

Environmental Permitting Regulations (England and Wales) 2010

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Criteria for setting limits on the
discharge of radioactive waste from
nuclear sites

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A QUICK GUIDE

This document provides guidance on the criteria that the Environment Agency will take into account when setting limits and levels on the discharges of liquid and gaseous radioactive waste into the environment. It follows the Statutory Guidance to the Environment Agency concerning the regulation of radioactive discharges into the environment published in 2009 and our RSR Environmental Principles. This guidance does not cover disposals by burial nor transfers of radioactive waste, where we do not routinely set limits.

In accordance with the statutory guidance we set limits based on the use of best available techniques (BAT) by operators to minimise disposals and their impact, with the minimum headroom necessary to permit “normal” operation or decommissioning of a facility. “Normal” operation or decommissioning of a facility includes the relevant operational fluctuations, trends and events that are expected to occur over the likely lifetime of the facility, consistent with the use of BAT.

We will also be flexible in setting discharge limits where other key Government objectives need to be met, for example the safe and timely decommissioning of redundant facilities; clean-up of the historic legacy of radioactive wastes; security of energy supply; maintaining defence nuclear and non-nuclear capabilities, and the use of radionuclides in medicine.

This document provides guidance on the legal requirements in relation to setting limits and levels, the policy issues that we take into consideration, and how we apply these to set limits and levels in practice.

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1 Introduction

1. This document provides guidance on the criteria that the Environment Agency will take into account when setting limits and levels on the discharges of gaseous and liquid radioactive waste from nuclear licensed sites in England and Wales. It follows the [Statutory Guidance to the Environment Agency concerning the regulation of radioactive discharges into the environment](#) published in 2009. We do not normally set limits on disposals of radioactive waste by transfer to other sites. There is separate guidance on the burial of radioactive waste in:
 - [Near surface disposal facilities on land for solid radioactive waste](#);
 - [Geological disposal facilities on land for solid radioactive waste](#).

This document is part of our guidance on the regulation of the management of the generation and disposal of radioactive waste on and from nuclear sites, which is available on our web-site under "[environmental permitting for radioactive substances activities on nuclear sites](#)".

2. We require operators to use "best available techniques" (BAT) to minimise the generation and disposal of radioactive waste such that the resulting radiological impact to members of the public is reduced to a level that is as low as reasonably achievable (ALARA) and the environment is protected. This is the optimisation requirement. We have produced separate guidance on optimisation and the use of BAT under the title "[RSR: Principles of optimisation in the management and disposal of radioactive waste](#)".
3. We set site limits on the discharge of radioactive waste to:
 - ensure that the radiation exposure of members of the public is less than the statutory dose limits and constraints and is as low as reasonably achievable;
 - ensure the environment is protected; and
 - provide a reference for the indication of operational discharge performance and the application of the best available techniques to minimise discharges.
4. We may also set "levels" for the site as a whole or for individual outlets so that we are notified of:
 - increased short term discharges which may significantly increase the dose to members of the public (called "advisory" levels in the permit); and
 - increased discharges indicative of a failure to use BAT (called "notification" levels in the permit).
5. The International Atomic Energy Agency (IAEA) has published guidance on the control of discharges of radioactive waste into the environment in [Safety Guide WS-G-2.3 : Regulatory control of radioactive discharges to the environment](#) and has published a review of current national practices and key practical issues in [IAEA-TECDOC-1638 "Setting Authorised Limits for Radioactive Discharges : Practical Issues to Consider"](#). These provide a global perspective on the authorisation of radioactive discharges within the IAEA framework.

