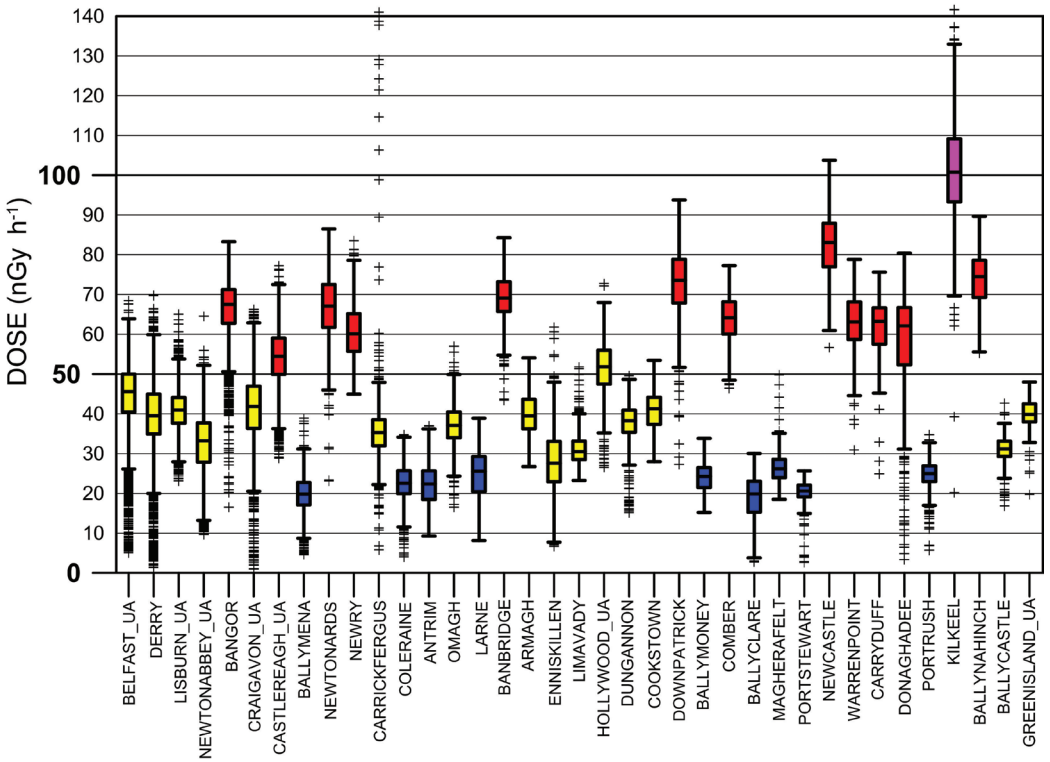

Figure 18.3. Box and whisker plot summarising the statistical behaviour of the airborne dose rate values classified according to the 37 towns of Northern Ireland with a population > 5000. Arranged in order of decreasing population.

TENORM contributions

The main central values for the Carrickfergus distribution (Fig. 18.3) lie in the range 30–40 nGy h^{-1}, but high values (data outliers) exceed this by a factor of 3. Kilroot Power Station, based in Carrickfergus, is Northern Ireland's largest power station. The waste material from combustion (fly ash) is contained within a landfill area on the coast. Figure 18.4 shows the detailed airborne observation points (dots) looking inland from the coast and centred on the landfill. High dose values are colour contoured and it is evident that the high values are confined to the landfill and that the data offer discrimination in the levels observed across the site. Further analysis, not shown here, indicates that the high levels are due to elevated concentrations in both thorium and uranium. In the context of other UK airborne data sets, colliery spoil heaps, iron ore mines and processing works and power stations are also marked by relatively high values of all three natural radioelements, but most notably thorium (Lahti and Jones, 2003). Radiometric measurements at ground level display a greater range of radionuclide concentrations due to the spatial averaging (typically > 100 × 100 m) inherent to the airborne measurement.

