Mountainview Generating Station (MVGS)

A Southern California Edison Company (SCE)

2492 West San Bernardino Avenue
Redlands, CA 92374
Steve Johnson, Technical Manager

Inland Empire Brine Line

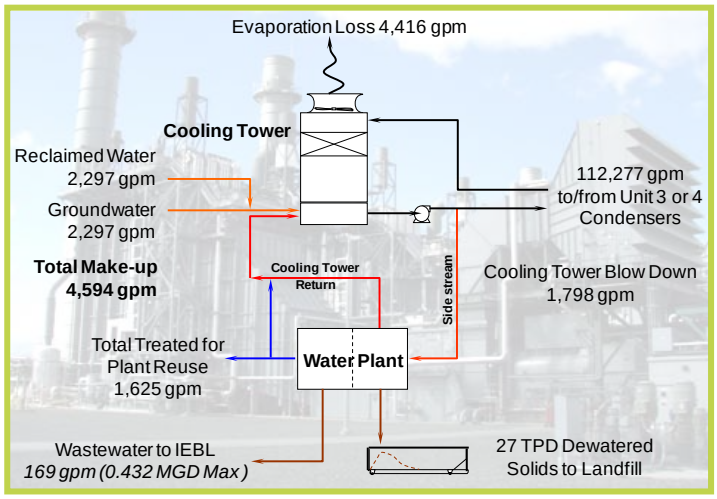
Wastewater

- Adjudicated water rights (1969)
  - California Energy Commission permit allows for 7,500 ac-ft/year from mid-aquifer
  - California Energy Commission permit allows for 750 ac-ft/year from deep aquifer
- MGVS uses 50-50 blend of cooling water make-up
  - Tertiary-treated municipal effluent (City of Redlands)
  - Non-potable groundwater
- Near-zero wastewater discharge
  - 85% of wastewater is recovered and reused
  - Brine discharge is sent via the Inland Empire Brine Line
- 2012 Water usage and discharge
  - Reclaimed water = 2,300 AF/Yr
  - Mid-Aquifer = 2,220 AF/Yr
  - Deep Wells = 414 AF/Yr
  - Wastewater = 144,806 MG/Yr
    = 444 AF/Yr
- Clarifier solid waste = 2,074 tons/Yr

MVGS (SCE)

- **Power plant uses gas turbines and steam turbines for a more efficient plant.**
- **Turbines generate 1,054 mega watts**
- **Southern California Edison owns property and operated power generation on the site since 1956**

Water Treatment and Recovery



SOUTHERN CALIFORNIA EDISON

April 2014

SAWPA

Mountainview Generating Station (MVGS)

A Southern California Edison Company

This presentation.....

- *Water Supplies*
- *Water Treatment*
- *Wastewater Discharge*

Mountainview Site

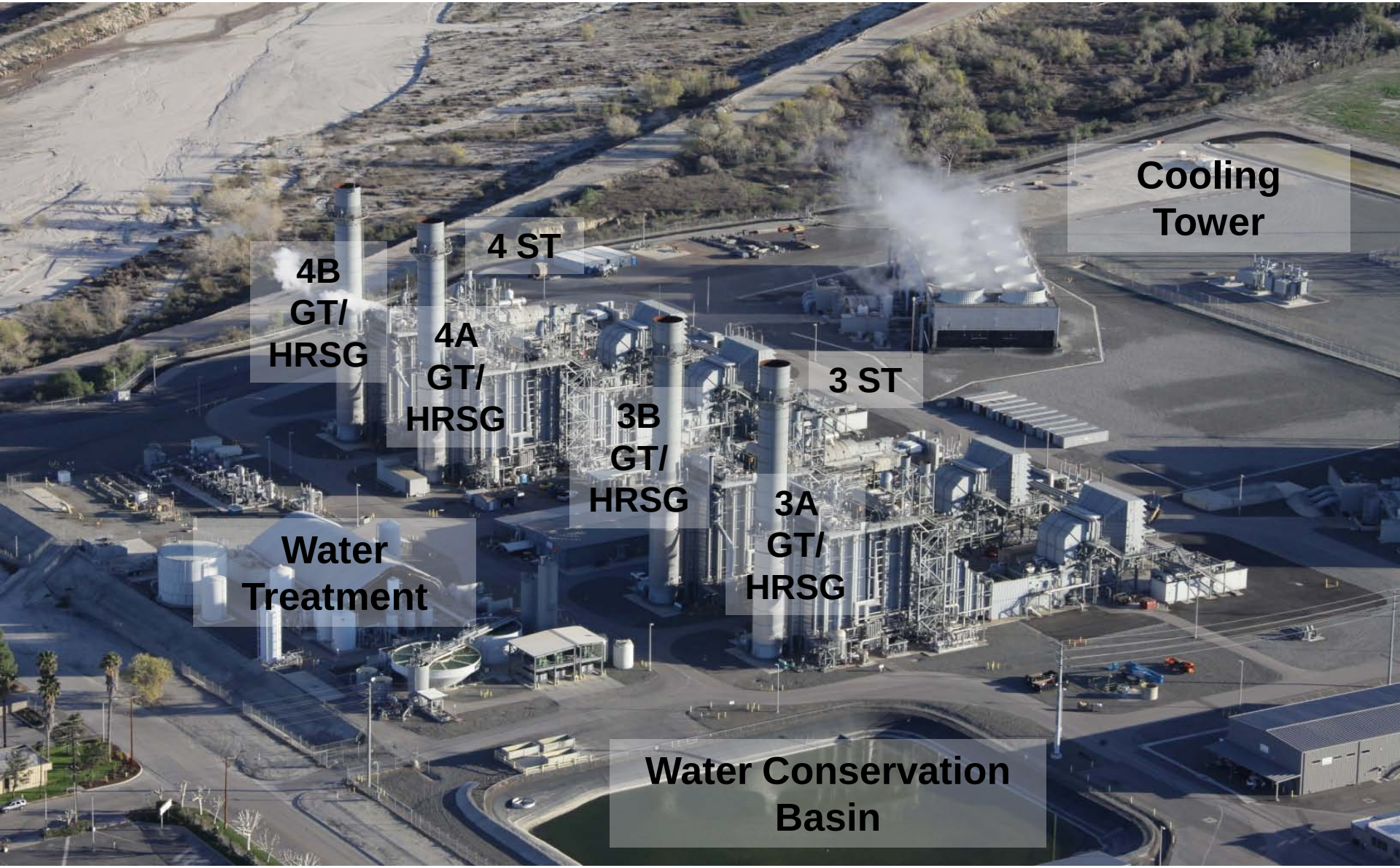
MVGS is a 4 x 2 combined cycle power plant using GE 7FA.03 Gas Turbines and D-11 Steam Turbines.

