Environment Agency Permitting Draft Decision: RSR Permits

Applicant Name
Magnox Limited

Reference Number
EPR/ZP3493SQ/V005

Record of decision

This document sets out our draft decision, for comment. We will take account of any comments received on our draft decision, before we make any changes to the permit. Throughout this document we have used the terms, 'decision', 'grant' or 'vary', these refer to our draft decision only and are intended to improve clarity. These references, however, should not be taken to imply our final decision.

We have decided to grant the application to vary the permit by Magnox Limited at Bradwell Site, Bradwell-on-Sea, Southminster, Essex.

The decision is effective from [date tbc].

We consider in reaching this decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure the appropriate level of protection of people and the environment.

These considerations are set out in

- DECC RSR Guidance
- RGN RSR1 RSR Environmental principles
- RGN RSR2 The regulation of radioactive substances activities on nuclear licensed sites
- and the documents referenced from those documents

Purpose of this document

This decision document sets out the reasons for our decision.

Glossary of terms used in this document

Term	Meaning
ADAP	Active Discharge Abatement Plant: A facility operating at Bradwell site whose purpose is to treat radioactive liquid waste from the Fuel Element Debris Dissolution plant in order to render it suitable to discharge into the environment.
ALARA	As Low as Reasonably Achievable (economic and social factors being taken into account). Radiation doses comply with ALARA when they have been reduced to a level that represents a balance between dose and other factors (including economics). This is a statement of the optimisation principle.
BAT	Best Available Techniques - the latest stage of development (state of the art) of processes, of facilities or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste. In determining whether a set of processes, facilities and methods of operation constitute the best available techniques in general or individual cases, special consideration shall be given to: a) comparable processes, facilities or methods of operation which have recently been successfully tried out; b) technological advances and changes in scientific knowledge and understanding; c) the economic feasibility of such techniques; d) time limits for installation in both new and existing plants; e) the nature and volume of the discharges and emissions concerned.
Care and Maintenance	A period of quiescence in which a nuclear site is kept in a passively safe and secure state, requiring minimal inspection and maintenance, for a great number of years
EPR	Environmental Permitting (England and Wales) Regulations 2010
FED	Fuel Element Debris: A general term used to describe the material produced from the process whereby the protective cladding from the spent uranium fuel, historically used to power Magnox reactors, is removed.
FSA	Food Standards Agency.
Justification	The benefits and detriments of any practice which could result in exposure to ionising radiation must by assessed prior to the practice being permitted. If the benefits outweigh the detriments, the practice is justified.
OSPAR	Oslo and Paris Convention for the protection of the marine environment in the north-east Atlantic. The UK is a signatory to this Convention, whose strategies aim to prevent pollution of the maritime environment by continuously reducing discharges, emissions and losses of chemically hazardous substances and radioactive substances.
RSR	Radioactive Substances Regulation, which is part of the Environmental Permitting Regulations
Water Discharge permit	A permit issued by the Environment Agency under the EPR. Water Discharge permits are required for specified activities, including for the discharge of non-radioactive sewage or effluents from industrial processes to watercourses, estuaries or to the sea.

Part 1 Permits and variations for the accumulation and disposal of radioactive waste.

Introduction describing the application.

This application concerns a request from Magnox Limited (Magnox), the permit holder, to allow modifications to the discharge system, which include two replacement radioactive aqueous waste discharge pipelines that have been constructed within the existing outfall structure. Therefore, the discharges will still be made to the Blackwater Estuary at the same place. The new discharge system has been designed so that it is more suitable for the management of low volumes of radioactive liquid waste arising from the on-going decommissioning activities at Bradwell Site. This system will no longer require abstractions to be made from the Estuary to ensure the effluent is effectively discharged as required by the existing discharge system. These arrangements will replace the current arrangements for discharge through the two existing radioactive waste discharge points currently authorised under environmental permit EPR/ZP3493SQ. If the new routes are permitted, Magnox will be able to switch over to the new systems, at the point it is no longer able to continue using the existing discharge system and this will no longer be used for making discharges.

Magnox also requested minor administrative changes to the permit to combine a number of approved gaseous radioactive waste discharge outlets and to remove other gaseous waste outlets that are now redundant.

