

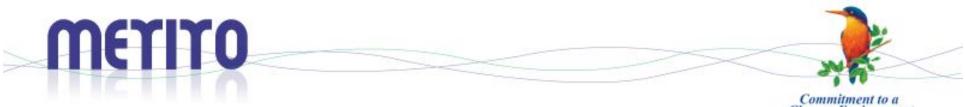
# **District Cooling Workshop**

Wednesday 18/6/2014

## Towards Cooperative District Cooling Society



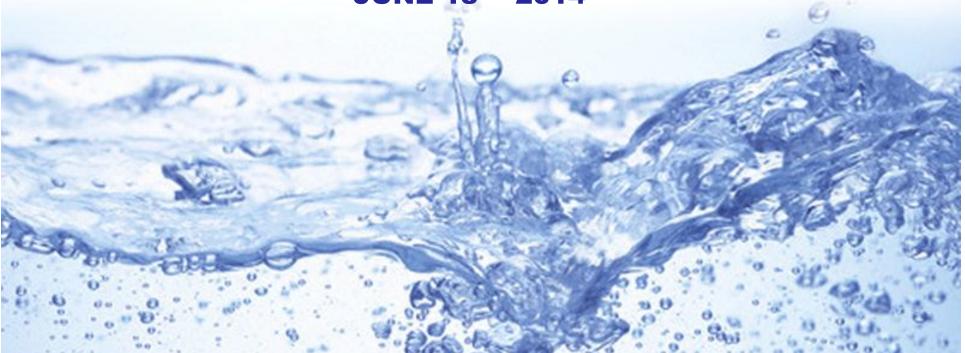




Commitment to a Cleaner Environment

## PRESENTATION ON **TSE TREATMENT**

**JUNE 18<sup>TH</sup> 2014** 





## **COMPANY BACKGROUND**

- OVER 55 YEARS EXPERIENCE IN THE WATER INDUSTRY
- PRESENT IN 12 COUNTRIES WORLD WIDE
- GLOBAL HEADQUARTERS IN DUBAI, UAE
- STAFF STRENGTH : 2500 + WORLD WIDE
- 10 YEARS IN QATAR
- FULLY FLEDGED OFFICE : 425 + STAFF
- PLANTS : RO / SEWAGE TREATMENT (PLANTS AND CHEMICALS)





## **TECHNOLOGIES OFFERED FOR DISTRICT COOLING**

- 1) R. O. PLANT
- 2) PRE TREATMENT
  - A) 2 STAGE FILTRATION (CONVENTIONAL), OR
  - **B) ULTRAFILTRATION**
- 3) CHEMICAL TREATMENT PROGRAM
- 4) OPERATION AND MAINTENANCE





#### **Design Basis:**

#### Source : Either Ground Water/ Sea Water or Treated Sewage Effluent (TSE)

Feed	TSE w	<mark>ater qualit</mark>	y (Typic	<u>cal):</u>
TSS	=	5 mg/l	TDS	= 1,500 mg/l
BOD	=	5 mg/l	COD	= 50 mg/l
Tempe	erature	= 22 - 35	С рН	= 6.5 - 7.5

#### **Actual TSE water quality at tap off point:**

TSS =	7 mg/l	TDS = 2,000 mg/l
BOD =	7 mg/l	COD = 65 mg/l
Temperature	= 22 – 35 C	рН = 6-8





