

To

Norwegian Environment Agency
c/o Erland Årstøl
Overingeniør
Industriseksjon 1

Ihre Nachricht	Unser Zeichen	Telefon	Name	Datum
Your E-Mail from	UW	02181-1645-220	U. Wülbers	05.07.2022
30.06.2022				

Dear Erland,

Please find below our response to your questions:

1. The NIVA report makes calculations based on pH 10.5, while you have applied for a higher pH-level (60%) than this. Can you comment on why you are applying for pH 10.7 in particular?

If we look at the measured values of the pH value over a longer period of time, e.g. up to 18 months, there are occasionally values that are greater than those at the time of the measurement for the NIVA report, whereby these reports also frequently only state > 10. We also have to note that there are isolated measured values that are > 10.7. (See appendix 1)

To reflect these fluctuations we have applied to increase the limit to 10.7. We still consider the NIVA report, which assumes that all water is discharged at 10.5 and does not reflect that there will be times with pH slightly lower and also slightly higher, to be a good and valid assessment of the total discharge.

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2. The length of a potential temporary extension is one of the things that we will have to evaluate. Can you offer some more details on the envisioned timeframes for installation of the new technology?

In our joint meeting in Oslo we had addressed the technical possibilities that seem reasonable to bring the pH permanently and safely below 10. One of these is the conversion of the wet scrubbers from water to sulfuric acid, or the use of Co₂. We are currently in the evaluation phase as to which is the better solution.

However, this issue is overshadowed by the situation around the Raudsand- and Kleiv dams. As you know, we need the water from both reservoirs, on the one hand to clean the waste gas from ammonia and on the other hand to operate our washing belt for the oxides.

The municipality of Molde has informed us that they are not interested in continuing to operate the dam and have offered to buy it for the symbolic price of 1 NOK. However, since there is a considerable renovation backlog at this dam, we are in discussion with the municipality here. The same applies to the Kleiv dam, which is owned by the Veidecke A.S. company. Based on this situation, a time line of at least 2 years is necessary to evaluate and implement both technical options. (Please see appendix 2)

3. Can you expand on why you don't view neutralization with acid as a viable alternative solution?

As mentioned in our discussion on 13.05.2022 in Oslo, one could add appropriate amounts of sulfuric acid, 20 kg/h, to the wastewater, i.e. our process water, and thus bring the pH value below 10. From our point of view, however, this does not seem to be in the interest of the environment, since with this step we are adding an additional substance, namely sulfuric acid to the fjord. We think that with this kind of pH adjustment the environment is not served. We are rather trying to find a solution which is more environmentally friendly.

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4. Has installation of a diffusor been considered?

With regard to a diffuser, we have a view that this will not really improve the overall situation.

5. Miljødirektoratet does not consider pre-emission dilution as a viable way of managing emission levels. Nonetheless, I think a brief clarification of the impact of the outlet pipe being shared between Real Alloy and others is necessary.

We have a total of 3 different water streams at the Raudsand site. One is the one that comes from the wet scrubbers, the other is the one that comes from our wash belt for the oxide, and finally the water stream that comes from the mine. The first two are our process water, which we continuously measure for pH, among other things. The water from the mine is outside our sphere of influence and arises naturally through snowmelt, etc..

Nevertheless, these three effluents are discharged into the fjord in a common outlet, which, depending on the concentration, may possibly lead to a reduction in the pH value, but this cannot be shown to be sustainable. We are rather trying to find a solution which is more environmentally friendly.

6. Improved of flocculants are described in the application as having the potential to reduce pH-levels, and are something you are currently working on. Can you expand on the potential for this to reduce pH-levels, and if you have any practical experience with pH-levels and flocculants in your process?

We tested the flocculant last year and now use it (Separ-Chemie) in the process. It achieves a higher level of flocculation and therefore taking out of suspended solids and some heavy metals among these.

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The waste water is much clearer than with the old Magnafloc 155 more of the suspended matter is taken out prior to reaching the NIVA Station. With regard to a remarkable improvement of the pH value, we can unfortunately not make any statement at this point in time.