The replacement discharge system comprises two new discharge pipelines for radioactive aqueous waste that have been installed by Magnox to take effluent directly from the Final Monitoring and Delay Tank (FMDT) and the Main Drains Pit, to allow discharge directly to the Blackwater Estuary. The current system is routed through the East Cooling Water Outfall. Utilising this route requires the pumping of the effluent via the Alternative Effluent Pumping System (AEPS). Magnox wishes to remove these pumps as part of its aim to minimise the complexity of discharge systems and reduce the frequency of maintenance activities.

However, the movement of silt in the Blackwater Estuary has been observed by Magnox to be impacting upon the inlet and outlet culverts, which allow the flow of water to aid dispersion of effluent from the Final Monitoring and Delay Tank and Main Drains Pit. Magnox is concerned that one or both of the culverts will become blocked prior to the site's entry into Care and Maintenance.

The use of the two additional discharge lines, which have already been installed, will therefore allow Magnox to maintain capability to discharge radioactive aqueous waste in the event that the existing discharge lines become blocked.

The changes requested to the gaseous radioactive waste discharge routes reflect the ongoing decommissioning of the Bradwell site and the associated de-planting or demolition of some facilities. This has resulted in a number of outlets being either no longer present or no longer used. Magnox has therefore applied to remove a number of redundant gaseous waste outlets and to combine a number of existing approved outlets under the permit.

Justification and Euratom Article 37 (RSR Part A Q9, RSR Part B3 Q2b)

The practice is justified as *3. Generation of electricity by nuclear reactors*[1]I.

An Article 37 submission is not required for this application.

Consultation

Magnox has not applied to increase the amount of radioactivity that it is authorised to discharge from Bradwell Site. We consider this application to be for a minor change to the permit. We do not normally consult formally on either the application or our decision for such minor changes.

However, in this case, we notified individuals and groups, who we thought might be interested that we received a request for changes to be made to the RSR permit (applications for variation). We also separately consulted on applications we received for changes to the permits covering the non-radioactive properties of the liquid discharges. A small number of the representations we received related to the radioactive properties of the liquid discharge. We have therefore considered the representations received from members of the public and interested parties insofar as these are relevant to our decision for the RSR permit.

Annex 1 summarises the consultation responses and how we have taken these into account in reaching our decision.

In addition, before we make any changes to the permit we are issuing our draft decision in the form of this decision document along with the draft permit to make these available for comment.

Operator and Operator competence (RSR Part A Q10)

We are satisfied that the applicant is the person who will have control over the operation of the facility after the grant of the permit. We have assessed the applicant's competence against the guidance on management arrangements. We have not identified any reasons indicating that Magnox is unable to operate in accordance with the permit.

Disposal of Radioactive Waste, disposal routes and limits (RSR Part B3, Q3, 4a, 4b)

Our document "Criteria for setting limits on the discharge of radioactive waste from nuclear sites" details our methodology for setting limits.

(a)

[1]See Department of Energy and Climate Change (DECC) guidance on the application and administration of the Justification of Practices Involving Ionising Radiation Radiations Regulations 2004, Annex 2.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/432763/JoPIIRR_guidance.pdf

Gaseous Waste
We have considered the proposals in relation to the changes to the radioactive gaseous waste discharge outlets. We have made changes to the specified gaseous discharge outlets listed in the permit to allow more effective and efficient reporting of discharges of radioactive gaseous waste to the environment.

There are no changes to the limits on gaseous radioactive waste in the permit and there will not be any changes to the gaseous discharge profile for the site as a result of these administrative changes.

Aqueous Waste
Criteria for setting limits have not been reviewed as part of the proposals in relation to the changes to the radioactive aqueous waste discharge route. We have not changed any limits or notification levels for the radioactive aqueous waste discharge outlets. Magnox is still required to ensure that the Best Available Techniques (BAT) are used at the site to ensure that the generation of radioactive waste is minimised; the impact of the discharges is suitably mitigated; and to ensure that there are adequate arrangements to monitor discharges and to demonstrate that radioactive waste disposals are in line with regulatory and Government Policy requirements.