## **Achievable Treated Water Quality:**

#### (Equivalent to Kahramaa Potable water quality):

- 1. pH = 6.5 7.5
- 2. TDS = 100 200 mg/l
- 2. TSS = Negligible

#### Applications/ End -use:

- 1. District Cooling make up water
- 2. Toilet Flushing
- 3. Industrial use



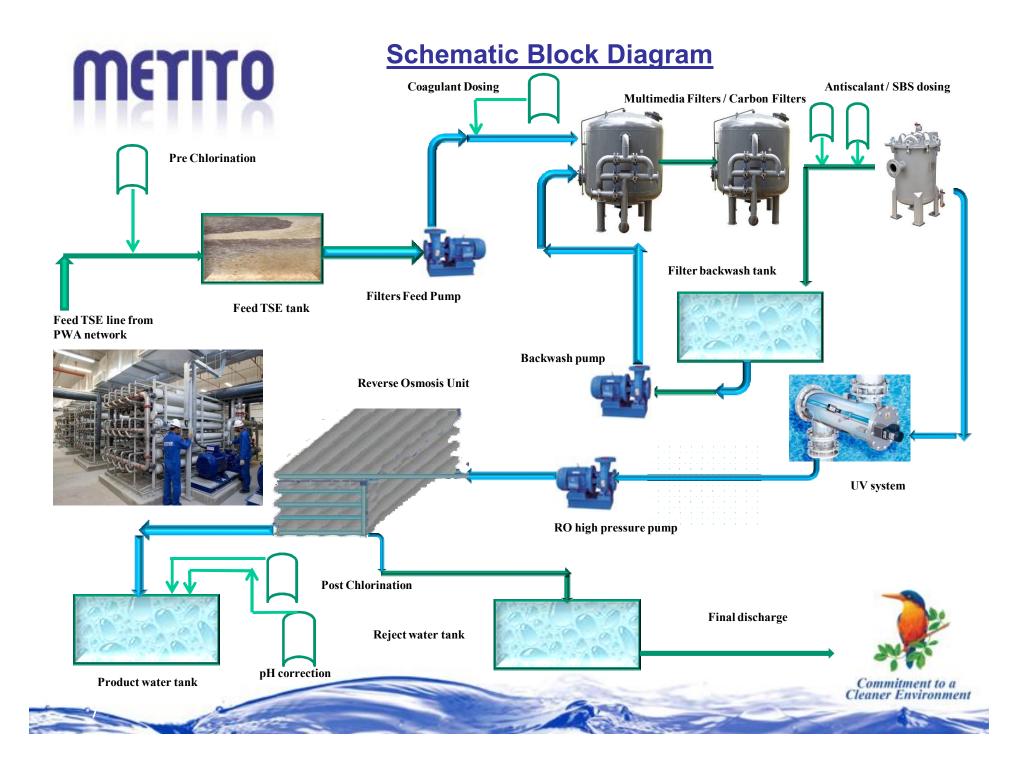


## **BASIS OF TREATMENT & EQUIPMENT SELECTION:**

- Hypochlorite dosing 1)
- **Multimedia Filters** 2)
- 3) **Activated Carbon Filters**
- **Cartridge Filters 4**) (Or Ultrafiltration skids replacing 2, 3,& 4)
- Acid / Antiscalant dosing 5)
- SBS chemical dosing **6**)
- Ultraviolet disinfection(UV) 7)
- 8) **Reverse Osmosis (R.O.)**
- 9) **Caustic dosing**

- : Primary disinfection
- : TSS / BOD removal
- : COD removal
- : Fine filtration
- : Minimize scaling
- : De chlorination
- : Disinfection
- : TDS removal
- : pH correction





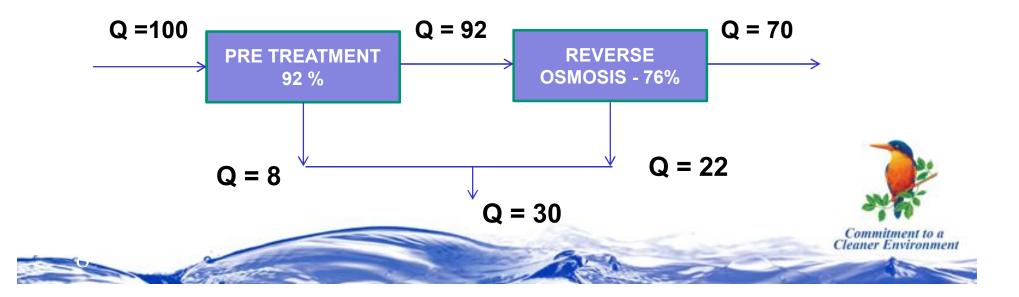


## WATER BALANCE

#### TYPICAL RECOVERIES:

1) PRE TREATMENT	: 92 %
2) R.O.	: 76 %

OVERALL RECOVERY : 70 % BALANCE WASTE WATER : 30%

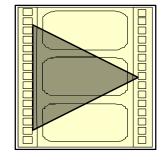




# **Membranes Types**

## **Spiral Wound Design**









## **MATERIAL OF COSNTRUCTION OF EQUIPMENT**

- FEED TANK (TSE TANK)
- CENTRIFUGAL PUMPS
- FILTERS
- UF MEMBRANE
- RO MEMBRANE
- RO PRESSURE TUBE
- UF- RO SKIDS
- UV STERILZIER UNIT
- CHEMCIAL DOSING TANKS
- TREATED WATER TANK