Nominal generation:

	Gas Turbine A	Gas Turbine B	Steam Turbine	Total
Unit 3	165 MW	165 MW	197 MW	527 MW
Unit 4	165 MW	165 MW	197 MW	527 MW
			Total Plant	**1,054 MW**

Commercial Operation December 2005 and January 2006

MVGS Units 3 & 4



MVGS is a Unique Water-Cooled Power Plant

<u>Adjudicated Water Rights (1969)</u>

- *CEC permit for 7,500 acft/year mid-aquifer*
- *CEC permit for 750 acft/year deep aquifer*

<u>50-50 Blend of Cooling Water Make-up</u>

- *Tertiary-treated municipal effluent (City of Redlands)*
- *Non-potable groundwater*

<u>Near-zero Wastewater Discharge</u>

- *85% of wastewater is recovered and reused*
- *Brine discharge is sent via the Inland Empire Brine Line (IEBL) to Pacific Ocean.*

Water Usage and Discharge

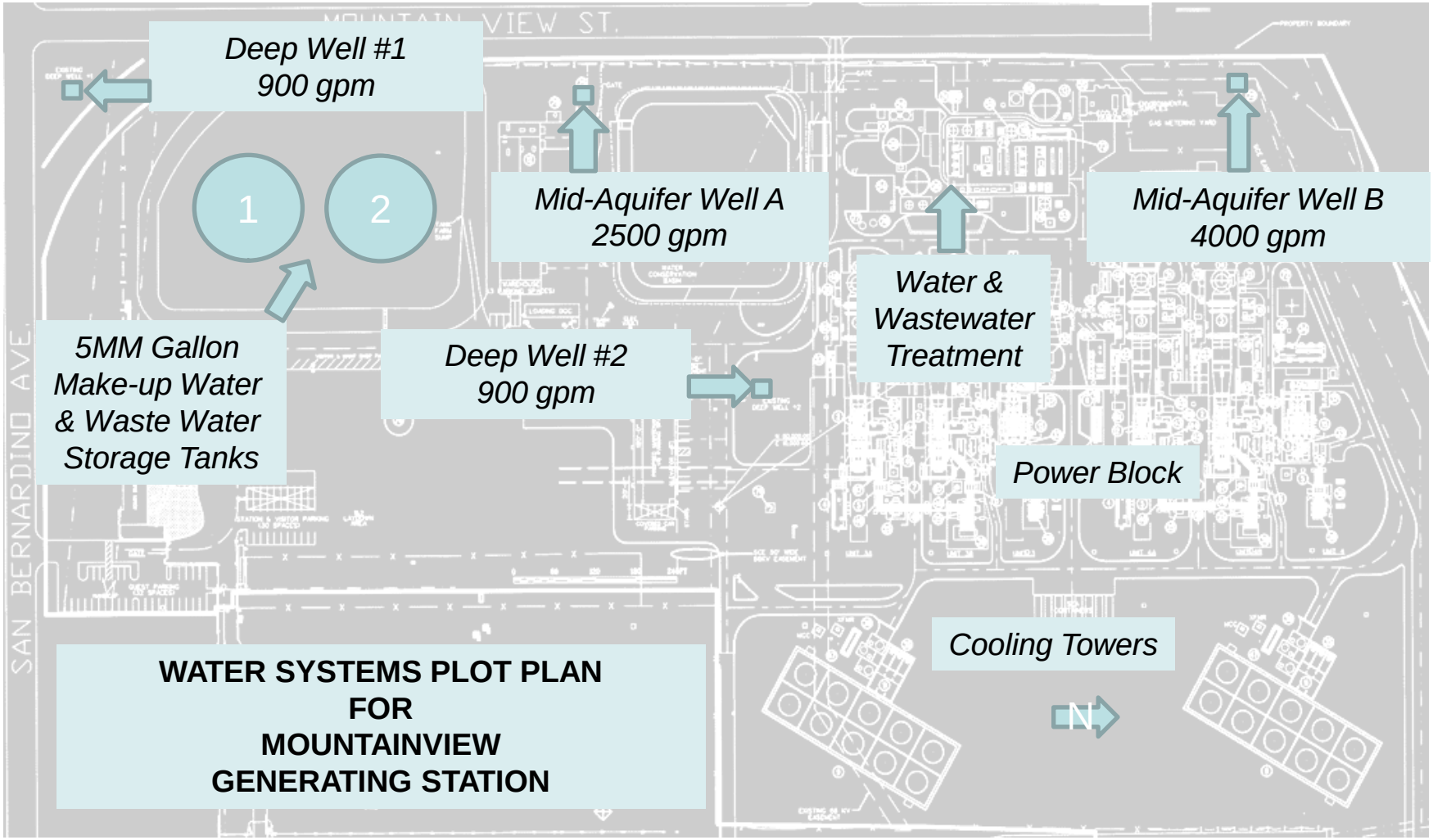
(2012)

