Environment Agency consultation: Variation to DRDL's Environmental Permit for the disposal of radioactive waste from Devonport Royal Dockyard

Response from Nuclear Information Service

1. Nuclear Information Service (NIS) is a not-for-profit, independent information service which works to promote public awareness and debate on nuclear weapons and related safety and environmental issues (see http://nuclearinfo.org for more information). Our research work is supported by funding from the Joseph Rowntree Charitable Trust.

2. Nuclear Information Service welcomes public consultation by the Environment Agency on the application to increase emissions of carbon 14 (C-14) from Devonport Dockyard by Devonport Royal Dockyard Ltd (DRDL) and is grateful for the opportunity to respond to this consultation.

3. We have a number of concerns about the application from DRDL.

4. The application proposes to increase the permitted annual limit for atmospheric discharges of C-14 from Devonport Dockyard from 43 to 66 Giga Becquerels – an increase of over 50%. Because of its relatively long half-life and disposition to organically bind to cell constituents, ionising radiation from C-14 can cause cell damage with corresponding impacts on human health, and the radiation dose commitment and the dose rate from C-14 are significant[1]. For this reason an increase in C-14 emissions into the environment is undesirable and should be avoided if possible.

5. Government policy on radioactive releases to the environment, outlined in the document 'UK Strategy for Radioactive Discharges' is to achieve “progressive and substantial reductions on radioactive discharges” and “progressive reductions in human exposures to ionising radiation ... as a result of planned reductions in discharges”. The unnecessary introduction of radioactivity into the environment is considered “undesirable” by government, “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”[2]. Although written principally to establish policy on radioactive discharges to the marine environment, this strategy document also relates to[3] and refers to radioactive emissions to the atmosphere as well as discharges to the aqueous environment. The proposal to increase C-14 discharges from Devonport Dockyard is contrary to national policy to reduce radioactive discharges as outlined in the strategy.

6. Statutory guidance to the Environment Agency on the implementation of the Strategy specifically states that, “In relation to its radioactive discharge functions, the

---

1 Pohl, R.O (1976): 'Nuclear energy: health impact of carbon-14'. Radiation and Environmental Biophysics, 13(4), pages 315-27. 23 December 1976.

2 Welsh Assembly Government, Department of the Environment, Scottish Government, and Department of Energy and Climate Change (2009): 'UK Strategy for Radioactive Discharges', July 2009. Paragraph 4, pages vi-vii.

3 Welsh Assembly Government, Department of the Environment, Scottish Government, and Department of Energy and Climate Change (2009): 'UK Strategy for Radioactive Discharges', July 2009. Paragraph 1, page vi.

Environment Agency should base its regulatory decisions on applying the environmental principles set out in the 2009 UK Strategy". One of the principles specifically cited is "the preferred use of 'concentrate and contain' in the management of radioactive waste over 'dilute and disperse'"[4].

7. Given that the proposed application from DRDL seeks to increase C-14 emissions for the purposes of dilution and dispersion, Nuclear Information Service concludes that the Environment Agency would not be able to consent to this application without breaching government policy and statutory guidance.

8. The application does not appear to have adequately considered alternatives to an increase in C-14 emissions, or the use of best available technology to contain and concentrate C-14 as an alternative to discharge.

    - The application states that "Whilst the presence of nitrogen can be minimised by careful chemistry control it is not considered reasonably practicable to eliminate. Consequently, the ^{14}C inventory within the NSRP is pre-determined and its formation cannot be precluded"[5]. The first sentence here is confusing, and it is not clear whether it relates to C-14 or whether the word 'nitrogen' has inadvertently been substituted for 'carbon'. No justification is given to explain why it would not be practical to eliminate C-14 by chemical control.

    - The possibility of retaining C-14 in a liquid form and storing this over an interim period pending further treatment or conversion to a solid form in future, rather than discharging to the environment, does not appear to have been considered by DRDL.

    - The application asserts that "Converting the gaseous ^{14}C into a stable solid waste form within the confines of the existing process would require fundamental modifications to the existing plant and is not considered reasonably practicable"[6], but does not explain why this would not be practicable, nor why modification to or replacement of plant could not be undertaken using best available technology.

    - The application concedes that abatement technology such as the use of wet scrubbers or molecular sieves could be used to capture gaseous carbon dioxide. This would allow C-14 to be converted into a solid form suitable for containment and concentration. The reasons presented for rejecting such options are not related to whether they represent best available technology, but to cost factors.

