

Utilization of 1st Pass RO Reject in Backwash for Multimedia Filters



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APOD/APOE
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Introduction



Abqaiq Plant Criticality

Abqaiq Plants is the largest oil stabilization and gas-processing facility in the world as Abqaiq Plant produces 6% of the oil world production.



Abqaiq Plant Master Plan

Conserve ground water recourses and ensure availability of water all time (Sustainability) for business continuity is Part of Abqaiq Plant master Plan.



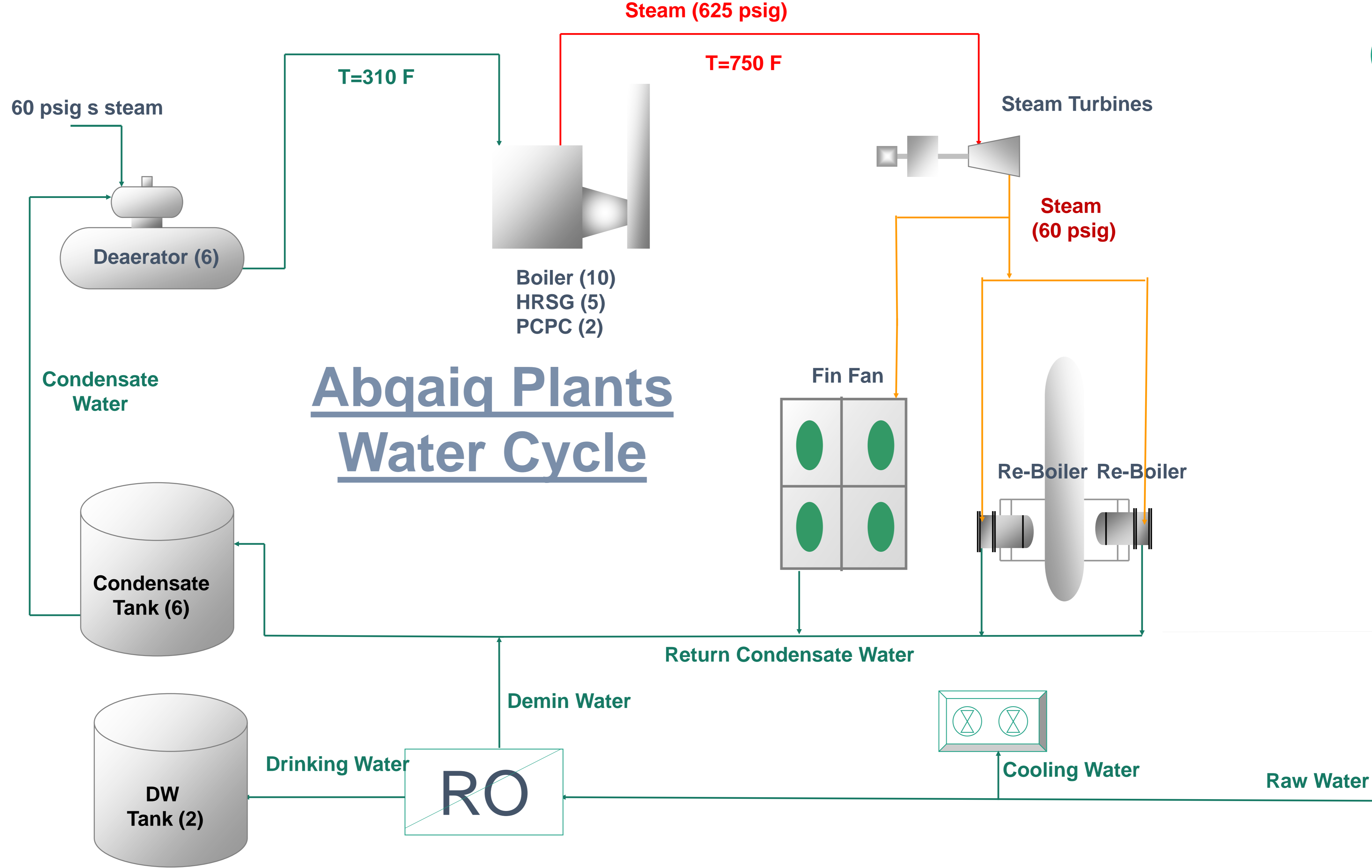
Sustainability

To ensure sustainable process in the facility, tremendous amount of energy is required, mainly steam for stabilization, pumping and processing where groundwater are one of the key elements in this formula