Reclaimed = 2,300 AF/Y
Mid-Aquifer = 2,220 AF/Y
Deep Wells = 414 AF/Y

Wastewater = 144,806 Mgal/yr
= 444 AF/Y
Clarifier solid waste = 2,074 TPY

(Plant Capacity Factor = 71%)

MVGS Site

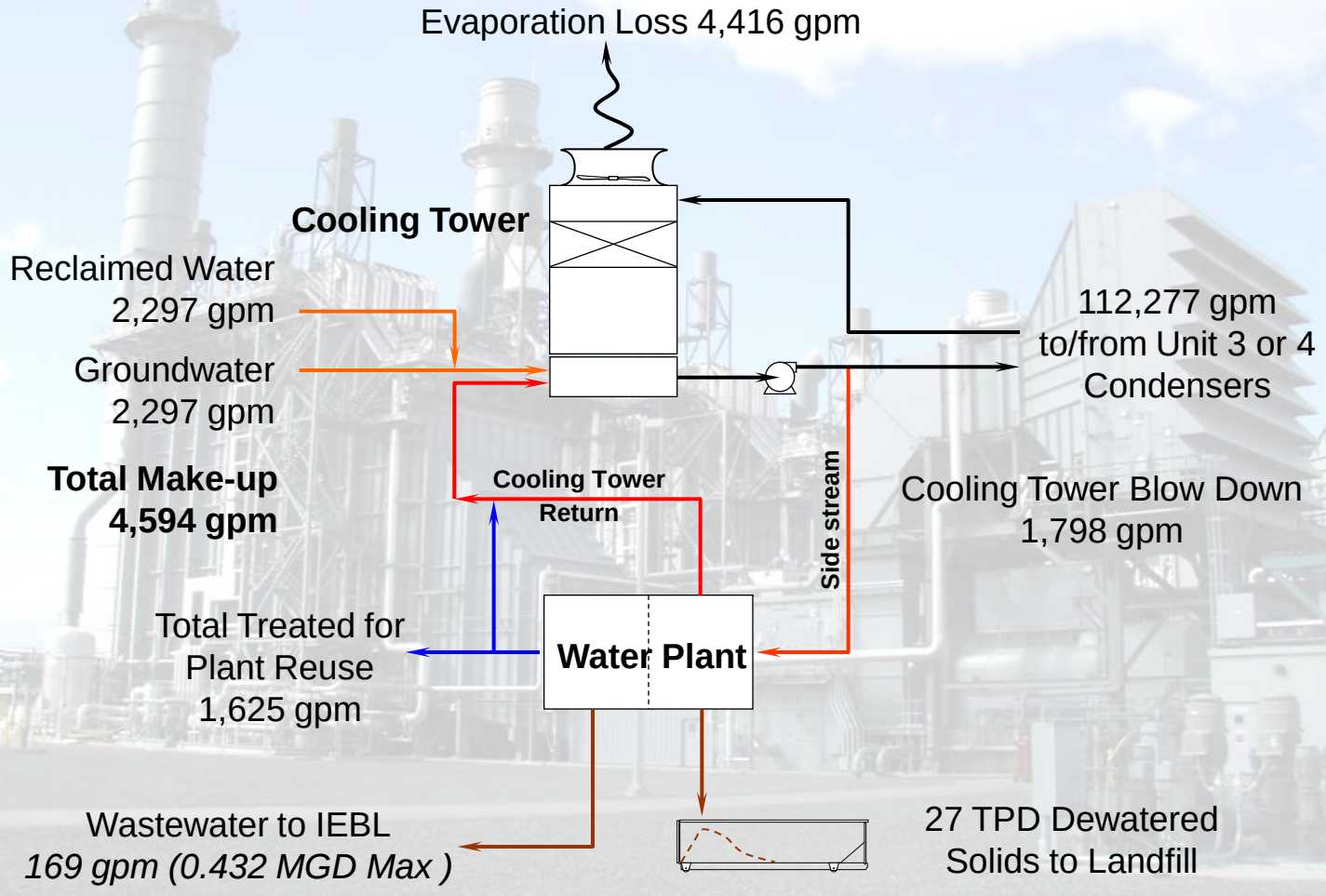

Deep Well #1
900 gpm
Mid-Aquifer Well A
2500 gpm
Mid-Aquifer Well B
4000 gpm
1
2
5MM Gallon
Make-up Water
& Waste Water
Storage Tanks
Deep Well #2
900 gpm
Water &
Wastewater
Treatment
Power Block
Cooling Towers
N
WATER SYSTEMS PLOT PLAN
FOR
MOUNTAINVIEW
GENERATING STATION