By their nature, TENORM contributions to high dose rates derive from existing and historical industrial activities and are spatially compact. A range of legacy effects due to many centuries of activity in the UK are reported by Beamish (2014). The largest recorded dose rate observed in modern UK airborne surveys is 579 nGy h^{-1}, from a highly localised

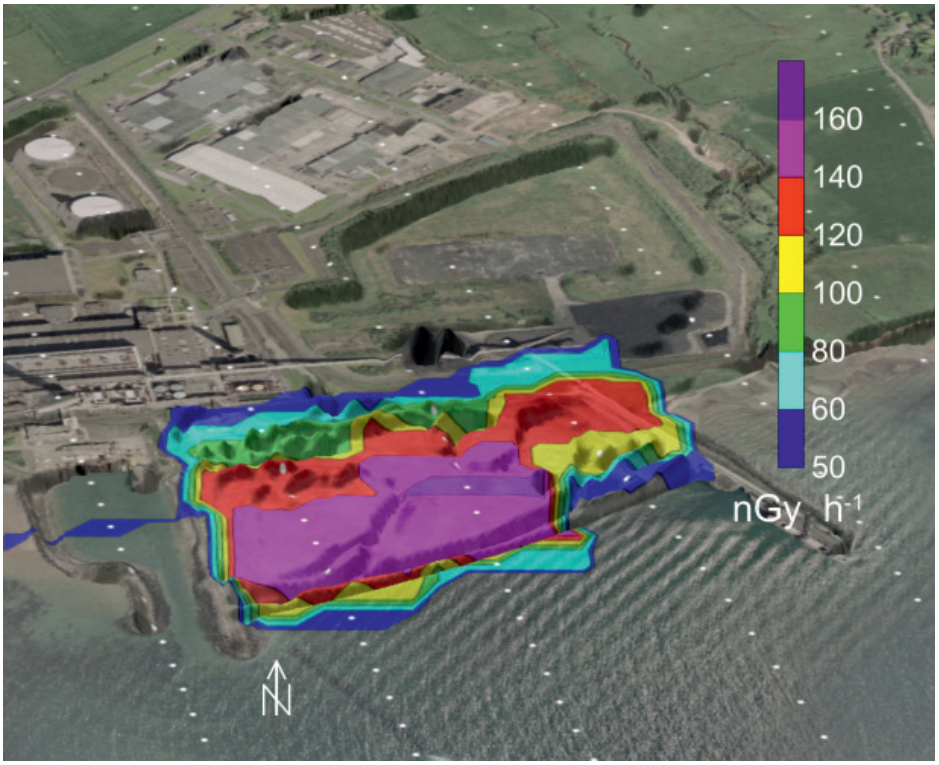

Figure 18.4. 3D perspective view (see north arrow), looking down on coastal landfill adjacent to the Kilroot power station at Carrickfergus. Air photograph draped on DTM. Colour contours show high values of dose rate. White dots are airborne survey sampling points, along flight lines every 200 m.

zone (predominantly along one flight line) associated with a former uranium mine in the vicinity of the St Austell granite in Cornwall. In the case of the Tellus surveys, TENORM contributions are observed to be typically less than 100 nGy h^{-1}. The relatively high value dose rates shown in Fig. 18.1 use a threshold of 60 nGy h^{-1}. The relatively high values account for only 1% of the total data. Areas of high dose were examined in relation to base topographical maps and airborne images. A significant proportion of the values occur in the vicinity of existing quarrying and other extractive industries. Two examples of localized detection (identified in Fig. 18.1) are shown in Fig. 18.5; both show the zone of values with dose rate > 60 nGy h^{-1}. Figure 18.5a shows a quarrying operation about 4 km SE of Stormont. The main zone is localised on one flight line. Figure 18.5b shows a larger quarrying operation in County Cavan, about midway between Bailieborough and Kingscourt, where two separate zones are detected across four flight lines. Site-specific conditions and potential causes of localised high values at a range of existing and former industrial sites across the UK are further discussed by Beamish (2014).

These determinations of TENORM are of course limited to the effects of direct radiation. They do not reflect the potentially greater health hazards of radiation from inhaled radioactive particulates (dust), which if lodged within the body may continue to emit tissue-damaging alpha and beta particles for many years.

