



KPI Dashboard - Avg Values Through June 5-17

Lewes BPW WWTP InSight Report

27-Aug-24 to 20-Sep-24

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System Equipment

4 x ZW 500D UF trains, 4 cassettes per train, 120 modules x 370 sq. ft. per train (44,400 sq. ft. per train)
 UF3 & UF4 membranes replaced 2020 Q1
 Net Capacity: 1.50 MGD (avg. daily flow), 2.25 MGD (peak daily flow)

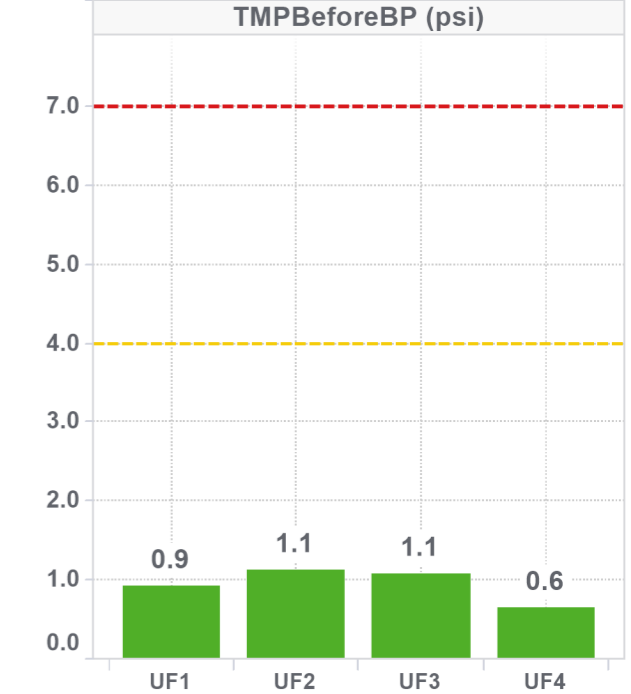
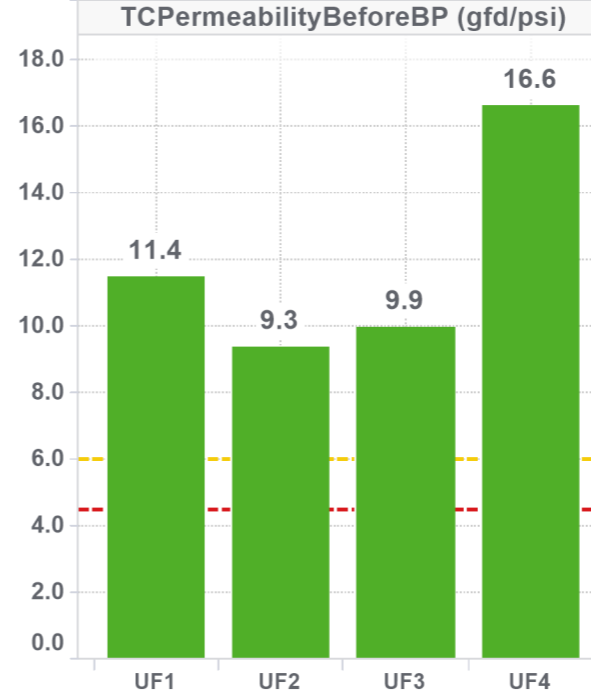
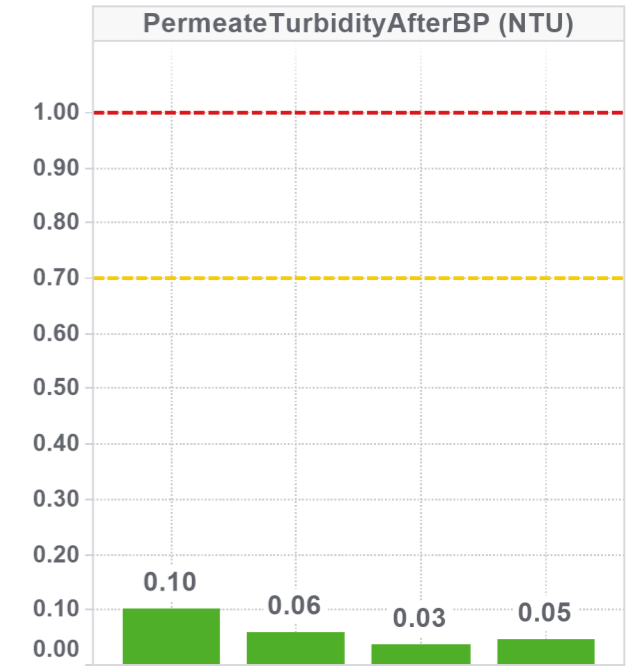
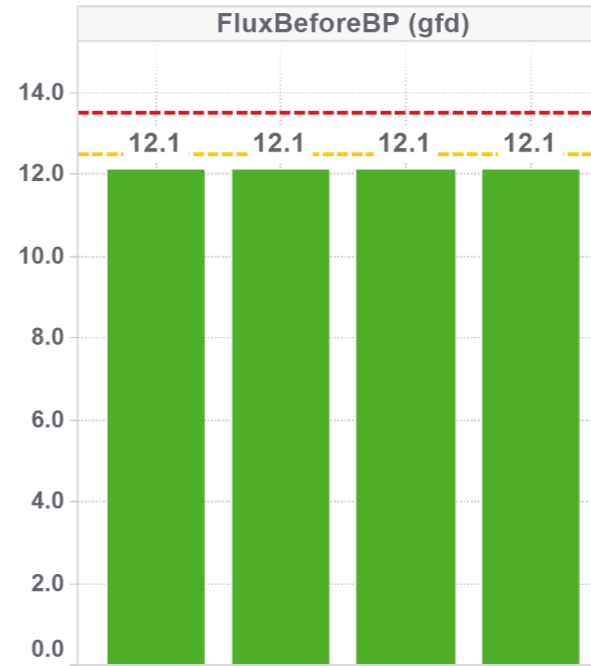
Cleaning Strategy

Maintenance Cleans:

2 x 200 ppm Sodium Hypochlorite per week
 1 x 2000 ppm Citric Acid per week

Recovery Cleans:

2 x 2000 ppm dose/1000 ppm soak Sodium Hypochlorite per year
 1 x 2000 ppm Citric Acid per year



Report Highlights

Membrane Performance:

- Permeability was stable without losses on all trains. Performance is excellent on all trains with TC permeability >8 gfd/psi, and TMP near or below 1 psi.
- Turbidity was <0.2 NTU on all trains >99% of the time on UF1, UF2, UF3, and UF4.

