PUMP STATION 196

Aug-21		PS 196		
		METER READING	24 HOUR FLOW	
SUN	1	71072780	0.144380	
MON	2	71217160	0.132630	
TUE	3	71349790	0.129830	
WED	4	71479620	0.130180	
THU	5	71609800	0.131540	
FRI	6	71741340	0.140700	
SAT	7	71882040	0.178310	
SUN	8	72060350	0.152940	
MON	9	72213290	0.144940	
TUE	10	72358230	0.132920	
WED	11	72491150	0.134500	
THU	12	72625650	0.136770	
FRI	13	72762420	0.144300	
SAT	14	72906720	0.169060	
SUN	15	73075780	0.148478	turned off 196 to lewes
MON	16	73224258	0.154162	3:00am 8/15/21
TUE	17	73378420	0.133240	
WED	18	73511660	0.133610	
THU	19	73645270	0.129620	
FRI	20	73774890	0.159505	
SAT	21	73934395	0.159505	
SUN	22	74093900	0.139940	
MON	23	74233840	0.142190	
TUE	24	74376030	0.141710	
WED	25	74517740	0.138170	
THU	26	74655910	0.133650	
FRI	27	74789560	0.135990	
SAT	28	74925550	0.136430	
SUN	29	75061980	0.134630	
MON	30	75196610	0.123610	
TUE	31	75320220	0.123190	
		75443410		actual flow to lewes
TOTAL			4.370630	from 8/1 to 8/15
COUNT			31	2.151478 gallons.
AVERAGE			0.140988	actual flow to
				wolfenck 2.219152 gals.
MINIMUM			0.123190	
MAXIMUM			0.178310	

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (include Facility Name/Location if different):

NAME Howard Seymour Water Reclamation Plant

ADDRESS 116 American Legion Road, Lewes, DE 19958 US

FACILITY Howard Seymour Water Reclamation Plant

LOCATION 116 American Legion Road, Lewes, DE 19958 US

PERMIT NUMBER DE0021512

DISCHARGE NUMBER 001

MONITORING PERIOD FROM 2021 07 01 TO 2021 07 31

REPORT DESIGNATOR A

DATA ENTRY COMPLETE 8/27/2021

REPORT SUBMITTED BY richardplack

STATUS OF SUBMISSION Submitted for Signature

#	PARAMETER		NDI	QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
				AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
1/1	Flow	SAMPLE MEASUREMENT		**0.89**	**1.167**	**Mil Gal/Day**				--	**0**	**99/99**	**RCOTOT**
	Gross Effluent (50050)	PERMIT REQUIREMENT	-	No Limit | Monitoring Reqd	No Limit | Monitoring Reqd	Mil Gal/Day	No Monitoring Required	No Monitoring Required	No Monitoring Required	--	--	99/99	RCOTOT
1/2	Dissolved oxygen (DO)	SAMPLE MEASUREMENT				--	**0.41**		**6.16**	**mg/l**	**0**	**99/99**	**Imersion**
	Gross Effluent (00300)	PERMIT REQUIREMENT	-	No Monitoring Required	No Monitoring Required	--	No Limit | Monitoring Reqd	No Monitoring Required	No Limit | Monitoring Reqd	mg/l	--	99/99	Imersion
1/3	pH	SAMPLE MEASUREMENT				--	**7**		**7.5**	**Std pH Units**	**0**	**01/01**	**Grab**
	Gross Effluent (00400)	PERMIT REQUIREMENT	-	No Monitoring Required	No Monitoring Required	--	6	No Monitoring Required	9	Std pH Units	--	01/01	Grab
1/4	Enterococcus	SAMPLE MEASUREMENT				--		**<1**	**<1**	**CFU/100 ML**	**0**	**01/07**	**Grab**
	Gross Effluent (31639)	PERMIT REQUIREMENT	-	No Monitoring Required	No Monitoring Required	--	No Monitoring Required	10	104	CFU/100 ML	--	01/07	Grab
1/5	BOD5	SAMPLE MEASUREMENT		**<17**	**<20**	**lbs/Day**		**<2.4**	**<2.4**	**mg/l**	**0**	**01/07**	**Composite 24**
	Gross Effluent (00310)	PERMIT REQUIREMENT	-	188	288	lbs/Day	No Monitoring Required	15	23	mg/l	--	01/07	Composite 24
1/6	BOD5	SAMPLE MEASUREMENT				--		**316**	**316**	**mg/l**	**0**	**01/30**	**Composite 24**
	Raw Sewage (00310)	PERMIT REQUIREMENT	-	No Monitoring Required	No Monitoring Required	--	No Monitoring Required	No Limit | Monitoring Reqd	No Limit | Monitoring Reqd	mg/l	--	01/30	Composite 24
1/7	TSS	SAMPLE MEASUREMENT		**<4**	**<4**	**lbs/Day**		**<0.5**	**<0.5**	**mg/l**	**0**	**01/07**	**Composite 24**
	Gross Effluent (00530)	PERMIT REQUIREMENT	-	188	288	lbs/Day	No Monitoring Required	15	23	mg/l	--	01/07	Composite 24

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

[ATTACH DIGITAL SIGNATURE RECEIPT FROM CROMERR]

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE

DATE YEAR MO DAY

NDI (No Data Indicator) Reasons: 8 - No Sample (Other); 9 - No Sample (Monitoring Not Required this Monitoring Period); B - Not Detected; C - No Sample (No Discharge)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

PERMITTEE NAME/ADDRESS (include Facility Name/Location if different):

NAME	Howard Seymour Water Reclamation Plant
ADDRESS	116 American Legion Road, Lewes, DE 19958 US
FACILITY	Howard Seymour Water Reclamation Plant
LOCATION	116 American Legion Road, Lewes, DE 19958 US

PERMIT NUMBER	DE0021512
DISCHARGE NUMBER	001
MONITORING PERIOD	
FROM	2021 07 01
TO	2021 07 31

REPORT DESIGNATOR	A
DATA ENTRY COMPLETE	8/27/2021
REPORT SUBMITTED BY	richardplack
STATUS OF SUBMISSION	Submitted for Signature

#	PARAMETER		NDI	QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
				AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
2/1	TSS	SAMPLE MEASUREMENT				--		533	533	mg/l	0	01/30	Composite 24
	Raw Sewage (00530)	PERMIT REQUIREMENT	-	No Monitoring Required	No Monitoring Required	--	No Monitoring Required	No Limit | Monitoring Reqd	No Limit | Monitoring Reqd	mg/l	--	01/30	Composite 24
2/2	Total Nitrogen	SAMPLE MEASUREMENT		44.5	76.1	lbs/Day		5.6	9.15	mg/l	0	02/30	Composite 24
	Gross Effluent (00600)	PERMIT REQUIREMENT	-	100	No Limit | Monitoring Reqd	lbs/Day	No Monitoring Required	8	No Limit | Monitoring Reqd	mg/l	--	01/30	Composite 24
2/3	Phosphorus, Total	SAMPLE MEASUREMENT		2.5	2.5	lbs/Day		0.3	0.3	mg/l	0	01/30	Composite 24
	Gross Effluent (00665)	PERMIT REQUIREMENT	-	25	No Limit | Monitoring Reqd	lbs/Day	No Monitoring Required	2	No Limit | Monitoring Reqd	mg/l	--	01/30	Composite 24

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		[ATTACH DIGITAL SIGNATURE RECEIPT FROM CROMERR]	TELEPHONE	DATE		
	I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		YEAR	MO	DAY
TYPED OR PRINTED						

NDI (No Data Indicator) Reasons: 8 - No Sample (Other); 9 - No Sample (Monitoring Not Required this Monitoring Period); B - Not Detected; C - No Sample (No Discharge)