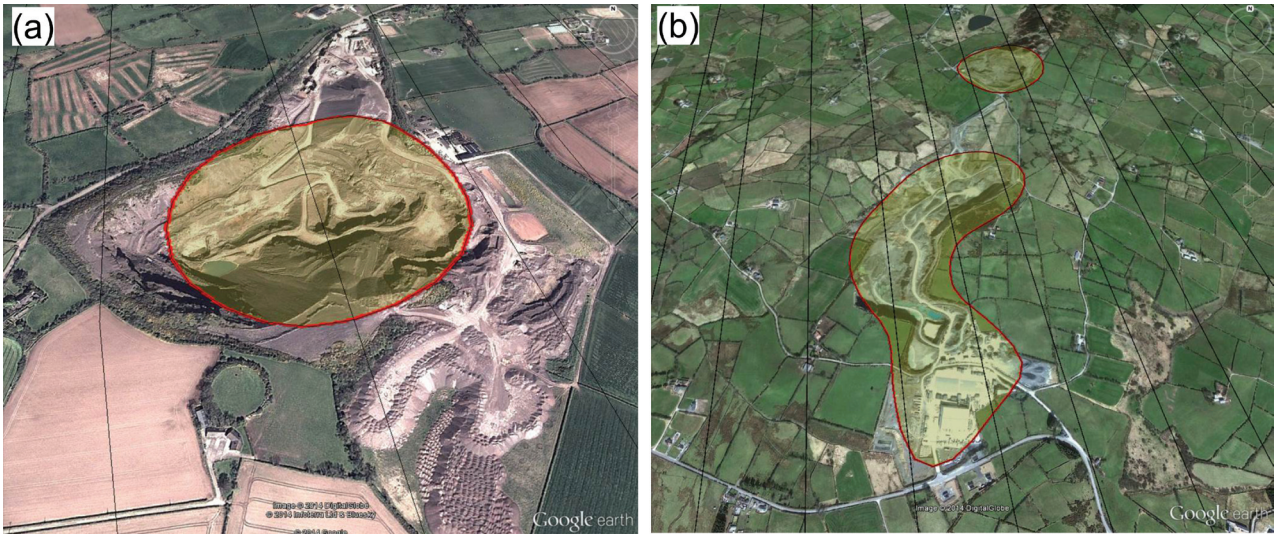

Figure 18.5. Two quarry areas with high (>60 nGy h^{-1}) dose rates identified with red contours and transparent infill. The black lines are flight lines (spaced at 200 m). Locations are shown in Fig 18.1. The background images are © Google Earth.

The Chernobyl nuclear accident took place in April 1986 and deposited significant amounts of the man-made radioelement caesium (^{137}Cs) over an extensive area of Europe. Although in the UK and Ireland this fallout was not directly hazardous to health, in some contaminated areas restrictions were placed on the movement and sale of sheep, which might accumulate caesium by grazing over an extended period.

Radiometric data from the first Tellus survey, alongside other airborne sets, were used to map the caesium (^{137}Cs) distribution (Scheib and Beamish, 2010; Rawlins *et al.*, 2011). The distribution obtained using the combined Tellus data sets is shown in Fig. 18.6, which identified zones and bands where high concentrations were deposited. The areas and bands of high concentration were found to cut across both and high and low topographical features, all soil types and differing land-use areas. The 'banding' in the results obtained was interpreted as representing a series of rain fronts intercepting the Chernobyl plume. Such a full understanding was, in fact, only achieved some 20 years after the accident.

Summary

Radiological assessments by bodies such as Public Health England (formerly the Health Protection Agency) and its predecessors have periodically refined assessments of the exposure of the population. The average annual dose from natural radiation remains at 2.23 mSv, with about half of this coming from indoor radon exposure. The average AAD UK dose rate, weighted by the distribution of population, has been found to be 32 nGy h^{-1}. It should be noted that, due to the spatial averaging inherent to the airborne measurements, ground distributions will typically display a higher spatial variance than the values reported here.