SARI Chemistry (MVGS)

TDS Average = 9,785 (Min 6,820; Max 13,410)
pH Average = 9.9 (Min 7.5; Max 10.9)
BOD Average = 4 (Min <0.6; Max 20)
O&G Average = 2.2 (Min <1.4; Max 5)
TSS Average = 26 (Min 4; Max 70)
VSS Average = 7 (Min 2; Max 42)

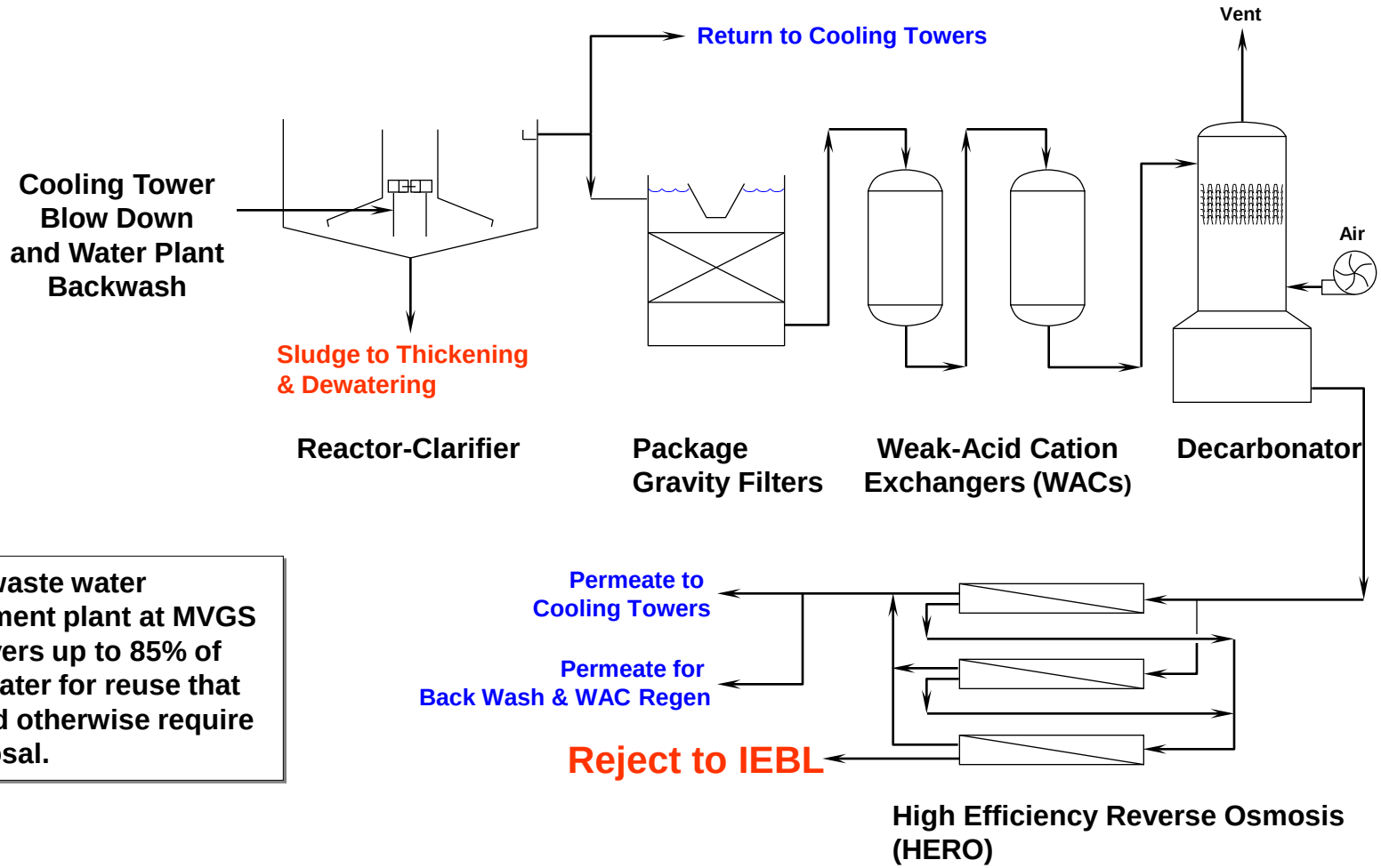
Water Treatment & Recovery

MVGS Design Basis (Full Load, 82F DB, 63F WB)