Plant Updates:

- UF1 was offline over Sept 16-19 for a recovery clean. Permeability was restored by +2.9 gfd/psi (11.8 to 14.7 gfd/psi) which is a good cleaning result and excellent post-clean permeability.
- UF trains spent only 8% of the time in LEAP High during this report, indicating higher efficiency in recent operations.

Averages Over Report Period

Parameter	Unit		UF1	UF2	UF3	UF4
FluxBeforeBP	gfd	Value	12.11	12.11	12.10	12.10
		Change	0%	0%	0%	0%
FluxDuringBP	gfd	Value	18.57	17.98	12.49	18.62
		Change	0%	-3%	-5%	-1%
PermeateTurbidityAfterBP	NTU	Value	0.10	0.06	0.03	0.05
		Change	-10%	14%	8%	26%
TCPermeabilityBeforeBP	gfd/psi	Value	11.44	9.34	9.92	16.58
		Change	-2%	-2%	1%	1%
TCPermeabilityDuringBP	gfd/psi	Value	10.69	10.59	5.92	9.01
		Change	1%	-1%	-4%	0%
TMPBeforeBP	psi	Value	0.92	1.13	1.06	0.63
		Change	2%	3%	2%	1%
TotalPermeateFlowDaily	gal	Value	133,010.00	183,658.25	176,993.65	181,504.80
		Change	-31%	-2%	-6%	2%

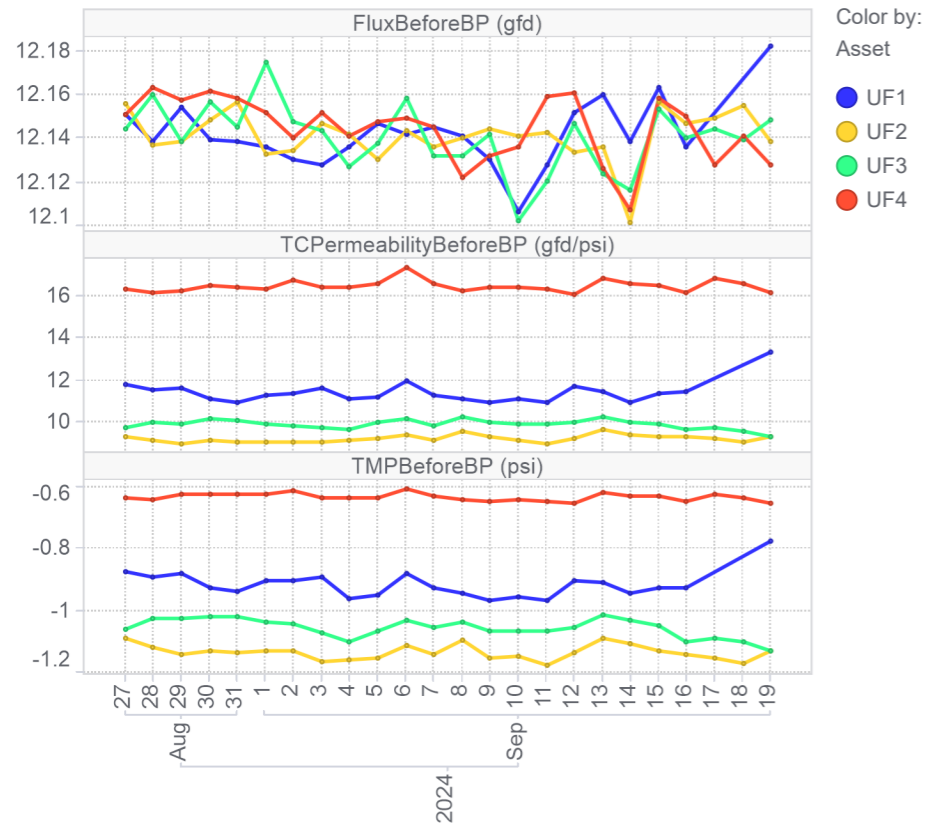
Temperature Corrected Permeability Trends



