Regulating discharges from Bradwell Power Station

Our decision to issue the permit variations

March 2017

Background

We have reached our decision to make changes to Magnox's Environmental Permits for their decommissioning operations at the nuclear power station at Bradwell in Essex, following requests for changes from Magnox. The changes requested included:

- An extension to continue discharging liquid effluent, from the fuel element debris treatment process (FED), into the estuary
- An option to switch the existing discharges to a new outfall structure in case the existing outfall becomes blocked by build up of silt
- Radioactive Substances application to allow the switch to the new outfall structure when necessary

Our decision

We are issuing three updated permits to Magnox, which include the changes made to the permits. These updated permits are available via the GOV.UK website along with decision documents that outline how we reached our decisions.

We have taken account of comments we received from stakeholders and interested parties, in reaching our decision, including those we received during the most recent public consultation period, which ran from 20 October – 15 December 2016.

Summary of our position

We are confident that the controls and requirements contained in the Environmental Permits provide a robust and rigorous basis for ensuring the appropriate protection of the environment and public health from discharges is maintained, whilst allowing ongoing decommissioning activities to continue at the Bradwell site.

- We have undertaken our permitting activities in accordance with our published processes.

- There is no legal requirement to consider the 'justification' of FED treatment separately as it forms part of decommissioning activities. However we are content that the permitted activity is suitably 'justified' as part of the justification of the existing practice of Magnox nuclear power station.

- We required the operator to undertake full radiological and non-radiological assessments of impacts on the Blackwater estuary, taking account of the implications for both human and non-human receptors. Although these assessments used conservative assumptions, they, together with some supplementary assessment work of our own (for the non-radiological components) indicated that potential impact to the environment and human health from discharges would be low or negligible and will not cause any unacceptable impacts.

- Discharges made under the permits will remain subject to detailed monitoring requirements. The monitoring of discharges and of the estuary to date provides us with further confidence that the environment is adequately protected.

- We continue to regulate the site and scrutinise their arrangements for compliance with regulatory requirements. One of the permit requirements is for Magnox to continue to optimise the management of its wastes and discharges. In accordance with this requirement, Magnox is also utilising an alternative disposal route for the lower activity component of FED waste, which comprise around half of all these wastes.

- We are content that treatment using FED dissolution remains the Best Available Technique for the management of the residual inventory in the absence of any other disposal route being available, avoiding prolonged storage of such wastes at the surface pending geological disposal, and resulting in disposals to the environment that have an acceptable impact well below any significance thresholds.

- While we were considering the requests for changes to the permit we adopted an enforcement position to allow treatment of FED and discharges to continue in accordance with appropriate controls. Our enforcement decision allowed the site operator to progress its decommissioning programme, helping reduce the overall hazard and risk at the site. The requirement for a new application led to a further assessment of the potential impact of discharges which again re-iterated that both radiological and non-radiological impacts upon the environment would be acceptable.

- We have consulted and liaised with partner organisations including Natural England and Office for Nuclear Regulation to ensure they remain content with our approach.

Frequently asked questions

What is FED dissolution?

This is a process used to treat the parts of the fuel cladding (known as fuel element debris or FED) that has been stripped off used nuclear fuel during refuelling and defueling operations. The treatment of FED includes dissolving it in acid and then treating the solution to take out heavy metals and radionuclides. The remaining effluent is monitored before it can be discharged and can only contain residual contamination at very low levels.

What is the justification for FED dissolution?

There is no legal requirement to consider the justification of the treatment of FED at Bradwell separately as it is part of the sites decommissioning activities. This is because, for justification purposes, waste management and disposal operations are considered to be an inevitable consequence of the original practice generating the waste and that it is inappropriate to regard them as a free-standing practices requiring their own justification. This is an internationally accepted approach and is set out in government guidance on the justification of practices: https://www.gov.uk/government/publications/the-justification-of-practices-involving-ionising-radiation-regulations-2004-guidance-on-their-application-and-administration

The operation of Bradwell and all other Magnox power stations started before the introduction of the UK regulations and is considered as an ‘existing class or type of practice’.

FED treatment using acid dissolution has been assessed in 2006 to be the Best Practicable Environmental Option at Bradwell.

What is the impact of discharges from FED dissolution upon the estuary?

Prior to permitting any discharge to the environment we required Magnox to undertake specific assessments of the potential radiological and non-radiological impacts upon the local Blackwater estuary, taking into account the local sensitivities of the environment. We subsequently did further assessment work of our own which included the sensitivities of the Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone and other designated conservation areas in the vicinity.