Simplified Waste Water Treatment & Recovery Process

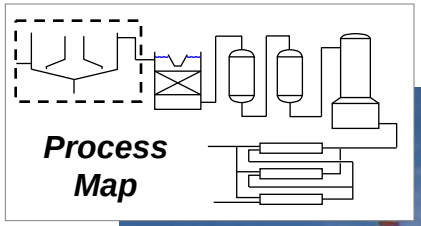
MVGS

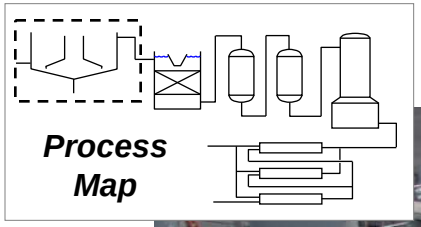


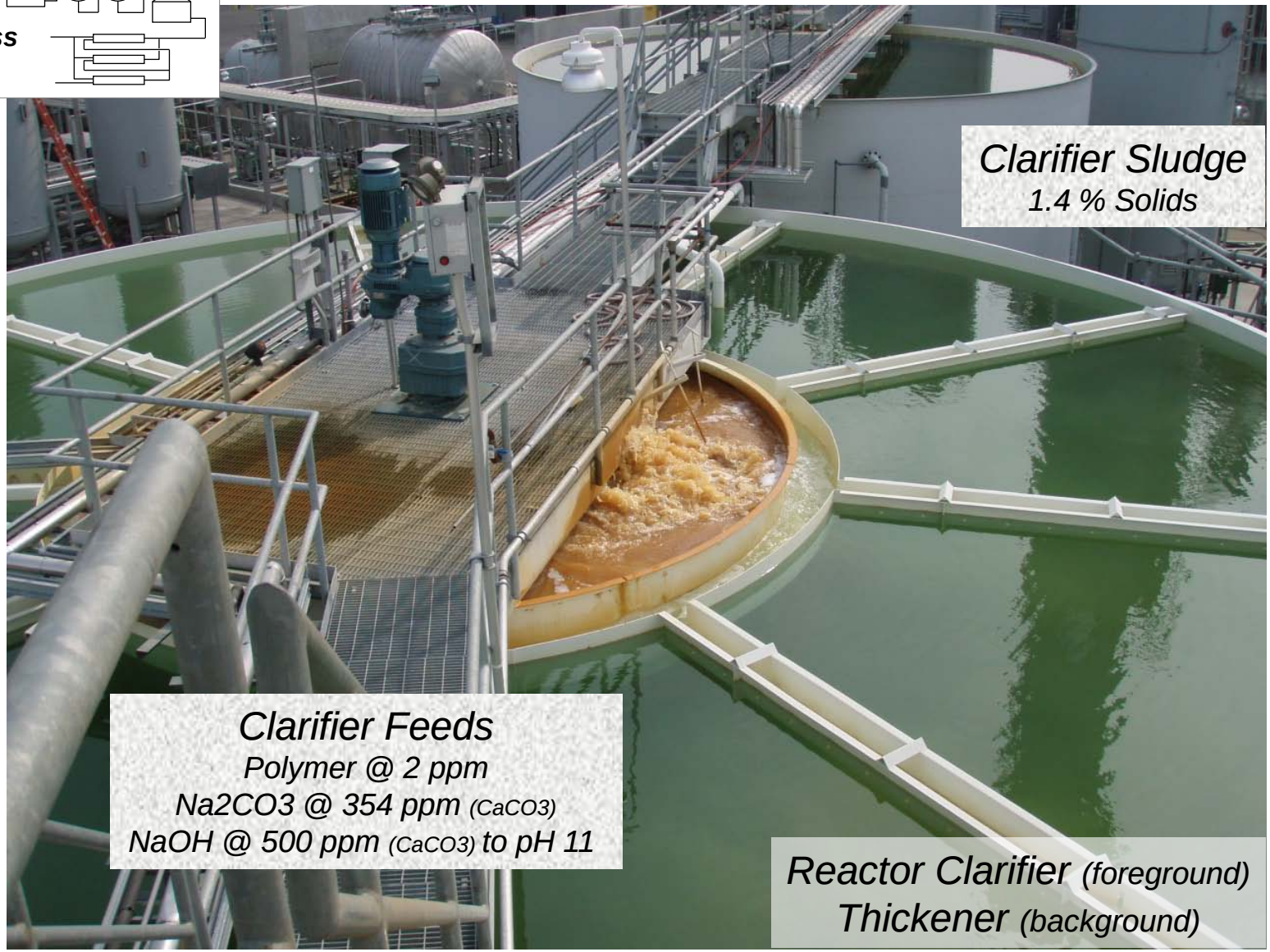
The waste water treatment plant at MVGS recovers up to 85% of the water for reuse that would otherwise require disposal.