Monthly Operations Report: July 2021

Site: LEWES WWTP

FINAL EFFLUENT OUTFALL 001																	
DATE	DAY	Flow	BOD		TSS		Enteroc.	Total P		Total N		Ammonia as N		Nitrite + Nitrate		TKN	
		MGD	mg/L	lbs	mg/L	lbs	col/100ml	mg/L	lbs	mg/L	lbs	mg/L	lbs	mg/L	lbs	mg/L	lbs
1	Thu.	0.924															
2	Fri.	1.167															
3	Sat.	1.137															
4	Sun.	1.043															
5	Mon.	1.103															
6	Tue.	0.997	<2.4	<20	<0.5	<4		0.3	2.49	9.2	76.08	7.5	62	0.2	1	9.0	75
7	Wed.	0.794					<1.0										
8	Thu.	1.036															
9	Fri.	0.990															
10	Sat.	0.909															
11	Sun.	0.873															
12	Mon.	0.859															
13	Tue.	0.871	<2.4	<17	0.5	4				2.1	14.89			1.2	9	0.8	6
14	Wed.	0.778					<1.0										
15	Thu.	0.824															
16	Fri.	0.916															
17	Sat.	0.922															
18	Sun.	0.778															
19	Mon.	0.762															
20	Tue.	0.829	<2.4	<17	<0.5	<4											
21	Wed.	0.841					<1.0										
22	Thu.	0.832															
23	Fri.	0.848															
24	Sat.	0.830															
25	Sun.	0.855															
26	Mon.	0.814															
27	Tue.	0.823															
28	Wed.	0.784	<2.4	<16	<0.5	<3											
29	Thu.	0.799					<1.0										
30	Fri.	0.849															
31	Sat.	0.809															
TOTAL		27.5960															
AVERAGE		0.8902	<2.40	<17.43	<0.50	<3.65	1.0	0.30	2.49	5.60	45.49	7.49	62.28	0.70	5.14	4.91	40.35
MAXIMUM		1.1670	<2.40	<20.00	0.50	<4.20	<1.00	0.30	2.49	9.15	76.08	7.49	62.28	1.22	8.86	8.98	74.67
MINIMUM		0.7620	<2.40	<15.70	<0.50	<3.30	<1.00	0.30	2.49	2.05	14.89	7.49	62.28	0.17	1.41	0.83	6.03
Removal (%)			99.2		99.9												

INFLUENT						
DATE	DAY	Flow	BOD		TSS	
		MGD	mg/L	lbs	mg/L	lbs
1	Thu.	0.896				
2	Fri.	1.087				
3	Sat.	1.077				
4	Sun.	1.068				
5	Mon.	1.034				
6	Tue.	0.881	316.0	2322	533.0	3916
7	Wed.	0.827				
8	Thu.	0.839				
9	Fri.	1.096				
10	Sat.	0.885				
11	Sun.	0.870				
12	Mon.	0.828				
13	Tue.	0.808				
14	Wed.	0.791				
15	Thu.	0.792				
16	Fri.	0.842				
17	Sat.	0.852				
18	Sun.	0.834				
19	Mon.	0.781				
20	Tue.	0.779				
21	Wed.	0.761				
22	Thu.	0.781				
23	Fri.	0.815				
24	Sat.	0.807				
25	Sun.	0.806				
26	Mon.	0.793				
27	Tue.	0.765				
28	Wed.	0.764				
29	Thu.	0.782				
30	Fri.	0.811				
31	Sat.	0.802				
TOTAL		26.5540				
AVERAGE		0.86	316	2,322	533	3,916
MAXIMUM		1.10	316	2,322	533	3,916
MINIMUM		0.76	316	2,322	533	3,916
Removal (%)						

LEWES WWTF

NUTRIENT OFFSET REPORT 2021

Month	Days	Average Monthly Flow	Monthly Average TN	Total Monthly TN Discharged	TN Based 16.9 lbs Manure Offset Required	Monthly Average TP	Total Monthly TP Discharged	TP Based 285 lbs Manure Offset Required	Max Manure Equivalent	Poultry Manure Relocated	Poultry Manure Offset Balance
		MGD	mg/L	lbs	Tons	mg/L	lbs	Tons	Tons	Tons	Tons
Carry Over											616.93
July	31	0.8902	5.60	1,288.85	10.89	0.30	69.05	9.84	10.89	-	606.04
August	31	0.7841	7.69	1,558.93	-	2.27	460.18	-		-	606.04
September	30	-	-		-	-		-		-	-
October	31	-	-		-	-		-		-	-
November	30	-	-		-	-		-		-	-
December	31	-	-		-	-		-		-	-
January	31	-	-		-	-		-		-	-
February	28	-	-		-	-		-		-	-
March	31	-	-		-	-		-		-	-
April	30	-	-		-	-		-		-	-
May	31	-	-		-	-		-		-	-
June	30	-	-		-	-		-		-	-
Year Balance											606.04

Comments:

Authorized Signatory

8/27/21

Date

LEWES BPW WWTP Biweekly InSight Report

Date: 9/8/2021

From: Erin Horocholyn - Suez Water Technologies & Solutions
To: Darrin Gordon, Austin Calaman, Inframark
cc: Matt Stapleford - Suez Water Technologies & Solutions

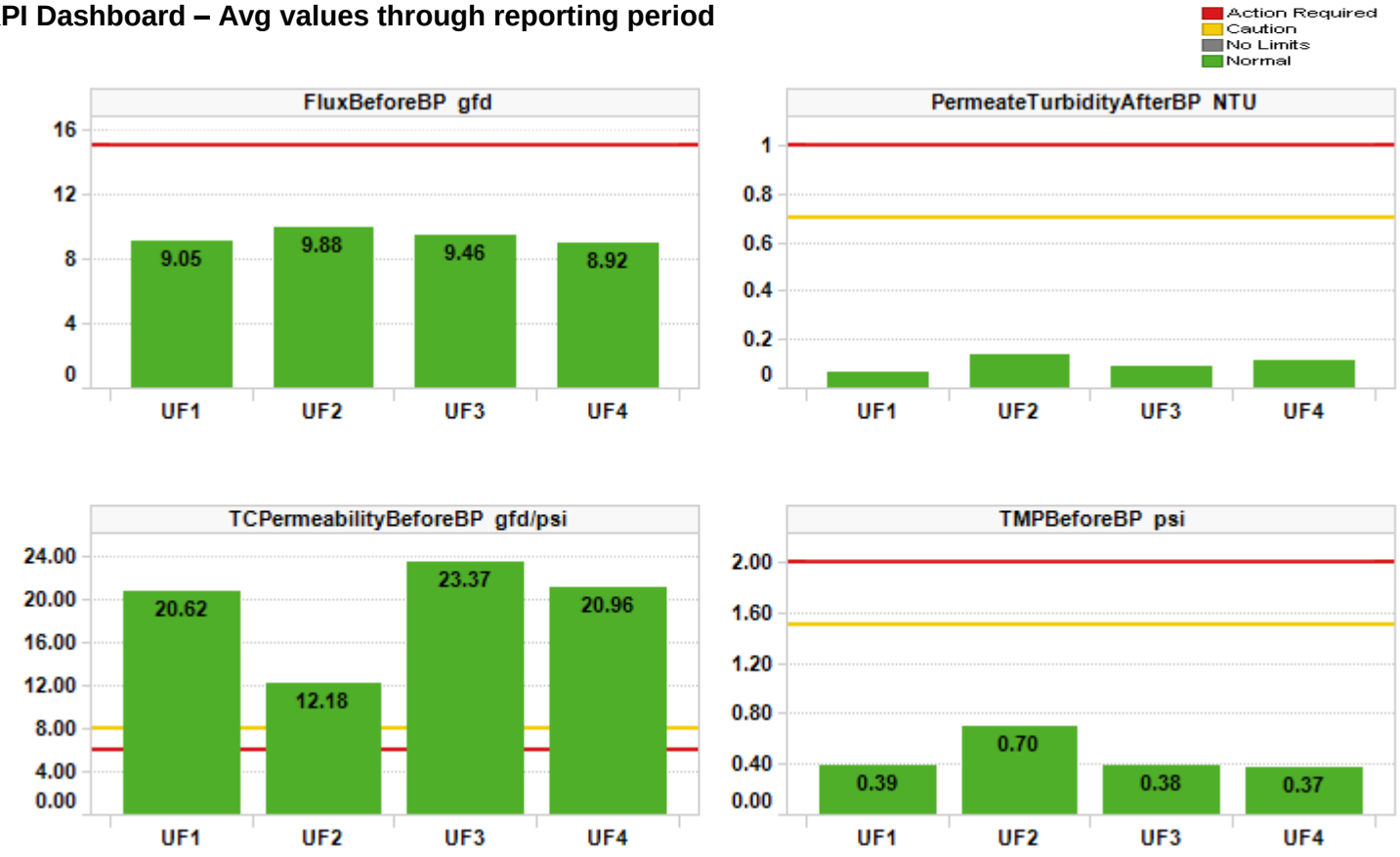
System Equipment

4 × ZW trains, each train consists of 4 - 500D cassettes, 120 modules x 370 sq. ft. per train (surface area 44,400 sq. ft. per train)
Replacement membranes installed Q1 2020 on trains UF3 and UF4

