

NORTHLAND REGIONAL COUNCIL HEARING OF RESOURCE CONSENT APPLICATION BY THE FAR NORTH DISTRICT COUNCIL MINUTE #2 OF THE HEARING COMMISSIONERS

Introduction

1. A hearing for the application (APP.004007.01.03)

lodged by the Far North District Council (the Applicant) relating to discharges from the East Coast Bays Wastewater Treatment Plant (the WWTP) was held between 24 and 26 June 2019.

2. This Minute outlines a request for further information from Mr Kurmann (a submitter) and also confirms the timetable for Mr Tait to provide his supplementary statement and for the Applicant to provide its Right of Reply.

3. Further Information - Mr Kurmann

On the second day of the hearing Mr W Parsonson presented evidence on behalf of Mr Kurmann, a submitter on the application. We were advised that Mr Kurmann was overseas and was therefore unable to attend the hearing in person. Mr Parsonson presented, and spoke to, a number of slides which Mr Kurmann had prepared before going overseas. It was agreed that, in the event that we had questions of Mr Kurmann, that we would prepare a Minute containing any such questions.

4. We have determined that we have a number of questions for Mr Kurmann regarding his presentation/evidence. We request that Mr Kurmann provides us with answers to the following ten questions:

a)

Had you read the four briefs of evidence provided by the Applicant (those being from Dr MacKay, Dr Macdonald, Mr Hegarty, and Mr Somers) prior to preparing the presentation/evidence that Mr Parsonson delivered at the hearing?

**Answer: My apologies, but I prepared my presentation in April and since the evidence provided by the above persons was only sent to me two weeks before the hearing date, I had no time to read through them.**

b)

The first aerial photograph of the WWTP in your presentation is dated 7 December 2017. Are the next four photographs, which show the var

ious treatment ponds, enlargements of part of the first photograph and therefore taken on the same date (none of them had date stamps)?

Answer: Yes we organised a Helicopter for the aerial photographs and all of them were taken on the 7<sup>th</sup> of December 2017.

c)

What was the date of the sixth photograph which shows the coastal waters near the Aurere River mouth (there is no date stamp provided on the photograph)?

Answer: Again the photograph was taken on the 7<sup>th</sup> of December 2017. In fact we took over 200 photos from many waste water treatment plants in the Far North. In addition we have taken a lot of photographs from each waterway above and below the treatment plants as well as from the coastal sites.

d)

Where within the existing WWTP treatment process would the electrocoagulation (EC) unit be used?

Answer: Just after the existing first oxidation pond or after the settlement pond. I have done trials on both outlets.

e)

What is the capital cost estimate for purchasing and installing an EC unit, including any additional associated capital such as a centrifuge, that would be able to treat the predicted wastewater flows and loads at the WWTP?

Answer: NZ\$950,000.00 for the EC unit; NZ\$200,000.00 for the two way water decanter; NZ\$85,000.00 for the complete installation.

f)

What is the annual operational and maintenance cost estimate for an EC unit, including any additional associated capital such as a centrifuge, that would be able to treat the predicted wastewater flows and loads at the WWTP?

Answer: \$14,900.00 for metal plate replacement; \$73,000.00 for power consumption; 8500.00 operator maintenance time. The centrifuge capital costs are mentioned above.

g)

What is the anticipated life of such an EC unit?

Answer: 25 Year

h)

We were advised that the EC unit at the WWTP could be operated by way of solar power. We presume that an electricity storage system would need to be provided to power the EC unit during periods when solar power is not able to be generated, is that correct? Would such a solar

system be able to run all associated components, for example a centrifuge if that is considered necessary after the EC treatment?

**Answer:** There are many options possible. We could run enough electro-voltage panels to provide the electricity on a sunny day and use the power from the grid during the night and if the sun is not available. We could also install enough panels to produce a double or triple electricity load and store the excess in new technology power banks to be more independent.

i)

What is the predicted quality of treated wastewater from an EC unit sized to be able to treat the predicted wastewater

flows and loads at the WWTP in terms of:

- i. Total ammoniacal nitrogen (mg/L);
- ii. Total nitrogen (mg/L);
- iii. Total phosphorus (mg/L);
- iv. Five-day biochemical oxygen demand (mg/L);
- v. Total suspended solids (mg/L);
- vi. Total faecal coliforms (cfu/100 mL).