6. The Government guidance on "[Radioactive substances regulation](#)" describes the statutory requirements and Government policy relating to the disposal of radioactive waste in general with paragraphs 4.5 to 4.11 covering certain matters relevant to limit-setting. Our guidance on "[The regulation of radioactive substances activities on nuclear licensed sites](#)" describes how we implement radioactive substances regulation and take account of the various statutory requirements and Government policies in general when determining applications and setting permit conditions, including limits.
7. RSMDP12 in our [RSR Environmental Principles](#) sets out our general approach to limit-setting. This document expands on RSMDP12 to provide further guidance on the criteria for selecting radionuclides to be limited and on the setting of the numerical values of limits and levels. This guidance does not set a detailed, prescriptive methodology. Regulators should use expert judgement to set limits and levels using this guidance to achieve the aims of limit and level setting (paragraphs 3 and 4) having regard to local circumstances.
8. Limits set an upper bound on the amount of radioactive waste that an operator may discharge into the environment, but an operator must always seek to minimise discharges and their impact in day to day operations consistent with the use of "best available techniques".
9. In this document "site" means those activities and disposals regulated under a single permit, and the dose-based criteria for selecting radionuclides relate to the impacts from the discharges under that single permit. This is not the same definition of "single site" as used for dose constraints¹.
10. In this document "discharges" means discharges of gaseous and aqueous radioactive waste directly into the environment. "Disposal" has a wider meaning as defined in the regulations and covers "removal, deposit, destruction, discharge (whether into water or into air or into a sewer or drain) or burial" of radioactive waste. "Outlet" means any individual discharge point, eg a stack or a discharge pipeline to sea. We have used this term, rather than "plant" limits, because an outlet may combine discharges from a number of separate plants and a single plant may have several outlets.
11. For civil nuclear facilities, where it is proposed to make the discharge limits less restrictive, an Article 37 Euratom submission to the European Commission (EC) may be needed to address potential impacts on other European Union (EU) member states, and the EC opinion received before proposals are implemented and new or varied limits brought into effect. There is further information on the DECC website on [Euratom matters](#).

¹ The dose constraint for a "single site" applies to the aggregate exposure from a number of sources with contiguous boundaries at a single location, irrespective of whether different sources on the site are owned or operated by the same or by different organisations

2 The statutory guidance

12. The [Statutory Guidance to the Environment Agency concerning the regulation of radioactive discharges into the environment](#) sets out the framework for limit-setting. The relevant paragraphs in the statutory guidance are:

15. The Environment Agency should set discharge limits based on the use of BAT by holders of authorisations under the Radioactive Substances Act 1993.²

16. Limits should be set at the minimum levels necessary to permit “normal” operation or decommissioning of a facility.

17. In regulating the normal operation or decommissioning of a facility the Environment Agency should take into account the relevant operational fluctuations, trends and events that are expected to occur over the likely lifetime of the facility. Flexibility in setting discharge limits may also be necessary in those cases where other key Government objectives need to be met, for example the safe and timely decommissioning of redundant facilities; clean-up of the historic legacy of radioactive wastes; security of energy supply; maintaining Defence nuclear and non-nuclear capabilities, and the use of radionuclides in medicine.

21. Where a legally binding obligation requires stricter conditions and limits than those which would be required by the application of BAT then the Environment Agency should ensure that those stricter conditions and limits are applied.

22. Where the prospective dose to the most exposed group of members of the public from discharges from a site at its current discharge limits is below 10 $\mu\text{Sv}/\text{yr}$ the Environment Agency should not seek to reduce further the discharge limits that are in place, provided that the holder of the authorisation applies and continues to apply BAT³.

13. In accordance with paragraphs 15, 16 and 17 of the statutory guidance we will set limits based on the use of BAT to ensure that operators control discharges within the envelope associated with “normal operation” of the facility. “Normal operation” covers the “operational fluctuations, trends and events that are expected to occur over the lifetime of the facility”, such as start-up and shut down, maintenance, plant wash out and other expected operational variability. This does not include increased discharges arising from other events, inconsistent with the use of BAT, such as accidents, inadequate maintenance, inadequate operation, including inadequate training and supervision, etc. This

² The Statutory Guidance predates the replacement of RSA93 by the Environmental Protection Regulations (England and Wales) 2010

³ With a footnote to paragraph 22 of “This supersedes the “threshold for optimisation” of 20 $\mu\text{Sv}/\text{yr}$ set out at paragraph 73 of Cm 2919, Review of Radioactive Waste Management Policy – Final Conclusions, July 1995. It should be noted that the 10 $\mu\text{Sv}/\text{yr}$ figure is not a dose target, a dose limit, threshold or a radiation standard. Instead, it represents an appropriate level of dose, below which discharge limits should not be reduced further if the operator is continuing to apply BAT”

definition of “normal operation” is the same as in the Office for Nuclear Regulation [Safety Assessment Principles](#) and the IAEA [Safety Guide WS-G-2.3: Regulatory control of radioactive discharges to the environment](#).

