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Bradwell Site, Magnox Limited : Environmental Permit Application to discharge liquid wastes from Fuel Element Debris (FED) Dissolution (dissolving in nitric acid) : reference PR2TSE10760/V003 and EPR/DP3217XB/V002.

Dear Sir,

Marinet Limited is a not-for-profit membership based limited company. Its concern is with the conservation and health of the sea. The above environmental permit application by Magnox Limited has been drawn to our attention by one of our Members, and this is the response of Marinet Limited to the permit application's public consultation.

The focus of our representation is the Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone (MCZ), designated with effect from 12th December 2013. The protected features of this MCZ along with the management objectives for these features are:

<u>Protected feature</u>	<u>Type of feature</u>	<u>Management objectives</u>
Intertidal mixed sediments	Broadscale marine habitat	Maintain in favourable condition
Native oyster (<i>Ostrea edulis</i>) beds	Marine habitat	Recover to favourable condition
Native oyster (<i>Ostrea edulis</i>)	Species of marine fauna	Recover to favourable condition
Clacton Cliffs and Foreshore	Feature of geological interest	Maintain in favourable condition

Note: In the Ministerial Order of 12th Decemeber 2013 the following terms are defined:

- (2) In paragraph (1), —**favourable condition**—
- (a) with respect to a **broadscale marine habitat** or a **marine habitat** within the Zone, means that—
- (i) its extent is stable or increasing; and
- (ii) its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating;
- (b) with respect to a **species of marine fauna** within the Zone, means that the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive;
- (c) with respect to the **feature of geological interest** within the Zone, means that—
- (i) its extent, component elements and integrity are maintained;
- (ii) its structure and functioning are unimpaired; and
- (iii) its surface remains sufficiently unobscured for the purposes of determining whether the conditions in paragraphs (i) and (ii) are satisfied.
- (3) In paragraph (2)(a)(ii), the reference to the composition of the characteristic biological communities of a habitat includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat.

Advice concerning the MCZ published by the Department for the Environment, Food and Rural Affairs, November 2013, states:

The Blackwater, Crouch, Roach and Colne Estuaries MCZ is located on the Essex coast. It extends from the mean high water mark to where the estuary mouths join the North Sea, and is the largest inshore MCZ covering an area of 284 km².

The site protects one of the largest estuaries in the East of England and includes the Blackwater, the largest tidal river in Essex. There are already a number of designations within the area including Sites of Special Scientific Interest, the Essex Estuaries Special Area of Conservation and Mid Essex coast Special Protection Area.

These existing sites protect extensive areas of mudflats and saltmarsh, which support a wide range of species including internationally and nationally important numbers of waterfowl such as Brent Goose and Curlew. The MCZ will build upon these existing designations, by offering protection to features such as the native oyster which are not already protected.

The MCZ comprises the most important area for both wild and cultivated native oyster (*Ostrea edulis*) in the south-east region. Where native oysters are found in large numbers they form beds made up of the oysters themselves and dead shells.

Many marine species such as sea snails, crabs and sea urchins live amongst these beds, with some using them as a place of shelter whereas others attach themselves to the surface.

Extensive oyster beds are found in the Crouch and Roach estuaries and throughout the Blackwater estuary. Oysters are susceptible to a range of threats including invasive species and over- fishing.

In addition to the above habitat features and species, the estuaries which comprise this MCZ are also identified by The Wildlife Trust as being important for blue mussels (*Mytilus edulis*) and ross worm (*Sabellaria spinulosa*) which are species noted for their biogenic reef-building characteristic (creating reef habitat which, in turn, is biologically diverse). The Wildlife Trust also identifies the tiny Lagoon Sea Slug (*Tenellia adspersa*) as being important.

Environmental Assessment Obligations.

- The EU Environmental Impact Assessment Directive, 97/11/EEC requires an EIA for nuclear power stations and their decommissioning, and for installations designed for the final storage and/or for the storage of nuclear waste. In the Bradwell SEA statement, September 2014, which accompanies the applicant's documents reference is made to the "Bradwell Site Environmental Impact Assessment Baseline (EIAB) Report".

It is not clear from the applicant's documents whether this EIAB Report covers the present permit application. Nor do the applicant's documents provide a reference to where this EIAB may be examined. It is therefore **not evident** whether the requirements of the EIA Directive 97/11/EEC have been met both in generic terms, and with reference to the Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone.

- Additionally, the Bradwell SEA states (Section titled: Surface Water Resources and Quality, pp.8/9): "The dissolution of Magnox Fuel Element Debris (FED) which has been recently commissioned will necessitate the discharge of the resulting effluent to the Blackwater Estuary. The radioactivity and heavy metals in the discharge from the process will be significantly reduced, and assessment of the nitrates in the effluent has led to the conclusion that there will be no unacceptable impacts to the estuary. The site has been granted a bespoke temporary permit for the discharge of FED liquors by the Environment Agency." It is further stated in the

Bradwell SEA, Section as cited : “A variation for Article 37 was submitted in November 2011 and an EC Opinion received in June 2012. The permit was evaluated and granted by the Environment Agency in September 2012 and became effective from October 2012.”