Cleaning Strategy

Recovery cleaning - 2 NaOCl @ 2000 ppm dose/1000 ppm soak per year, 1 Citric acid @ 2000 ppm per year
Maintenance cleaning - 1 NaOCl per week @ 200 ppm, 1 Citric acid per week @ 2000 ppm

KPI Dashboard – Avg values through reporting period



Plant Summary

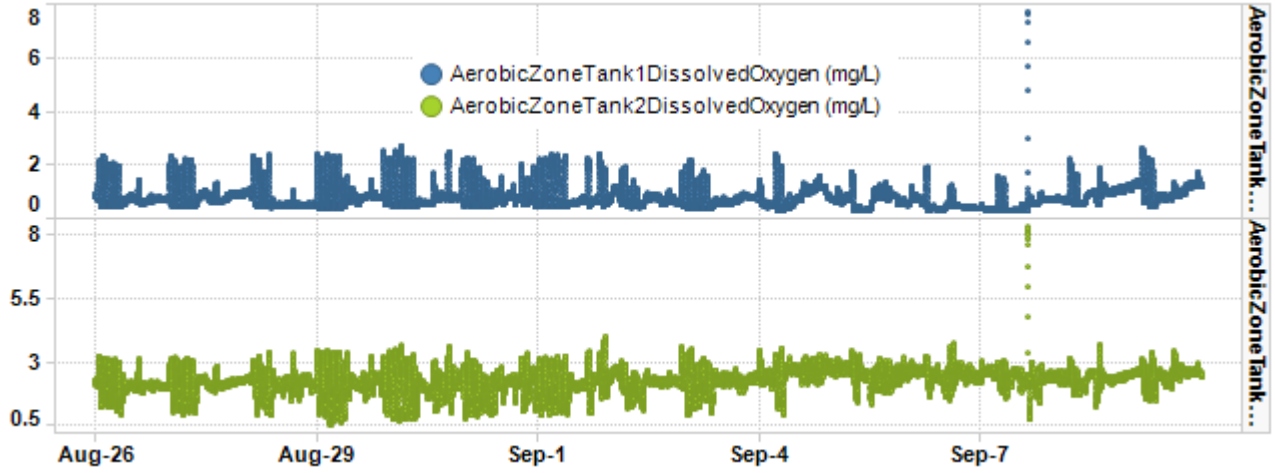
All trains had good KPI levels for permeability, TMP, and turbidity. All trains are <1.0 psi for TMP and >8.0 for permeability which is excellent.

- Daily permeate production averaged 0.73 MGD. Permeate temperature averaged 81°F (-1°F). All online trains are in Backpulse with constant LEAP Hi aeration. UF4 was mainly off in past two weeks
- TMP BBP averaged <1.0 psi on all trains. Averages for UF1, 3, and 4 ranged 0.37 – 0.39 psi, and UF2 averaged 0.70 psi
- TC permeability BBP averages were excellent and >8 gfd/psi, ranging 21 - 23 gfd/psi on trains UF1,3,4, and 12 gfd/psi on UF2
- Permeate turbidity ABP averages ranged from 0.06 – 0.13 NTU on all trains

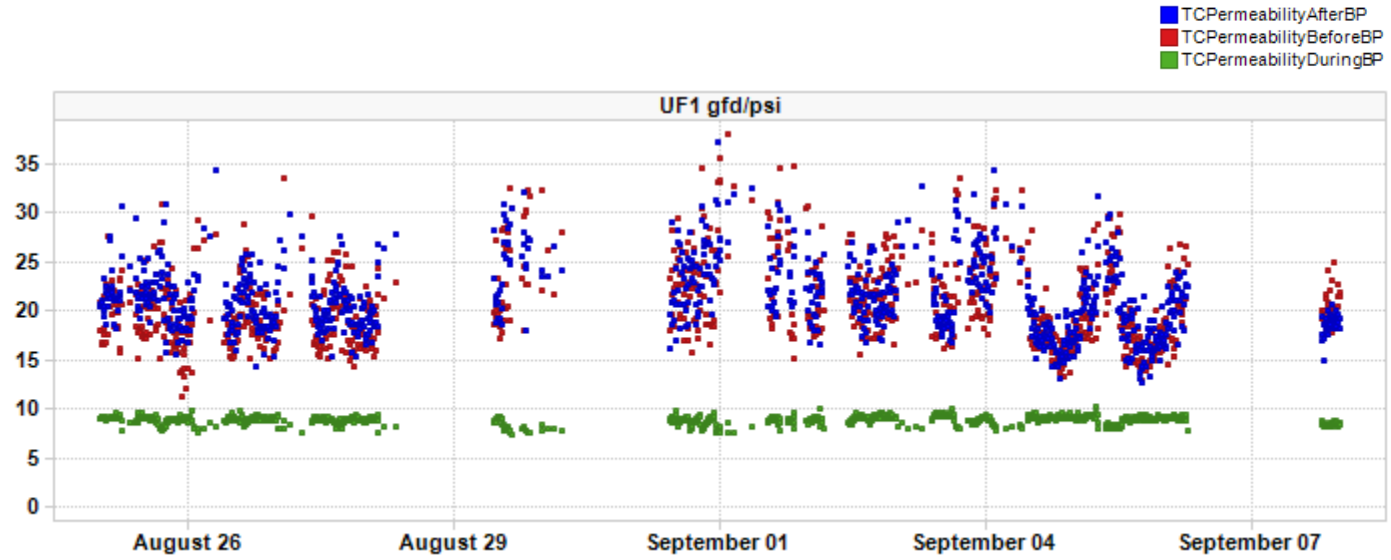
Table 1. Record of maintenance cleans (MCs) run between July 28 and August 24.

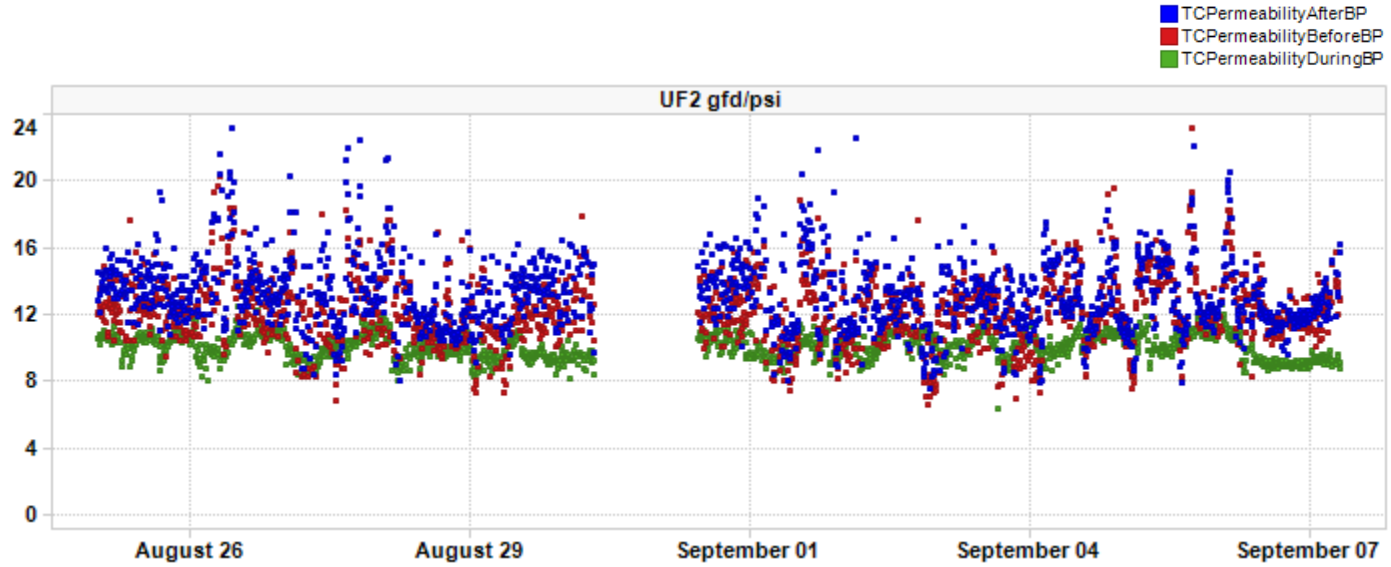
Train	UF1	UF2	UF3	UF4
# of Hypochlorite MCs	2	1	0	0
# of Citric Acid MCs	0	1	1	0