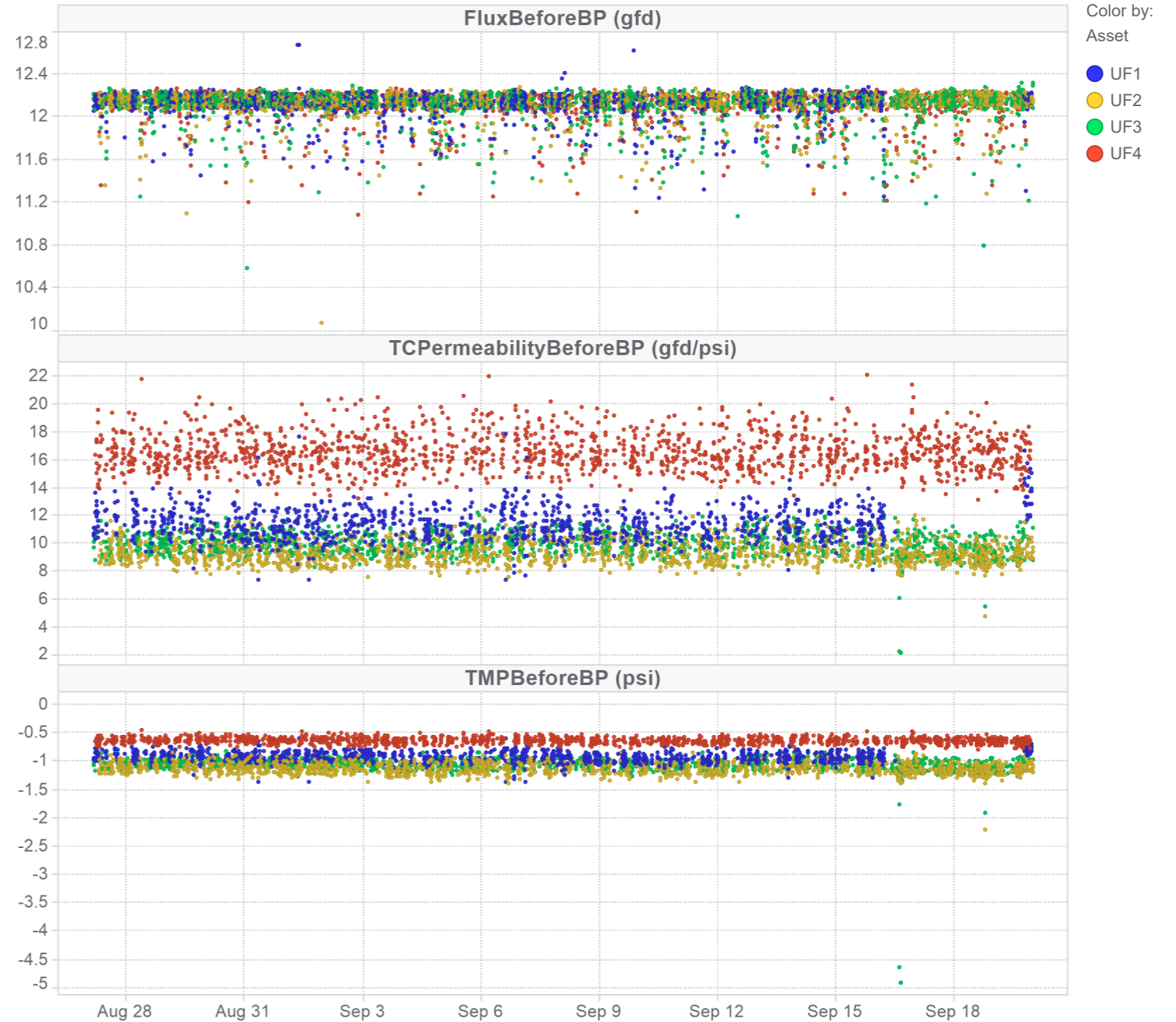
Comments

- Flux/flow rate was steady on all trains in Production.
- Permeability was stable without losses on all trains.

MBR KPI Daily Median Averages



MBR KPI Raw Trends



Comments

- Turbidity was <0.2 NTU on all trains >99% of the time on UF1, UF2, UF3, and UF4.

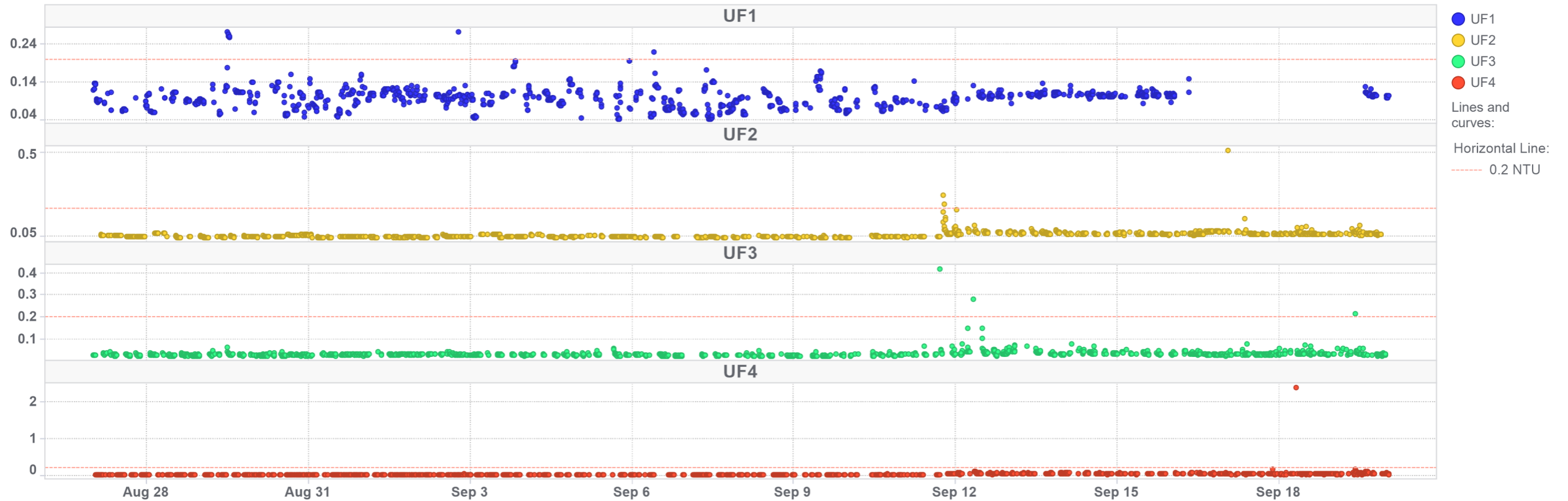
Permeate Turbidity: % Data Within Range

Parameter	Value Range	UF1	UF2	UF3	UF4
PermeateTurbidityAfterBP	< 0.20 NTU	99.31%	99.80%	99.79%	99.94%
	> 0.50 NTU	-	0.07%	-	0.06%
	0.50 NTU > x > 0.20 NTU	0.69%	0.13%	0.21%	-

