



BANNG
Blackwater Against New Nuclear Group



APPLICATION BY MAGNOX FOR AN EXTENSION TO THE TIMESCALE FOR THE DISCHARGING OF LIQUID EFFLUENT FROM THE FUEL ELEMENT DEBRIS TREATMENT PROCESS (FED) INTO THE ESTUARY FROM 12 MONTHS TO A FURTHER 24 MONTHS

APPLICATION BY MAGNOX FOR AN OPTION TO SWITCH THE EXISTING DISCHARGES TO A NEW OUTFALL STRUCTURE WHEN IT BECOMES NECESSARY DUE TO BLOCKAGES CAUSED BY SILTATION IN THE EXISTING STRUCTURE

A RADIOACTIVE SUBSTANCES APPLICATION TO ALLOW THE SWITCH TO THE NEW OUTFALL STRUCTURE WHEN NECESSARY

RESPONSE FROM THE BLACKWATER AGAINST NEW NUCLEAR GROUP (BANNG)

BANNG Paper No. 26

1. Introduction

BANNG wishes to state at the outset that it is opposed to the discharges into the Blackwater estuary and the atmosphere arising from FED dissolution at Bradwell. It, therefore, wishes the Environment Agency (EA) to put a stop to these discharges. BANNG believes that the FED should be packaged and stored as it believes will now be the case at other sites.

The EA has claimed to BANNG (at the BANNG/EA meeting on 25 August, 2015) that the dissolution plant continues to be best available technology (BAT). The fact that the plant has experienced many problems and delays and that dissolution will not now take place at other Magnox sites as originally planned (where it seems FED will be packaged and stored) contradicts such a claim.

The EA also say that economics plays a part in BAT assessment. However, BANNG believes that economics has become the determining factor in the dissolution of FED at Bradwell.

BANNG believes that there is space available for packaged FED in the intermediate-level waste (ILW) store at Bradwell. However, the Nuclear Decommissioning Authority (NDA) is proposing to make use of this space by turning the ILW store at Bradwell into a regional store and to transfer ILW from Dungeness and Sizewell to the site. BANNG is also opposed to this proposal.

The reasons for its opposition to the discharges have been laid out by BANNG on several occasions, including at its Public Meeting in West Mersea on 24 June, 2014. Among them are:

- the Blackwater is a vulnerable, shallow estuary with a slow refresh rate
- the Blackwater has many national and international designations, including the recent award of Marine Conservation Zone (MCZ) status, primarily aimed at protecting the Colchester Native Oyster and its breeding grounds;
- the Blackwater estuary is relied on as a place of work for many fishermen and oystermen;
- the Blackwater estuary is a place that has sizeable populations living around it;
- the Blackwater is a tourist area and in the summer many people sail and wind-surf on and swim in the estuary; many of these activities take place close to the outfall pipe;
- the Blackwater hosts many caravan and camping sites and beach huts; in the summer, e.g. the population of Mersea Island doubles.

However, if the EA is minded to grant the permit variation to Magnox to extend the period of the discharges from 12 months for another 24, then BANNG wishes to raise points that it believes need to be taken into consideration. These are provided below.

2. Public Trust and Confidence

BANNG would like to draw the attention of the EA to what it believes has been the misleading information given to the public about the discharges from Bradwell.

Information given to the Bradwell Local Communities Liaison Council (LCLC) on the nature of the discharges:

The Bradwell LCLC members are local councillors whose remit is to report back to their constituencies on items raised at meetings, i.e. report back to the public. Members of the public also attend the meetings.

BANNG believes that confusing information has been given to the LCLC over the years about the nature of the discharges into the Blackwater estuary. Information found in a selection of LCLC Minutes from the past few years describes the discharges as 'benign'. For example:

4 December, 2011:

- (Item 2220) '**benign liquid**' would be discharged into the estuary;
- (item 2223) 'The content of the **benign effluent** was questioned.....the **abatement process would trap the radioactivity and any heavy metals, leaving essentially clean water containing Magnesium salts.....confirmed that this effluent would be benign**';

4 December, 2012:

- (item 2330) '**an aqueous discharge of a clean salt solution**' would be put in the estuary;

11 June, 2013:

- (item 2486) ‘dissolution produces an effluent stream that is passed through the ADAP **to remove waste and activity**’.

Such misinformation may have led to the original local acceptance of the dissolution process. When the Nuclear Decommissioning Authority (NDA) produced its Credible Options consultation paper with reference to location of FED dissolution treatment plants (see below), Bradwell was excluded as a result of this acceptance.