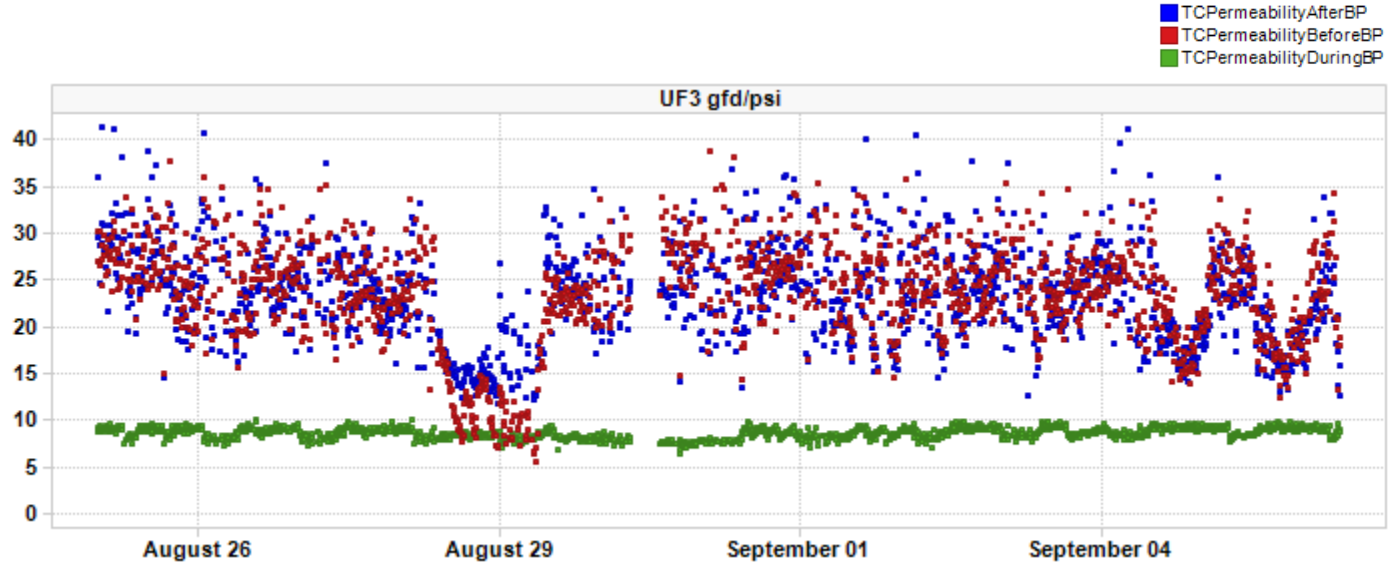
- UF1's hypo cleans were run for 24 and 31 hours respectively. UF3's clean was run for 18 hours
- Aerobic zone 1 dissolved oxygen averaged 0.81 ppm, while tank 2 averaged 2.28 mg/L. The pre-anoxic zone's DO averages were 0.57 mg/L in tank 1, and 1.74 mg/L in tank 2 which is high for feeding anoxic zones (ideally <0.5 mg/L for denitrification), but both have improved since the last report

