Email giving operation details

Hi  team

This email from Leny Samuel sets out the risk case for the nanobubble system (yellow high light by me).

If you have a power cut or run out of gas, all nanobubble generators would have to be lifted out of the lake and dried for 2 days before they would work again.

That could be game changer during spring when we get big storms and power outages

Think about it

Cheers

Max

**From:** Leny Samuel [mailto:leny.samuel@henleygroup.co.nz]
**Sent:** Monday, 5 March 2018 1:51 p.m.
**To:** Ben Woodward <Ben.Woodward@niwa.co.nz>
**Cc:** Jacob Power <jacob.power@henleygroup.co.nz>; Piet Verburg <Piet.Verburg@niwa.co.nz>; Max Gibbs <Max.Gibbs@niwa.co.nz>
**Subject:** Nanobubble test unit

Hi Ben,

Thanks for your time today.

Just repeating what we said about the operation of Nanobubbles.

Turning the machine ON:

1. Open the Gas supply
2. Start the pump
3. Maintain gas pressure at around 100 KPa, or slightly lower pressure, wherever you find the bubbles to be tiniest

Turning the machine OFF:

1. Turn off the pump
2. Remove water form the nanobubble generator - Lift the discharge pipe out of water so that water can drain out (This is to prevent Reverse Osmosis – water getting inside the pores of the nanobubble generator)
3. Close the gas supply

Please make sure that there is sufficient gas in the cylinder at all times. If the gas gets over while the pump is still running, then water will seep into the pores of the nanobubble generator. This is reverse osmosis.

This will block the pores and when you run the system again, you will not get nanobubbles. If reverse osmosis does take place, please follow the step highlighted in Red above. And keep the nanobubble generator dry for two days. This will cause water to dry out.

You can also observe how long water stays in supersaturated state. Oxygenate it for a few hours and turn the machine off when it is supersaturated to greater than 25 mg/L. Measure the DO the next day in the morning. This will give a good idea on how long the nanobubbles stay in water under supersaturated conditions.

Please do note that the ability of nanobubbles to remain in water also depends on the depth of the water. Since the test is being done in a small bucket, it won’t be surprising if it doesn’t remain in supersaturated condition for a long time.

Also, when creating CO2 and Nitrogen nanobubbles, do try varying the pressure between 50 KPa and 200 KPa to get the smallest bubble diamater.

Should you have any queries or doubts, please feel free to contact us anytime.

Many thanks for testing our nanobubble system.

Kind Regards,

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