Information on the discharges taken from Nuclear Decommissioning Authority (NDA) Papers:

The NDA’s consultation document *Credible Options for Optimising the Number and Location of FED Treatment (Dissolution) Facilities in Magnox Ltd. – Credible Options, (May, 2013)*, gives a different story. The document states that the FED dissolution process retains more than 85% of the radioactivity in residues but that ‘**it does lead to some discharges of radioactive and non-radioactive by-products to the environment**’ (pp. 4 & 5).

In fact, the NDA’s paper entitled *FED discharges to UK coastal waters - NFLA request under FOI Act* of April, 2014 (obtained under Freedom of Information by the Nuclear Free Local Authorities) outlines the radionuclides expected to be discharged, among others Tritium, Strontium, Plutonium and Americium. Discharge of heavy metals was also expected, e.g. Boron, Cadmium, Lead, Mercury, Zinc and the maximum allowed daily discharge of nitric acid. (Please see the paper under Appendix A.)

There does not seem anything ‘benign’ (as normally understood by the public) about the discharges revealed in these papers.

Information provided on the prolonged outage

Little information has been given for the outage and what has been provided has not been entirely clear:

29 October, 2014:

- the Chair of BANNG attended the NDA’s National Stakeholder Meeting and was informed by the Chief Executive of the NDA that the dissolution plant was experiencing ‘**challenges**’ and that discharges had ceased shortly after they had begun on 23 June;

21 November, 2014 at the meeting of BANNG representatives with David Griffiths (Nuclear Regulation Group South Team Leader) and Karl Littlewood (Nuclear Regulator, Nuclear Regulation Group South), it was stated that:

- the FED treatment plant was currently not operational after a planned inspection found problems with the process, there were **leaks** within the modular equipment and there were **fundamental problems**;
[Note: Karl Littlewood had, in fact, been asked by David Griffiths to discuss with the Site Operator the adoption of a Plan B, i.e. encapsulation of the FED]

4 December, 2014 at the LCLC meeting:

- (item 2553), responding to a query, Scott Raish, the Site Manager, ‘advised that the commencement of the outage was delayed from late July to early October to enable a surety about what needed to be improved’;

4 March, 2015 at the LCLC Special Meeting:

- (item A1b) ‘Mr Moore added that **the process had not been operating to full design output** and that modifications, particularly to the abatement plant, had been undertaken to increase output going forward.’

[**Note:** at this meeting it was also stated that the discharges had re-commenced on 3 March]

At several meetings of the LCLC and in various pieces of correspondence with BANNG it has been claimed that the outage was planned. This seems far-fetched given the length of time that the outage lasted. The quote above from Mr. Raish seems to suggest that there was an outage because of problems (July to October) and then there was a planned outage (from October to March) to deal with the problems.

BANNG is concerned at the paucity of information and the misleading information provided for the public on the nature of the process, its outputs and the outage. There has been little attempt at engagement with a public that has justified concerns about the discharges.

BANNG believes that when it became apparent that there were fundamental problems with the dissolution process, a public statement should have been made by Magnox. In spite of the high level of public concern about the dissolution process, the public was kept in the dark. Throughout the whole process there has been a lamentable lack of openness and transparency.

Information on timing, number and constituents of the Bradwell discharges:

Despite many attempts, it has not proved possible for BANNG to gain information from Magnox on the timing number and constituents of the discharges that have taken place. All that is known is that discharges started in June, 2014 but stopped shortly after because of the discovery of fundamental problems. It was reported that the discharges recommenced on 3 March, 2015 but the situation remains very unclear.

Once again contradictory information has recently been given on the frequency of the re-started discharges:

3 June, 2015 at the LCLC meeting:

- (item 2610 from the draft Minutes) Mrs. V. Blowers asked for confirmation of the frequency of discharges currently, Chair advised that this had been covered exhaustively previously and was once daily half an hour after high tide. Mr. P Haley confirmed that this remained as previously reported at a maximum of one per day.

25 August, 2015 at the BANNG/EA meeting :

- it was noted that the discharges were not taking place on a daily basis but several times a month.

BANNG believes that the public has every right to know how many discharges have taken place, the frequency of discharging and constituents of the discharges now and in the future.

Information on the use of the dissolution plant elsewhere:

Confusing information has also been given about the future of the dissolution plant. The original NDA plan had been to remove the plant or parts of the plant from Bradwell for use at other Magnox sites.

21 November, 2014, at the BANNG/EA meeting, it was stated that:

- FED dissolution would not take place at any other Magnox sites.

