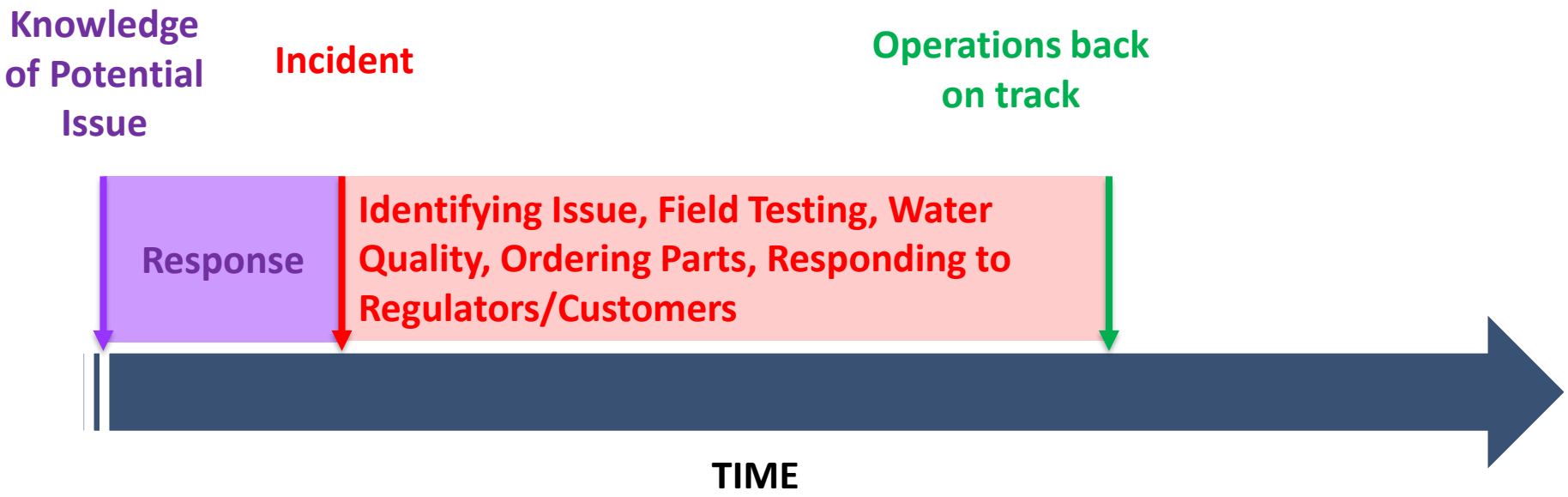
Hazen

Using Dashboards to Optimize Plant Performance

Watereuse Los Angeles Chapter
August 14th, 2018

Proactive vs Reactive Operations

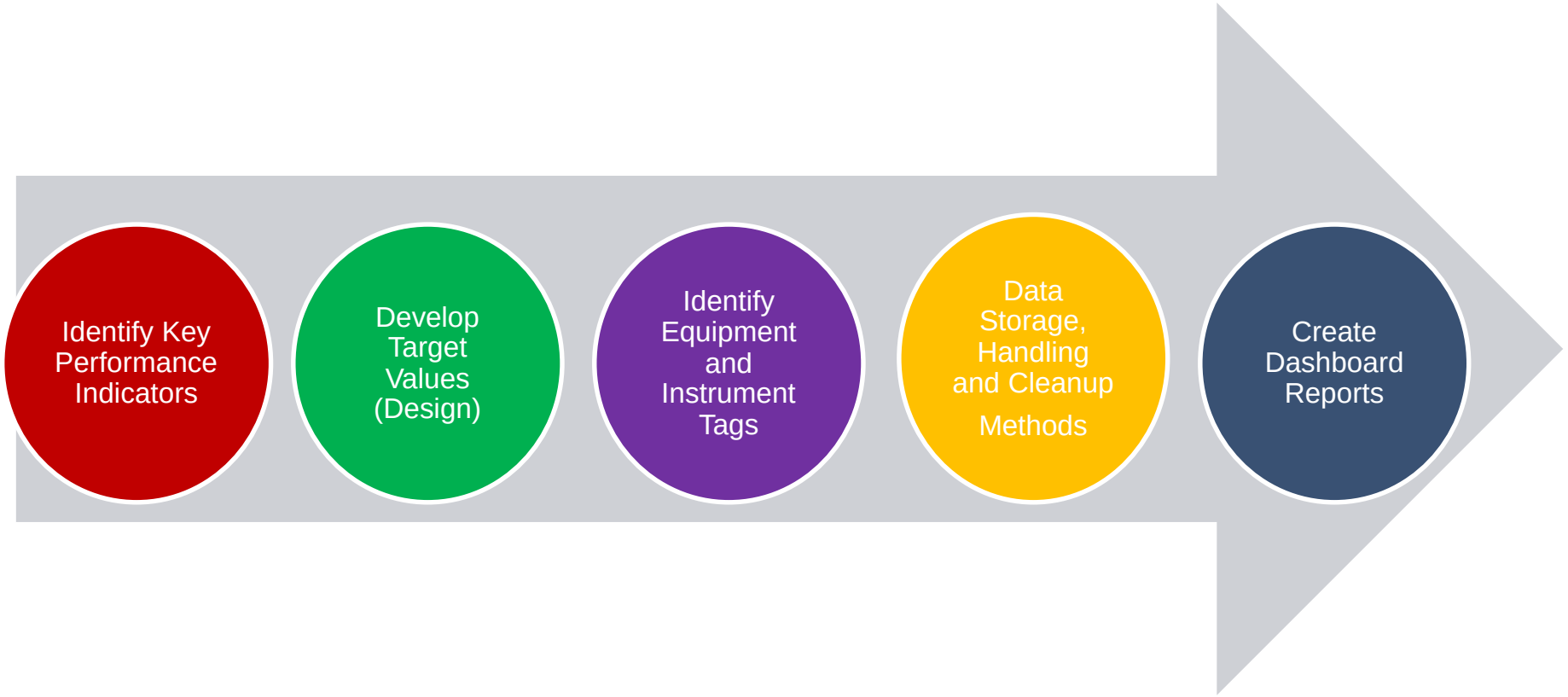


Reuse System Operations Challenges

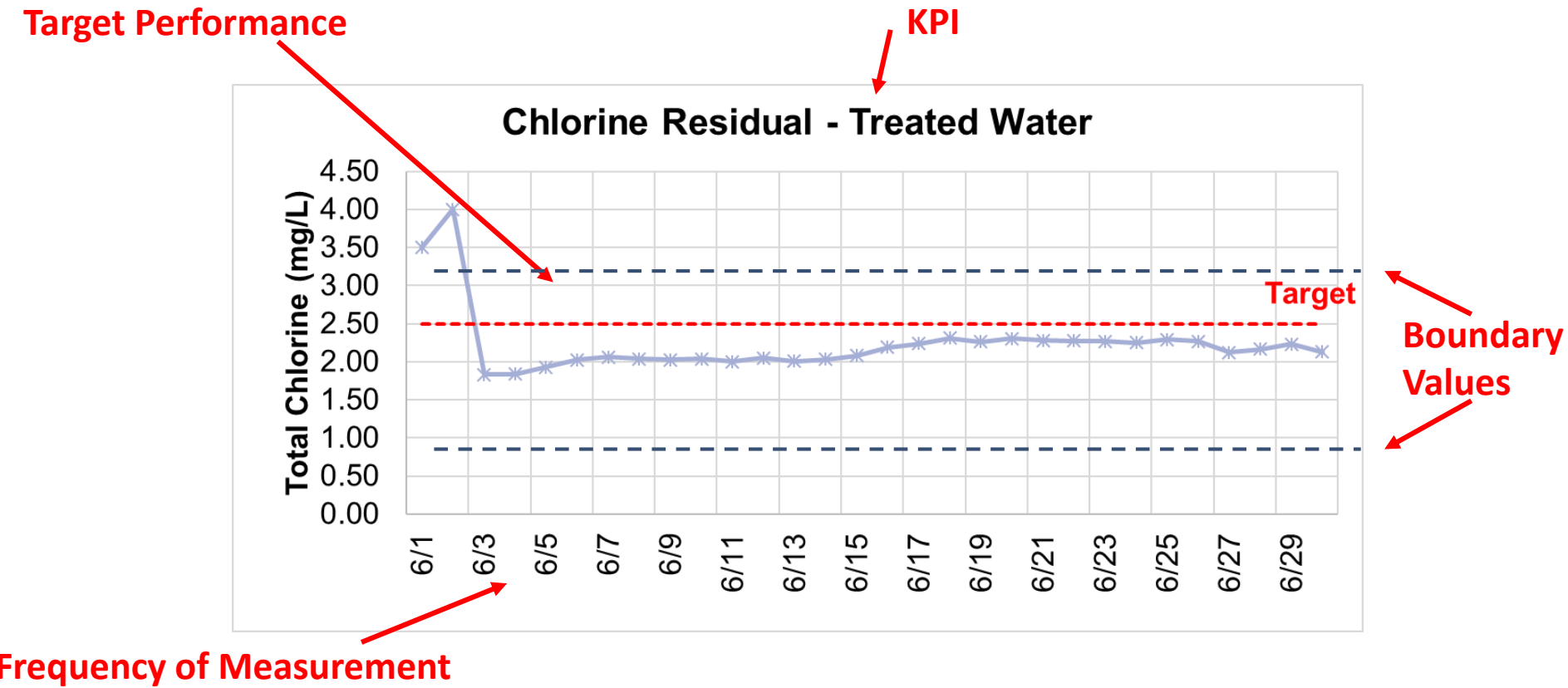
- How do we monitor Critical Control Points (CCP)
- How do we best control fouling?
- How do we plan chemical cleaning?
- How do we optimize pretreatment?
- What is the remaining useful life?
- Is our system reliable and robust?
- Are we meeting customer demand?
- Are we meeting regulatory requirements?
- Can we produce water more efficiently?