We considered information supplied by Magnox in support of its application to demonstrate how the proposed changes to the radioactive aqueous waste discharge arrangements represent BAT (Reference 2 and Reference 6).

In particular, the BAT report (Reference 6) highlighted several issues with maintaining the existing discharge route, including: risks from de-silting operations on native oyster populations; operational restrictions on de-silting operations; costs and hazards arising from de-silting operations; and the likelihood of their success.

We are satisfied that the proposed changes to the aqueous waste discharge management arrangements will not give rise to any unacceptable environmental impacts and will allow Magnox to continue to apply BAT to minimise the radioactivity in the discharges, in accordance with the requirements of the permit.

We are equally satisfied that both the current and the proposed arrangements for the management and control of radioactive aqueous waste discharges are compatible with the requirement to apply BAT.

Representations received on the permit variation application included suggestions for us to consider alternative radioactive aqueous waste management options, including the use of settlement tanks and disposal at sea by tanker.

We do not consider the evidence is available to support the conclusion that either of these suggestions would constitute BAT. Settlement tanks are generally only helpful for treatment of aqueous wastes with a significant particulate component. In this case, the radioactive aqueous waste is treated at ADAP prior to discharge, which effectively removes particulate from the effluent to below the corresponding standard for drinking water. Transfer of radioactive aqeous waste for disposal at sea by boat is not considered a viable waste disposal option, as it would be impractical, and prohibitively expensive, as well as not being permissible under international agreements, e.g OSPAR.

Further information on how we have taken account of representations received is included in Annex 1.

Specified solid waste transfers to other premises
Magnox's application does not include any proposals to the way that solid waste is managed at the site, nor to the specified disposal routes. These remain subject to the application of BAT to ensure the minimisation of the creation of waste, including the activity in the waste and the volume of waste generated. We have not considered this as part of our decision.

Monitoring (RSR Part B3 Q5)

Magnox is not proposing to alter its existing arrangements for monitoring discharges of gaseous and aqueous radioactive waste.

However, Magnox has proposed adding new radiological environmental monitoring to its programme around Bradwell Site when it uses the new discharge system for radioactive aqueous waste. This will involve additional weekly sampling of silt from a location near to the outfall pipe for the discharge lines for a period of 3-6 months to validate its modelling of the dispersion characteristics of the new discharge system.

We are satisfied that Magnox's environmental monitoring programme represents BAT and remains consistent with the joint Technical Guidance Note 2 on Environmental Radiological Monitoring (Reference 16).

In addition to Magnox's environmental monitoring programme we, along with the Food Standards Agency (FSA), carry out independent environmental monitoring around Bradwell Site. This information is made available to the public by the annual Radioactivity in Food and the Environment (RIFE) Report (Reference 14). We also make this information available to the public and interested parties through a web portal.

Radiological Assessment (RSR Part B3 Q6)

Magnox has assessed the potential impact of radioactive aqueous waste discharges to the most exposed members of the public (Reference 6). The identified potential impact over a year remains the same whether discharges are made from the old or from the new discharge system.

In addition, Magnox considered the potential impact to a swimmer/water user in the Blackwater Esturary during the period of a discharge.

Magnox's assessment indicated that the potential radiological impact remained below the legal dose limit and relevant dose constraint for members of the public.

Magnox's proposed changes to the radioactive aqueous waste discharge system at Bradwell Site will result in reduced dilution of the radioactive aqueous waste prior to it being discharged. When we originally granted the permit, we carried out an independent assessment of the potential impact of radioactive liquid waste discharges to the most exposed members of the public. Our original assessment did not assume dilution of the effluent, either prior to or at the point of discharge and therefore remains valid for our determination of this application.

Our assessments include consideration of the potential impact on non-human species. The assessments indicate that these potential impacts remain well below

the relevant levels of radiological significance agreed internationally and so remain valid.

We have taken account of the conservation advice provided by Natural England in relation to delivery of the conservation objectives for the Blackwater Estuary Marine Conservation Zone (Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone (MCZ) – Supplementary Advice on Conserving and Restoring Site Features) (reference 17) and are satisfied that this application is consistent with the advice received.

We are satisfied also that there remains no significant adverse impact on a European Site; Site of Special Scientific Interest; Area of Outstanding Natural Beauty or other conservation site.