With regard to the discharges of radioactivity, although the abatement plant may reduce the radioactivity significantly as asserted above in the Bradwell SEA, it is not clear from the applicant’s documents how this statement is substantiated for the purpose of this permit application as no supporting evidence is provided concerning this reduction.

Nor does the applicant’s documentation provide the text of the EU Opinion obtained in June 2012, effective October 2012, regarding Article 37. Therefore compliance of this permit application with this requirement is not evident either.

Moreover, it is **not evident** in this application, either in terms of the documents provided or references supplied, as to how and whether the impact of radioactive discharges on the Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone has been correctly assessed in terms of procedure, and adequately assessed in terms of impact.

Environmental Assessments Procedures.

Responsibility for the inshore fisheries in the Blackwater, Crouch, Roach and Colne Estuaries MCZ lies with the Kent and Essex Inshore Fisheries and Conservation Authority (IFCA), and overall management responsibility for the MCZ lies with the Marine Management Organisation (MMO).

The MMO lays its management emphasis on the statutory licensing regimes and permits relating to human activity occurring within or adjacent to the MCZ. In determining whether such licenses and permits should be issued the MMO has set out a clear procedure for assessing environmental impact. This may be viewed on their website and is as follows:

- First, establish whether there is a significant risk of the activity harming the conservation objectives of the MCZ (Note: these conservation objectives relating to the protected MCZ features are identified on the first page of this submission).
- Second, demonstrate that the benefit of the activity to the public outweighs damage to the environment, and that the activity will carry measures of equivalent environmental benefit to mitigate the damage.
- Third, the MMO will work with statutory nature conservation bodies (SNCBs) to help identify changes that can be made to bring an environmental benefit equivalent to the likely damage. The MMO also requires that the license holder makes proportionate environmental enhancement.
- Fourth, if the activity will likely have a significant impact the MMO must make an appropriate assessment of the implications for that site in view of the site’s conservation objectives. The MMO will only grant a licence having decided that the activity will not adversely affect the integrity of the site, unless imperative reasons of overriding public interest require otherwise.

Having read the documents submitted by Magnox Limited in connection with this permit application and its respective public consultation, it is evident to us that:

- There is **no evidence** that the Kent and Essex IFCA has been consulted about inshore fisheries in the area, and no evidence with regard to the oyster shellfishery in particular.
- There is **no evidence** that the MMO has been consulted in connection with its overarching management responsibilities for the MCZ. Nor is there any evidence that the environmental impact assessment procedure identified above as necessary by the MMO for the safeguarding the conservation purposes of the MCZ has been conducted by the applicant in conjunction with the MMO.

Note:

- The Blackwater, Crouch, Roach and Colne Estuaries MCZ was not considered in the applicant’s *Environmental Risk Assessment for the Environmental Permit in Support of Fed Treatment* prepared by H R Wallingford, and archived 23/01/2014.
- There is a box entry in Table 17 of the applicant’s *Environmental Risk Assessment to Support the EPR Permit Variation for FED Discharges through the new discharge line*, signed off 16/07/2015. This reads:

Designation	Proximity to site	Key features	Included/ reason
Blackwater, Crouch, Roach and Colne Estuaries Marine Conservation Zone	Immediately adjacent	To maintain in favourable condition ‘intertidal mixed sediments’ and ‘Clacton Cliffs and Foreshore’ and to recover to favourable condition the ‘Native Oyster’ and the ‘Native Oyster beds’	Yes – Potentially for water quality in the estuary to be affected and therefore potential impact on the oysters in the estuary. Impact on water quality and specifically on oyster beds have been considered in the modelling reports attached and the risk assessment.

However, there were no “modelling reports attached” to this Risk Assessment in the public consultation documents, and thus this evidence could **not** be verified; And, more particularly, we could find **no evidence** of the impact on the MCZs conservation features and the conservation objectives (intertidal mixed sediments, and oysters and their beds) having been assessed in the Risk Assessment.

- In the public consultation documents, document *Aqueous 3*, authored by H R Wallingford and titled *Effluent discharge arrangements: initial dilution, Section 5.3 reports on Oyster beds*. It reads: “MagnaX has identified two oyster beds in the vicinity of Bradwell, at the locations shown in Figure 5.7: Oyster beds. These locations are around 600 m and nearly 8 km from the outfall, both of which are well outside the area of initial dilution. Effluent concentrations at the oyster beds are in the far-field dispersion report, Reference 5.” We observe, firstly, that ‘Reference 5’, titled *Bradwell Power Station FED discharge arrangements : Far-field dispersion, H R Wallingford EBR4908-RT010, 2014* was not included in the public consultation documents, and Google could find no reference to such a document in the public domain. Therefore there is **no evidence** provided in this application concerning the effluent concentrations that will arise and be experienced in ‘far-field’ oyster beds. And second, we observe, that ‘far-field’ oyster beds are far more numerous and far more widely dispersed throughout the MCZ estuaries than the two beds identified in Section 5.3 of the H R Wallingford report, 2014. Therefore there is **no evidence** that the risk assessments have assessed the impact of the oyster features of the MCZ in any comprehensive or adequate manner.
- In the Environment Agency’s Newsletter, January 2015, titled *Our role in regulating nuclear sites and discharges to the environment* the following statement is made: “We reviewed our assessments following the

designation of the Blackwater estuary as a Marine Conservation Zone at the end of 2013. We are satisfied they remain valid and that the discharges will not affect the conservation objectives of the Marine Conservation Zone designation.” We observe, firstly, that this statement is made by the Environment Agency and not the applicant, and therefore does **not constitute evidence** in respect of the permit application. And secondly, there is **no evidence** or references supplied by the Environment Agency in support of their assertion.

