
From: Rue Ancona (Magnox) <Rue.Ancona@magnoxsites.com>
Sent: 14 January 2016 07:47
To: Greenwood, Bill
Cc: Littlewood, Karl; Patrick J Haley (Magnox); Richard Mensah (Magnox); Samuel Billing (Magnox); Joanne Pashley (Magnox); Wendy Stacey (Magnox); Magnox Regulatory Interactions
Subject: EA52552 - Further information request FED discharges

Bill,

I can now confirm our response to the questions that you sent before Christmas that we discussed last week.

Answers:

1. A more appropriate CORMIX input file has been sent. This is the seed file for the 'FED7' set used in RT009, and matches the quoted water depth and discharge density (1122kg/m³), but retains the ambient density at 1027 kg/m³ rather than 1024 kg/m³. The discharge concentration of 22000 mg/l has been used for the far-field dispersion and for comparison with background levels.
2. The nitrate concentrations and densities in the modelling are those that were expected to be in the discharge from the mass balance. They do match what we've actually measured in discharges. The concentration in the effluent composition document was the maximum concentration that could be in the effluent if we optimised to process all of the FED in one year – environment worst case but doesn't relate to the actual discharges.
3. A1 A more appropriate CORMIX input file has been sent.
4. A more appropriate CORMIX input file has been provided. This is the set we used in RT009, and matches the quoted water depth and discharge density (1122kg/m³), but retains the ambient density at 1027 kg/m³ rather than 1024 kg/m³. We consider that a difference of 3 kg/m³ in the ambient water density is insignificant (especially as the discharge density is probably not known to that accuracy).

If you have any further questions please do not hesitate to contact me.

Kind regards,

Patrick Haley
Head of Environment
Tel: 01621 873520

From: Greenwood, Bill [<mailto:bill.greenwood@environment-agency.gov.uk>]
Sent: 23 December 2015 10:22
To: Aisha Knaffel (Magnox)
Cc: Edwards, Karen P; Richard Mensah (Magnox)
Subject: RE: EA52549 - HR Wallingford Permission Email 2 of 2

Hi Aisha

Having read the response from HR Wallingford to our questions we have some further questions and points to be clarified. Depending on the answers it might also be necessary for HR Wallingford to rerun some scenarios through the model. Below are details of what we need.

Bill

1. Confirm the **density** and **nitrate concentrations** within the FED discharge that were used in the modelling. The values for these vary in the different reports (see Table) and will have an impact on both the initial dilution and the far field dispersion and nutrient impact within the estuary.
2. Explain the derivation of the nitrates figures used in the modelling, i.e are they derived from real sampling data or have they been estimated in some way?

Report	FED density	Nitrate Concentration
HR Wallingford Initial Dilution report (EBR4907-RT009-R04-00) from March 2014	1,122 kg/m ³	22,000 mg/l
HR Wallingford report FED discharge – outline outfall design update (EBR4908-RT008-R01-00)	1,154 kg/m ³	
FED non-technical summary		35,582 mg/l

Note: These values are also not the same as those provided in the original permit application in which nitrates concentrations exceeded 50,000 mg/l.

3. The CORMIX file provided by HR Wallingford has several input values that need to be addressed and potentially the FED CORMIX scenarios rerun:
 - a. In the “Effluent” tab, the “Effluent Density” is included as 1,154 kg/m³. This should be checked with regard to the question above as the HR Wallingford Initial Dilution report refers to the discharge density as 1,122 kg/m³.
 - b. In the “Discharge” tab, the “Port Ht. Above Channel Btm” is input as 8m, but the Initial Dilution report indicates that the port is 5.5m above the bed.
 - c. In the “Ambient” tab, the “Ambient Density Data” has an average density for non-fresh water of 1026.95 kg/m³. This appears to have been calculated within CORMIX using a temperature of 10C and salinity of 35ppt. This salinity value is too high for the discharge point in the estuary. Looking at Environment Agency data for sample points around the discharge point, the average salinity is around 32ppt (and average temperature of 12.5C) – resulting in an ambient density of 1024.17 kg/m³. This may be significant depending on what density is included for the Effluent.
- 4 Provide the necessary re-runs or explanations of why they are not needed.

Bill Greenwood

Water Quality Permitting Officer

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