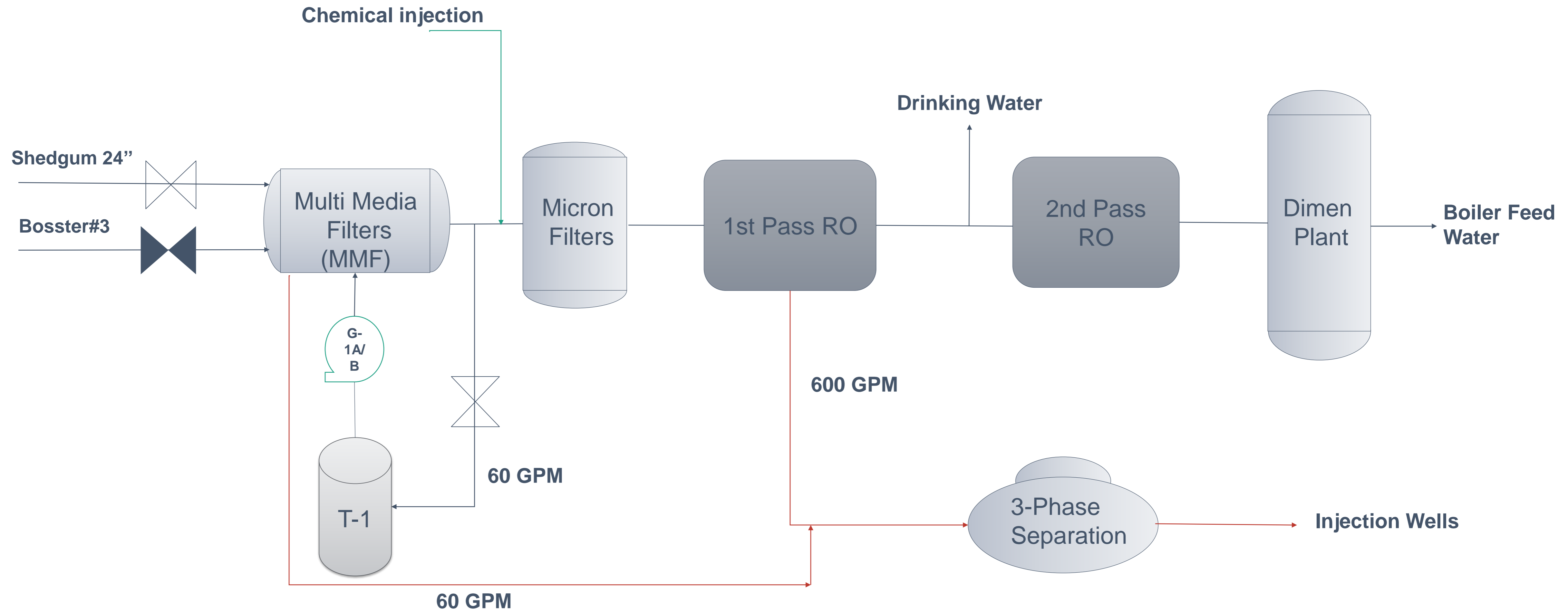
Roadmap

Abqaiq Plants formulated a water conservation road map with the objective of streamlining all processes, new initiatives and deployment of new technologies to reduce usage of groundwater consumption

