

Technical Note

Project: Glan Llyn, Newport

Subject: PAN-014591 PJA Response to NRW Schedule 5

I Introduction

Under Paragraph 4 of Part 1 of Schedule 5 of the Environment Permitting (England and Wales) Regulations 2016, NRW has requested further information to support the determination of an application for an environmental permit relating to a proposed surface water discharge activity at Glan Llyn, Newport.

NRW's comments and queries are presented in **bold font** in Sections 2 to 6 of this technical note, with PJA's responses provided in regular font.

2 Sampling

- **For Monks Lake and Monks Ditch can you please provide me with all the laboratory test reports sent to you by the testing laboratory for each of the samples taken. This is for audit purposes. Can you also include the UKAS accreditation number for the testing laboratory.**

The UKAS accreditation number for the analytical laboratory, ALS, is 1291. The PDF laboratory analytical reports are provided as part of this response.

- **Can you let me know what the sampling strategy was for the site as I have noticed a few anomalies with the sampling i.e. Samples were only collected between September and March for 2019-20 and November and March 2020-21?**

The strategy has generally been to collect samples from the wider surface water reën network at a fortnightly frequency. Monks Lake was connected to the surface water reën network in August 2019 and surface water sampling commenced in September 2019.

Protracted discussions were held with NRW during 2019 and 2020 on what would constitute 'representative' sampling data for the proposed surface water discharge. There is a more comprehensive sampling dataset for the wider reën network; however NRW advised that this would not be considered 'representative'.

The sampling data gap identified by NRW is associated with the ongoing Covid-19 global pandemic. No surface water sampling was undertaken in Monks Lake from April 2020 to October 2020 inclusive and only limited essential works were undertaken at the site after the UK Covid-19 lockdown in 2020.

The dataset provided in support of the permit application comprises 57 surface water samples. In accordance with UK Government guidance document '*Surface Water Pollution Risk Assessment for your Environmental Permit*' which states the requirement for '*a minimum number of 12 samples (the ideal number is 36)*', the dataset is considered to be of sufficient size.

- **Why were there no samples collected for the western point of Monks Lake in 2020-21?**

Sampling was carried out on the western side of Monks Lake in addition to the northern and southern areas in the period immediately following its formation to provide more targeted information on water quality. Sampling data was generally consistent in the different areas of Monks Lake so the western sampling location was removed from November 2020.

In line with the response to the previous question, the dataset provided in support of the permit application comprises 57 surface water samples. In accordance with UK Government guidance document '*Surface Water Pollution Risk Assessment for your Environmental Permit*' which states the requirement for '*a minimum number of 12 samples (the ideal number is 36)*', the dataset is considered to be of sufficient size.

- **Samples taken on 04/11/2020 and 10/11/2020 do not show a sampling location?**

The sample location in the laboratory analytical data is provided as 'Monks Lake'. It has not been possible to determine if this was the northern or southern sampling location but the data is still considered relevant.

- **Indicated on the site plan supplied - 2554-HH-003-P1 was a sample point MD-S. Were any samples collected at this point? This point is down stream of the discharge and important factor when assessing the impact of metal bioavailability and the downstream distribution.**

Surface water samples have been collected from the MD-S 'downstream' sampling location in Monks Ditch. The data has been added to the updated laboratory analytical data spreadsheet on the 'Monks Ditch for H1 Input' tab.

- **Why were no samples taken at Monks Ditch for 2020 – 2021?**

Targeted sampling within the Glan Llyn surface water network only was undertaken during the period from November 2020 to April 2021 for the same reasons as provided above for Monks Lake i.e. only limited essential works were undertaken at the site after the UK Covid-19 lockdown in 2020 . The available data for Monks Ditch is still considered to be relevant for the purposes of the permit application.

3 Appendix E Laboratory Data

- I would be grateful if the Water Quality Laboratory Analytical Data could be resubmitted as I have found the following inconsistencies:

- The ‘Monks Lake 2020-21 Raw data’ tab shows that the last sample was collected on 19/03/2021. The subsequent tabs show samples collected up to 29/04/2021. Is there Raw data missing?

The additional March 2021 and April 2021 data shown in the subsequent Monks Lake tabs has been added to the ‘raw data’ tab in the updated spreadsheet.

- The ‘Monks Lake 2020-21 Raw data’ tab shows a sample taken 10/11/2021 that does not appear in the subsequent tabs?