14. What constitutes “normal operation” and the associated discharges are site-specific. Operators are therefore required when applying for a permit or variation to a permit to assess and identify disposals for “normal operation”, including:
- routine operation (that is, typically, the design basis or “flowsheet design” and is the minimum level of discharges);
 - start-up and shutdown;
 - maintenance and testing; and
 - infrequent but necessary aspects of operation, for example, plant wash-out; and the foreseeable deviations from planned operation (based on a fault analysis) consistent with the use of BAT, for example, occasional fuel pin failures in a reactor.

Operators are also required to support the estimates with performance data from similar facilities, or from past experience of their existing facility, and explain, where relevant, how changes or differences in design or operation affect the expected discharges and disposals.

15. This approach is illustrated in figure 1 taken from [IAEA-TECDOC-1638 “Setting Authorised Limits for Radioactive Discharges: Practical Issues to Consider](#).

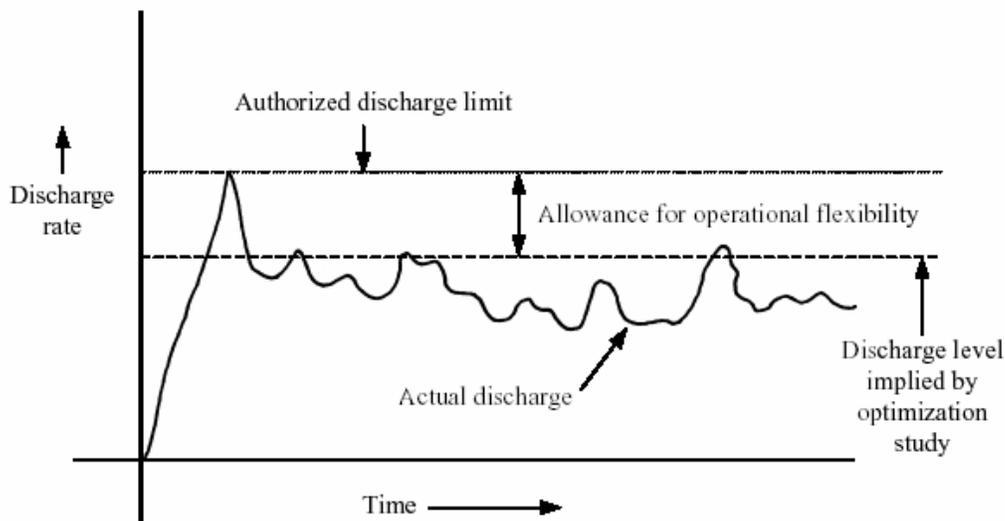


Figure 1: illustrative representation of the relationship between optimised and permitted discharge levels.

16. What constitutes normal operation and hence disposals will change over the lifetime of a site. We aim initially to set limits which cover the operational phase, as described in the application, including allowance for ageing and other specified changes. But the operator will need to seek revised limits wherever it is proposed to change the nature of operation, eg from operational to decommissioning, or where it is proposed to change current operations in a way which significantly affects discharges.

17. Paragraph 22 of the Statutory Guidance emphasises that the requirement to minimise discharges through the use of BAT applies at all times and explains that 10 $\mu\text{Sv}/\text{yr}$ is not a threshold, target or standard below which there is no need to reduce discharges and their impact, where it would otherwise represent BAT to do so. In this context we note the following paragraph [paragraph 5 and 1.6.1] from the [UK Strategy for Radioactive Discharges \(2009\)](#).

“The Government considers that the unnecessary introduction of radioactivity into the environment is undesirable, even at levels where the doses to both human and non-human species are low and, on the basis of current knowledge, are unlikely to cause harm.”

18. The progressive and substantial reduction in discharges is an outcome expected from the implementation of the UK Strategy for Radioactive Discharges. The intent of paragraph 22 is to ensure that there is no expectation that the environmental regulators must continue to implement discharge limit reductions solely for the purposes of the discharge strategy, where the total prospective dose from a site has dropped below 10 $\mu\text{Sv}/\text{yr}$.

3 Limit-setting

19. The process of limit setting consists of:
- 1) the applicant assesses discharges associated with normal operation supported by an assessment of BAT to control discharges;
 - 2) the applicant proposes annual site limits, or revisions to existing limits, based on the discharges estimated in step (1);
 - 3) we assess the operator's proposals and set annual site limits, limits on individual outlets and levels, as appropriate.