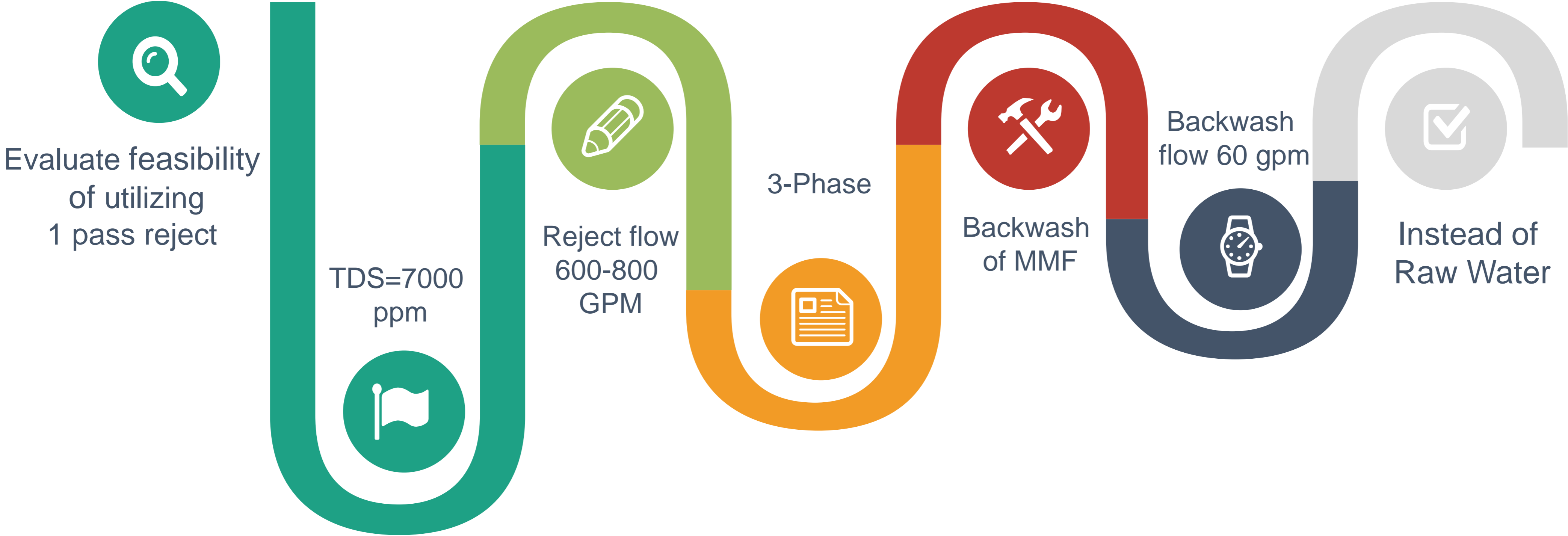


Abqaiq Plants Water Cycle

Current RO Plant System



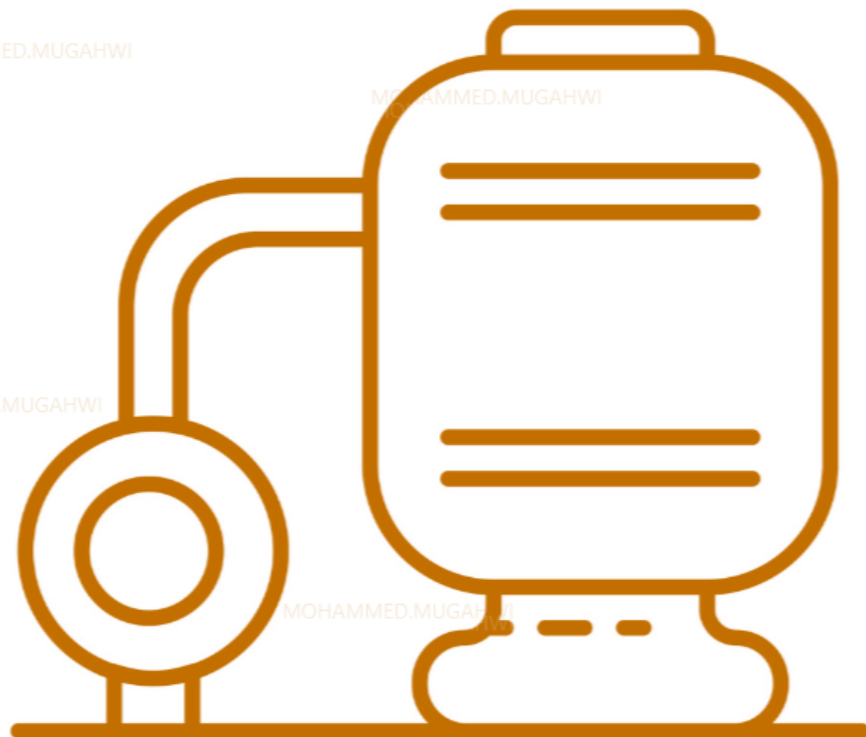
Objectives



Multimedia Filters (MMF) Process



Layers of Sand & Gravel



8 MMF
400 GPM



Suspended Solids

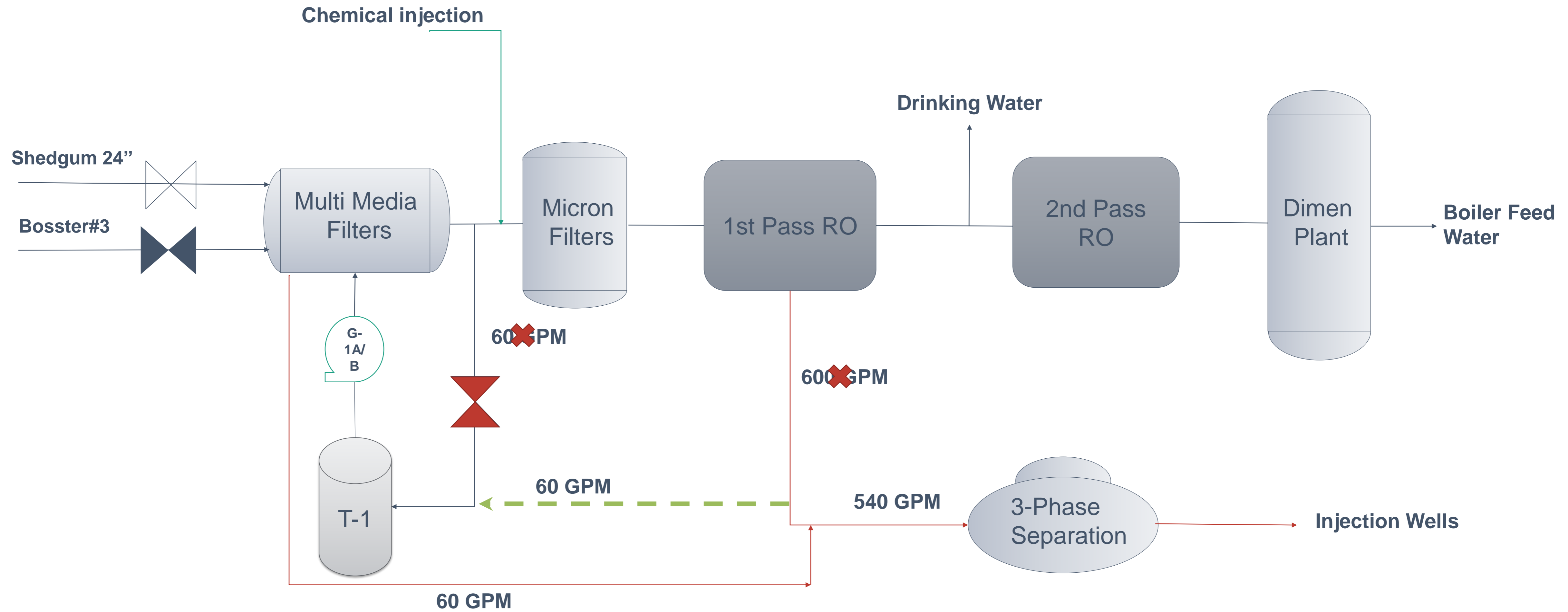


- (SDI) above 3
- ΔP above 10 psi
- 7 Days



Backwash
flow rate