Receipt of waste (RSR Part B3 Q7)

No new considerations for this application.

Non-radiological issues

The changes Magnox has requested to their arrangements for management of aqueous radioactive waste discharges are also subject to changes being made to the EPR permits covering the non-radiological properties of the liquid discharge (Water Discharge Permits). These changes have been considered separately, in parallel. Although the permitting decisions are separate, Magnox will only be able to change its arrangements for managing the liquid discharges if all the permits allow this. Therefore, we have reached our decision in conjunction with colleagues considering changes to the other permits. For simplicity and transparency we have also provided joint updates to interested parties, and we are making our draft decisions available for comment at the same time.

Other-including any special points considered.

We acknowledge that a significant number of representations have been received during the consultation on the separate application from Magnox to vary the non-RSR environmental permits relating to the discharge of treated effluent from FED dissolution at Bradwell Site. A small number of these representations expressed concern in relation to the disposal of radioactive waste and included a number of specific questions. Insofar as these are relevant, we have considered these points in reaching our draft decision and we have summarised this in Annex 1.

Our Operational Instruction 247_10 sets out our process for determining environmental permit applications for radioactive substances activities on nuclear sites and sets out the expectations on us during consultation on permit applications.

We will consider all questions received during the consultation phase but will not seek to provide answers to respondents' specific questions on the grounds of maintaining procedural fairness during the written consultation process. We may, however, address a consultee's question in our decision document.

As a result of this application we have implemented some minor changes to the permit to reflect minor modifications to the standard permit conditions for nuclear licensed sites.

Decision

We conclude that that Magnox Limited can operate in accordance with the permit conditions to meet statutory requirements and the requirements of Government policy. We therefore grant the application, subject to the conditions of the permit.

Annex 1: Summary of representations received

When we advertised the applications for the Water Discharge permits variation applications (references: EPR/DP3127XB/V002 and PR2TSE10760/V003), we took the opportunity to notify interested parties that we had received an application for variation of the RSR permit at Bradwell Site.

We received a significant number of representations for the Water Discharge permits variation applications. A small number of the comments we received related to matters also relevant to radioactive waste discharges and the impact of these discharges on the environment. Due to the high level of public interest in the permit applications we decided to consult the public on our draft decision and draft permit for the RSR permit variation application as well.

We have summarised in this Annexe how we have taken the responses into account in reaching our decision. Copies of all consultation responses have been placed on the Environment Agency public register, except where the person making the response asked for these not to be made public.

We received 44 responses. These are summarised below, together with our consideration of them.

Topic: Optimisation in the management and disposal of radioactive waste	
Summary of issues raised	**Our consideration of the issues**
A number of respondents have expressed the view that the operational performance of the FED treatment plant at Bradwell Site has been sub-optimal and/or that the treatment of FED at Bradwell Site does not represent BAT. **Raised by:** PR5, PR5a, PR7, PR9, PR10, PR15, PR16, PR17, PR19, PR21, PR22, PR25, PR26, PR29, PR30, PR34, PR35, PR36, PR38 PR39, PR40, PR41, PR42, PR44	In 2006 Magnox identified that its preferred approach for the management of FED at Bradwell Site was to treat it on-site by a process of dissolution and abatement to remove radioactivity from the discharge. In 2011 Magnox applied to us for changes to its RSR permit to allow them to carry out the FED treatment process. As part of our determination we considered the technical justification provided by the operator and accepted that Magnox's decision for the treatment of FED could be pursued provided Magnox applied BAT to minimise the levels of radioactivity in the discharges and ensure that the radiological impact to members of the public was kept ALARA. The application included a request to increase the limits for gaseous discharges for H-3 and C-14. Therefore, in accordance with Article 37 of the Euratom Treaty, on 12 March 2012 the UK Government submitted a modified plan for the disposal of radioactive waste arising from the decommissioning of the Bradwell Site, including general data on the radiological impact to members of the public in other European member states from discharges associated with the FED treatment. We only granted the permit, in June