The pervasive blanket bog and organic soils, and their water content, attenuate the radioactive flux and therefore screen much of the survey area (say >25%) from potential

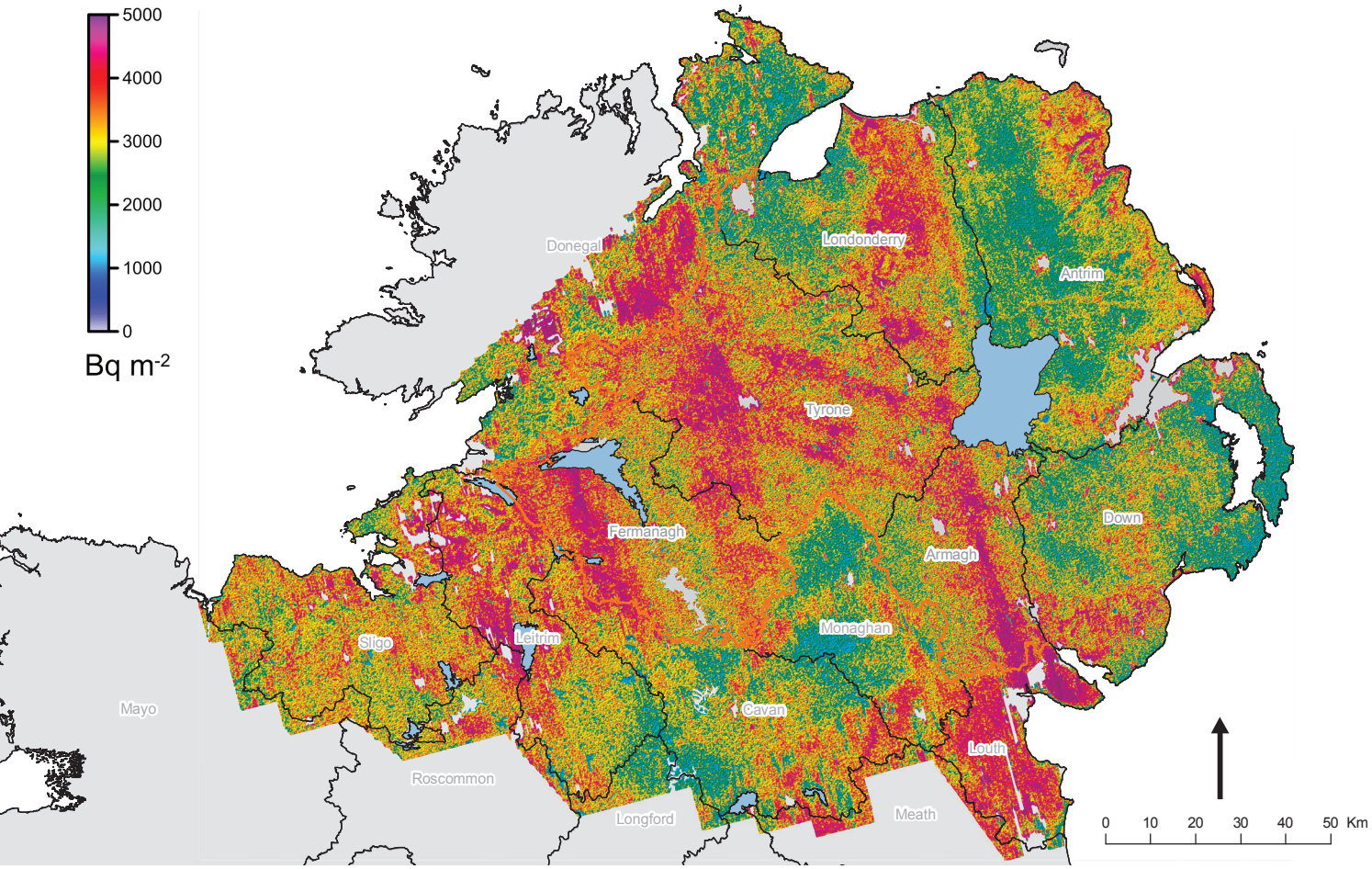

Figure 18.6. The caesium distribution obtained from the Tellus surveys (Bq m^{-2}). The distribution is cut to the coast and water bodies (>5 km^2), and high-fly areas (>180 m) are excluded.

high, in-air dose levels. The highest natural background dose rates are found in association with granites. Only a few small areas possess values in excess of 200 nGy h^{-1} (an effective annual dose rate of 1.23 mSv). The city–town analysis of dose rates, which covers the major percentage of the population, indicates that central values are routinely below 100 nGy h^{-1}, but one granite location (Kilkeel) has a median value close to 100 nGy h^{-1}.