Russell Barr
Executive Vice President
Europe Managing Director Europe



Uwe Wülbers
Director Operations/ Technology & HSE

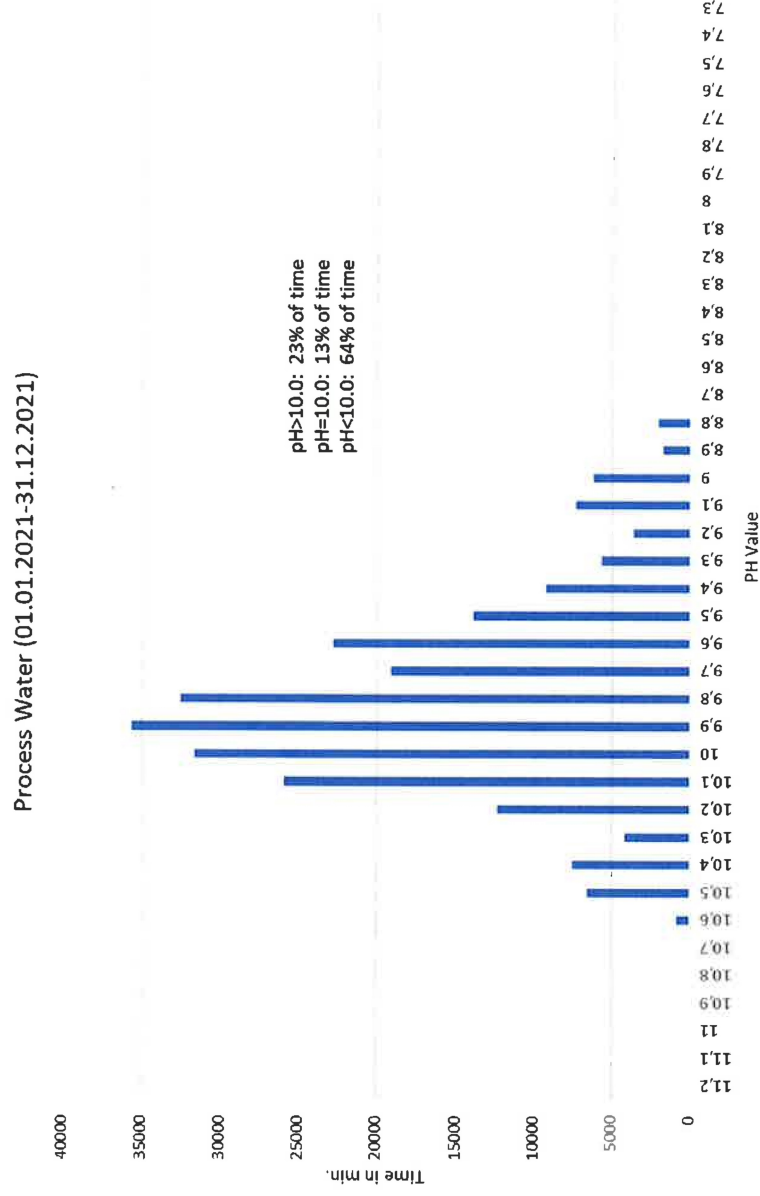
Appendix: pH-Situation in Raudsand/ Norway 05.07.2022

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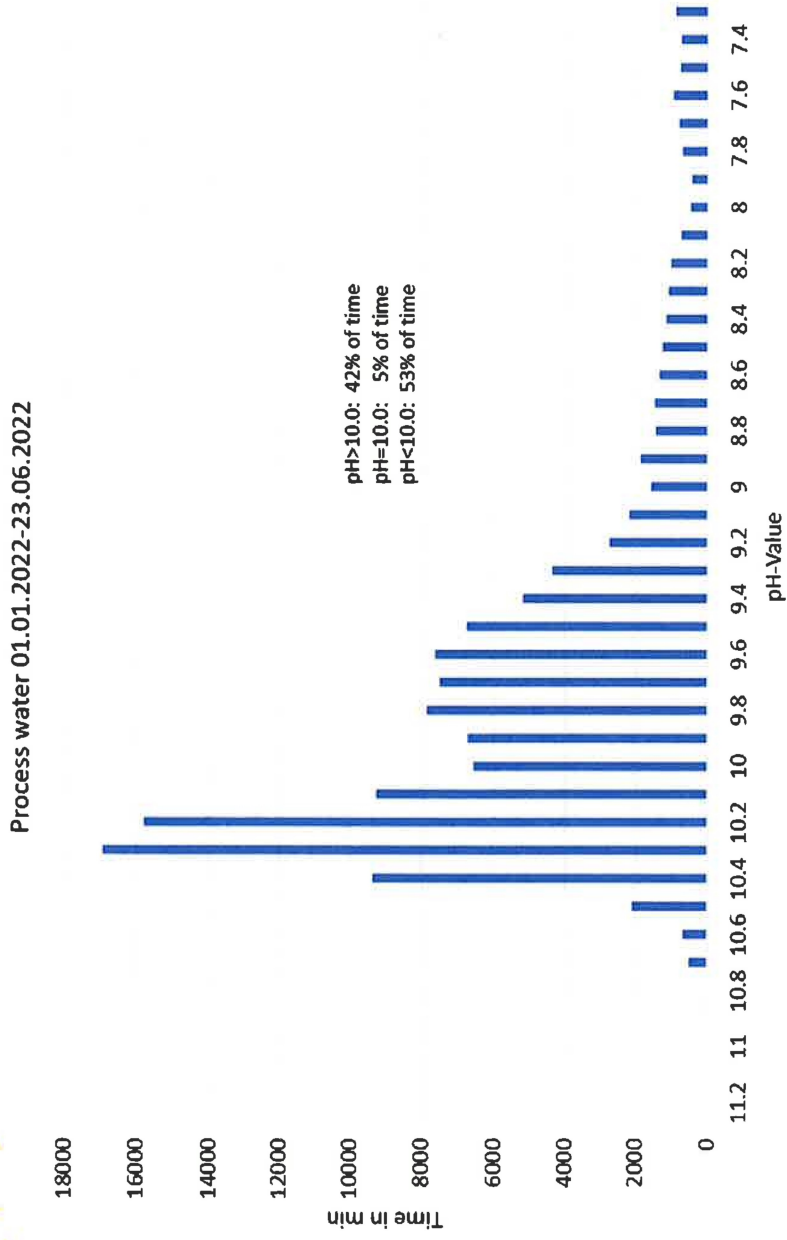
Messwerte 01.01.2021 bis 31.12.2021

Appendix 1



Messwerte 01.01 bis 23.06.2022

Appendix 1



Overall Timing

Appendix 2

