

Organised by :





29th October 2020 Thursday 10:00hrs - 11:00hrs

HOUSEKEEPING

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- Please share your questions in the chat where we will try to provide answers where possible in the Q & A Segment.
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Welcome Address



Mr Robin Wong

SWA Council Member Director, Municipal Vertical Market & Key Accounts (Southeast Asia) Xylem Water Solutions Singapore Pte Ltd

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SWA Initiatives



SWA Marketplace Assist Platform (SWA-MAP)

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Upgrading of Choa Chu Kang Waterworks (CCKWW)

- Ceramic Membranes, Ozone and Biological Activated Carbon

Dr Jodie Chin (General Manager) 29 Oct 2020

> **OPUB** SINGAPORE'S NATIONAL WATER AGENCY

Marina Barrage

Upgrading of Choa Chu Kang Waterworks (CCKWW)

https://youtu.be/986cLmcGins





CHOA CHU KANG WATERWORKS (80mgd)

PHASE 1:

Completed : 1976 (upgraded to membrane in 2008) Capacity : 182,000 m³/day (40mgd) Raw Water : Kranji, Pandan PHASE 2:Completed: 1981Capacity: 182,000 m³/day (40 mgd)Raw Water: Tengeh (Western Catchment)

UPGRADING (2019)

40 mgd ceramic membrane filtration New ozone system Biological activated carbon (BAC) intration Relift pumping station



Raw Water Sources & Challenges

- → Raw Water Sources: Kranji, Pandan and Tengeh reservoirs
- → Increasingly challenging raw water to treat: low turnover in dry period (climate change)
- → High Total Organic Carbon (TOC) in raw water increases potential of formation of Disinfection By-products e.g. Trihalomethanes (TTHM), Haloacetic acids (HAAs)
- → Presence of algae can increase potential of aesthetic issues, e.g. undesirable taste and odour compounds (2-methylisoborneal (MIB) & geosmin)



Treatment Processes before Upgrading







Treatment Processes after Upgrading





Ceramic Membranes



✓ More durable

- Longer lifespan (~20yrs)
- Able to withstand harsher chemicals for thorough cleaning
- ✓ Less water loss:
 - Higher recovery (~99%)

Membrane Element Specifications

Туре	Inner Pressure Monolithic
Material	Ceramics
Nominal Pore Size	0.1µm
Outer Diameter × Length	O.D. 180mm × 1,500mmL



Ozone Generators

Before Upgrading 12 ozone generators occupied a building.



After Upgrading





✓ More efficient:

- The new three ozone generators are as efficient as the 12 older ozone generators
- ✓ Smaller footprint:
 - The three new ozone generators occupy a smaller space in the plant.

Post-Ozone Reaction Tank (PORT)





Biological Activated Carbon (BAC)



- \checkmark More effective in removal of :
 - Organics
 - Taste and odour compounds (MIB and Geosmin).





Benefits of CCKWW upgrading

Benefits of Ceramic Membrane during Operation

- Higher Recovery (99.5% vs 95%);
- Able to handle poorer quality raw water;
- Lower downtime for membrane replacement.

Benefits of Ozone/BAC during operation

- Able to handle high MIB & Geosmin;
- Reduction in TTHM & HAAs;
- Lower TOC in final treated water.



- With the upgraded processes, CCKWW is able to sustainably produce high quality drinking water even with more challenging raw waters.
- ✓ The upgraded processes are more cost-effective in terms of treatment efficiency and land use.

Continue to ensure a clean, safe, and sustainable supply of drinking water for Singapore.









https://youtu.be/986cLmcGins



Q & A

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Water for All – Sustainable Resource Management (3rd Nov 2020, 9am – 10:30am)

> In Conversation with ESG (by invite only)

(11th Nov 2020, 1:30pm – 2:30pm)

Advancing Innovations through Partnerships: The Singapore Experience (19th Nov 2020, 3pm – 4:30pm)



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VIRTUAL INTRODUCTION Choa Chu Kang Waterworks

For further queries on the event, please contact



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