	2012, after the European Commission had provided its opinion that the planned modification would not give rise to doses to the population in another Member State that would be significant from the point of view of health. The current changes requested by Magnox do not include any requests to change the nature or magnitude of their discharges (i.e. the limits in the permit). Hence, our original assessments of potential environmental impacts from discharges remain valid (see also comments under 'Radiological Assessment: Impact on non-human species and our conservation duties'). It took Magnox longer than originally anticipated to bring the FED treatment plant on line and the treatment of FED at site did not start until June 2014. Magnox has had operational difficulties with the FED treatment plant and has not been able to achieve the desired level of throughput. However, the environmental performance of the FED treatment process (abatement to reduce the levels of radioactivity in the discharge) has remained consistent with our regulatory expectations. We are satisfied that the treatment of FED is compatible with the requirement to apply BAT to ensure that radioactivity in the discharges is kept ALARA. The levels of radioactivity in the discharges remain well within the limits set in the environmental permit (less than 1% of the annual limits). This does not mean an alternative approach could not equally be demonstrated to be compatible with the requirement to apply BAT. We recognise that a number of other possible approaches to the management of the FED waste could be equally acceptable from an environmental perspective.
Some respondents have stated their opposition to any proposals that might be made for the future importation of FED from other nuclear sites for dissolution at Bradwell Site. **Raised by:** PR9, PR10, PR13, PR15, PR16, PR17, PR19, PR25, PR26, PR30, PR34, PR35, PR36, PR38, PR39	It is a requirement of the environmental permit that transfers of radioactive waste between sites can only be made via an optimised disposal route. In addition, the possible future importation of FED to Bradwell Site from other nuclear sites might require planning approval. The conditions of the RSR permit do not prevent Magnox from disposing of FED that has come from other nuclear sites at Bradwell Site. We are not aware of any such proposals from Magnox and do not see this as a likely priority for Magnox in the future, as this would further extend

	the Bradwell decommissioning programme and delay the site's entry to Care and Maintenance. However, if Magnox's plans were to change we would consider such proposals on the basis of the evidence that would be needed in order to demonstrate that this disposal route is optimised.
Some respondents suggested that Magnox should consider alternative ways of dealing with the discharges from the FED treatment process, such as the use of settlement tanks prior to discharge, or the transport, by boat, and subsequent discharge of the treated FED effluent in the open sea. **Raised by**: PR3, PR9, PR10, PR13, PR15, PR16, PR17, PR21 PR25, PR26, PR30, PR34, PR35, PR36, PR38, PR39, PR44	**Use of settlement tanks:** The FED dissolution process, including treatment of the effluent in the ADAP, involves the use of fine and micro-filtration to remove un-dissolved particles, as well as ion-exchange to remove specific dissolved radionuclides from the aqueous waste. Magnox checks the turbidity of the effluent against specified operational environmental performance criteria. Turbidity levels are measured pre and post discharge from the Final Monitoring and Delay Tank to confirm compliance with the RSR permit condition to use BAT to exclude entrained solids. Turbidity results for discharges from the Bradwell Final Monitoring and Delay Tank, covering the period 12 April to 21 October 2015, were provided to us by Magnox (Reference 13). The results showed that the turbidity levels are typically below 1 Nephelometric Turbidity Unit (NTU), with the highest value being 3 NTU. The Bradwell Site environmental performance criterion for turbidity in routine discharges from the Final Monitoring and Delay Tank is <10 NTU. For comparison: UK Drinking Water standards prescribe a maximum value for turbidity of 4 NTU. Turbidity levels of discharges from the Final Monitoring and Delay Tank at Bradwell Site are therefore comparable to drinking water. The operation of settlement tanks prior to discharge would serve to allow heavier particles to settle to the bottom of the tank. However, such particles would have already been removed via the filtration process at ADAP. We do not think any additional measures to further remove suspended solids from the liquid discharges are required, at this stage, to exclude entrained solids from the discharge as the current process demonstrates that BAT is achieved.