As noted in paragraph 11 if the operator has made an Article 37 submission we are unable to complete step 3 until we have received an opinion from the EC.

20. The guidance associated with the RSR application form part B3/C3 provides details of the information to be provided by operators in steps (1) and (2); this information is not repeated here. The rest of this chapter provides guidance to regulators on:

- identifying the radionuclides to be limited;
- determining the numerical values of the limits;
- setting levels;
- additional points for clarification.

This will also be of interest to operators when proposing annual site limits in their application.

21. Regulators should aim to set the minimum number of limits and levels consistent with ensuring adequate control of discharges and adequate monitoring of process performance. Regulators should also take into account the practicability and cost of monitoring when choosing the radionuclides to be limited. Radiological Monitoring Technical Guidance Note 1 provides guidance on monitoring.⁴
22. When setting limits regulators must ensure that the dose limit for members of the public will not be exceeded in respect of regulated activities. The dose limit (effective dose) is 1.0mSv/year as set out in Article 13 of the EU Basic Safety Standards Directive (BSSD) and Schedule 23, Part 4 of the Environmental Permitting (England and Wales) Regulations 2011.
23. Regulators must also have regard to the following maximum doses to individuals (dose constraint) which may result from a defined source, for use at the planning stage in radiological protection (Schedule 23, Part 4);
- 0.3 mSv/year from any source from which radioactive discharges are made;
or
 - 0.5 mSv/year from the discharges from any single site.

⁴ This is available on the SEPA website at http://www.sepa.org.uk/radioactive_substances/publications/guidance.aspx

24. The document “Principles for the Assessment of Prospective Public Doses arising from Authorised Discharges of Radioactive Waste to the Environment” provides principles and guidance for the prior assessment of doses to the public arising from exposure to ionising radiation which may arise from planned discharges to the atmosphere and to the aquatic environment.⁵
25. Examples of the approach to limit setting described in this document are contained in our Generic Design Assessment reports on new nuclear power stations, ie⁶:
- [gaseous radioactive waste disposal and limits](#);
 - [aqueous radioactive waste disposal and limits](#).

Identifying radionuclides to be limited

Site limits

26. We will normally set annual site limits for each radionuclide, or group of radionuclide(s), that, for normal operation:
- (a) are significant in terms of radiological impact on people (that is, the dose to the most exposed group at the proposed limit exceeds 1 μ Sv per year);
 - (b) are significant in terms of radiological impact on non-human species (this only needs to be considered where the impact on reference organisms from the discharges of all radionuclides at the proposed limits exceeds 40 μ Gy/hour);
 - (c) are significant in terms of the quantity of radioactivity discharged (that is, the discharge of a radionuclide exceeds 1 TBq per year);
 - (d) may contribute significantly to collective dose (this only needs to be considered where the collective dose truncated at 500 years from the discharges of all radionuclides at the proposed limits exceeds 1 man-sievert per year to any of the UK, European or World populations);
 - (e) are constrained under national or international agreements or is of concern internationally⁷;
 - (f) are indicators of plant performance, if not otherwise limited on the above criteria; and
 - (g) for the appropriate generic categories from the [RSR Pollution Inventory](#) (eg “alpha particulate” and “beta/gamma particulate” for discharges to air) to limit any radionuclides not otherwise covered by the limits set on the above criteria.⁸

⁵ This document is currently under review.

⁶ These assessments and limits relate to a generic design and generic assumptions not to any specific facility, site or locality.

⁷ We do not set limits to give effect to the targets in the [UK Strategy for Radioactive Discharges](#) (UKSDR) and we do not set limits for the substances reported under the UKSDR. These are reported via the RSR Pollution Inventory.

⁸ Where no limit is specified in the permit for any given radionuclide, discharges are in effect numerically unlimited although still controlled by the BAT conditions. The generic categories can be used to limit all radionuclides not otherwise limited in the permit.

The rationale for these criteria is set out in Annex A. Where none of criteria (a) – (f) is satisfied we may set site limits using only the appropriate generic categories.