We were satisfied that the assessments demonstrated that the proposed discharges from FED dissolution would not have an unacceptable radiological or non-radiological impact on the local environment (including the native oyster populations). On that basis we were content to grant the permit.

Has the operator been allowed to discharge beyond a time-limit within the permit?

Some stakeholders have suggested that the discharge to the environment has been allowed to continue beyond a time-limit stipulated in their original permit.

The original FED (non-Radioactive Substances Regulations (RSR)) permit did include a 12 month time-limit for the discharge ‘activity’. However issues associated with the plant’s reliability meant that FED dissolution was taking significantly longer than originally anticipated. This meant that the operator was unable to complete the campaign within the time-limit.

When the one-year discharge time-limit came to an end we decided not to enforce the time-limit for the 'activity' conditional on Magnox making a permit application to vary it. We stipulated an application was necessary in order for us to undertake a full determination with appropriate consultation.

Such an application took longer than expected, owing to the operator's concerns about the potential need to establish a new discharge pipe (owing to silt build up in the existing route). An application was subsequently received on 24 July 2015 and there followed a period of time when the application was advertised to the public. It was soon declared to be of high public interest and therefore our determination timescales were no longer governed by Penfold requirements. An initial request to extend the determination timeframe was made on 17 November 2015 for an extension until 1 February 2016. Subsequent extensions to the determination period were agreed with Magnox during the period we were reaching our decisions.

What implication would a revised discharge route have?

Existing discharge arrangements result in a 50 fold pre-dilution factor of the treated FED treatment effluent. The revised discharge route is designed for lower volumes of liquid waste discharges, reflecting the current demands of the Bradwell site during its decommissioning.

The estuary has several habitat designations including SSSI, SPA, SAC, RAMSAR, and the Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone which was designated in November 2013 nearly two years after the original FED permit was issued.

In order to consider the potential impact of the revised permits we required Magnox to include in their application for varied permits an assessment of the dispersion characteristics and impacts of discharges made via the revised discharge route on the receiving environment.

> ***Non-radioactive impact:*** The key features of concern in this assessment related to the nitrate and metal inputs to the estuary. The position taken by our National Permitting Service is that there is no risk of any significant adverse effects on any of the sensitivities of the receiving estuary outside a very small mixing zone around the outlet.
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> ***Radioactive impact:*** The radiological assessment also indicates that any impact on the estuary will be negligible.

Specific issues of interest

Issue raised	Environment Agency position
The estuary is a sensitive habitat for native oysters and holds the designation as a Marine Conservation Zone (MCZ). Oyster beds are present in close proximity (reported by locals to be directly underneath) to the discharge pipe.	We are satisfied that there will not be any unacceptable environmental impact to oysters from the radioactive discharges. Our radiological assessment indicated that even if radioactive discharges were made at the level set by the limits specified in the permit, the potential impact (to all wildlife groups) would be well below the significance threshold. For the non-radioactive components of the effluent we are satisfied that there will be no significant adverse effects from these on native oysters, or their habitat, outside the very limited (100 metre) mixing zone. Responses from the oystermen associations confirms that there are no harvesting areas within the mixing zone.
The time limitation in the water discharge permits have been exceeded which makes the permit null and void. This means Magnox are operating illegally.	Under the terms of a notice we issued to Magnox, all the conditions of the previous permit (which protect the environment) have been legally enforceable whilst we have been determining the variation. Only the time-limit for the 'activity' had expired. All the other conditions remained live. The reason for the delay was due to plant reliability and so an extended timeframe for operations became necessary. We required Magnox to make an application for varying the time-limit on FED operations so that we could undertake a full determination and consultation process.
The process of FED treatment is not justified as required by Justification of Practices Involving Ionising Radiation Regulations, 2004.	We are confident that there is not a need to consider the justification of treatment of FED at Bradwell. This is because, for justification purposes, waste management and disposal operations are considered to be an inevitable consequence of the original practice generating the waste and that it is inappropriate to regard them as a free-standing practices requiring their own justification. This is an internationally accepted approach and is set out in government guidance on the justification of practices.
Accumulation of radioactivity in the estuary	Recent assessment of the potential impact to members of the public was published in the Radioactivity in Food and the Environment (RIFE) report 2014.This indicates the radiological impact was less than 5 microsieverts, which corresponds to less than 0.5% of the relevant dose limit for members of the public (or less than 0.2% of the average dose to members of the UK population from all sources of radiation).