

Hach helps key provider of energy solutions avoid plant shutdown

Tuas, Singapore

Who is the client?

This power station is located at the western part of Singapore and contributes about 20 per cent of Singapore's total power supply. It is also one of the Singapore's leading power generation companies which maintained a strong reliability performance record of 99.9 per cent over the last ten years. This power station is a key provider of energy solutions, multi-utilities and environmental services.



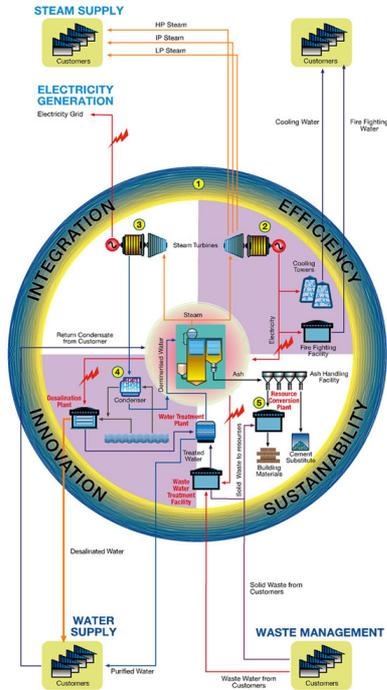
It has a plant portfolio of five highly efficient Combined Cycle Plants and one 600MW steam plant. The station has been accredited with ISO 14001 and OHSAS 18001 in recognition of their efforts in maintaining environmentally responsible operations as well as a safe and healthy work environment.

What is the challenge?

Being a huge aspect of power generation and a key provider for energy solutions, client cannot afford to have the plant shutdown due to downtime.

What is the process and Hach's solution to client?

Client's process to enable the water monitoring would be as follows:

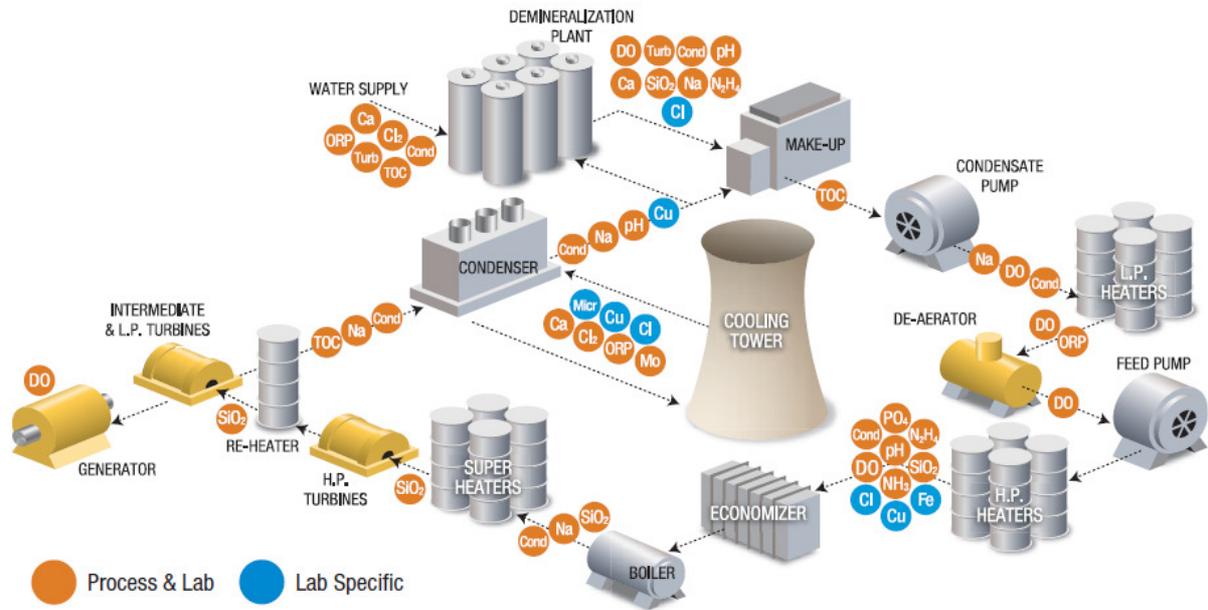


Hach offered a total solution to customer, which was being adopted by client. In the boiler process, Hach 9240 Sodium Analyzer (test for sodium) and Hach 9210 Silica Analyzer (test for silica) was installed to test for both sodium and silica parameters.