27. For clarity, we expect to set site limits as above, regardless of whether the total prospective impact to people is above or below 10 $\mu\text{Sv}/\text{yr}$.
28. For the purposes of limit-setting, impacts will be assessed on a prospective basis for the total discharge of each radionuclide from a site at the limits proposed in the application⁹. We will use stage 2 of the Agency radiological assessment tool for the initial prospective source assessment to provide a consistent basis across the sector. Operators are required to provide assessments using this methodology in their applications. Operators will also need to undertake more detailed assessments, using site specific information in support of their application, as appropriate.
29. We will use the radionuclides and groupings contained in the [RSR Pollution Inventory reporting form](#) when we are deciding which radionuclides to limit. We will only use different radionuclides and groupings where it is reasonable and proportionate to do so.
30. Limits for performance monitoring purposes may be set for radionuclides whose discharges under normal operation do not meet any of criteria (a)-(e). See Annex A for more detail. For larger sites with several outlets contributing to the overall discharges, site-based limits for performance monitoring and control purposes may be ineffective. In that case regulators should consider setting limits (or notification levels) for this purpose on individual outlets.
31. Where there are several radionuclides with a common discharge profile, it will normally be appropriate to limit only one as a common indicator of performance.
32. Regulators should consider whether to use notification levels, which monitor performance normally over a three month period, as an alternative to annual limits (whether for the site or individual outlets) for performance monitoring and control purposes.

Individual outlet (“plant”) limits

33. Limits should be set on individual outlets as necessary to ensure that BAT is used to control discharges where, and to the extent that, the site limits do not do so. For example if a single outlet is the major, dominant source of a specific radionuclide from a site, setting both site limits and limits on that individual outlet may be unnecessary. On the other hand where there is a number of separate discharges of radionuclides, limits may be appropriate to monitor and control discharges from the principal individual sources and outlets. Subject to this point, limits on individual outlets may be set on the same basis as in paragraph 26.
34. For clarity, there is no expectation that limits are set for all individual outlets.

⁹ For the purposes of limit setting only, we consider the impacts arising from the proposed discharges, and disregard the impact from historical discharges [but the impact of past discharges should be taken into account in any comparison with the 1 mSv/y dose limit].

Determining the value of limits

35. We will normally set limits on a rolling 12 month period, based on discharges determined on a monthly basis. Limits on inputs to incinerators will normally be on a calendar year basis (see paragraph 50).
36. The pattern of discharges can vary greatly depending on the type of facility and its phase of operation. In some cases, discharges may result from continuous operation with relatively little change over time, in other cases discharges may only occur as a result of infrequent batch processes, batch disposals or infrequent and random events, e.g. nuclear fuel pin failures, such that the levels of discharges may be very variable. The same site may of course discharge radionuclides with differing patterns of discharges. For these reasons this document does not set any specific arithmetic rules for determining limits from the actual or predicted levels of discharges.
37. Limits should be based on the discharges achievable through the use of BAT during normal operation (see paragraph 13) and so include infrequent but necessary operations (eg plant wash-out) and foreseeable deviations from best operational conditions consistent with the use of BAT (eg occasional fuel pin failures in a reactor). Operators are required to provide this information, with a supporting justification that the techniques used are BAT, in their applications. Regulators will assess whether the information on discharges and limits provided by operators is consistent with the techniques used to control discharges and must apply their expertise and judgement in deriving limits, based on the specific characteristics of each facility and the information provided by the operator.
38. Limits as performance indicators should be based on the same basis, ie based on the levels of discharges expected during normal operation.
39. In setting limits, we must be satisfied that the operators can comply with the proposed limits without unduly affecting their ability to operate. Therefore, we must set limits which provide sufficient headroom for normal operation. For new facilities there may be considerable uncertainty about the data presented in the application, particularly when discharges are due in a large part to irregular events such as nuclear fuel pin failures, and hence limits for new plants will, in general, provide for greater headroom than operational plants where discharge data are available. We will review limits for new plants against operating data, when available.

Notification levels

40. We may set notification levels on radionuclides where we wish to be notified of significant short term changes in plant performance and process control as shown by the level of discharges **and** we require the operator to review the techniques used to control discharges (condition 4.3.7 of the permit template). These are typically quarterly notification levels.
41. We normally set radionuclide-specific quarterly notification levels (QNL) for the site based on:

- (a) the typical levels of discharges, excluding abnormal events, over a quarter; and
- (b) the level of increased discharges that indicates **significant** deterioration of plant performance and process control to the extent that it is necessary for the operator to review the techniques used.