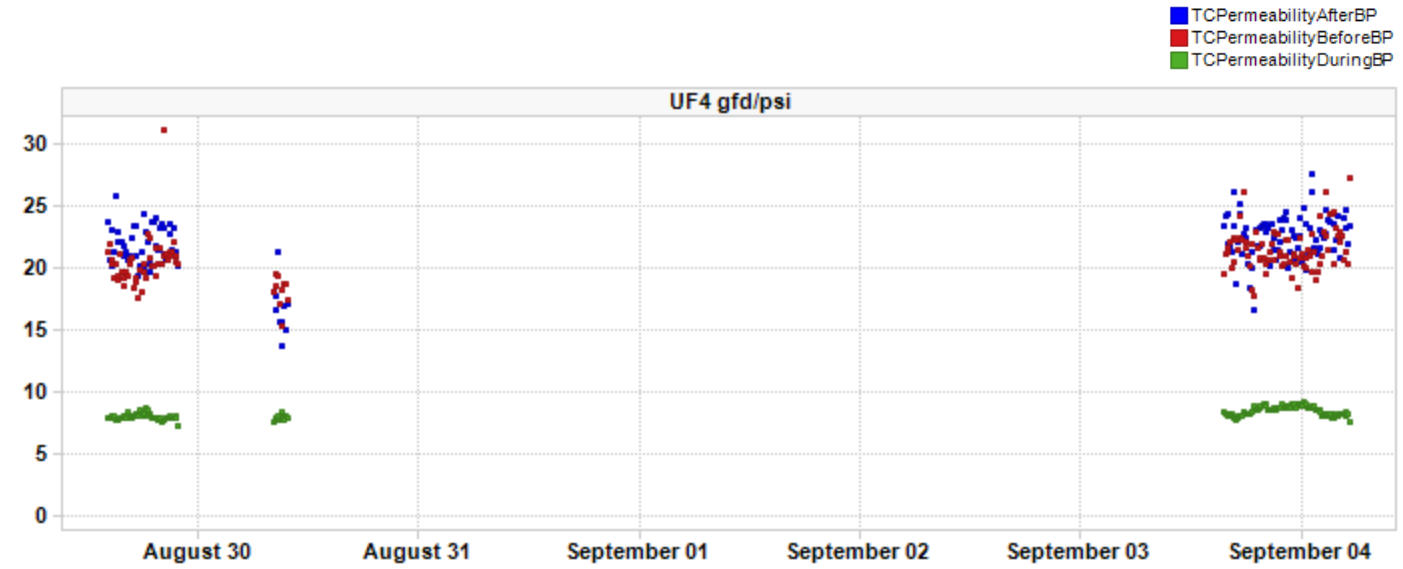


TC Permeability Trends By Train

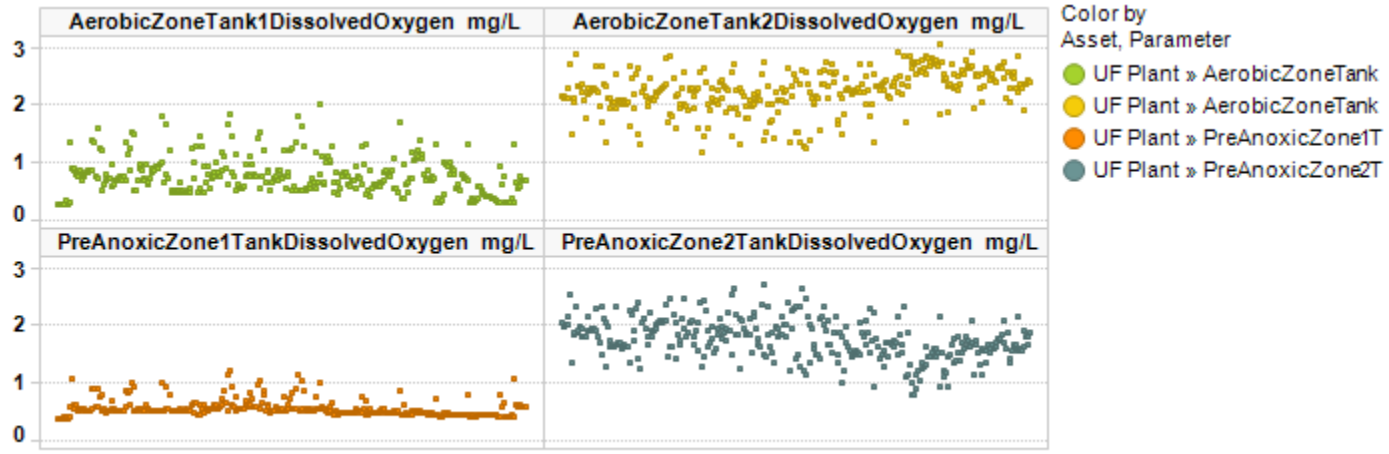




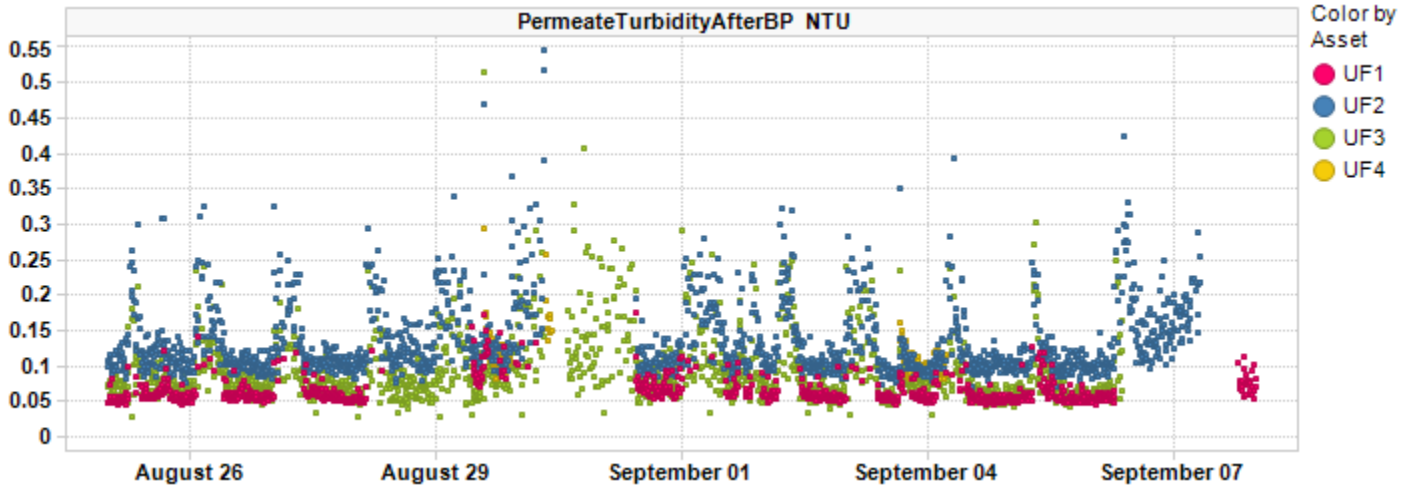




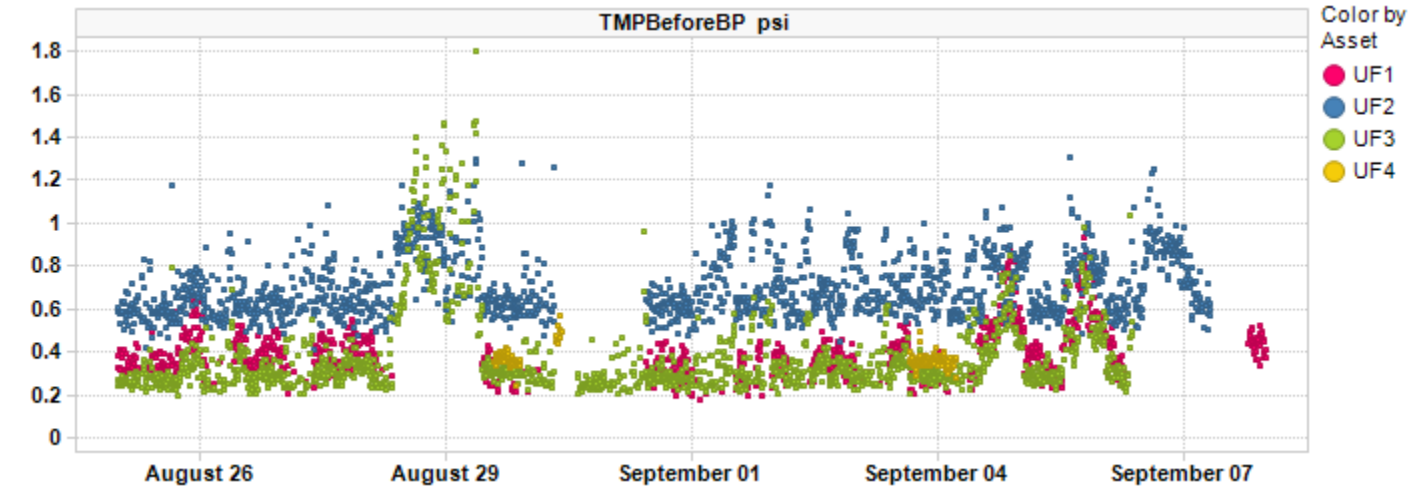
Bioreactor Dissolved Oxygen



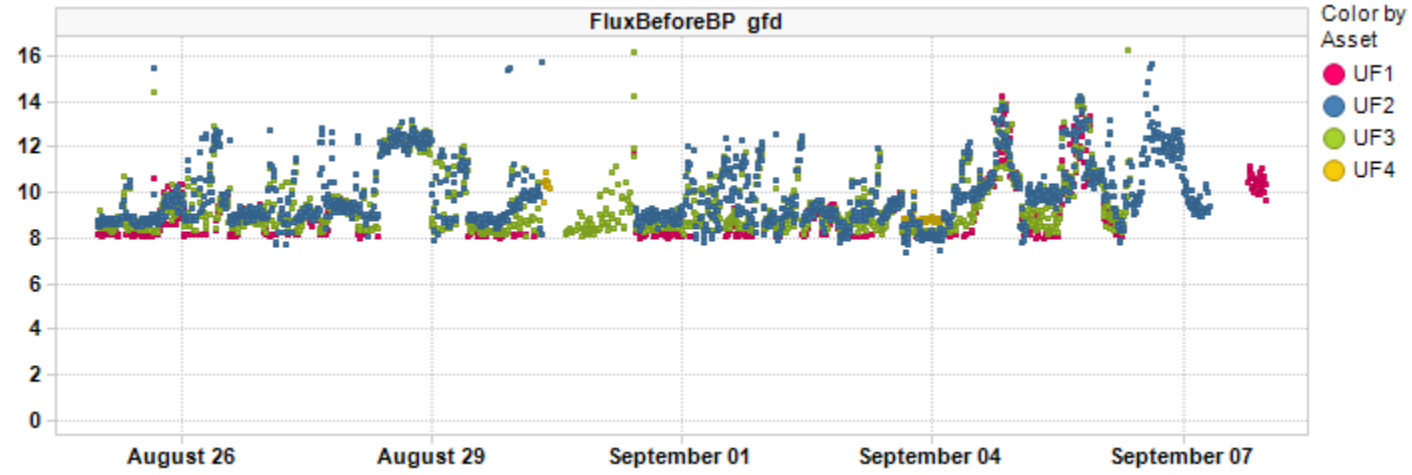
Permeate Turbidity Trend



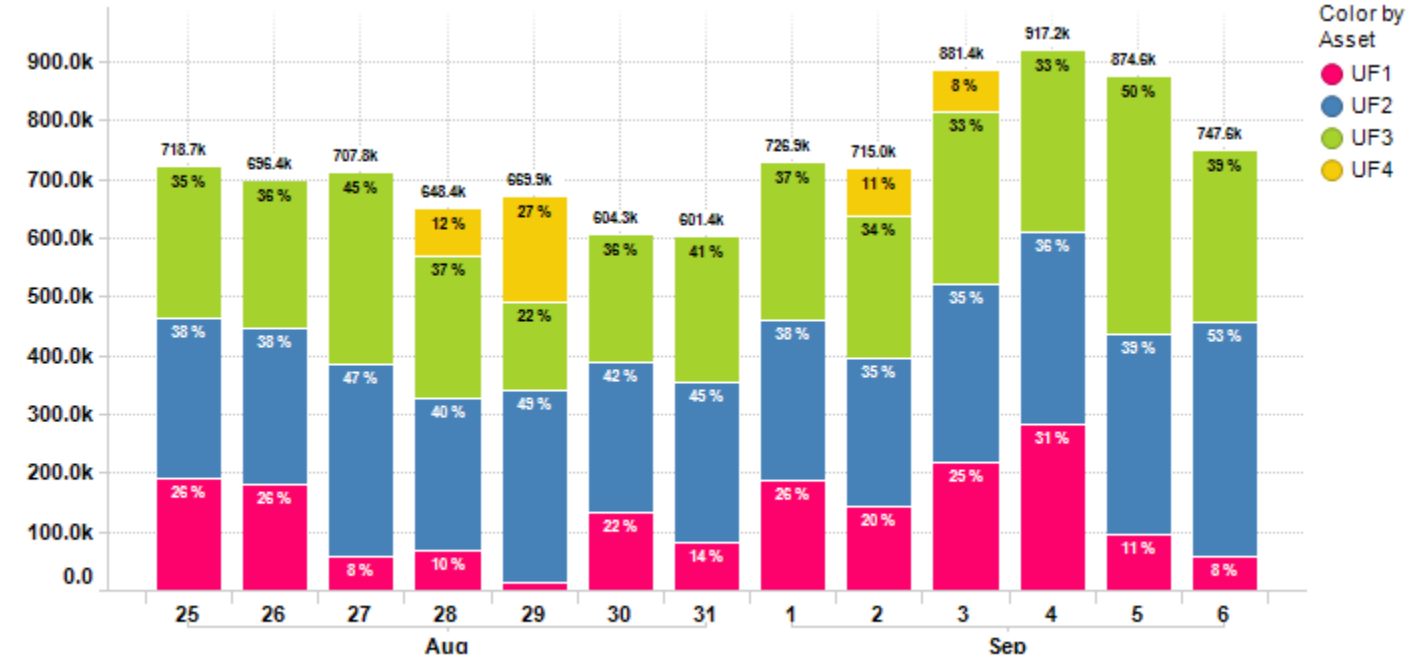
Before BPTMP Trend



Before BP Flux Trend



Daily Permeate Flow



Average Daily permeate flow from 8/25/2021 to 9/7/2021 is 731.5k gal with a maximum daily flow of 917.2k gal.

Asset Summary

KPI Parameters	Value/Change	UF1	UF2	UF3	UF4
FluxBeforeBP gfd	Value	9.05	9.88	9.46	8.92
	Change	-0.68 %	0.79 %	-2.42 %	-14.23 %
FluxDuringBP gfd	Value	18.81	18.42	18.59	18.77
	Change	-0.03 %	-0.22 %	0.07 %	0.22 %
PermeateTurbidityAfterBP NTU	Value	0.06	0.13	0.09	0.11
	Change	4.27 %	9.18 %	-3.04 %	4.21 %
TCPermeabilityBeforeBP gfd/psi	Value	20.62	12.18	23.37	20.96
	Change	9.24 %	4.55 %	-4.52 %	10.60 %
TMPBeforeBP psi	Value	0.39	0.70	0.38	0.37
	Change	-8.62 %	-2.66 %	7.01 %	-30.41 %
TotalPermeateFlowDaily gal	Value	131.41k	298.62k	270.17k	31.31k
	Change	-33.80 %	5.23 %	-1.63 %	-60.16 %

Plant Summary

KPI Parameters	Value/Change	UF Plant
PermeateTemperature °F	Value	80.86
	Change	-1.12 %
TotalPermeateFlowDaily gal	Value	799.20k