	Transport of FED effluent by boat for subsequent discharge to the open sea: The transfer of radioactive liquid waste for disposal at sea is not likely to be consistent with UK Government's radioactive waste discharge strategy and is likely to be in contravention of international agreements – e.g. OSPAR. From an environmental impact perspective it is also unlikely that any reduction to localised radiological impact would be offset by the wider environmental impacts associated with transportation. In addition, such an approach is likely to be unreasonable, in terms of the associated implications for worker health and safety; highly resource intensive; expensive; and impractical. We have not considered this suggestion further.
A number of representations have been made concerning the fact that the new discharge system proposed for use at the site for the disposal of radioactive aqueous waste will not provide the comparable level of initial dilution of the waste that is afforded by the existing aqueous waste discharge system. **Raised by**: PR1, PR2, PR3, PR6, PR7, PR9, PR10, PR15, PR16, PR17, PR21, PR25, PR26, PR29, PR30, PR34, PR35, PR36, PR38, PR39, PR43, PR44	We have considered the proposals to utilise the new discharge route for radioactive aqueous waste, specifically noting that this route will provide a reduced level of initial dilution to the liquid waste in comparison to the existing discharge system. In particular, the BAT report from Magnox (Reference 6) highlighted several issues with maintaining the existing discharge route, including: risks from de-silting operations on native oyster populations; operational restrictions on de-silting operations; costs and hazards arising from de-silting operations; and the likelihood of their success. Even though the proposed discharge system does not provide the same level of dispersion, the environmental impact of these changes will be localised, and for a short time immediately following the discharge. We do not consider these changes to be environmentally significant and also that there are additional environmental benefits to using the new discharge system. We are satisfied that the proposed changes to the aqueous waste discharge management arrangements continue to represent BAT with respect to the radioactivity in the discharges.

	We are equally satisfied that either the current or the proposed arrangements for the management and control of radioactive liquid effluent discharge could each be considered compatible with the requirement to apply BAT.

Topic: Radiological Assessment: Comparison with constraints and limits	
Summary of issues raised	**Our consideration of the issues**
Some respondents raised concerns that the ongoing discharges of radioactive waste from the site pose a risk of harm to people. **Raised by:** PR14, PR20, PR23, PR28 PR41, PR44	We have carried out detailed assessments of the potential radiological impact of discharges made from Bradwell Site, including the potential impact to public health. The most recent assessment of the potential impact to members of the public was published in the Radioactivity in Food and the Environment (RIFE) report 2014 (Reference 14). 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). In practice, discharges from Bradwell Site are significantly below the limits set in the permit. Even if discharges were made at the maximum level allowed by the permit, our assessments indicate the potential radiological impact would be well below the relevant dose limit for members of the public.

Topic: Radiological Assessment: Impact on non-human species and our conservation duties	
Summary of issues raised	**Our consideration of the issues**
Some respondents raised concerns that the application fails to adequately consider the impact of the liquid radioactive waste discharges on the Blackwater Estuary Marine Conservation Zone. **Raised by:** PR9, PR10, PR14, PR15, PR16, PR17, PR19, PR20, PR23 PR21,	We have undertaken detailed radiological assessments, which include looking at the potential impact of discharges from Bradwell Site on plant and animal life in the Blackwater Estuary. The Blackwater Estuary holds a number of designations due to its important ecological value. These include designations as a Special

PR22, PR25, PR26, PR28 PR29, PR30, PR34, PR35, PR36, PR38 , PR39, PR41, PR43, PR44	Protection Area (SPA), a Special Area of Conservation (SAC), a Site of Special Scientific Interest (SSSI) and a Ramsar site, as well as a more recent designation as a Marine Conservation Zone (MCZ). We have assessed the potential radiological impact to the environment on the basis of radioactive discharges being made at the levels of the limits in the permit. On this basis, the predicted that dose rates to marine and terrestrial plant and animal life were still below the value where we are satisfied there will be no adverse effect on non-human species. The limits in the permit are not being changed so the assessments remain valid for the proposed changes to the liquid discharge system. We have taken account of the recent designation of the area as an MCZ. We remain satisfied that the radioactive discharges made in accordance with the requirements of the environmental permit will not compromise the identified conservation objectives.
Some respondents thought that a new radiological assessment should be done for this application due to the fact that the proposed system of discharging radioactive liquid waste from the site no longer involves the pre-dilution of the waste prior to it being discharged to the Blackwater Estuary. **Raised by:** PR9, PR10, PR15, PR16, PR17, PR21, PR25, PR26, PR29, PR30, PR34, PR35, PR36, PR38, PR39, PR44	Our radiological assessment did not take into account the pre-dilution of the discharge when screening the potential impact on the environment. The screening assessment provides reassurance that even if discharges were made at the level of the limits in the permit they will not cause unacceptable environmental consequences. Our assessment therefore remains valid for the proposed changes to the liquid discharge system. The modelling studies provided by Magnox show that the effect of the reduced dilution provided by the new discharge system for radioactive aqueous waste compared with the existing discharge system is only likely to cause a short term localised increase to the levels of radioactivity in the environment.