For emphasis, we set QNLs based on the expected level of discharges associated with the use of BAT.

- 42. Wherever practicable, QNLs should be set at the site level only based on the most sensitive indicator of performance on-site. However, on larger and more complex sites with many discrete sources of discharges it may not be practicable to set a single site-wide QNL. In such cases we may set outlet based QNLs, as well as, or instead of, site-based QNLs.
- 43. There is no simple arithmetic relationship between the annual limits and the QNLs, as the latter need to take account of the pattern and variability of discharges on a quarterly basis. Expert judgement will be needed to set QNLs at the level necessary to achieve the correct balance between under-reporting and spurious reporting.
- 44. Exceeding the notification levels is not a breach of the permit conditions; in contrast failure to notify exceedance of a notification is a breach.

Short term releases: advisory levels and limits.

- 45. If a significant proportion of the permitted discharges is released in a short time period, this could lead to higher annual doses than those assessed assuming a uniform release rate. We may therefore set limits or advisory levels in relation to such short term discharges. There is further information on short term releases in Principles for the Assessment of Prospective Public Doses arising from Authorised Discharges of Radioactive Waste to the Environment¹⁰ and [NDAWG guidance note 6 \(Guidance on short term releases assessments\)](#)
- 46. The latter provides guidance on when and how to carry out short term release assessments. It should be noted that operators only need to undertake short term assessments under the circumstances specified in that guidance.
- 47. We will normally set Weekly Advisory Levels where a short term release assessment based on:
 - a single short term release of all radionuclides at the proposed 12-month limit; and
 - all other parameters as specified in Table 1 of NDAWG6 for a **cautious** short term release;

results in:

- a dose close to or exceeding the source constraint (0.3 mSv/y), taking into account other relevant contributions; or

¹⁰ This document is currently under review.

- a maximum permitted level in foodstuffs being exceeded.
48. We will normally set Weekly limits where a short term release assessment based on:
- a single short term release of all radionuclides at the proposed 12-month limit (unless the operator can demonstrate that this is not feasible, in which case more realistic release scenarios may be considered); and
 - all other parameters as specified in Table 1 of NDAWG6 for a **realistic** short term release;

results in a dose close to or exceeding the source constraint (0.3 mSv/y), taking into account other relevant contributions.

Additional points for clarification

49. We do not include any allowance for accidents in our limits but we do include allowance for discharges that arises from minor malfunctions, equipment and operator failures where BAT have been used to avoid their occurrence and the impacts are acceptable. We may set limits as indicators of performance on radionuclides whose discharges are small during normal operation and which may only have a significant impact during accident conditions.
50. The site limits will normally apply to all discharges from the site. However, in some permits discharges to air from on-site incinerators may be excluded from the site discharge limits to avoid the need to determine the partitioning of radionuclides in the incinerator. Where this is the case, limits shall be set on the radionuclide content of the waste fed to the incinerator, based on the types and quantities of waste that the operator has demonstrated are best disposed of by on-site incineration.
51. The permit will specify all discharge outlets to which the site limits apply, with the exception of “approved outlets”, these being outlets whose discharges in total are less than 5% of the site limits or any specific limits on “approved outlets” set in the permit. The site limits apply to these “approved” outlets; however, the outlets themselves are not specified in the permit but in the CEAR^{11, 12}.
52. For clarity, there is no provision in the permit for us to agree to changes to discharge limits, disposal outlets (other than “approved” outlets) or to transfer routes: all such changes must be made by variation of the permit following an application by the operator.
53. As set out in paragraph 17 of the Statutory Guidance we can, where necessary, increase existing limits or permit new disposals in support of a number of Government objectives, including decommissioning of legacy facilities and the operation of new nuclear power stations, providing that the operator uses to BAT to minimise discharges and their impact.