	Change	-12.18 %

Contract Expiry Date : **08/11/2021**

For InSight technical assistance please email insight.src@suez.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.

This review was prepared by SUEZ Water Technologies & Solutions solely to assist water treatment plant owners and/or operators in analyzing and optimizing plant performance and is not intended to be used or relied upon for regulatory compliance or any other purpose. The content of this review is based in whole or in part on operation data obtained from the plant using InSight software. SUEZ Water Technologies & Solutions makes no representations or warranties as to the accuracy of the plant data utilized in the preparation of this review. SUEZ Water Technologies & Solutions accepts no liability for consequences or actions taken in whole or in part by any person on the basis of this review or its contents

LEWES BPW WWTP Biweekly InSight Report

Date: **8/25/2021**

From: Erin Horocholyn - Suez Water Technologies & Solutions
To: Darrin Gordon, Austin Calaman, Inframark
cc: Matt Stapleford - Suez Water Technologies & Solutions

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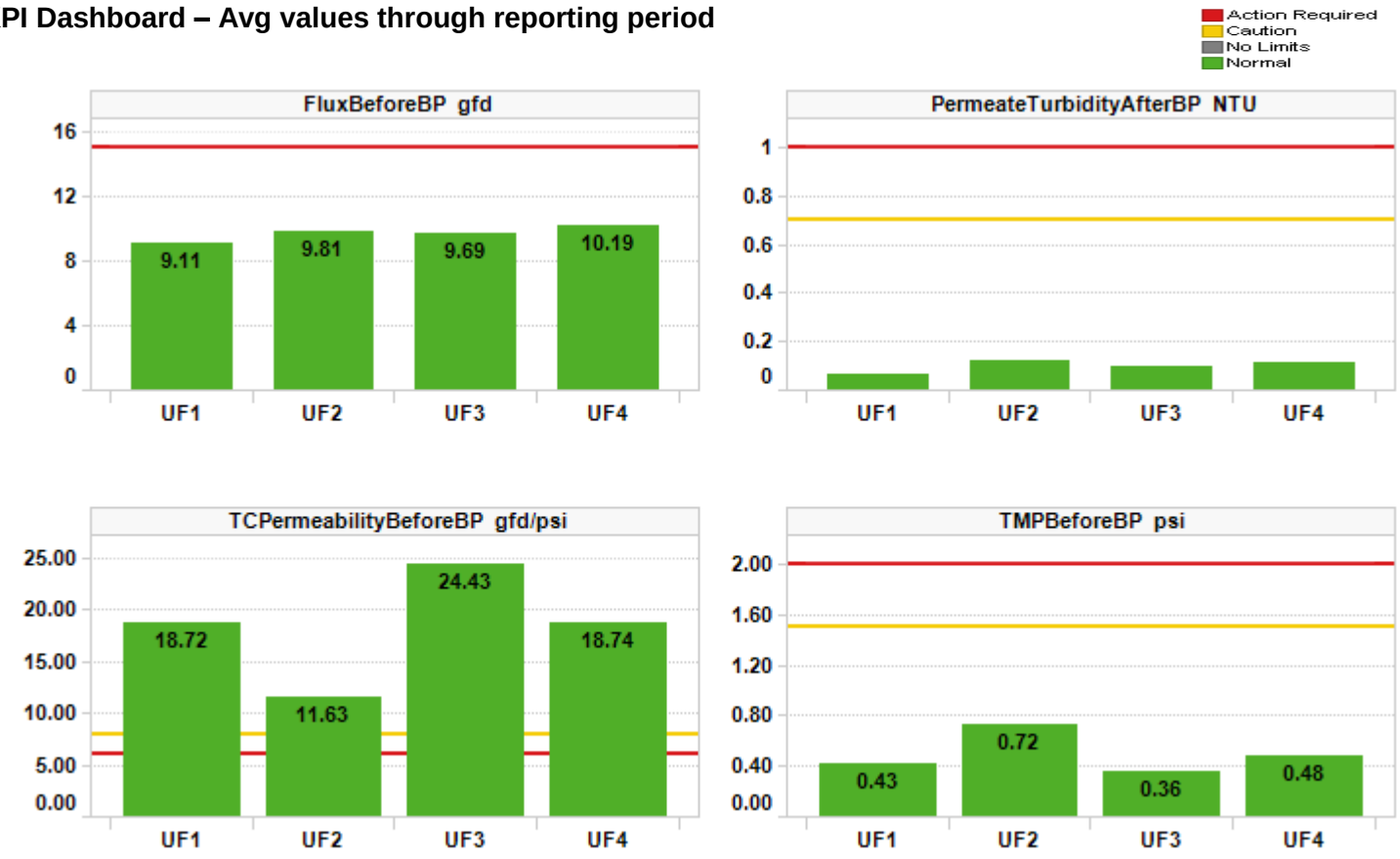
Maintenance cleaning - 1 NaOCl per week @ 200 ppm, 1 Citric acid per week @ 2000 ppm