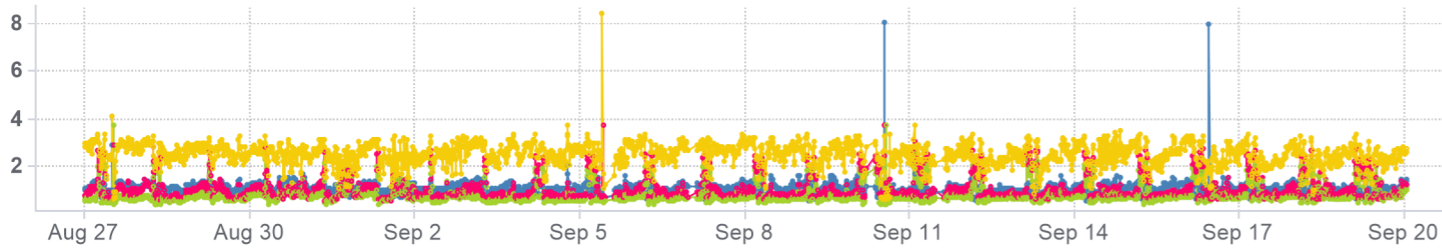
Permeate Turbidity Distribution

Parameter - Unit	Asset	Average	Min	Max
PermeateTurbidityAfterBP (NTU)	UF1	0.10	0.04	0.27
	UF2	0.06	0.05	0.52
	UF3	0.03	0.03	0.42
	UF4	0.05	0.03	2.41

PermeateTurbidity Trends



Dissolved Oxygen and pH Trends

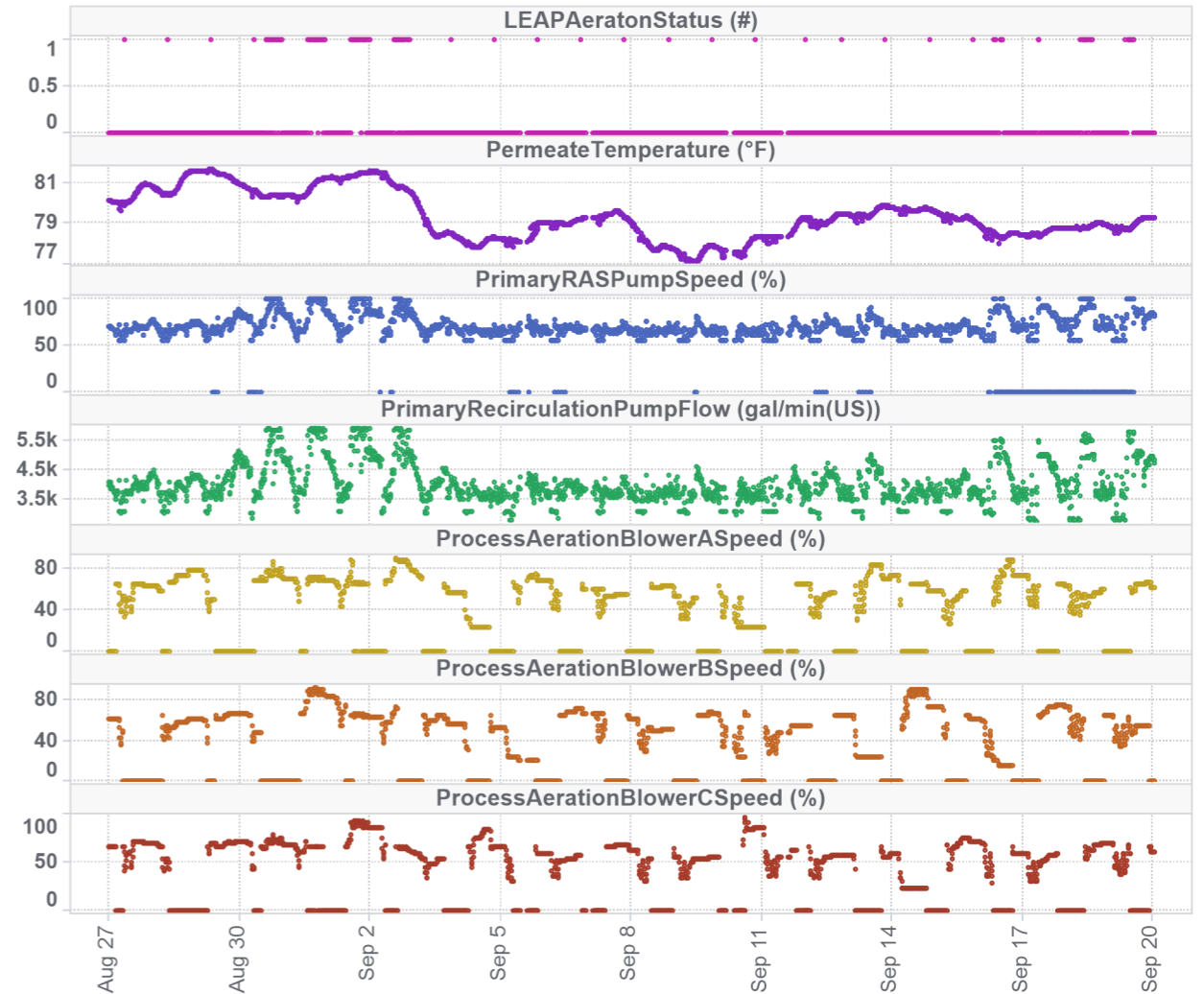


Dissolved Oxygen Distribution

Parameter - Unit	Average	Min	Max
AerobicZoneTank1 DissolvedOxygen (mg/L)	1.07	0.59	3.75
AerobicZoneTank2 DissolvedOxygen (mg/L)	1.11	0.59	8.04
PreAnoxicZone1Tank DissolvedOxygen (mg/L)	0.85	0.46	3.74
PreAnoxicZone2Tank DissolvedOxygen (mg/L)	2.53	0.65	8.42