Through the wastewater process, Hach has installed Hach astroTOC UV Analyzer (test for TOC), Hach CODmax II (test for COD), Hach 1720E Turbidimeter (test for turbidity), Hach DO Analyzer (test for DO), Hach 8350 pH Probe (test for pH), Hach 8351 Redox Probe for High Temperatures (test for ORP), Hach 8312 Conductivity Sensor (test for conductivity).

In the de-mineralized water process, we have the Hach 9210 Silica Analyzer (test for Silica), Hach 9240 Sodium Analyzer (test for Sodium), Hach 8312 Conductivity Sensor (test for conductivity) and Hach 8350 pH Probe (test on pH) installed.

Aside from that, through the following diagram, it could show the solutions that Hach could offer to clients and the parameters tested, together with the stage of process. Attached below the diagram, there is a table listed Hach's solutions for both boiler water and de-mineralized water.



Water Treatment

- Cl_2 Chlorine
- Cl Chloride
- Cond Conductivity/Total Dissolved Solids (TDS)
- DO Dissolved Oxygen
- Ca Hardness/Alkalinity
- N_2H_4 Hydrazine/Oxygen Scavenger
- ORP Oxidation-Reduction Potential
- pH pH
- SiO_2 Silica
- Na Sodium
- TOC Total Organic Carbon (TOC)
- Turb Turbidity and Suspended Solids

Steam Cycle

- NH_3 Ammonia
- Cl Chloride
- Cond Conductivity/Total Dissolved Solids (TDS)
- Cu Copper
- DO Dissolved Oxygen
- N_2H_4 Hydrazine/Oxygen Scavenger
- Fe Iron
- ORP Oxidation-Reduction Potential
- pH pH
- PO_4 Phosphate
- SiO_2 Silica
- Na Sodium
- TOC Total Organic Carbon (TOC)

Cooling Water

- Cl Chloride
- Cl_2 Chlorine/Oxidants
- Cond Conductivity/Total Dissolved Solids (TDS)
- Cu Copper
- Ca Hardness/Alkalinity
- Micr Microbiology
- Mo Molybdate and Other Corrosion Inhibitors
- ORP Oxidation-Reduction Potential
- pH pH
- Na Sodium

Close monitoring of Silica concentration using the Hach 9210 Silica Analyzer, helps ensure power plant efficiency and reduce downtime by avoiding costly plant shutdowns and repairs. A deposit of 0.1mm can reduce thermal transfer by 5%. If there is even trace level of silica in the water when it is heated to steam it can deposit itself on the blades of a turbine in a very short period of time. Silica deposits affect how a turbine spins and causes:

- Reduced capacity and efficiency of the turbine
- Increased maintenance costs
- Unscheduled plant shutdown for repair or exchange of blades

Boiler Water

Parameter	Benefit	Hach Offering
pH	Maintain pH to reduce corrosion	8362sc High Purity pH/ORP System with sc200 or sc1000 controller
Conductivity (Specific and Cation)	Detect presence of dissolved solids.	sc200 or sc1000 controllers with GLI D3422A2 high purity conductivity sensors
DO	Control DO levels to reduce corrosion due to oxidation of metal surfaces.	K1100 Dissolved Oxygen Sensor
Phosphate	Confirm target levels; may also be used to detect carryover in the system.	Series 5000 Phosphate Analyzer (low or high range)
Silica	Identify earliest signs of anion breakthrough in demineralizers and polishers. Monitor in steam to prevent carryover to turbines.	Series 5000 Silica Analyzer (with sample heater for faster response time)
		DR 5000 or DR 3900, Spectrophotometers with pour through cells for high-throughput testing
Sodium	Identify earliest signs of cation breakthrough in demineralizers and polishers. Sodium in steam causes pitting corrosion on turbine blades.	9240/9245 Sodium Analyzers
Turbidity	Monitor corrosion.	2100Q Portable Turbidimeter 2100AN Laboratory Turbidimeter 1720E Process Turbidimeter.