4 December, 2014 at the LCLC meeting:

- (Item 2558) ‘Mr Moore reminded attendees that no other options had been approved and that, whilst cost savings may drive the intention to deploy alternative options, FED dissolution may have to be used if it continued to be the only approved option.’

4 March, 2015 at the LCLC Special Meeting:

- (item A11) the meeting was advised by Mr. Ireland that the original plan had been to re-use some of the Bradwell dissolution plant in a plant at Hinkley Point A. ‘Further analysis has shown that FED waste at Hinkley Point A site is ILW. It is proposed that encapsulating this in 6m³ concrete boxes will be more cost effective than processing by dissolution’.
[Note: the majority of the FED at Bradwell is ILW.]

BANNG believes that a categorical statement is required to the effect that the plant will NOT be used elsewhere and that packaging and storage are the preferred options for the other Magnox sites.

Information about the entry of the Bradwell site into Care and Maintenance (C & M):

The public has been given several dates for the entry of the site into C & M but more recently that this would take place at the end of 2015. However, an extension to the dissolution process will mean that the site does not enter C & M until 2018. Given what has happened in the past, this can be regarded only as an aspiration and not a certainty. There is no guarantee that more problems will not arise which would mean the discharges being continued for even longer and entry to C & M could recede even further.

BANNG believes that as a result of what appear to be fundamental problems experienced with the dissolution plant and the uncertainties about how long it will be necessary to continue the discharges into the Blackwater estuary, the opportunity should be taken now to stop discharging and to package and store the FED, as it has been told will be happening at other Magnox sites.

Information on current consultation.....is it public, targeted or not necessary?

The status of the current consultation is unclear:

7 August, 2015:

- the Rt. Hon. Priti Patel, MP, received the information about the current consultation and was told by Charles Beardall of the EA, ‘We have also invited the general public....’ to comment.

18 August, 2015

- in response to a question enquiring if the consultation was going to be advertised in the Mersea Island Courier and referring to the public consultation in the form of a drop-in event that took place when the permit was for 12 months, a BANNG supporter was told by Ian Alexander-Barnes of the EA: ‘We have taken the decision not to publish the proposal in the local press but to publicise it on our website and then to notify people we know have an interest in the matter directly. We considered this form of targeted approach to be the most effective in this case.’

25 August, 2015 at the BANNG/EA meeting it was stated that:

- there was no need for the Agency to hold any consultation.

The different information given about the nature of the current consultation gives the impression of an unwillingness to engage with the public on a matter about which the EA and Magnox are fully aware there is a high level of concern. The EA organised a public consultation in the form of a drop-in session at West Mersea (in which Magnox and others took part) in July, 2014, as a result of the high level of public anxiety expressed at the BANNG Public Meeting, held on 23 June, 2014. This anxiety has not diminished.

BANNG believes that it behoves the EA to hold a proper public consultation on the application to extend the period of discharges, in view of: the continuing high level of public anxiety about and interest in the discharges; the misleading and unclear information that has been put into the public sphere about the nature of the discharges, the reasons for the outage and about what the current consultation constitutes; and the lack of public information about the timing, number and constituents of the discharges into an estuary where large numbers of people live, work and spend their leisure time.

[BANNG believes that the EA has agreed to hold another round of consultation. This proposal is welcomed and the group looks forward to receiving details in due course.]

3. Possible future importation of FED from other sites for dissolution at Bradwell

Although not part of the consultation, BANNG wishes to state now that it is completely opposed to any possible future importation of FED from other sites for dissolution at Bradwell.

At various LCLC Meetings, it has been stated that it is **not intended** to use the Bradwell dissolution plant for FED from elsewhere.

The NDA's consultation document *Credible Options for Optimising the Number and Location of FED Treatment(Dissolution) Facilities in Magnox Ltd. – Credible Options, (May, 2013)*, states:

‘the undertaking of active operations over a number of years is not consistent with the concept of C&M. In addition whilst the short-term impacts of discharges have been deemed to be acceptable (and the relevant permit obtained), the Bradwell site is sub-optimal in terms of longer term environmental impacts, as would occur if Bradwell was used as a shared plant. For this reason, the Environment Agency has stated that the continued use of the Bradwell site in this way would require strong justification’.

The above statement does not engender confidence that the Blackwater estuary is even able to withstand the effects of the current regime of discharges.

BANNG believes that a categorical statement must be issued to the effect that FED from other sites will NOT be transferred for dissolution in the Bradwell plant.

4. Information perceived to be inaccurate in the application documents

BRAD/EN/REP 138 Annual Average Concentration Dedicated Discharge.