Accordingly, in this review of Environmental Assessment Procedures, we conclude that the Blackwater, Crouch, Roach and Colne Estuaries MCZ has neither been assessed adequately (in terms of substances having an impact), nor comprehensively (in terms of all geographic locations being considered) nor transparently (in terms of all documentation having been made publicly available for scrutiny), and therefore the permit application is **seriously deficient**. Furthermore, we conclude that the agencies responsible for the management of the MCZ (Kent and Essex IFCA and MMO) and which have specific management responsibilities for the MCZ have not been consulted as there is **no evidence** in the application documents that they have been consulted, nor that the procedures for assessing impact on the MCZ, as set out by the MMO, have been properly implemented.

Environmental Assessment Issues.

The range of issues that need to be assessed by this application in relation to the Blackwater, Crouch, Roach and Colne Estuaries MCZ are numerous. It would serve no purpose to enumerate them here as they can all be identified by reference to established environment impact assessment procedures (e.g. EU EIA Directive 97/11/EEC, MMO Marine Licensing Guidance, and so forth). However there are a number of deficiencies evident to us in the environmental risk assessment documents which the applicant has submitted in connection with this application, and we wish to identify these issues here so that the risk assessment - which we believe **still** requires to be done - is conducted thoroughly. These are:

- It is important to establish the flushing time of the Blackwater estuary i.e. the number of tidal movements required to entirely replace the existing body of water in the estuary by a new body of water. This is important because materials discharged into the Blackwater estuary on the ebb tide return with the flood tide, and therefore have a residence time before they are completely removed from the estuary’s water column. Being “in residence”, they are thus available to have an environmental impact, and the duration of the flushing time has **not** been stated in any of the applicant’s risk assessment documents. Further, as materials discharged into the Blackwater estuary will, as a consequence of its flushing, also become available to the Colne, Crouch and Roach estuaries, it is also important to know the flushing times of these estuaries in order to assess the impact on them of the discharged materials.
- The nature of the radionuclides, both in terms of their identity (the element and its isotope) and in terms of the quantity to be discharged, is provided in a **seriously deficient** form in the applicant’s documents. Firstly, a full record of the range of radionuclides to be discharged is not provided. Secondly, the quantity (Becquerels) of each radionuclide to be discharged is not provided. It is not possible to assess risk and environmental impact unless these facts are known. At present, they are **not known**.
- Risk assessment relating to radionuclides also needs to consider, firstly, whether there is a likelihood that a radionuclide in suspension in salt water will precipitate out on contact with freshwater, thus being deposited at the tidal limit of the estuaries and the interface between salt and freshwater, hence leading to higher concentrations of that radionuclide in that locality. And secondly, risk assessment needs to be based on comprehensive monitoring and measurement of the presence of radionuclides in inter-tidal sediments. These sediments accumulate deposits of radionuclides, thus providing areas of elevated concentration, and these sediments are key habitat locations for oysters and other marine life which are, of course, the primary

object of concern in the nature conservation designation (MCZ). There was **no evidence** of this form of risk assessment in the applicant's documents.

- The foregoing risk assessment relating to radionuclides is also essential to establishing the challenge to the well-being of local shell fishermen and other members of the public who use the MCZ estuaries for commercial and recreational reasons. There was **no evidence** of this kind of risk assessment in the applicant's documents.

- The applicant recorded that the FED discharges would be "negatively buoyant" i.e. heavier than the water of the estuary into which they are discharged. The consequence of this **negative buoyancy** in terms of dispersion, residency in the estuary, and contact with sediments in the estuary needs to be more thoroughly assessed than has been evident in the documents submitted to date.

Conclusion.

It is clear to Marinet that the impact of the Magnox FED discharges on the estuaries, their protected MCZ features, and the management objectives of the Blackwater, Crouch, Roach and Colne Estuaries MCZ have not been properly assessed by the applicant.

The assessment is **not adequate** in terms of identifying or quantifying the substances which may have an impact. The assessment is **not comprehensive** in terms of evaluating the impact on all the MCZ protected features and their associated geographic locations within the MCZ. The assessment is **not transparent** in terms of identifying all the documents necessary for proper public scrutiny of the application. And, most importantly, the application is **not coherent** and **deficient in procedure** in terms of its evaluation of risk and impact on the MCZ with the result that no coherent view can be formed at the present time as to whether the impact will be adverse, temporary or inconsequential.

For these reasons, the application should be **refused**.

Yours faithfully

S. D. Eades
Marinet Limited.