TENORM contributions are localised and there are many contributions that can be identified, typically at levels below 100 nGy h^{-1}. The fly-ash landfill at Carrickfergus has a localised area providing in excess of 140 nGy h^{-1}.

The audit on environmental radioactivity reported here indicates that effective (biological) dose thresholds are within acceptable levels, subject to the inherent spatial averaging of the measurements.

Acknowledgements

This chapter is published with the permission of the Executive Director of the British Geological Survey (NERC).

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Unearthed: impacts of the Tellus surveys of the north of Ireland
First published in 2016 by the
Royal Irish Academy
19 Dawson Street
Dublin 2
www.ria.ie

ISBN: 978-1-908996-88-6

British Library Cataloguing-in-Publication Data. A catalogue record is available from the British Library.

Design: Alex Donald, Geological Survey of Northern Ireland.
Index: Brendan O'Brien.
Printed in Poland by L&C Printing Group.

Table of Contents:

Addendum 2
LA01/2023/0008/F

1.0 Update

1.1 Since the September Planning Committee further letters of representation have been received. There are currently 1405 letters of objection, 221 letters of support and 1 petition.

1.2 Many of the issues raised are broadly the same as those already considered within the report. Further issues raised include (*with the Planning Department's consideration in italics*):

1.3 The impact of the proposal on Drumcovitt House, a listed building, has not been considered – *The ES (chapter 9) includes figure 9.3 which shows heritage assets which have been considered in the assessment. Drumcovitt House has not been included. The included assets are located within a study area of between 5 to 10km from the inner study area. The inner study area includes the lands within the control of the Applicant i.e. within the immediate vicinity of the site. The study area is based on the zone of theoretical visibility and 'Guidance on Setting and the Historic Environment' (HED 2018). It appears that Drumcovitt House is located just outside the 10km study zone. The assessment was carried out by Headland Archaeology (UK) Ltd, a Registered Organisation with the Chartered Institute for Archaeologists (CIfA), an audited status which confirms that all work is carried out in accordance with the highest standards of the profession.*

1.4 Failure by the Applicant to properly assess the impact of the development on Whooper Swans – *Both NIEA and the Agent were asked to provide comment on this. The Agent provided a statement from the Ornithologist which has been published to the Public Register. The statement sets out the Ornithologist's experience and the background to the survey method. They also advised that the ornithology chapter highlights within Table 7.4 that*

no sites designated for supporting Whooper Swan (or other bird species of conservation concern) are present within 10km of the proposed wind farm, and no established migration and/or crepuscular flight-paths of Whooper Swan are known to exist within the vicinity.

This response was provided to NIEA as part of their consultation. NIEAs response states 'NED's opinion is that the ornithologist has addressed the concerns raised regarding Whooper Swans, and therefore we have no further comments to make. Please see NED's response dated 29 April 2025 which states that NED has no concerns regarding protected landscapes, designated sites and other natural heritage interests, subject to conditions'.