The modelling predictions used for the discharges through a new outfall structure are based on report EX6399 from 2011 which was for diluted discharges via the old culverts and which occur between high water to high water plus 1.5 hours. These existing discharges have only a small temperature differential to the estuary due to the 75:1 dilution, and are more likely to readily mix due to their similar specific gravity (s.g.) to the estuary waters.

The projected build up of pollutants in the estuary over time reflects the longer period for the discharges to disperse into the Thames estuary with the six hour tidal ebb prior to the next incoming flood tide.

BANNG believes that the old modelling should have no place in assessing the characteristics of the discharges through a new outfall structure.

These discharges will not be prediluted and will have a much higher s.g. than the estuary waters, so will tend not to admix readily and the discharges are projected normally to sink to the sea bed in dilutions of as little as 50:1 in the vicinity of the outfall up to distances of as much as 800 metres.

These discharges will be made later in the tidal cycle between H.W. +1 hour to H.W. + 2.5 hours so will have less time to move as far out of the estuary to disperse before the next incoming flood tide brings them back into the Blackwater 3.5 hours later.

BANNG notes that there is no evidence that these points have been recognised in the document.

Also the effect of the differences will mean greater concentrations of pollutants will accumulate in the Blackwater than previously. This is not reflected in the projections.

The FED discharges can have a maximum temperature of 41.67 celsius, as stated in the application for permit **EPR/DP3127XB**. The effects of this significant temperature differential are dismissed with the comment ‘changes in temperature are very small and will not affect the quality of the estuary’ (BRAD/EN/REP 103, p. 5).

The modelling projections do not make any attempt to reflect the effects of weather conditions such as high winds and storm surges.

BANNG considers that the EA should demand a completely new radiological assessment to reflect the fact that no dilution of the discharges would take place when the new outfall structure comes into use and also to reflect the consequent higher radioactivity levels and concentrations in discharges and their effects on nearby ecology and human activity.

The **Environmental Risk Assessment** asks ‘Is the discharge into a location with restricted dilution and dispersion?’. The answer given is that it is discharged into ‘a dynamic water body’ and on that basis it is claimed the test is passed.

This does not take into account that the Blackwater is not the open sea and has a very low refresh rate of 10 days. It has restricted dilution and dispersion.

Environmental Risk Assessment, Section 6.4 states that the nearest oyster beds are 600m. and 8km. away from the outfall. However, there are a great many oyster beds far closer than 8km. which the statement totally ignores.

5. Other ways of dealing with the discharges

If the EA does not refuse the application, it should consider other ways of dealing with the discharges that will avert dissolution direct into the estuary, e.g.:

- the use of settlement tankers to further reduce the chemical and radioactive content of the effluent; or
- the placing of the effluent into tankers for discharge into the open sea instead of into the shallow Blackwater MCZ with its low refresh rate - it is in effect a three-sided lake.

If it allows the permit to continue, BANNG urges the EA to consider other ways of dealing with the discharges, such as into the open sea, in light of the potential damage to the marine environment and human health from discharging into the Blackwater estuary.

6. EA question: has new information become available since the permits were issued or last varied?

The Blackwater estuary has many national and international designations. However, the recent award of Marine Conservation Zone (MCZ) status to the estuary is a major difference since the original permit was granted. The MCZ status is aimed primarily at affording protection to the Colchester Native Oyster and its habitat. The Native Oyster is designated as in 'recover to favourable condition' and the MCZ status requires that no activity is undertaken which will affect it and its breeding grounds. Many of these are immediately adjacent to the outfall and will certainly suffer from toxic discharges which will fall to the seabed on a frequent basis.

It is a matter of regret that scant mention is made of the important, new MCZ status of the Blackwater in the current consultation.

BANNG believes that the non-radiological discharges (and, of course, the radiological discharges) from Bradwell are potentially harmful and should not be taking place into a shallow estuary with national and international designations and MCZ status and they should be stopped.

7. EA question: is there evidence to suggest the practice to date has caused harm to the environment?

Virtually no discharges have taken place so far due to the failure of the FED dissolution plant to work to specification or to plan. There has, therefore, been little opportunity to assess harm to the environment from the process.

There was an on-site leak last year which it was reported was contained on site.

The EA should stop the uncertain risks associated with the continuing failed Magnox attempts to implement this new version of FED dissolution as a means of radioactive waste reduction in the vulnerable Blackwater estuary. It is now agreed it will not be used elsewhere so can no longer be described as Best Available Technology (BAT).

8. CONCLUSION

As stated in the Introduction, BANNG is completely opposed to the discharges taking place and urges the EA to stop them.