- RCC/ GRP
- SS 316
- GRP / CARBON STEEL
- PES / PVDF
- POLY AMIDE
- GRP
- CARBON STEEL
- SS 316
- GRP
- RCC/ GRP





## WASTE WATER DETAILS

Sources within the RO plant:

From RO reject / Pre-treatment backwash waste / Membrane cleaning & Flushing / Over flows

#### **Typical quality:**

- TSS : Less than 50 mg/l
- BOD : Less than 50 mg/l
- COD : Less than 150 mg/l
- TDS : 8,000 10,000 mg/l
- pH : 6.5 to 7.5

**Disposal - Permits from MOE/ Ashghal need to be obtained** 





## **OPERATION & MAINTENANCE:**

- 1) MANPOWER
- 2) CHEMICALS
- 3) MEMBRANES
- 4) CONSUMMABLES
- 5) SPARES



# METITO

#### **MOL Chemicals Total TSE Solutions**

#### STANDARD KEY REQUIREMENTS

- Compliance with all requirements for equipment defect liability period / warranty maintenance
- High degree of automation to ensure all key parameters are logged and normalisation data is available real-time for RO
- For District Cooling, a full automation offering focussed on Operational Results; Risk Management





• Full support 24/7



#### MOL Chemicals Total Membrane Solutions

- Inhibitor Management System
- Normalisation Data
- Data Utilisation
  - Internet Access
  - Graphic Representation
  - Online Sensors
  - Real-Time Data
  - Advance Notices
  - Alarm Messages
  - Trend Graphs
  - Consumption water/chemical

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Commitment to a Cleaner Environment

# METITO

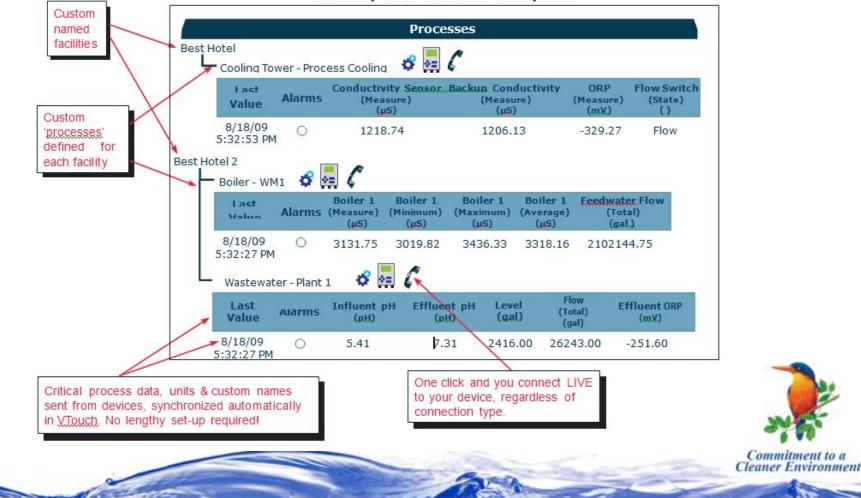
#### **MOL** Chemicals Total Cooling Solutions

- Chemistry, Equipment, Software and Communications technology
- Award-winning technology focussing on corrosion (pitting/general) and biofilm / scale monitoring
- Web-based summary of account status based on 24/7 monitoring
- One-click to any device in the field for full view and reconfiguration
- "Access" and "permissions" options
- Open System
- Boilers, Cooling, Closed, RO





#### MOL Chemicals Total Cooling Solutions – Data Management



Summary view of all monitored systems



## **METITO'S R.O. POLISHING FOR DISTRICT COOLING**

- ✤ PALM JUMEIRAH , DUBAI (TSE)
  18,000 M3/DAY (2009)
- EMAAR DOWNTOWN, DUBAI (TSE) 20,000 M3/DAY (2013) (UNDER EXECUTION)
- ✤ HOTEL FOUR SEASONS , DOHA (TSE) 50 M3/DAY (2006)
- ✤ HOTEL ST. REGIS, DOHA (TSE) 1,700 M3/DAY (2012)
- PEARL RO , DOHA 35,000 M3/DAY (2013) (SEA WATER TO FOR DISTRICT COOLING)





## SAMPLE RO PLANT PHOTOGRAPHS





### Temporary Containerised SWRO Plants – Multi-media Filters





## SWRO – 3000 m3/day







### TSE Polishing RO – 18,000 m3/day







## Ghuzlan Island SWRO – 4 X 1,000 m3/day + 1 X 500 m3/day













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