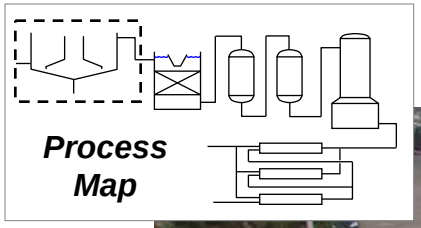
Water Plant Overview

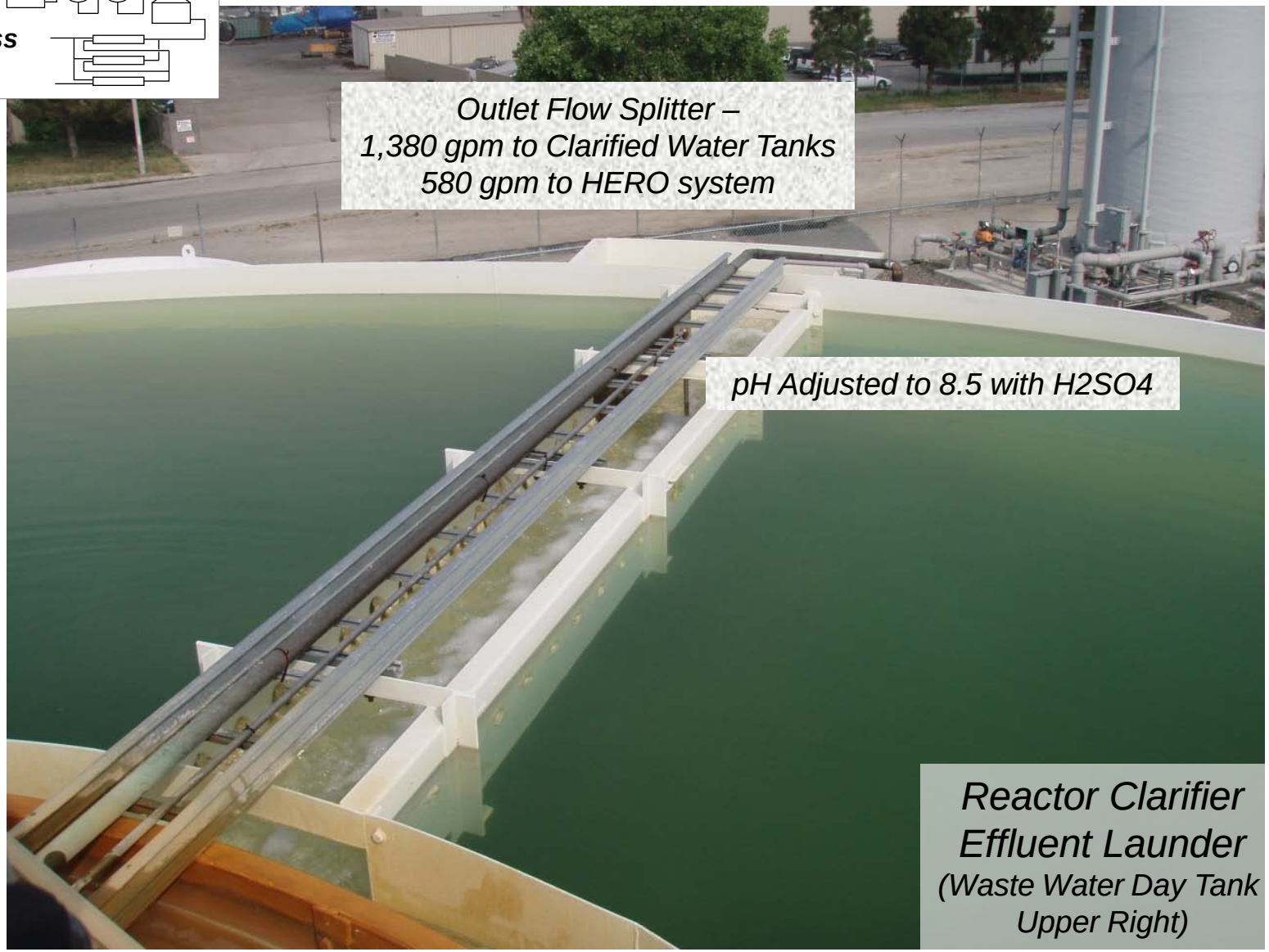
Infilco-Degremont System

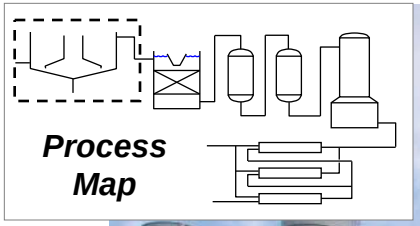



Process
Map


Clarifier Sludge
1.4 % Solids
Clarifier Feeds
Polymer @ 2 ppm
Na2CO3 @ 354 ppm (CaCO3)
NaOH @ 500 ppm (CaCO3) to pH 11
Reactor Clarifier (foreground)
Thickener (background)

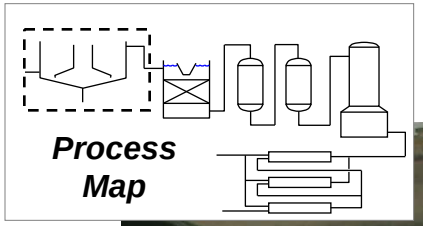

Process
Map


Outlet Flow Splitter –
1,380 gpm to Clarified Water Tanks
580 gpm to HERO system
pH Adjusted to 8.5 with H2SO4
Reactor Clarifier
Effluent Launder
(Waste Water Day Tank
Upper Right)