Topic: Environmental Monitoring	
Summary of issues raised	**Our consideration of the issues**
We received queries concerning the regulatory programme of environmental monitoring that is undertaken around Bradwell Site, including the scope and coverage of the programme and the availability of the data. **Raised by**: PR6, PR9	Environmental monitoring around Bradwell Site is undertaken separately by Magnox and the relevant regulatory authorities (i.e. the Environment Agency and the FSA). The results of Magnox's environmental monitoring programme are required to be submitted to us under Bradwell Site's RSR permit. This information is used by Magnox to assess the annual retrospective dose received by members of the public It is also a requirement under the site's environmental permit to provide this information to us. This information is available to the public. A separate independent programme of environmental monitoring around Bradwell Site is also carried out for the Environment Agency and the FSA. The results of this independent monitoring programme are included in the RIFE report, which is published annually. The 2014 RIFE report was published on 28 October 2015 (Reference 14). The 2014 report covers the January to December 2014 period. The FED treatment programme began in June 2014 and so around half of the monitoring in 2014 covers this period. The report found that concentrations of artificial radionuclides in aquatic materials, including seaweed and locally caught fish and shellfish were low. The report found also that the total dose to members of the public, from all sources and pathways, was less than 0.5% of the legal dose limit of exposures of members of the public to ionising radiation. Our environmental monitoring programme continues to show that the levels of radioactivity in the environment are not significant from a radiological perspective. We have already enhanced the coverage of our environmental monitoring programme to take into

	account public concern over the FED treatment programme. The results obtained from our recent monitoring continue to show that levels of radioactivity in the environment during the FED treatment campaign are similar to the levels of radioactivity found in the environment previously.

Topic: Consultation on the RSR environmental permit application	
Summary of issues raised	**Our consideration of the issues**
We received several representations that our consultation on the RSR environmental permit application was inadequate. **Raised by**: PR20, PR23, PR28, PR29, PR32, PR41	We have decided to consult key partner organisations; the public; and interested parties on our draft decision and draft RSR permit for this application. We did not consult on the application. This application is considered to be a small administrative change, as there is no change being sought to the limits in the permit. Our procedures and guidance covering how we deal with environmental permit applications for nuclear sites do not require us to consult on such applications. Nevertheless, we did inform interested parties that we received the RSR permit variation application from Magnox. We did not receive any requests for the RSR application, although we note that a small number of the representations received on the non-RSR variation applications related to the radioactive aspects of Bradwell Site's discharges. We therefore decided to respond to these comments, as set out in this Annex, and to make our draft RSR permit and draft decision publically available for comment along with those covering the non-RSR aspects of the discharge.

Topic: Provision of information/transparency	
Summary of issues raised	**Our consideration of the issues**
Included in many of the responses were comments attributed to Magnox and others related to information made available to the public, including via the Bradwell Site Local Community Liaison Council (LCLC). **Raised by**: PR6, PR7, PR9, PR10, PR15, PR16, PR17, PR18, PR19, PR21, PR25, PR26, PR28 PR29, PR30, PR34, PR35, PR36, PR38, PR39, PR43, PR44	These comments do not have a bearing on our decision in relation to this environmental permit variation application. It is our view that these are matters for Magnox to respond to. We recommend that any specific queries or information requests of this nature are directed to the owner of the relevant information. We are committed to operating openly and transparently and have been consistent in our reporting about the environmental significance of permitted discharges.