Optimizing Processes by Operating Proactively

Creating Dashboards to assist making critical decisions



Overview of KPIs

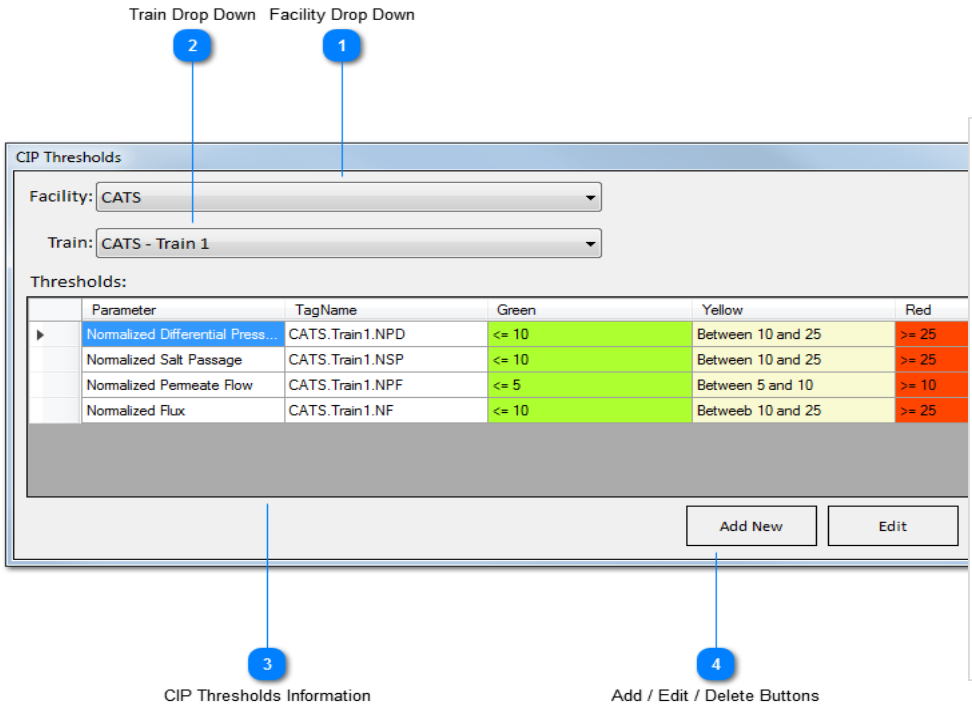


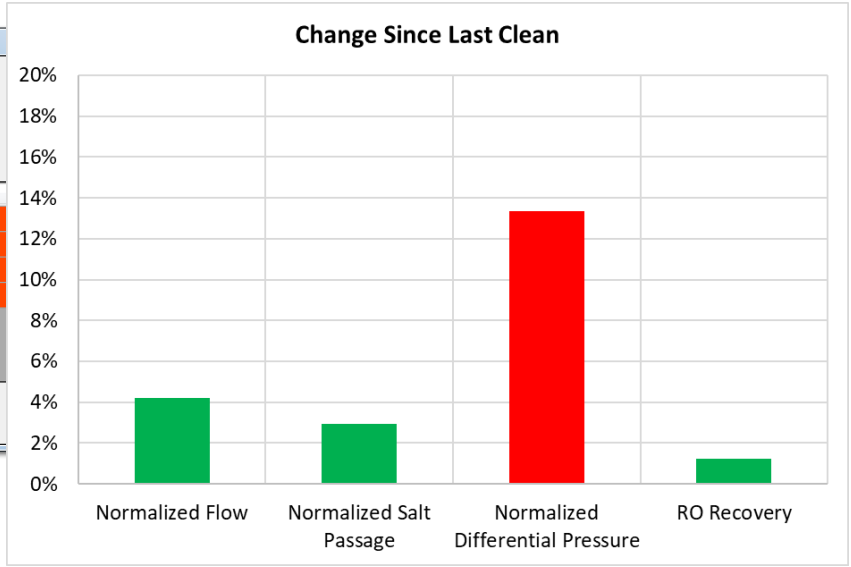
Process Audits develop useful KPIs

- Investigate opportunities to improve operations and optimize plant
- Identify and review Key Performance Indicators (KPIs)