10. We consider that, as it stands, the application provides an inadequate justification for the proposed increase in discharges. It appears that viable alternatives to the atmospheric discharge of C-14 may be possible, but have been rejected by DRDL on the grounds of cost or other factors. If it is possible to contain and concentrate C-14 using best available technology, such approaches should be considered preferable to

4 Department of Energy and Climate Change and Welsh Assembly Government (2009): 'Statutory Guidance to the Environment Agency concerning the regulation of radioactive discharges into the environment'. Paragraph 11, page 9.

5 Devonport Royal Dockyard Ltd (2016): 'Environment Agency Submission: Application for a variation to DRDL's Environmental Permit for the disposal of radioactive waste from Devonport Royal Dockyard'. Devonport Royal Dockyard Ltd, April 2016. Page 22.

6 Devonport Royal Dockyard Ltd (2016): 'Environment Agency Submission: Application for a variation to DRDL's Environmental Permit for the disposal of radioactive waste from Devonport Royal Dockyard'. Devonport Royal Dockyard Ltd, April 2016. Page 23.

discharge to the environment, and the Environment Agency should require DRDL to investigate the practicability of such options further.

11. As a further alternative to increasing discharge limits, work on the deep maintenance period (refuel) for HMS Vanguard could be extended over a longer period of time in order to comply with existing annual and quarterly discharge limits,

12. Although the application claims that the outcome of the proposed variation to the DRDL environmental permit would indirectly serve to reduce dose rates to dockyard workers and submarine personnel as a result of primary circuit decontamination, the variation would result in an overall increase in dose to members of the public as a result of release into an urban environment (and also to non-radiation workers within the Devonport Dockyard). Unlike dockyard workers and submarine personnel, members of the public have no stake in and receive no clear benefit as a result of the submarine refit process, yet would face an increased risk as a result of the discharges.

13. We note that DRDL has apparently exceeded the quarterly notification level for gaseous C-14 during primary circuit decontamination during the refit of HMS Vigilant[7], and wish to register our concern that action to prevent a repetition of this occurrence does not appear to have been taken by DRDL.

14. DRDL may argue that, because the proposed increase in emissions is the result of defence-related activity undertaken under contract on behalf of the Ministry of Defence, it should be considered as subject to a 'defence imperative' and thus override certain aspects of policy relating to radiation and the environment. However, the application has been submitted by a civilian company subject to the civilian permitting regime, rather than the Ministry of Defence itself. Defence exempt activities at Devonport, subject to authorisation by the Defence Nuclear Safety Regulator rather than the Environment Agency, are conducted by the Commanding Officer of HM Naval Base Devonport and not DRDL, whereas the deep maintenance period (refuel) for HMS Vanguard is under the control of DRDL and subject to regulation by the Environment Agency. Any suggestion that the increase in discharge limits is necessary in the interests of defence and national security should therefore be rejected.

15. For these reasons presented above Nuclear Information Service objects to this application, and considers that the Environment Agency should not authorise an increase in C-14 emission limits from Devonport Dockyard.

16. If, however, the Agency does decide to allow an increase in emission limits, this increase should only be permitted under strict conditions:

    - The increase should be a strictly one-off, temporary, time-limited increase limited to the relevant phase of primary circuit decontamination during the current deep maintenance period (refuel) for HMS Vanguard. It should not represent a long-term increase covering future submarine refits.

    - DRDL should be required to reduce dose rates to the public resulting from other aspects of their operations as compensation for the proposed increase.

---

7 Devonport Royal Dockyard Ltd (2016): 'Environment Agency Submission: Application for a variation to DRDL's Environmental Permit for the disposal of radioactive waste from Devonport Royal Dockyard'. Devonport Royal Dockyard Ltd, April 2016. Page 12.

- DRDL should be required in the longer term to invest in the necessary technology to capture gaseous C-14 and employ such technology to reduce emissions during future submarine refits.

- C-14 emissions from the dockyard should be controlled to ensure that they are only permitted during appropriate weather and atmospheric conditions which will minimise the impact that they have on the Plymouth urban population. To ensure that C-14 is not distributed over populated areas the environmental permit should only allow C-14 emissions to take place when wind is blowing away from the Plymouth urban population and towards the sea, and in the absence of rain, precipitation, or mist.

Responding organisation: Nuclear Information Service
Contact person: Peter Burt
Email address: peter@nuclearinfo.org

We consent to publication of this submission by the Environment Agency, although we request that personal details and email addresses are redacted from the published version.

Sent to: DevonCornwallEnquiries@environment-agency.gov.uk