However, if the EA is minded to permit the continuation of the discharges, BANNG believes that Magnox should submit an application for a full permit and not a variation, given the extension required is a substantive departure from the original permit.

Misleading and unclear information has been given to the public on the nature of the discharges, on the outage, on the timing, number and constituents of the discharges, on whether or not the dissolution plant will be used elsewhere, on when the site will enter C & M and on the status of the current consultation. In order to restore public trust and confidence, BANNG believes the EA should

undertake a proper public consultation, given the high level of concern about and interest in the discharges.

Further, a categorical statement should be made that the FED plant at Bradwell will not be used to dissolve FED from elsewhere.

BANNG believes that the old modelling predictions for diluted discharges should have no place in assessing the characteristics of the undiluted discharges that will take place when the new outfall structure comes into use and that the EA should demand a completely new radiological assessment.

BANNG urges the EA to consider other ways of dealing with the discharges, such as into the open sea, to protect the marine environment and human health.

Neither the radiological nor the non-radiological discharges should be taking place in a vulnerable, shallow estuary with a slow refresh rate, that has been awarded many national and international designations, including more recently Marine Conservation Zone status.

BANNG is disappointed that the EA may consider extending the period of the discharges, leaving Bradwell the only site at which dissolution of FED with nitric acid will take place and the only one that is situated on a vulnerable, shallow estuary.

Prepared on behalf of the Blackwater Against New Nuclear Group (BANNG) by,

***Varrie Blowers, Secretary and Media Relations Officer
and
Barry Turner, Vice-Chair***

18 September, 2015

APPENDIX A

NDA FED discharges to UK coastal waters- NFLA request under FOI Act

1. List of expected constituent/individual radionuclides in the proposed liquid radioactive waste discharge stream.

Radionuclides	
Tritium (H3)	Yttrium (Y 90)
Carbon (C 14)	Silver (Ag 108m)
Chlorine (Cl 36)	Cadmium (Cd 113m)
Calcium (Ca 41)	Samarium (Sm 151)
Iron (Fe 55)	Europium (Eu 154)
Cobalt (C 60)	Europium (Eu 155)
Nickel (Ni 59)	Thallium (Tl 204)
Nickel (Ni 63)	Plutonium (Pu 240)
Krypton (Kr 85)	Plutonium (Pu 241)
Strontium (Sr 90)	Americium (Am 241)

2. Estimated quantities of each consistent radio nuclide in the liquid waste stream (Bqs/ l)

Table 1. Environmental Permitting Regulations 2010

Discharge to River Summary	(approximately 18 month campaign)		
Parameter	Consent (TBq/year)	Predicted TBq/year	Predicted Tbq Total(18months project)
Tritium	7	6.55	9.82
Cs137	0.7	1.62E-05	2.43E-05
Other	0.7	0.28	0.42

3. List of expected heavy metals in the proposed liquid waste discharge stream

Heavy metals
Boron
Cadmium
Chromium
Copper
Iron
Lead
Mercury

Nickel
Zinc

4. Estimated quantities of each heavy metal in the liquid waste stream (µg/l)
Table 2. Environmental Permitting Regulations 2010

Substance	Limit Total Concentrations (µg/l) Surface Waters
Cadmium	0.4
Lead and its compounds	14.4
Mercury and its compounds	0.1
Nickel and its compounds	40

Other metals expected in the liquid discharges will be at levels such that the Environmental Quality Standards (EQS) will not be exceeded for the Blackwater Estuary.

Table 3. Environmental Permitting Regulations 2010

Discharge source and discharge point ref. & location	Parameter	Limit (including unit)
Trade effluent consisting of treated dilute nitric acid	Maximum daily discharge	30m ³ /day

5. Expected temperature of the FED dissolution liquid waste stream at point of discharge

The liquid discharged from site will be at the ambient temperature of the estuary. This is because of a fifty fold pre dilution with water abstracted from the estuary which will occur prior to discharge.

The temperature of the effluent will be a maximum of 24 degrees Celsius. This information is referenced in the permit application to the Environment Agency- Form B6, Q7 and is this information is available on the public register.

6. Clarification of whether the proposed discharge will be pulsed/intermittent or continuous over the 5 to 7 year period.

The FED dissolution programme has been scheduled to last for approximately 18 months and the proposed discharge will be of a batch process.

7. If pulsed/intermittent details of the proposed chronology i.e.

- a. yearly frequency**
- b. time scale, (length of each pulse)**
- c. relationship to tidal cycle**

a-c; Discharges are expected to happen once daily for a period of 18months. The discharges are planned on the high tide (ebb tide) for approximately one hour.