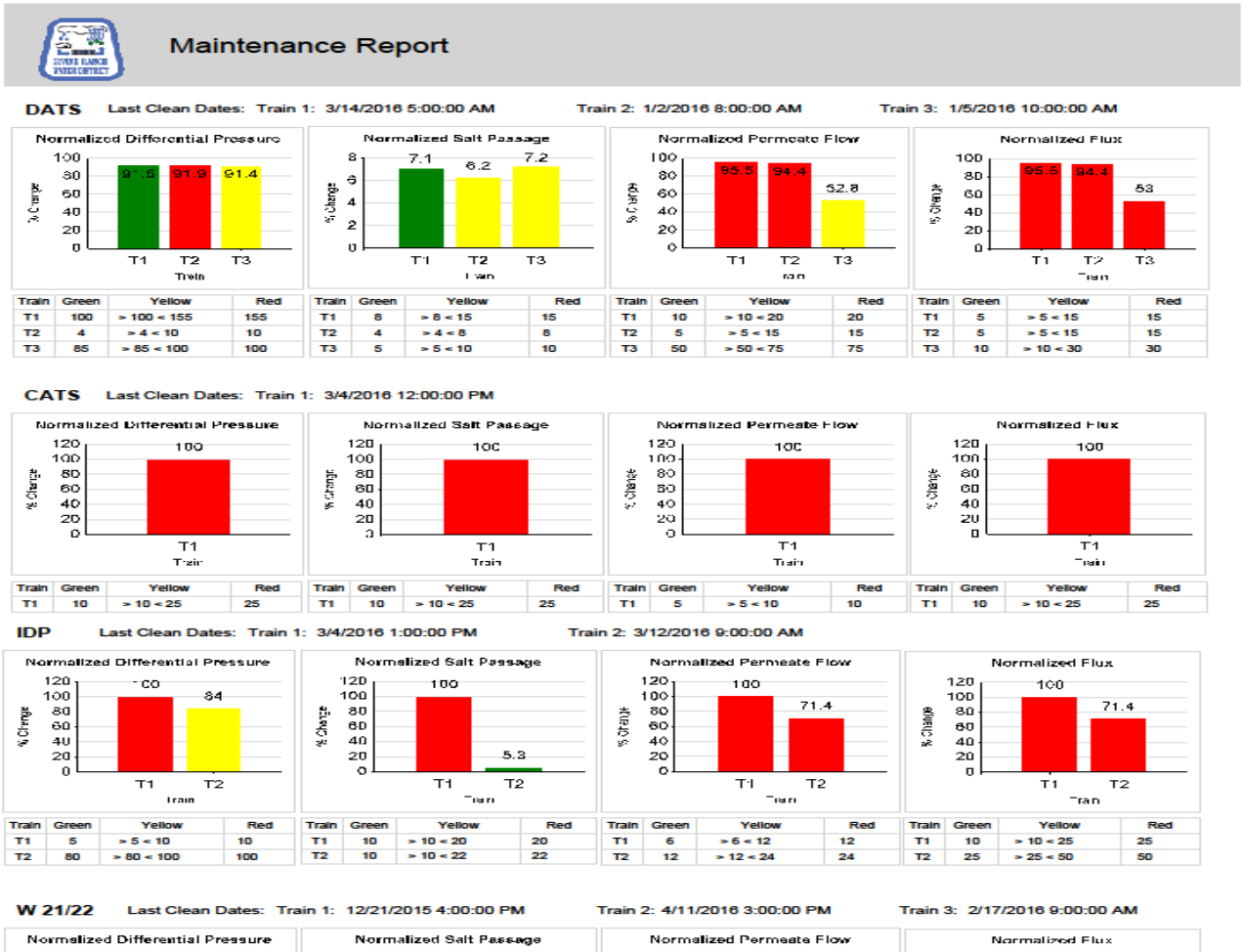
ID	Train	Parameter	Units	Historian Tag
D1	1	Feed Temperature	°F	W75.TEM_001_SCL.23H
D2	1	Feed Conductivity	µS/cm	W75.CON_001_SCL.23H
D3	1	Train 1 – Stage 1 Permeate Flow	gpm	W75.FLO_101_SCL.23H
D4	1	Train 1 – Stage 2 Permeate Flow	gpm	W75.FLO_201_SCL.23H
D5	1	Train 1 – Combined Permeate Flow	gpm	W75.FLO_301_SCL.23H
D6	1	Train 1 – Concentrate Flow	gpm	W75.FLO_500_SCL.23H

Membrane Maintenance – CIP Triggers





Facility Reports



Maintenance Report

DATS Last Clean Dates: Train 1: 3/14/2016 5:00:00 AM Train 2: 1/2/2016 8:00:00 AM Train 3: 1/5/2016 10:00:00 AM

Normalized Differential Pressure

Train	Green	Yellow	Red
T1	100	> 100 < 155	155
T2	4	> 4 < 10	10
T3	85	> 85 < 100	100