The Monks Lake sampling data for 10/11/2020 (rather than 10/11/2021) shown in the ‘raw data’ tab was omitted from the subsequent tabs in error and has now been added to the subsequent tabs in the updated spreadsheet. The statistics (average, maximum etc.) have been updated accordingly.

- Why are there missing results for some determinands in the samples collected 26/01/2021 and 19/03/2021?

A less comprehensive analytical suite was scheduled on samples collected during these two monitoring rounds owing to a scheduling error. However, this is not considered to be significant in the context of the overall dataset which comprises laboratory analytical data for 57 samples.

- Can you include Monks Ditch sample data for 2020-21 if testing took place.

Targeted sampling within the Glan Llyn surface water network only was undertaken from November 2020 to April 2021 and laboratory analytical data for Monks Ditch is not available for the period. The Monks Ditch dataset is still considered to be relevant for the purposes of the permit application.

- The determinands from the first sampling period (2019-20) to the second sampling period (2020-21) are in a different order making it difficult assess the data. Can they be added in the same order please?

This has been amended in the updated laboratory analytical data spreadsheet so that the determinands are presented in the same order.

- Please provide the appropriate EQS or PNEC (and its source) that are used in your appraisal of the raw data.

The calculated PNECs and bioavailable fractions of copper, manganese, nickel and zinc were presented in the Metals Bioavailability Assessment Tool (M-BAT) that was included in Appendix E of the permit application. The screened data, together with the relevant, published water quality standards are presented in the updated laboratory data assessment spreadsheet in tab 'Monks Lake for H1 with Screening'.

Water quality standards have been obtained from:

- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015;
- Published UK Government guidance on surface water pollution risk assessment¹ which NRW is understood to be continuing to follow; and
- NRW Gwent Levels Briefing Note: Advice on Water Quality Standards to be used for Impact Assessment of the M4 Relief Road on the Gwent Levels Ditch System (December 2016). NRW has previously advised under a planning scenario that they consider this briefing note to be applicable to Glan Llyn. For most substances, the briefing note advises using the WFD standard, however for a small number of substances the briefing note provides a specific Gwent Levels Water Quality Standard (WQS).

4 HI Risk Assessment

- **A new H1 needs to be submitted for the following reasons:**
 - **All potential hazardous substances should be screened through the H1 tool not just those on the Priority Hazardous Substance and Specific Pollutants list. The H1 screening eliminates all substances which are considered not liable to cause pollution. This stage uses precautionary, raw data which have not been “cleaned up”. i.e. no adjustment of “less than” values or removal of outliers. All the hazardous pollutants which are likely to be in the discharge must be assessed.**
 - All substances with either a published freshwater EQS which is adopted under UK legislation, an M-BAT PNEC, or a Gwent Levels WQS have been inputted to the H1 assessment tool.

Published UK Government Guidance on surface water pollution risk assessment¹ which NRW is understood to be continuing to follow states *‘Your discharge may contain other hazardous chemicals or elements that are not listed in the tables, for example, pesticides, biocides or disinfectants. You should include information about these with your permit application to the Environment Agency. You should also include measurements of these*

¹ <https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit>

pollutants in your discharge'. Recorded concentrations of all other substances without a published freshwater EQS, an M-BAT PNEC or a Gwent Levels WQS have been included in the permit application, which is considered to be in accordance with the requirements outlined above.

PJA requested clarification from NRW on this aspect of the Schedule 5 notice via email and NRW has stated that EQS or PNEC need to be provided for every substance in the analytical suite. PJA is concerned that this may be beyond the requirements of the guidance outlined in the previous paragraph, and The Environmental Permitting (England and Wales) Regulations 2016 (in particular Schedule 21 which relates to Water Discharge Activities). In PJA's experience, we have not been asked to apply other EQS or PNEC which have been published in scientific papers, presumably on the basis that these have not undergone a rigorous peer review process, for example by the WFD UK Technical Advisory Group, which would typically be expected before an EQS is adopted by the Government under UK legislation.

PJA is concerned that if EQS or PNEC values are arbitrarily attributed from sources other than the recognised published peer reviewed data, then the Permit containing the condition specifying limits could be deemed to be Ultra Vires. We therefore respectively request confirmation from NRW's legal team as to the position regarding the validity of a Permit containing EQS or PNEC values that have not been adopted by the Government under UK legislation.