Andritz-Netzsch Plate and Frames
20 Cubic Yard Roll-off Bins

Sludge Filter Presses

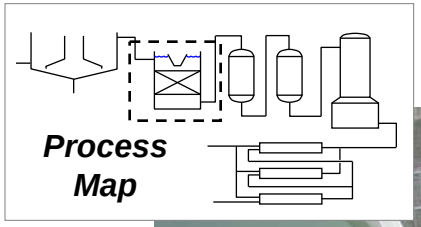


Thickener Outlet
6% Solids

Filter Press
33% Solids

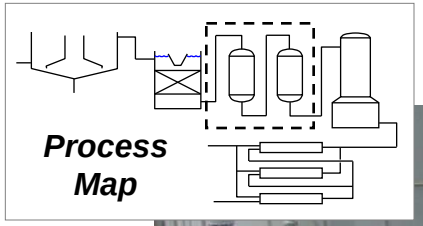
Solids Trucked To Double-Lined Landfill

Solids
Calcium Carbonate
70%
Magnesium Hydroxide/ Silicates
25%



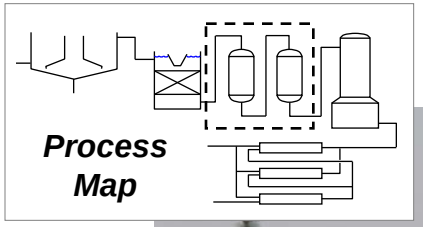
Multimedia Sand/Gravel/Anthracite
<5 micron, 1 NTU max
NaOCl for bio-growth followed by NaHSO3

Package Gravity Filters

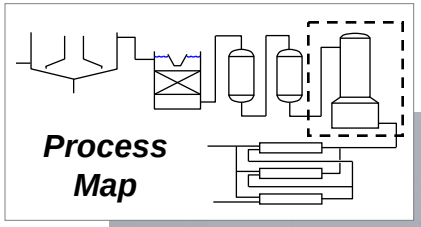


Lead-Lag Configuration
Purolite C-104+ resin
<0.5 ppm Total Hardness
Regenerated with 0.8% H2SO4 &
4% NaOH