Demineralized water

Parameter	Benefit	Hach Offering
Chlorine	Assess chlorine levels of effluent sources (rivers, wastewater treatment effluent or city water) Prevent damage to RO filters	CL17 Free and Total Residual Chlorine Analyzer CLF10 sc Free and CLT10 sc Total Reagentless Chlorine Sensor AutoCAT 9000 Chlorine Amperometric Titrator
Conductivity	Detect contamination.	sc200 or sc1000 controllers with GLI D3422A2 or D3725E2T high purity conductivity sensors
Hardness	Detect hardness breakthrough from water softeners.	DR 5000™ UV-Vis Spectrophotometer DR 3900™ Benchtop Spectrophotometer APA6000 Low High Range Hardness Analyzer SP510 Hardness Analyzer
pH	Determine potential corrosiveness of water.	8362sc High Purity pH/ORP System with sc200 or sc1000 controller
Particle Counting	Determine filter effectiveness/breakthrough	2200PCX Particle Counter
Phosphate	Detect carryover problems from the boiler.	Series 5000 Phosphate Analyzer DR 5000™ UV-Vis Spectrophotometer DR 3900™ Benchtop Spectrophotometer
Silica	Detect breakthrough of solids resulting from resin bed exhaustion.	Series 5000 Silica Analyzer
Sodium	Detect condenser leaks. Detects breakthrough of solids resulting from resin bed exhaustion.	9240/9245 Sodium Analyzers
Turbidity	Determine filter effectiveness/breakthrough.	1720E Low Range Process Turbidimeter with sc200 Controller SOLITAX sc Suspended Solids and Turbidity Analyzer TSS sc Suspended Solids Sensor

Under the mixed bed process, client monitored for silica using Hach 9210 Silica Analyzer and sodium concentration using Hach 9240 Sodium Analyzer. For silica, we need to monitor mixed bed and anion bed break through and silica concentration to control scaling property of steam water. For sodium testing, it is to monitor mixed bed break through and sodium concentration to control corrosiveness of steam water. Below you can find a picture of customer's site while using Hach instrumentation and adopting Hach's total solution provided.



How is the end result?

In summary, Hach offers total solution for client with the solution table for list of instrumentation as follows:

Products	Application Point
Sodium: 9240 Sodium Analyzer	Boiler Water
Silica: 9210 Silica Analyzer	Boiler Water
TOC: astroTOC UV Analyzer	Wastewater
COD: CODmax II	Wastewater
Turbidity: 1720E Turbidimeter	Wastewater
DO: DO Analyzer	Wastewater: De-Aerators
pH: 8350 pH Probe	Wastewater
ORP: 8351 Redox Probe for High Temperatures	Wastewater: De-Aerators
Conductivity: 8312 Conductivity Sensor	Wastewater
Silica: 9210 Silica Analyzer	Demineralized Water
Sodium: 9240 Sodium Analyzer	Demineralized Water
Conductivity: 8312 Conductivity Sensor	Demineralized Water
pH: 8350 pH Probe	Demineralized Water

Client's feedback: As Hach has the capability and the massive library of knowledge, client finds themselves turning to Hach for solutions. Being the leading expert in water quality, Hach has helped customers avoid plant shutdown by providing them with solutions for continuous monitoring and safe control of their plant. Besides that, Hach offers water analysis online and lab solution covering the whole water cycle.

FOR TECHNICAL ASSISTANCE, PRICE INFORMATION AND ORDERING:

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In the interest of improving and updating its equipment, Hach Company reserves the right to alter specifications to equipment at any time.