It is understood that UK EQS are derived and adopted for substances which pose the greatest toxicological risk to receptors and which are released to UK waters in significant quantities. A limited number of substances without a UK freshwater EQS, an M-BAT PNEC or a Gwent Levels WQS have been recorded above LOD in Monks Lake on at least one occasion during the monitoring period. Due to PJA's concerns highlighted above, EQS or PNEC have not been assigned for the following 15 substances and they have therefore not been included in the H1 assessment tool:

- Sulphide;
- Sulphur;
- Barium;
- Selenium;
- Magnesium;
- Calcium;
- Cresols; and

- PAH compounds (acenaphthene, acenaphthylene, phenanthrene, fluorene, chrysene, pyrene, benzo(a)anthracene, indeno(1,2,3-cd)pyrene).

In the case of the eight PAH compounds, benzo(a)pyrene is commonly used as a 'marker' compound on the basis that of the 16 USEPA PAH compounds, it poses the highest ecotoxicological risk. It is therefore not considered critical to assess these eight PAH compounds using the H1 tool.

It is considered that the risk posed by cresols, which were recorded above LOD on a single occasion, can be sufficiently assessed via the phenol dataset. There is a published UK freshwater EQS for phenol and that data are included in the H1 tool.

For the remaining six substances, there is considered to be no robust published EQS, PNEC or other WQS with which to assess to the potential ecotoxicological risk.

With reference to this request, all other substances included in the analytical suite which have not been recorded above LOD and do not have a UK freshwater EQS, an M-BAT PNEC or a Gwent Levels WQS are not considered 'likely to be in the discharge' and have therefore not been assessed further.

– **What is the basis of the Q95 river flow data?**

River flow data was previously obtained for Monks Ditch during 2016 and 2017 using a flow meter. This data has been used in the H1 risk assessment and an additional tab has been provided in the spreadsheet to present the available data and calculated Q95 value. It is understood based on email correspondence that NRW does not have flow data for Monks Ditch, and it is therefore appropriate to use this available data.

- **For the H1 tool you should use the average figure generated for each determinand found in the raw data. It appears that you have used the results found in the Tab 'Monks Lake with 0.5 LOD values. To run the data through the H1 tool, and to calculate the summary statistics required, all less than values should be taken at face value. For example, a value of <10 should be assumed to be 10.**

The data assessment has been revised to assign the value of the LOD to concentrations of <LOD. The same approach has been taken in calculating the average and maximum concentrations to be inputted to the H1 tool.

- **I cannot match the data inputted in the H1 tool for zinc, copper, manganese, nickel and lead with data from the sampling laboratory data.**

The average of the bioavailable fraction of each of these metals was calculated using the outputs from the M-BAT. Assuming this was insufficiently conservative for the purposes of the H1 assessment, the average of the recorded dissolved phase concentration has instead now been inputted to the updated H1 assessment tool.

- For the data entered the H1 Tool (Phase 1), only metals which have bioavailable EQSs should be assessed using dissolved metal data for both bioavailable and MAC EQSs assessments. All other metals should be assessed using total metal data rather than dissolved metal data. You have incorrectly included some dissolved metals in the H1 tool; Cadmium, Chromium, Mercury. Dissolved metal data will be required for all metals which pass through to Phase 2 modelling.

As requested, all other metals data has been inputted using the total (aq) concentration.

- When completing an H1 screening please note that Annex E is no longer relevant. Guidance can be found in document annex D and D2.

Noted. The reference to Annex E has been removed from the updated Non-Technical Summary.

5 MBAT

- In the 'Metal Bioavailability Assessment Tool' (MBAT) I cannot match the data inputted for pH, Dissolved Organic Carbon (DOC) or Calcium (ca). I would be grateful if you could identify the source of this data.

The inputted data is an average of the recorded MD-N and MD-S data from 02/09/2019 to 26/03/2020. Both MD-N and MD-S data are included in the updated laboratory data assessment spreadsheet. It is understood based on correspondence with NRW that it is appropriate to use the average of data collected from both MD-N and MD-S locations for this purpose.

6 Management Plan – Sampling/Monitoring Points

- The management plan references Drawing 02554-AA-003-P1 showing the location of the future sampling/monitoring points can you please provide this drawing.

Drawing 02554-AA-003-P1 was prepared as part of a previous request for information from NRW and was provided on 5 August 2021. The drawing has been provided again for convenience.

- Please could you supply me an estimate of the volume and surface area for Monks Lake.

The approximate surface area at an elevation of 6.5 mAOD is 3,450m² with a volume of 11,350m³.