60 gpm

New Modified Process



Analysis



Product Quality

	Current 2018	Modified 2019	
SDI	1.4	1.5	✓
pH	7.4	7.39	✓
TDS	1817	1814	✓
Calcium	184	212	✓
Magnesium	70	71.3	✓
Sulfate	445	475	✓
Chloride	530	540	✓
Bicarbonate	231	230	✓
Hydroxide	0	0	✓
Ba	0.04	0.03	✓
K	26	27	✓
Sodium	300	286	✓

A comparison between multimedia filters water product quality of design condition (raw water for backwash) and modified condition (reject water of 1st pass for backwash)

Materials Condition of Multimedia Filters

HAMMED.MUGAHWI

**SAUDI ARABIAN OIL COMPANY (SAUDI ARAMCO)
OPERATIONS INSTRUCTION MANUAL
ABQAIQ PLANTS T&I PLANNING & EXECUTION**

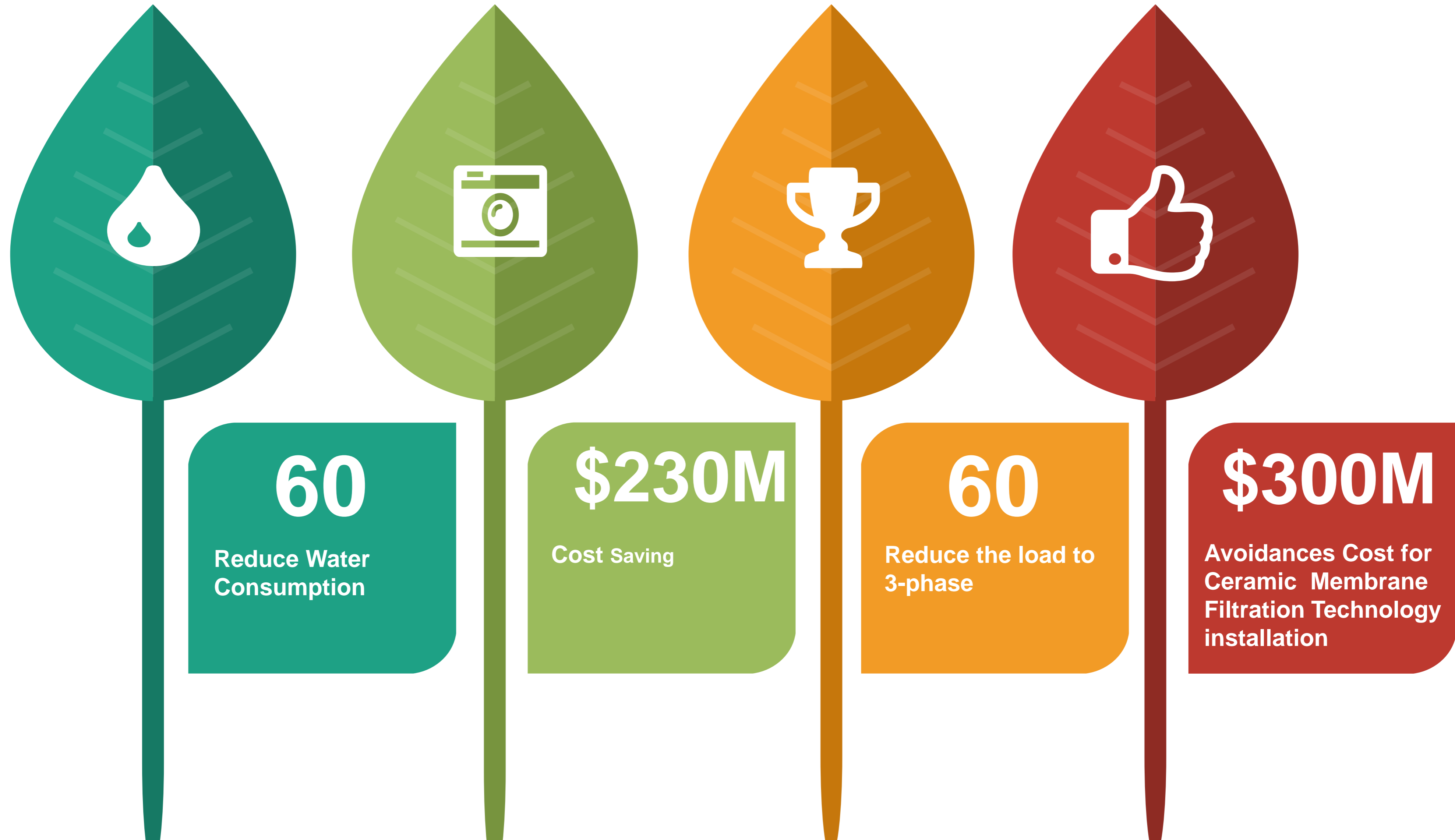
EXHIBIT- 1
GENERALINSTRUCTION NO. 2.039-1