**Answer:** Average results of the reduction of water soluble nutrients and E. coli bacteria from the discharge water of the Taipa settlement pond after the EC unit (16 samples analysed)

**Ammonium reduction** Average of 50 to 60 %

**Nitrate reduction** Average of 80 to 85%

**Phosphate reduction** Average of over 95%

The **reduction of E.coli bacteria** was in every run over 99.9%

Customer	Taipa Waste Water Treatment Plant		
Ministry of Health ID No			
Sample	Sample 15		
Date	25/10/2018	Time	17:30pm
Customer ID	2153	Sampler	Andreas
Sample taken from	Outlet settlement pond after EC	Sample source	TWWP
Sample condition at arrival	>10°C	Sample accepted Yes/No	yes
Start Date Laboratory	29/10/2019	Time	3:30pm

### Laboratory result

Laboratory No	8554
Total Coliforms Colilert 9223B	<1
Escherichia Coli Colilert 9223B	<1
Faecal Coliforms CFU/100 ml	
Escherichia Coli CFU/100 ml	
pH	9.91
Ammonium NH <sub>4</sub> mg/l	36
Nitrate NO <sub>3</sub> mg/l	<0.2
Chloride mg/l	
Phosphate mg/l	0.16

Customer	Taipa Waste Water Treatment Plant		
Ministry of Health ID No			
Sample	Sample 2		
Date	13/04/2018	Time	
Customer ID	2153	Sampler	Andreas
Sample taken from	after EC unit 2.5 Amps	Sample source	TWWTP
Sample condition at arrival	>10°C	Sample accepted Yes/No	yes
Start Date Laboratory	13/04/2018	Time	10:00am

### Laboratory result

Laboratory No	8160
Total Coliforms Colilert 9223B	
Escherichia Coli Colilert 9223B	
Faecal Coliforms CFU/100 ml	<10
Escherichia Coli CFU/100 ml	<10
pH	7.65
Ammonium NH <sub>4</sub> mg/l	37
Nitrate NO <sub>3</sub> mg/l	3.1
Chloride mg/l	
Phosphate mg/l	0.17

The trial is ongoing and I would like to add the data for the next 5 month to the file as well. The only parameter to date which I think would need some improvement is ammonium. Please note that I have not measured the total ammoniacal nitrogen, but the ammonium (NH<sub>4</sub>).

I would strongly suggest to change, modify the operation of the existing plant to remove/convert the ammonium into nitrate which we can easy remove. The original design of the plant would have included a nearly complete conversion of urea to nitrate. I am prepared to help with the change of operation that the original aim/task of the treatment plant in Taipa can achieve the designed goal.

The parameters BOD5 and the TSS have not been part of the original trial, but will be included from now on.

j)

Please provide anticipated median and 95th percentile concentrations for each of the above determines for an EC unit sized to be able to treat the predicted wastewater flows and loads at the WWTP.

Answer:

<u>Contaminants Removed</u>	<u>Percentage of Removal</u>
a) BOD	90%+
TSS (Clay, coal, silt, silica, etc.)	99%+
Fats, Oils, Grease	93-99%+
Water From Sludge	50-80%+
Heavy Metals	95-99%+
Phosphates	93%+
Total Coliform	99.99%+

**Total Nitrogen**

**80% +**

My apologies, but I have not all the new data from the Taipa waste water plant available on my laptop in Europe. As soon as I am back home in Taipa I will provide you with all the data collected to date.

k)

Will such an EC unit be able to deal with high algal loads which may develop within the WWTP?

How do high algal loads affect the performance of the EC unit?

Answer: The EC unit will perform nearly the same with or without algae. There is a report from Niwa which proves that all the algae used at the Cambridge waste water plant could be removed by the EC unit. (They have borrowed my EC units for the successful trials)  
The more algae we have in the pond the better would be the removal ratio of ammoniacal nitrogen. For nitrate, phosphate and faecal coliforms removal the algae have no influence.

5.

We are happy for Mr Kurmann to provide answers to the above questions by way of an email. We request that Mr Kurmann provide his response to us, via Ms Sluys (email: [alissas@nrc.govt.nz](mailto:alissas@nrc.govt.nz)), no later than 5 pm, Wednesday 3 July 2019.

Kind Regards



Andreas Kurmann  
M.Sc.  
Far North Envirolab Ltd