KPI Dashboard – Avg values through reporting period



Plant Summary

This report covers two reporting periods from July 28 – Aug 24. Averages in the text and tables refer only to the last reporting period of two weeks from August 11 – 24.

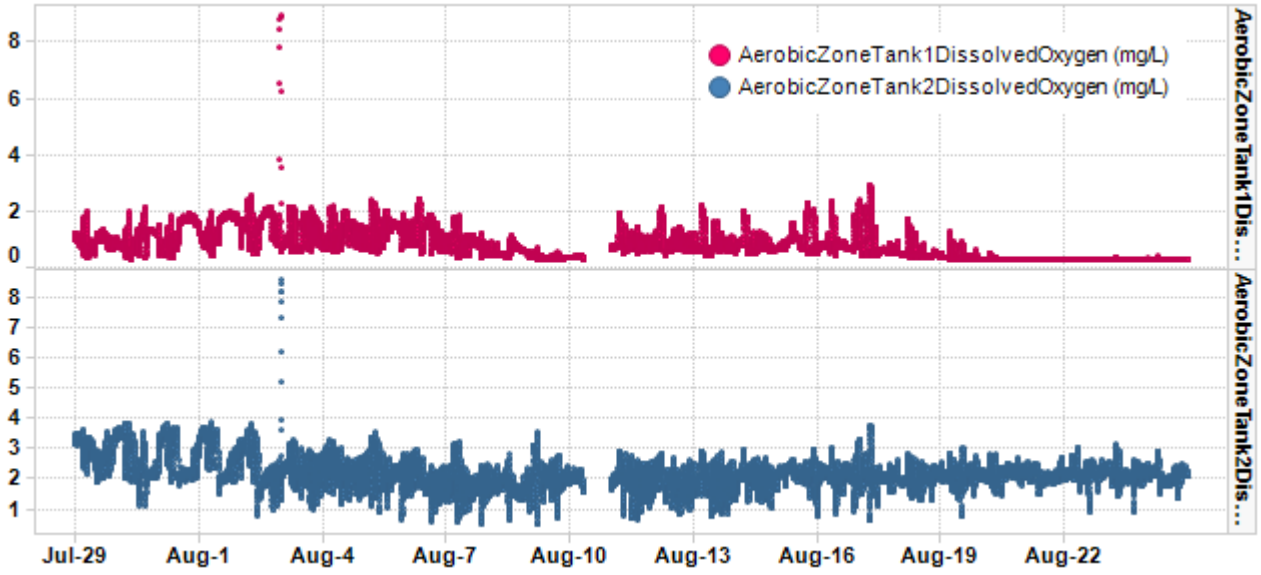
All trains had good KPI levels for permeability, TMP, and turbidity. UF1 and UF2 saw a decrease in TMPs in this report. All trains are <1.0 psi for TMP and >8.0 for permeability which is excellent.

- Daily permeate production averaged 0.79 MGD. Permeate temperature averaged 82°F (+0°F). All online trains are in Backpulse with constant LEAP Hi aeration. UF4 was shut down for much of the past two weeks and had no MCs. Flux BBP averaged 9.7 – 10.2 gfd on UF1, 2, 3, and 4
- TMP BBP averaged <1.0 psi on all trains. Averages for UF1, 3, and 4 ranged 0.36 – 0.48 psi, and UF2 averaged 0.72 psi
- TC permeability BBP averages were excellent and >8 gfd/psi, ranging 19 - 24 gfd/psi on trains UF1,3,4, and 11.6 gfd/psi on UF2
- Permeate turbidity ABP averages ranged from 0.06 – 0.11 NTU on all trains

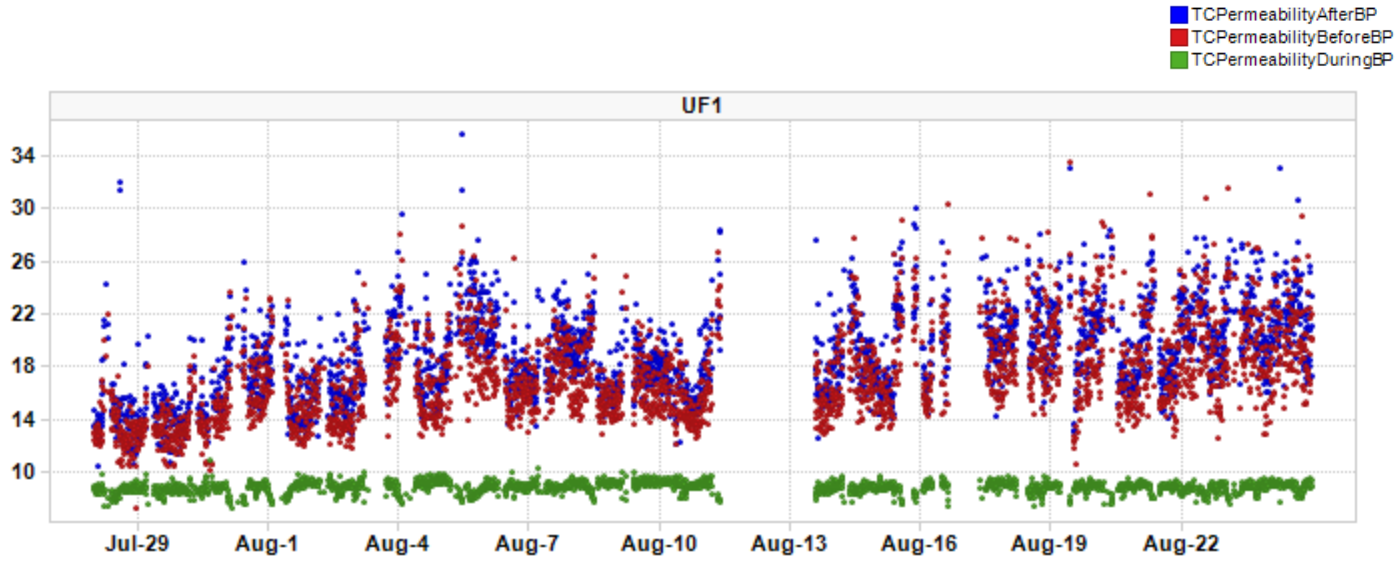
Table 1. Record of maintenance cleans (MCs) run between July 28 and August 24.