Process Control Parameter Distribution

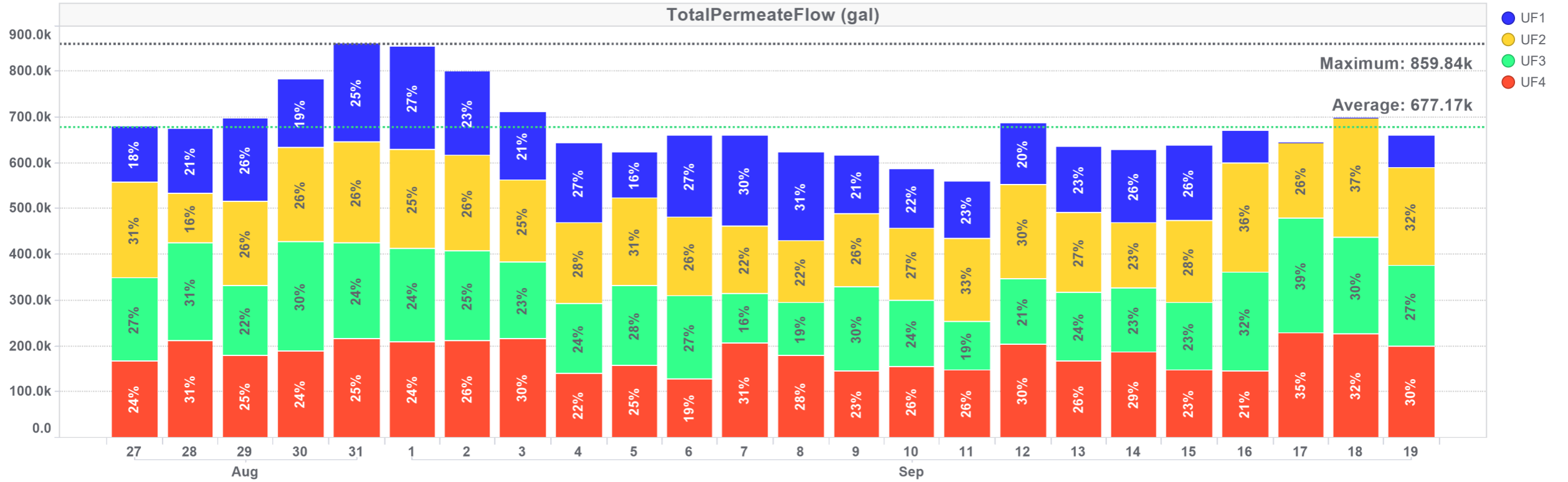
Parameter - Unit	Asset	Average	Min	Max
FeedFlowRate (gal/min(US))	UF1	538.21	0.00	1152.00
	UF2	617.15	0.00	1184.00
	UF3	441.47	0.00	973.00
	UF4	475.06	0.00	561.00
FoamPumpFlow (gal/min(US))	UF Plant	0.01	0.01	0.02
MembraneAerationAirFlow (scfm)	UF Plant	1007.48	0.00	3130.59
PermeateTemperatureAfterBP (°F)	UF1	79.90	77.08	82.49
	UF2	79.76	77.13	82.49
	UF3	79.83	77.10	82.48
	UF4	79.80	77.08	82.46
PrimaryRAS PumpSpeed (%)	UF1	65.19	0.00	100.00
	UF2	70.67	0.00	100.00
	UF3	71.41	0.00	100.00
	UF4	71.24	0.00	100.00
PrimaryRecirculationPumpFlow (gal/min(US))	UF Plant	4093.12	2728.11	5972.41
ProcessAerationBlowerASpeed (%)	UF Plant	40.70	0.00	92.00
ProcessAerationBlowerBSpeed (%)	UF Plant	38.86	0.00	92.00
ProcessAerationBlowerCSpeed (%)	UF Plant	41.92	0.00	96.00
TotalWASFlowDaily (gal)	UF Plant	500.00	0.00	10000.00
WasteSlugWASFlow (gal/min(US))	UF Plant	9.41	0.05	300.00



Comments

- Blowers A, B, and C rotate to share process aeration demand.
- Dissolved oxygen was stable on all four sensors.

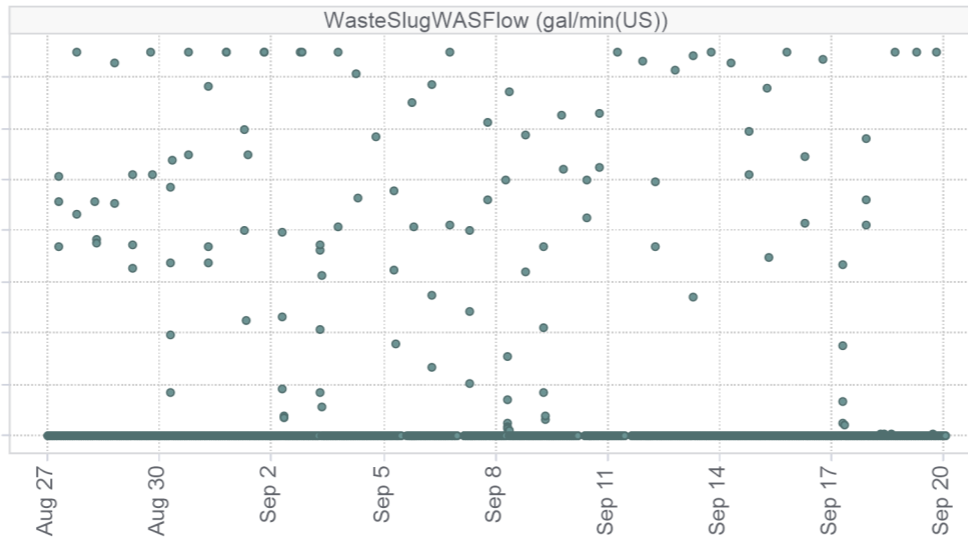
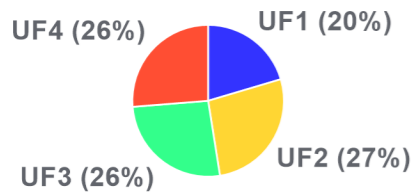
Production Summary