Normalized Salt Passage

Train	Green	Yellow	Red
T1	8	> 8 < 15	15
T2	4	> 4 < 8	8
T3	5	> 5 < 10	10

Normalized Permeate Flow

Train	Green	Yellow	Red
T1	10	> 10 < 20	20
T2	5	> 5 < 15	15
T3	50	> 50 < 75	75

Normalized Flux

Train	Green	Yellow	Red
T1	5	> 5 < 15	15
T2	5	> 5 < 15	15
T3	10	> 10 < 30	30

CATS Last Clean Dates: Train 1: 3/4/2016 12:00:00 PM

Normalized Differential Pressure

Train	Green	Yellow	Red
T1	10	> 10 < 25	25

Normalized Salt Passage

Train	Green	Yellow	Red
T1	10	> 10 < 25	25

Normalized Permeate Flow

Train	Green	Yellow	Red
T1	5	> 5 < 10	10

Normalized Flux

Train	Green	Yellow	Red
T1	10	> 10 < 25	25

IDP Last Clean Dates: Train 1: 3/4/2016 1:00:00 PM Train 2: 3/12/2016 9:00:00 AM

Normalized Differential Pressure

Train	Green	Yellow	Red
T1	5	> 5 < 10	10
T2	80	> 80 < 100	100

Normalized Salt Passage

Train	Green	Yellow	Red
T1	10	> 10 < 20	20
T2	10	> 10 < 22	22

Normalized Permeate Flow

Train	Green	Yellow	Red
T1	6	> 6 < 12	12
T2	12	> 12 < 24	24

Normalized Flux

Train	Green	Yellow	Red
T1	10	> 10 < 25	25
T2	25	> 25 < 50	50

W 21/22 Last Clean Dates: Train 1: 12/21/2015 4:00:00 PM Train 2: 4/11/2016 3:00:00 PM Train 3: 2/17/2016 9:00:00 AM