1.5 Soil erosion and groundwater impact – *The impact of the proposal on erosion and groundwater is dealt with in Chapter 8 of the ES, 'Water and Geology Environment and PSHA'. The contents of which will have been assessed by NIEA.*

1.6 Failure to carry out a grid capacity feasibility study – *This is not a policy requirement.*

1.7 No consideration of alternative locations/technologies – *While there is no requirement within PPS 18 to consider alternative sites, The Planning (Environmental Impact Assessment) Regulations (NI) 2017 requires a 'description of the reasonable alternatives' (for example in terms of development design, technology, location, size and scale) studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. An 'Assessment of Main Alternatives' has been provided by the Applicant within Chapter 2, 'Site and Project Design' which sets out the alternatives considered by the Applicant.*

1.8 Inefficient use of public money/lack of fiscal accountability and transparency – *These are unsubstantiated comments.*

1.9 The submitted ZTV's are inaccurate as they refer to a 145m tip height for Evishagaran which has been approved with a tip height of 140m – *The Agent clarified in an email dated 16/10/2025 that*

the reference to a tip height of 145m was a typo and the ZTV has been based on a tip height of 140m. They advised that, to make sure this was correct, they re-ran the ZTV at 140m and it came out the same. The Planning Department is content that the ZTV's are accurate

1.10 The path over Benbradagh should be formally asserted as a public right of way – *With regards to safety, paragraph 1.3.54 of the SPG requires that turbines be set back at least fall over distance plus 10% from the "edge of any public road", right of way or railway line. As the track has not been formally asserted as a right of way, the safety distance does not apply and has not been considered as part of the assessment.*

1.11 Failure to consult the Republic of Ireland Competent Authority and conduct a Transboundary EIA consultation regarding assessment of Whooper Swans flight lines between Republic of Ireland SPA sites and Northern Ireland SAC & SPA sites' – *This is not required. The ornithology report states that no sites designated for supporting Whooper Swan (or other bird species of conservation concern) are present within 10km of the proposed wind farm, and no established migration and/or crepuscular flight-paths of Whooper Swan are known to exist within the vicinity. This has been assessed by NIEA and SES who are content that there will be no likely impact. As there is no impact, there is no need to consult RoI or conduct a transboundary EIA.*

1.12 The proposal fails to comply with SPG advice on separation distances between windfarms - *These representations refer to SPG guidance for wind farms published by the then Department of the Environment. This refers to spacing between wind farms and states adequate separation distances between wind farms is important as this helps prevent the landscape becoming dominated by wind farms and reduces intervisibility. The SPG goes on to state that in areas of appropriate character it might be possible to locate wind farms closer together if they are seen as a cluster or single coherent group within the landscape. In this instance, the Planning Department considers there to be adequate separation from the consented Sumgeldon Wind Farm while proximity to Evishagaran Wind Farm is acceptable as the scheme appears as an extension.*

1.13 The proposal conflicts with the Peaceplus Partnership and the importance of Benbradagh as the gateway to the Sperrins – *The Peaceplus Partnership is a European funding programme for peace building projects. One of these projects involves improving accessibility to Benbradagh and attracting visitors. As the Planning Department considers the impact of the proposal on Benbradagh to be acceptable, this is not in conflict with the funding project.*

1.14 Contamination and radiation from the Chernobyl disaster has not been considered in the HRA, thus rendering the HRA incomplete - *The policy responsibility for radiation and radiological protection lies with DAERA and UKHSA. NIEA, within DAERA, carries out ongoing monitoring for land contamination from radioactivity, which includes residual effects from incidents like the 1986 Chernobyl accident. The Council has not obtained specific instruction or guidance from DAERA or UKHSA pertaining to the consideration of planning applications in the Sperrin range relative to this issue. With regard to HRA, SES is the competent authority who carry out HRA's on behalf of the Council. SES uses the NIEA response to inform its HRA. NIEA Regulation Unit, uses land contamination data to inform its consultation responses. NIEA Regulation Unit did not indicate any concerns about contaminated land in their consultation response. The Planning Department is content that the HRA was complete.*

1.15 Destruction of cultural heritage which may severely impact the enjoyment of cultural rights and all human rights – *This statement relates to the impact of the proposal on Benbradagh Mountain, which is seen as an important asset which is central to the cultural and natural heritage, and identity of the community of Dungiven. The Planning Department considers the impact of the proposal on Benbradagh to be acceptable and therefore, it is not considered that there is any harm caused to cultural heritage, cultural rights or human rights.*

2.0 Recommendation

2.1 That the Committee note the contents of this Addendum and agree with the recommendation to approve the application in accordance with Paragraph 1.1 of the Planning Committee report.