Flow Division

Asset	Flow Division
UF1	20.4%
UF2	27.1%
UF3	26.2%
UF4	26.3%

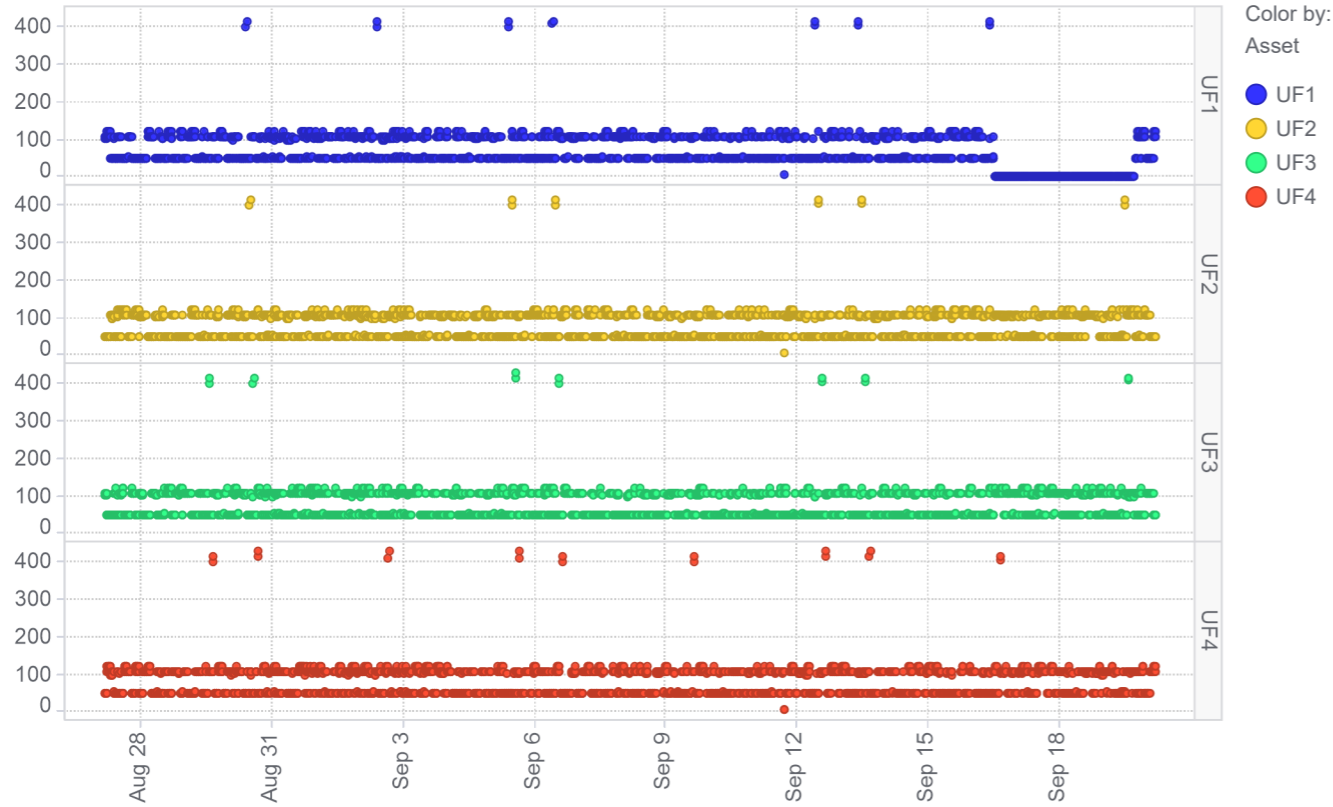
● + 5%
○ Even Distribution
● -5%



Comments

- Plant production averaged 0.7 MGD. Data indicates daily flow peaked between 0.9 MGD on Aug 31.
- Daily permeate production was even between trains, excluding periods when a train was in a clean. Even flow split is beneficial for even wear and membrane longevity.

Train Status Plot



Comments

- UF1 was offline over Sept 16-19.
- Maintenance cleans (MCs) were run about 2/week on all trains in Production.
- UF trains spent only 8% of the time in LEAP High.

Train Status Legend:

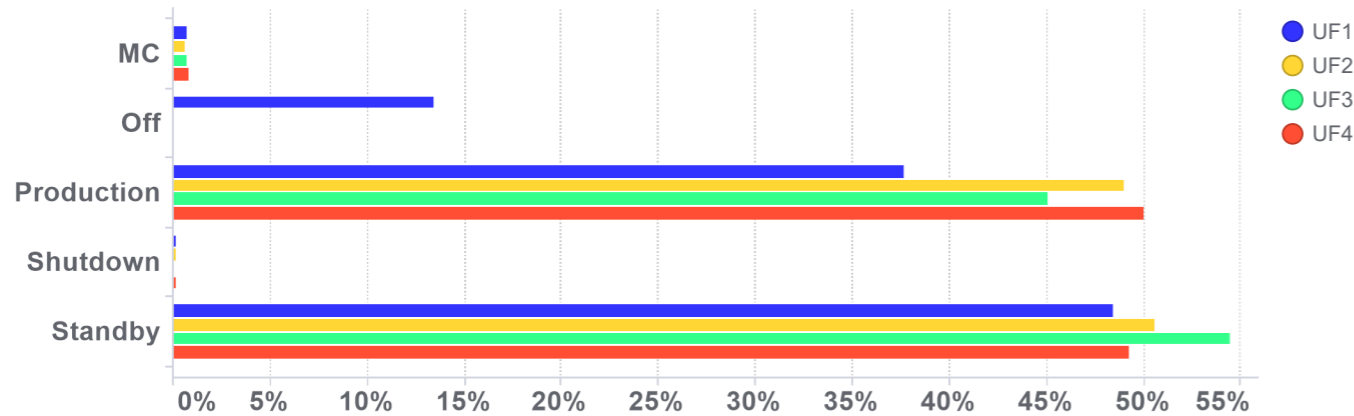
2=Off (includes manual recovery cleans), 7=Shutdown, 52=Standby, 102=Production, 400=Maintenance Clean, 500=Recovery Clean

Train Status Analysis

Mode	UF1	UF2	UF3	UF4
MC	0.61%	0.52%	0.61%	0.78%
Off	13.39%	-	-	-
Production	37.58%	48.89%	44.99%	49.93%
Shutdown	0.04%	0.04%	-	0.09%
Standby	48.37%	50.54%	54.40%	49.20%