PLANT NO.	EQUIPMENT NO. AND NAME	DATE OPENED	DATE CLOSED
500	Multimedia Filter D-103A	08/08/2019	08/18/2019
Reason(s) for opening <input checked="" type="checkbox"/> Scheduled T&I <input type="checkbox"/> Repair requirement <input type="checkbox"/> Mothball Inspection <input type="checkbox"/> Modification <input type="checkbox"/> Other (inspect S/D for trip investigation)			
RESPONSIBILITY	AUTHORITY	NAME & BADGE #	SIGNATURE & DATE
1. All necessary work is completed per job scope. All tools and other materials have been removed.	Maint. Engr./ T&I Planning Engr.	Mohammed Nemer # 291267	 08/18/2019
2. All necessary work is completed operational requirements.	Operations Engineer	Abhinav Shaje # 145650	 8/18/2019
3. All necessary repairs/modifications are completed in accordance with the applicable codes and standards.	Inspector	Abdullah Alhyri #782857	 08-18-2019
4. All necessary work is completed. All foreign materials have been removed. Vessel is clean and acceptable for operations.	Operations Foreman	Abdulaziz #26089	 08-18-2019
REMARKS:			

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Results





60 MM Gallon

Largest swimming pool :San Alfonso del Mar (Chile)



60 GPM = 31 MM Gallon /Year



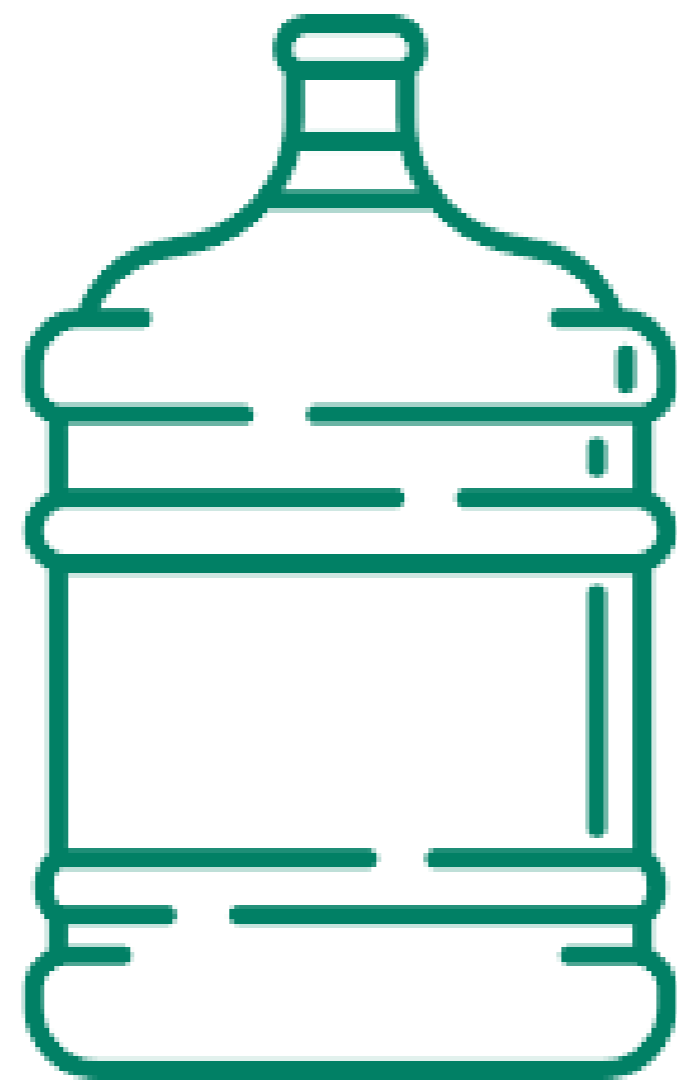
60 MM Gallon

Largest swimming pool :San Alfonso del Mar (Chile)

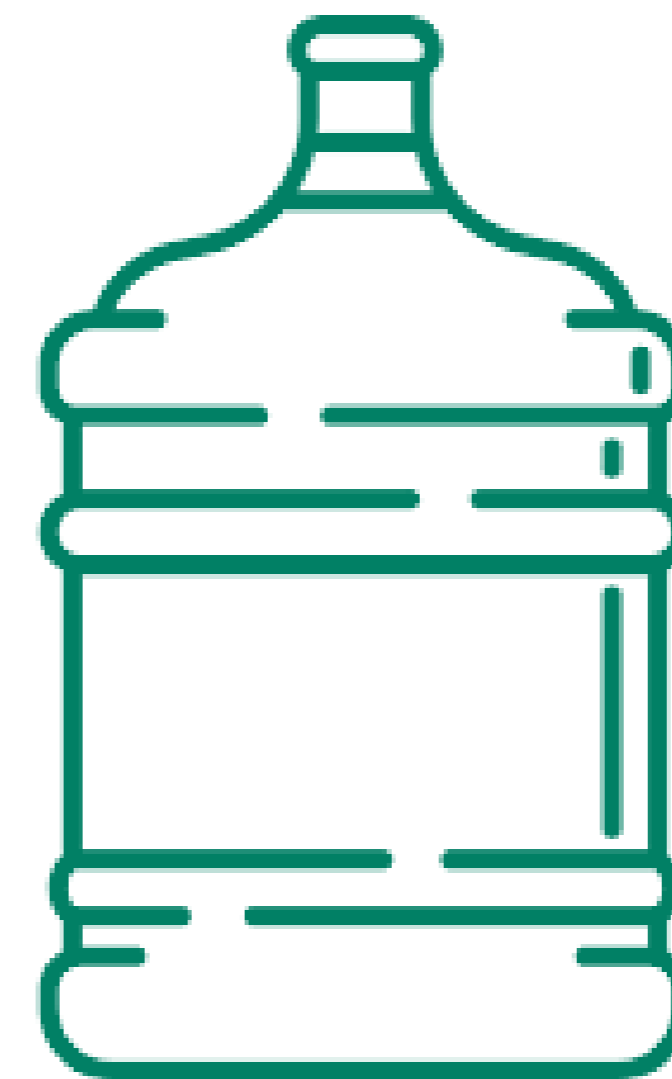


60 GPM = 31 MM Gallon /Year

60 GPM is equivalent



12 bottles /min



6.3 MM bottles/yr

Assessment Team Members



**Mohammed
Almugahwi**

Process
Engineer



**Abdulaziz
Alsubaie**

Operation
Foreman



**Hussain
Almubarak**

Operation
Supervisor



**Abdulaziz
Almalki**

P&CSD

Thank You