¹¹ CEAR means the “Compilation of Environment Agency Requirements”

¹² We do not now use the term major and minor outlets

54. It follows from the definition of normal operation that we do not set variable site limits to reflect changes in throughput or other changes, affecting discharges, within the envelope of normal operation. However it may exceptionally be appropriate to set throughput related limits on individual outlets to ensure greater regulatory control (via tighter limits) on specific plants.
55. Both annual limits and QNLs may be used for performance monitoring purposes but for different reasons. Annual limits may be set where discharges are normally small to ensure operators exercise adequate control over what might otherwise be regarded as trivial discharges. In contrast we use QNLs where we want operators to notify us of increased discharges which may indicate a failure to use BAT.

Annex A Rationale for criteria

56. This annex sets out the rationale for the criteria set out in paragraph 26 for deciding when to set site limits.
57. For individual radionuclides or a group of radionuclides criterion (a) is where the dose to the most exposed group at the proposed limit exceeds 1 $\mu\text{Sv/yr}$ as determined by the Agency's radiological assessment tool. We consider this the appropriate level of impact for an individual radionuclide (or group of radionuclides) recognising that there may in general be several, perhaps many, radionuclides contributing to the overall dose to the individual. This is also consistent with the reporting threshold in the RSR PI.
58. 40 $\mu\text{Gy/hour}$ is considered as a threshold below which there is no measurable effect on the environment.¹³ Where the impact for all discharges on a prospective basis at the proposed limits exceeds this value using the Environment Agency's radiological assessment tool (stage 2) then consideration should be given to set limits on the principal radionuclides contributing to that dose¹⁴. This is criterion (b).
59. The generic categories (eg "alpha particulate" and "beta/gamma particulate" for discharges to air) may potentially cover a wide range of (unspecified) radionuclides of varying radiological significance. We therefore seek to minimise the numerical value of limits applied to such categories by excluding numerically large discharges of low radiological impact, where these do not meet the 1 $\mu\text{Sv/yr}$ criteria. Therefore, criterion (c) is where discharges of a radionuclide exceed 1TBq over a 12 month period, if not limited on considerations of dose.
60. Criterion (d) is where the collective dose truncated at 500 years assessed for the UK, European or world population exceeds 1 man Sievert on the basis that the International Atomic Energy Agency (IAEA) considers practices giving rise to collective doses below this value may be exempted from regulatory control. Where criterion (d) is satisfied, consideration should be given to set limits on the principal radionuclides contributing to that dose.
61. Criterion (e) relates to discharges constrained under national or international agreements or is of concern internationally. However, it should be noted that:
- we do not set limits specifically for the discharges reported for the [UK Strategy for Radioactive Discharges](#) (UKSRD) (e.g. total alpha and beta) : although these may be limited for other reasons; and
 - such discharges are reported via the RSR Pollution Inventory for the purposes of the UKSRD.

¹³ Regulatory Guidance Series, No RSR 2: The regulation of radioactive substances activities on nuclear licensed sites provides a summary of research on the environmental impact of radiation.

¹⁴ Operators are required to assess the impact from their discharges only. We will also assess any "in combination" effects and we will use this "in combination" impact for comparison with 40 $\mu\text{Gy/hour}$ and limit-setting.

62. Under criterion (f) we may set limits (or notification levels) as indicators of performance, where limits have not been set based on the other criteria, i.e for discharges which do not satisfy criteria (a) – (d) but for which there is the potential for increased levels of discharges as a result of process deviations or maloperations, such as failure of abatement equipment. We will set limits, despite the expected low level of discharges, to ensure operators exercise adequate control over what might otherwise be regarded as trivial sources of discharges.
63. The determining factors in deciding whether to set such limits are:
- the potential for significantly increased discharges, under reasonably foreseeable fault conditions, such as involving a failure to use BAT, for example, the loss or poor performance of abatement equipment;¹⁵
 - there are no other limits in place (based on the other criteria) which serve that purpose.

For clarity, we are not setting limits for accidents nor do we require any risk assessment in relation to accidents. But we consider it appropriate to limit discharges, which are normally small, for performance monitoring purposes where there is potential for significantly increased discharges resulting from a failure to use BAT.

64. Criterion (g) reflects the fact that where the permit has not specified limits for individual radionuclides we may use the generic categories to limit all radionuclides not otherwise limited in the permit, where necessary. For clarity, it is not necessary to set such limits in all cases.

¹⁵ For clarity, consideration is restricted to those facilities, equipment, processes and outlets involved in the generation and disposal of radioactive waste under normal operation, as set out in the application and permit.