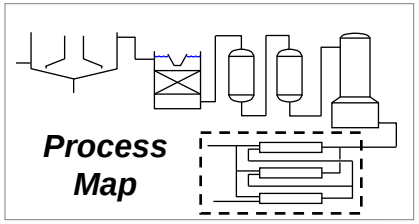
Weak Acid
Cation Exchangers


Process
Map


Self neutralized WAC waste 8-10 pH Range
Neutralization
System

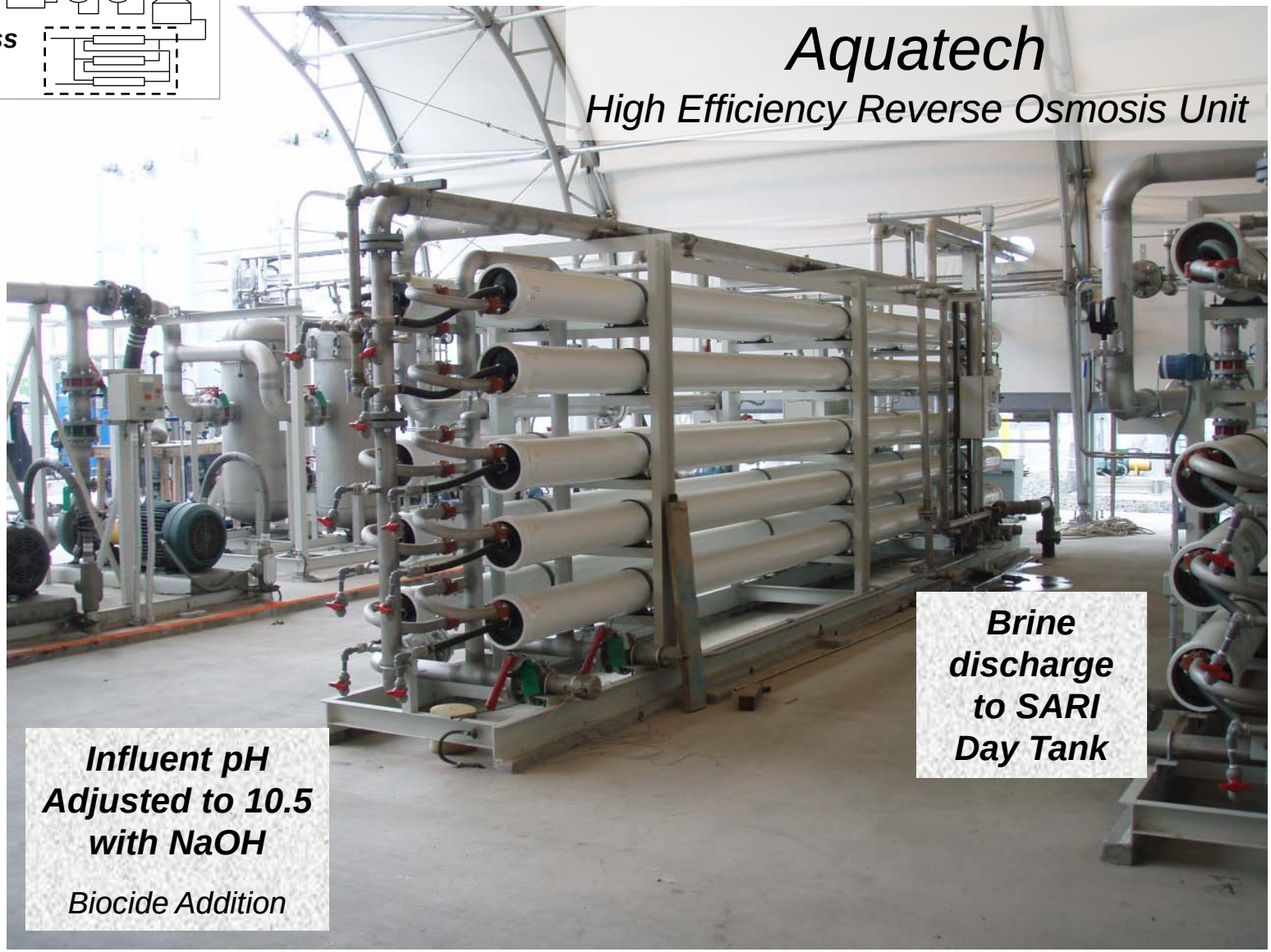


WAC effluent Adjusted to 4.1-4.5 pH
with H2SO4



Aquatech

High Efficiency Reverse Osmosis Unit

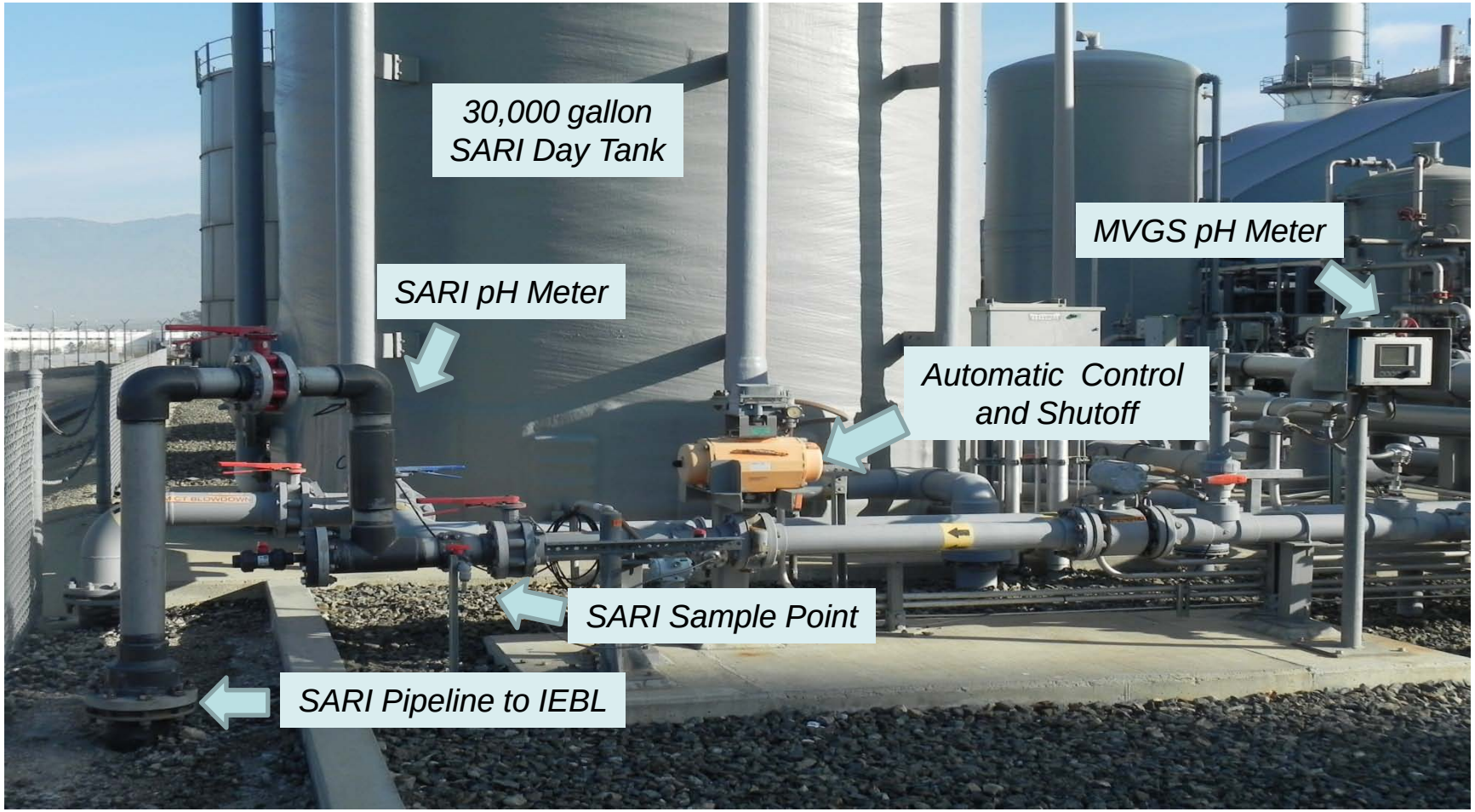


Brine discharge to SARI Day Tank

Influent pH Adjusted to 10.5 with NaOH

Biocide Addition

MVGS SARI DISCHARGE



The End

QUESTIONS?

Answers?