From: Rue Ancona
Sent: 05 November 2015 16:28
To: Greenwood, Bill
Cc: Littlewood, Karl; Paul N Drew; Patrick J Haley; Richard Mensah; Wendy Stacey; Joanne Pashley
Subject: EA52532 - Further information request for Environmental Permit Variation application on site discharges

Dear Mr Greenwood,

Below are responses to some of the questions raised at the recent meeting.

Oyster Beds location – As per our telephone discussion there are only two known oyster beds location in the vicinity of the site. This information was provided by a local oyster man. These two known locations are identified on a map and assessed in HR Wallingford report EBR4908-RT0089-R04-00.

AEVF Correction for Aqueous Effluent Discharge Assessment - I have had a look at this calculation again at AEVF estimate used in the comparison test for the Phase 1 Test 5 assessment. See attached a document titled EA Further Information AEVF correction describing the changes made to the assessment.

Bradwell FED Dissolution Only and Period of Dissolution of FED clarification - Bradwell is planning to dissolve only Bradwell FED, excluding Bradwell FED that is approved for disposition to LLWR. Although it is intended that the FED dissolution programme will be completed within 2 years, there are occasional technical issues which cause delays. As such, the worst case schedule for completion of the programme is 4 years. This does not increase the volume of effluent discharged over the total period, but spreads it over a longer duration which would result in a lower environmental impact.

We are still working on responses to other questions raised in your email dated 20th October and from the meeting held with HR Wallingford. This will be sent to you as soon as they are ready.

Do not hesitate to contact me should you require further information or clarification on any of the issues discussed above.

Document attached to above email

AEVF Correction for Aqueous Effluent Discharge Assessment

This is a correction to a TraC Screening Phase 1 Test 5 assessment (part of the Environment Agency's H1 Annex D1 assessment) carried out to support an environmental permit application PRT2SE10760C for non-radioactive and radioactive effluent discharges for Magnox, Bradwell site. In this revised assessment the difference in height between the discharge point and the Neap High Water Tide at Bradwell has been used as the mixing column within the estuary for discharged buoyant effluent. The mixing column is thus calculated as below.

The height of the discharge port is 5.5m above the estuary bed level. This is below the Lowest Astronomical Tide (LAT) around the outfall structure estimated as 5.8m above the estuary bed level.

The Neap High Water tide height at Bradwell is approximately 9.0m[1] above the estuary bed.

For buoyant effluents, water column mixing is calculated as the difference between the heights of the High Water Tide and the height of the discharge port (i.e. 9.0m – 5.5m = 3.5m). In the H1 Annex D1 guidance, the Allowable Effective Volume Flux (AEVF) in m^3/s is equal to the water depth in meters or for buoyant effluents, the difference in height between the discharge point and the High Water Tide in meters up to a maximum of 3.5m. The AEVF then becomes $3.5m^3/s$. The rest of the assessment remains the same and it is as shown below.

TraC Screening Phase 1 Test 5

This test compares the Effective Volume Flux (EVF) (a measure of pollutant load) with the AEVF for buoyant effluents. Providing the EVF is less than the AEVF then the discharge can be considered insignificant.

The EA's H1 Annex D1 Assessment of hazardous pollutants within surface water discharges defines the EVF as:

EVF = (EFR x RC) / (EQS-BC) m^3/s

Non-Radioactive Effluent

EFR - Effluent discharge rate for EQS-AA and EQS-MAC in m^3/s are 0.0015 m^3/s and 0.3031m^3/s respectively.
(EFR for EQS-AA is calculated as 5.4m^3 volume pumped per hour / 3600 (seconds) EFR for MAC 1091m^3 volume pumped per hour/3600seconds)
RC - Release concentration, µg/l
EQS - EQS-AA and EQS-MAC, µg/l
BC - Background concentration, µg/l

Table 7: Effective Volume Flux Average Release Concentration

Substance	Avg. Effluent Flow Rate, m^3/s	Average Release Conc., µg/l	EQS-AA, µg/l	Background Conc., µg/l	EVF (EQS-AA), *m^3/s*
Cr	0.0015	3.38	0.6	0.5	0.0508

Table 8: Effective Volume Flux for Maximum Release Concentration

Substance	Max. Effluent Flow Rate, m^3/s	Maximum Release Conc., µg/l	EQS-MAC, µg/l	Background Conc., µg/l	EVF (EQS-MAC), *m^3/s*
Cr	0.3031	6.77	32	0.5	0.065

As stated above, the AEVF is $3.5m^3/s$. At $3.5m^3/s$, the AEVF is greater than the EVFs' of $0.508m^3/s$ and 0.065 m^3/s for Chromium so it can be screened out and no further modelling is required for this effluent.

Radioactive Effluent

EFR - Effluent discharge rate in m^3/s (0.008m^3/s)

[1] HR Wallingford, March 2014. Bradwell Power Station Effluent Discharge Arrangements: Initial Dilution

(EFR calculated 30m^3 volume pumped per hour / 3600 (seconds) i.e. Maximum pumping capacity)

RC - Release concentration, µg/l

EQS - EQS-AA and EQS-MAC, µg/l

BC - Background concentration, µg/l

Table 9: Effective Volume Flux

Substance	Effluent Flow Rate, m^3/s	Release Concentration, µg/l	EQS -AA, µg/l	EQS - MAC, µg/l	Background Concentration, µg/l	EVF (EQS-AA), *m^3/s*	EVF (EQS-MAC), *m^3/s*
Cu	0.008	30	5	N/A	1.09	0.06	-
Cr	0.008	23	0.6	32	0.50	1.84	0.006
Zn	0.008	122	40	N/A	1.01	0.03	-
Cd	0.008	2	0.2	1.5	0.04	0.10	0.011
Hg	0.008	2.1	0.05	0.07	0.01	0.42	0.280

The AEVF (3.5m^3/s) at Bradwell is greater than the EVFs for all the metals listed in Table 9 so they can be screened out and no further modelling is required for this effluent.