Topic: Matters outside the variation to the permit	
Summary of issues raised	**Our consideration of the issues**
Information has been requested on the planning requirements in relation to the outfall structure. **Raised by**: PR11	The planning requirements in relation to the outfall structure are a matter for the relevant planning authority. We recommend that this information request is directed to the owner of the relevant information.
We note a number of representations included subjective personal statements or preferences about reducing or stopping discharges from FED treatment at Bradwell Site, without providing relevant supporting information or evidence. **Raised by**: PR8, PR9, PR10, PR12, PR15, PR16, PR17, PR18, PR19, PR21, PR22, PR25, PR26, PR27, PR28, PR29, PR30, PR31 PR33, PR34, PR35, PR36, PR37 PR38, PR39, PR40, PR42, PR43, PR44	Our permitting decisions take account of broad aspects of detriments, including social and other impacts, as well as the environmental impacts. We have extensive powers to stop discharges where there is evidence of potentially significant environmental harm. We are only likely to use these powers in an enforcement scenario, where the environmental impact is significantly greater than would arise from routine discharges that are controlled under an environmental permit. Potential significant harm to the environment is only likely to arise where discharges are substantially above the thresholds set out in the permit. Our decisions must also be fair and reasonable, and must take account of an operator's business needs, in order for us to continue to meet our requirement to support sustainable growth.

Annex 2 – References

1. Cover letter to accompany Magnox application (Magnox, EA52453, dated 14 July 2015
2. Details of Proposed Variation to EPR permit EPR/ZP3493SQ to Modify Aqueous Discharge Line Outfall (Magnox, BRAD/EN/REP/099, dated 15 June 2015)
3. Variation to Permit EPR/ZP3493SQ for Gaseous and Particulate Discharges at Bradwell Site (Magnox, BRAD/EN/REP/141, dated 16 June 2015)
4. Introduction to the Safety and Environment Management Prospectus (Magnox, M-023, Issue 3, dated 19 March 2015)
5. Notice for further information and accompanying cover letter (Environment Agency, EPR/ZP3493SQ/V005, dated 29 September 2015)
6. An Assessment Report Demonstrating How the Proposed System for the Disposal of Radioactive Aqueous Waste and for the Discharge of Treated Sewage Effluent and Storm Water to the Blackwater Estuary Represents Best Available Techniques (Magnox, BRAD/EN/REP/169, dated 20 October 2015)
7. Letter requesting more time to determine permit application (Environment Agency, EPR/ZP3493SQ, dated 18 September 2015)
8. Letter accepting proposal to extend period of determination for permit application to 1 February 2016 (Magnox, EA52515, dated 22 September 2015)
9. Magnox Bradwell Site Environmental Permit EPR/ZP3493SQ (Environment Agency, dated 26 February 2013)
10. Letter requesting more time to determine permit application (Environment Agency, dated 29 January 2016)
11. Signed copy of Environment Agency letter accepting proposal to extend period of determination for permit application to 1 June 2016 (Magnox, EPR/ZP3493SQ, dated 2 February 2016
12. Magnox correspondence following request for further information in relation to turbidity of discharges from Final Monitoring and Delay Tanks (Magnox, dated 26 October 2015)
13. FDT Turbidity A and B Sample – (Magnox, dated 22 October 2015)
14. Radioactivity in Food and the Environment report 2014 (RIFE-20, dated October 2015)
15. Environmental Permitting: Handling and Determining Environmental Permit Applications for Radioactive Substances Activities on Nuclear Sites (Environment Agency, Operational Instruction 247_10, dated 11 July 2013)
16. Radiological Monitoring Technical Guidance Note 2 – Environmental Radiological Monitoring (Environment Agency, Scottish Environment Protection Agency and Food Standards Agency, 764_11/GEHO0811BTVY-E-E, Version 1, dated December 2010)
17. Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone (MCZ) – Supplementary Advice on Conserving and Restoring Site Features (Natural England, undated)

18. Decision Document for environmental permit variation application from Magnox for Bradwell Site - EPR/ZP3493SQ/V002 - (Environment Agency, dated 2 April 2012)
19. Letter requesting more time to determine permit application (Environment Agency, dated 19 July 2016)
20. Letter accepting proposal to extend period of determination for permit application to 3 January 2017
21. Letter requesting more time to determine permit application (Environment Agency, dated 26 September 2016)
22. Letter accepting proposal to extend period of determination for permit application to 3 January 2017