● Max
○ Min

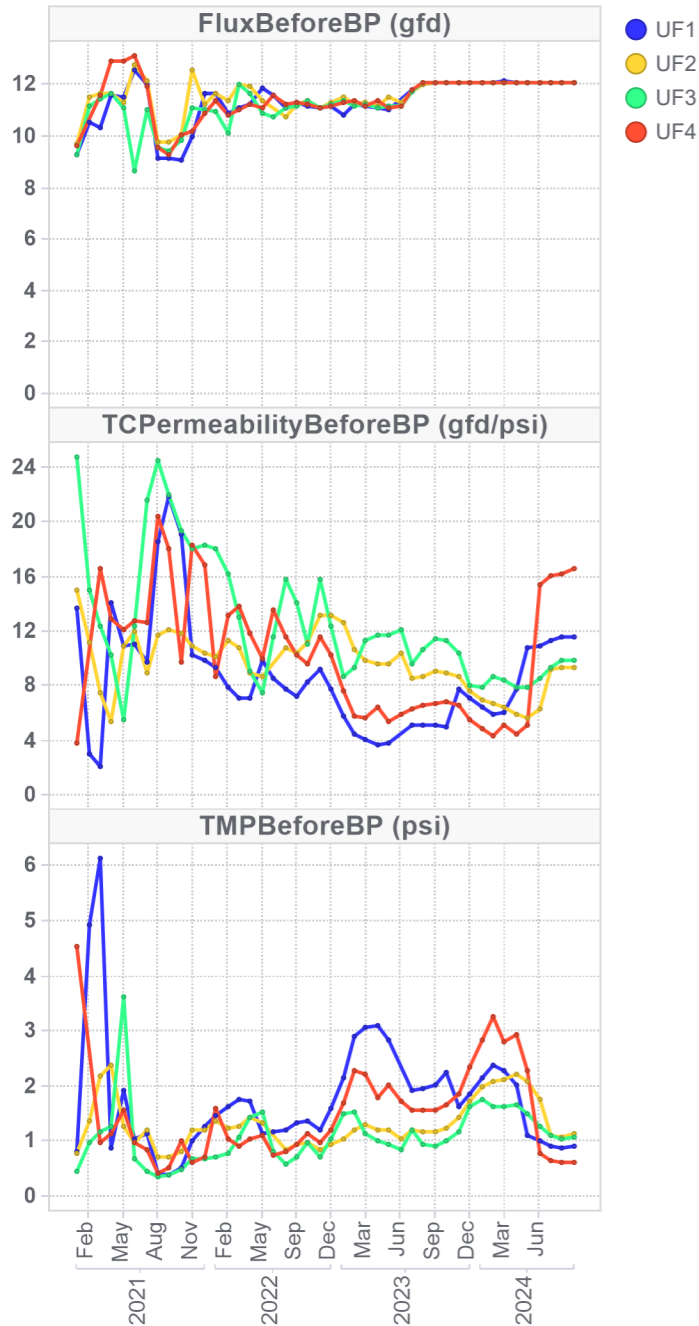
Train Status Distribution % Time



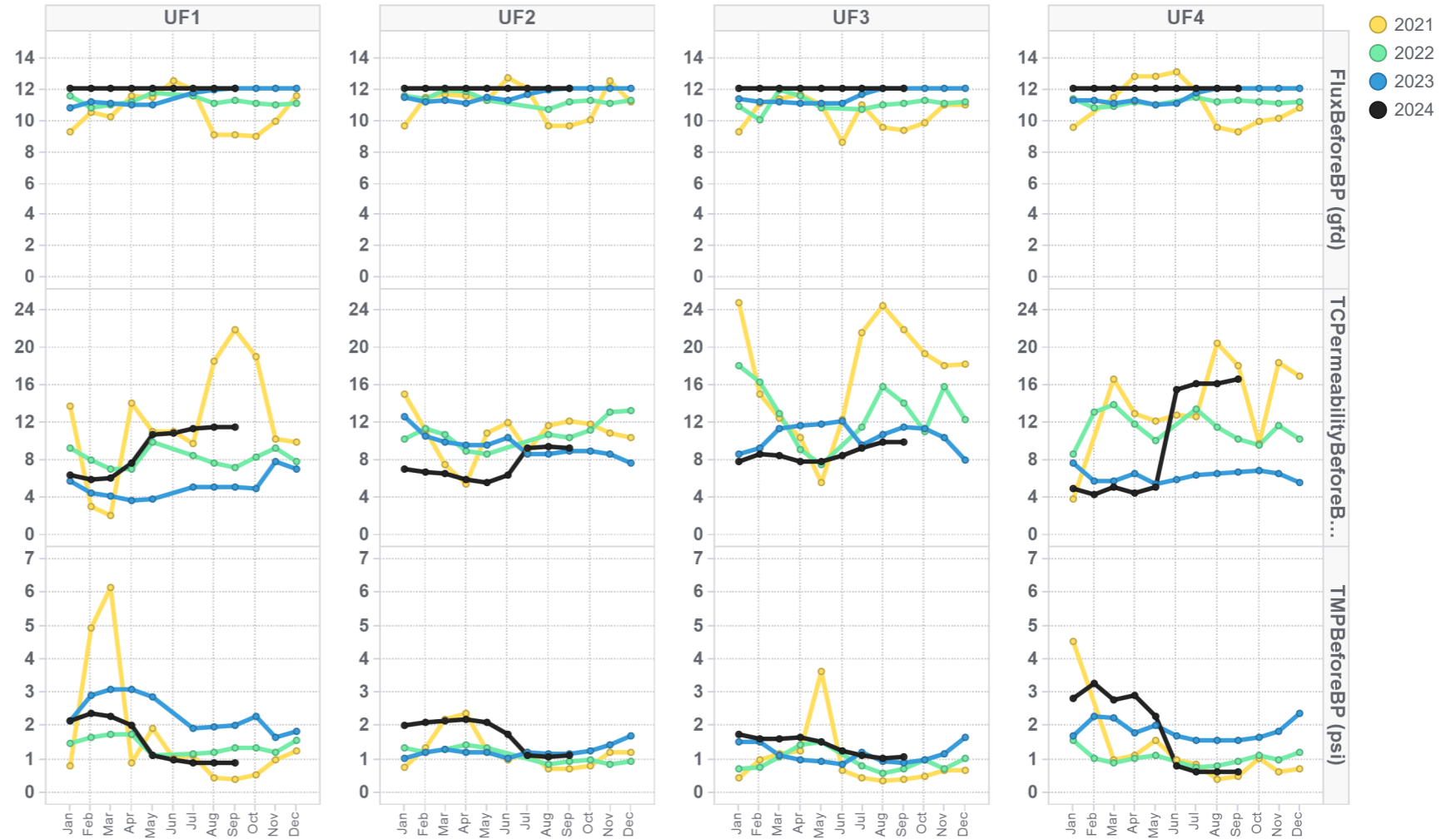
LEAP Aeration Distribution



Long-term KPI Trends



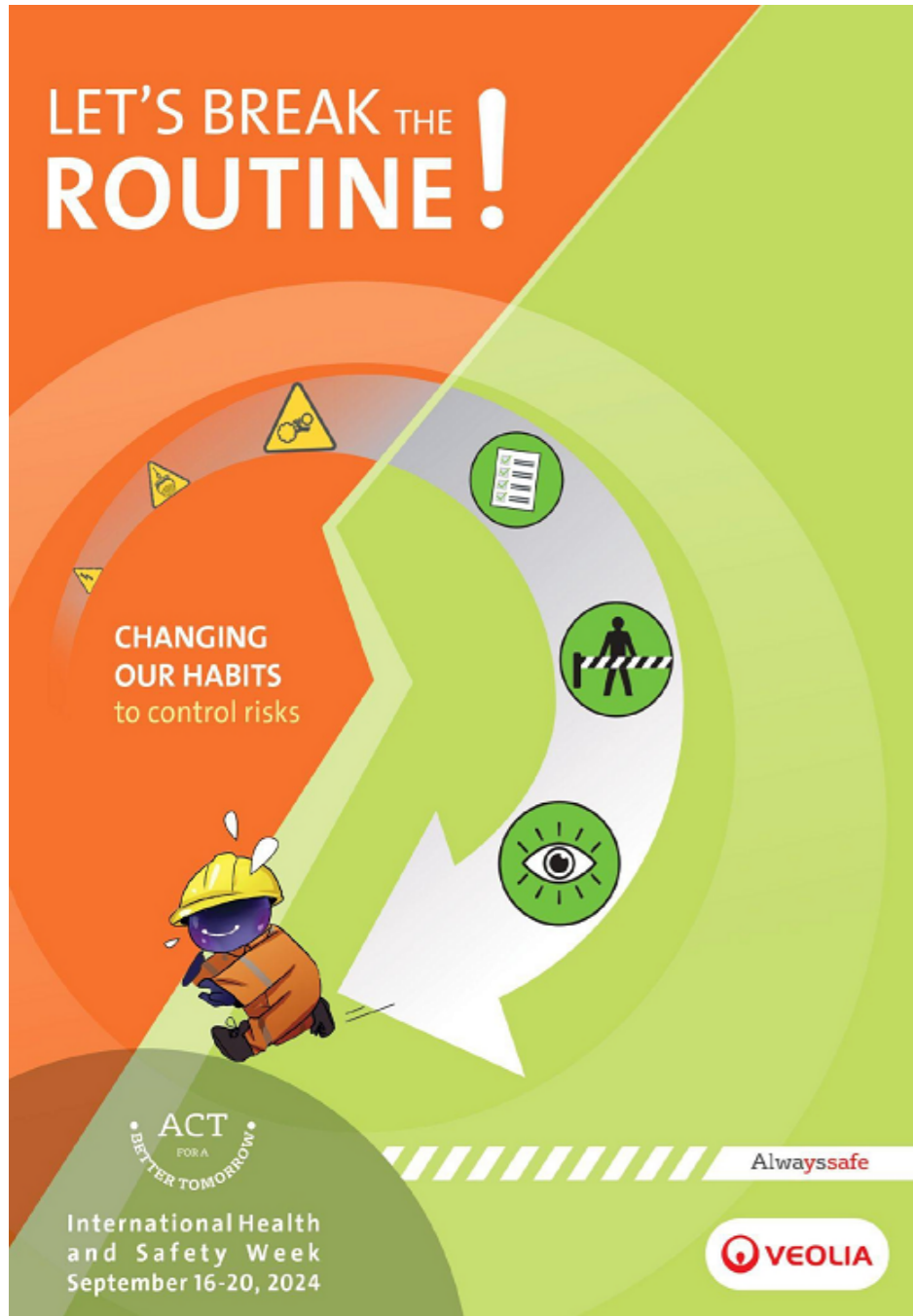
Comparing Data Year to Year



Comments

The graphs to the left are chronological in time. The graphs above on the right of the page are coloured by year (ex. black for 2024, blue for 2023). Both are used to track long-term performance. Comparing year to year additionally accounts for seasonality (ex. comparing Dec 2023 to Dec in 2022 and 2021).

- Flux/flow rate increased starting Aug 2023, yielding more production, and influencing TMP
- TMP was higher and permeability lower in 2024 Q1 compared to previous year Q1's on trains 2, 3, and 4
- 2024 Q2 saw improvements in TMP and permeability on trains 1 and 4, especially in June and July



cleaning chemicals

WARNING

Allowing solutions containing citric acid and calcium hypochlorite to mix may create deadly chlorine gas, posing a severe safety hazard to all personnel within the facility. Under no circumstances should such solutions be permitted to come into contact with one another.

NOTICE

Chemicals must be segregated based on compatibility. When storing chemicals, ensure that all relevant manufacturer's instructions regarding safe storage and handling are observed.

CAUTION

Failure to observe all safety precautions outlined in the applicable MSDSs while handling cleaning chemicals may result in injury. (See Volume III - Supplementary Documentation Binder.)

For InSight technical assistance please email insight.dcs@veolia.com or please call technical support at 1 866 271 5425 or 905 469 7723 and follow the prompts, if you require after hours assistance please contact the 24/7 Emergency number provided in your plant documentation. This email is a summary of issues identified during a manual review of InSight data from the time period above. This review is an analysis of data that is logged by InSight and identifies key plant performance issues determined from this data. This data review was not focused on minor data issues but on identifying possible existing and/or upcoming critical operational issues.

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