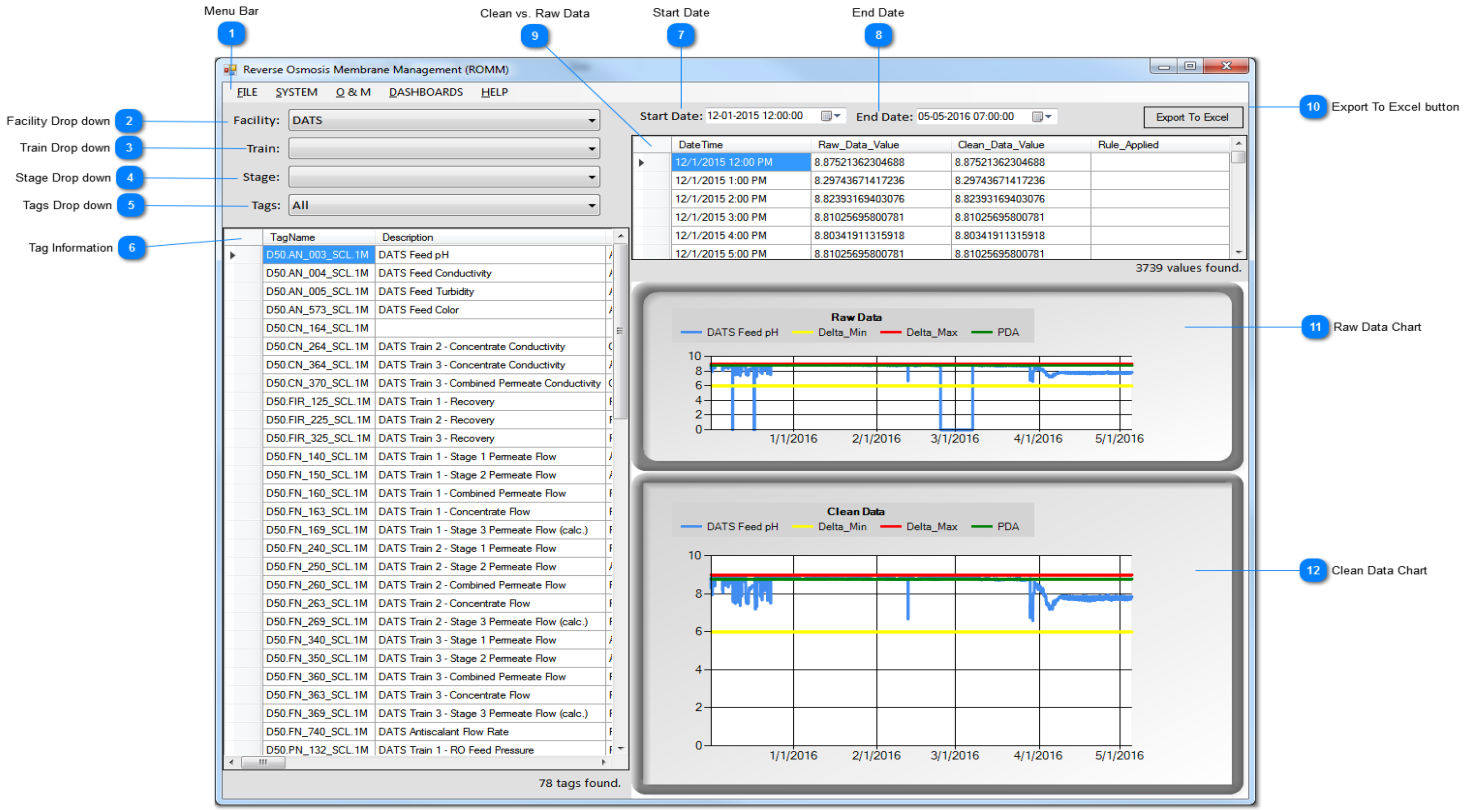
Normalized Differential Pressure

Normalized Salt Passage

Normalized Permeate Flow

Normalized Flux

Example – Irvine Ranch Water District Graphical User Interface

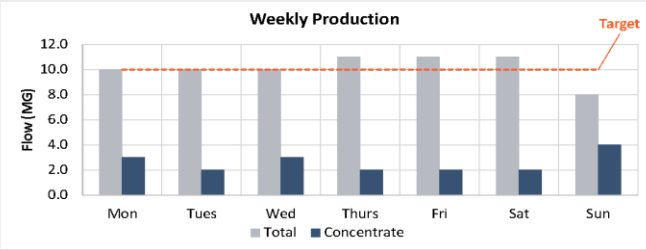


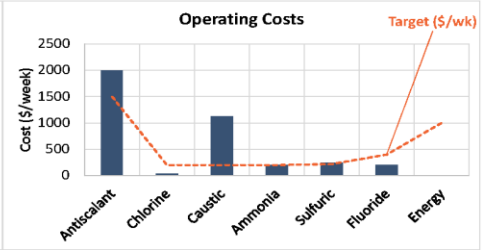
Project Example – Beverly Hills

Weekly Report — June-15

Week Beginning	6/1/2015
Report Completed By	Nathan

COMPLIANCE SAMPLING	
Samples Collected	✓
Sampling Date	4/5/2015

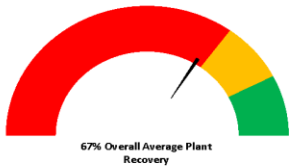




TREATED WATER QUALITY		Target	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
			6/1	6/2	6/3	6/4	6/5	6/6	6/7
Arsenic	mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.09
Chlorine	mg/L	3	3.5	4	1.8	1.8	1.9	2.0	2.1
H2S	ppm	0.1	2	0.5	0.5	0.5	1	2	3
Fluoride	mg/L	0.7	1	1	1	1	1	1	1

Total Chemical Cost (wk)	$	3,807
Total Energy Cost (wk)	$	6
Cost per MG of water produced	$	53.70

Key Items	1	Antiscalant higher than usual due to increased RO runtime
	2	Caustic dosing higher than normal due to high raw water pH
	3	
Actions	1	
	2	
	3	



Project Example – West Basin

Key Benefits

- Data ‘on demand’ to make quick decisions.
- Help manage data from complex reuse systems - Normalization of RO Data, log removal values, large arrays of data.
- Save hours of engineering time by automating data handling.
- Remove potential for erroneous values.
- Information focused and tailored to all levels of operations – management, engineering and operations.

Thankyou

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