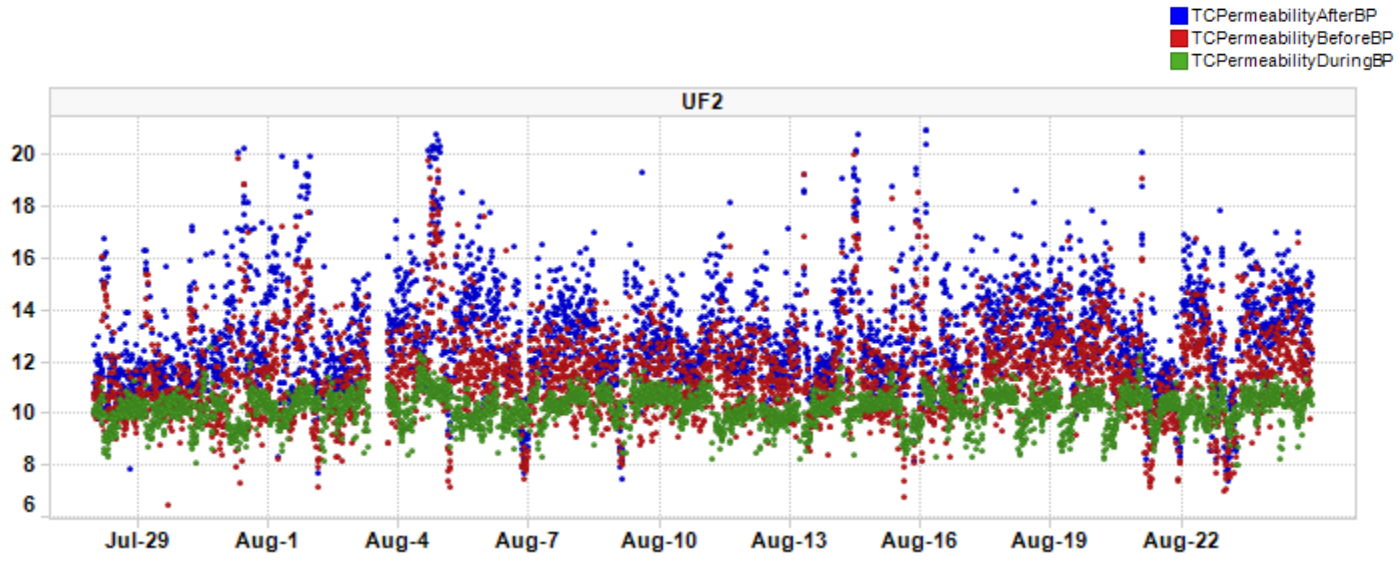
Train	UF1	UF2	UF3	UF4
# of Hypochlorite MCs	4	4	3	0
# of Citric Acid MCs	3	4	3	0

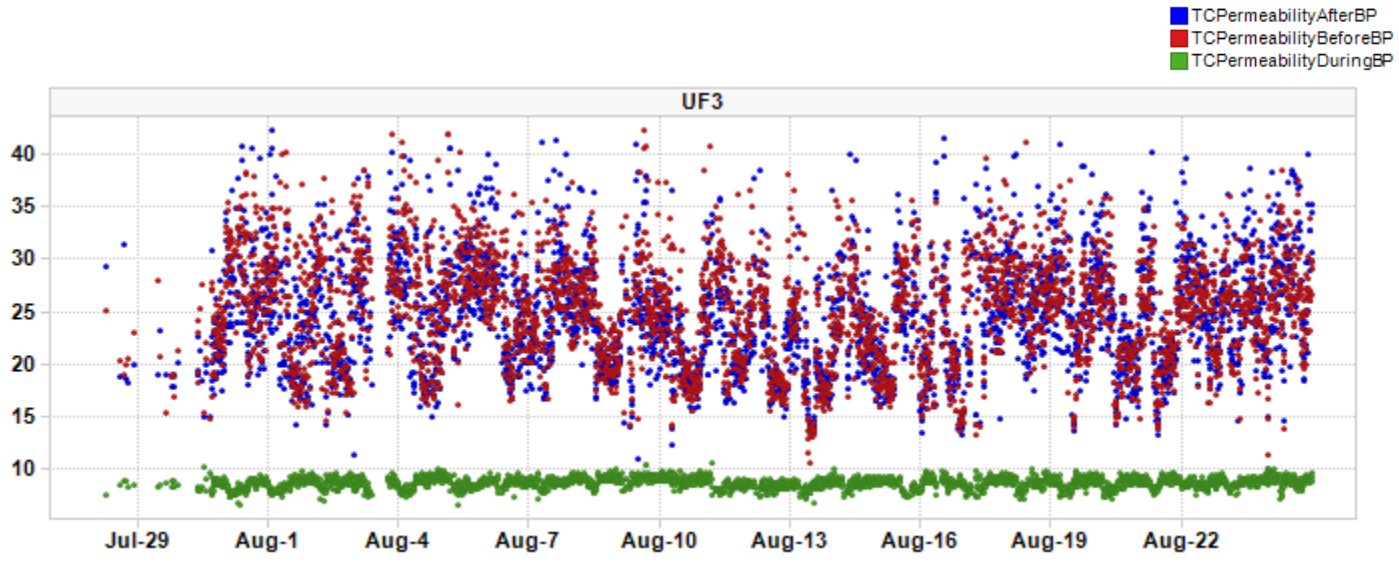
- Aerobic zone 1 dissolved oxygen averaged 0.79 ppm, while tank 2 averaged 2.16 mg/L overall. From Aug 20 - 24, tank 1 averaged 0.27 mg/L. Tank 1 averages during this time are on the low side for ideal MLSS health, which should be between 1 – 2 ppm, but overall DO averages have improved in both aerobic tanks. The pre-anoxic zone's DO averages were 0.73 mg/L in tank 1, and 2.14 mg/L in tank 2 which is high for feeding anoxic zones (ideally at or under 0.5 mg/L for denitrification)

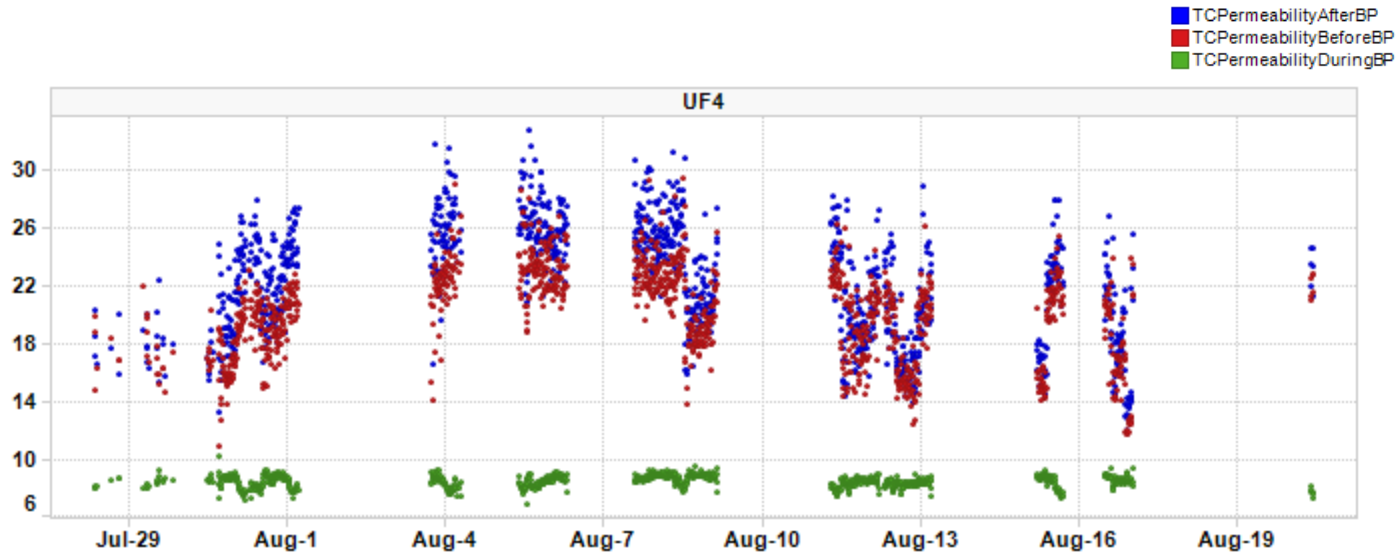


TC Permeability Trends By Train

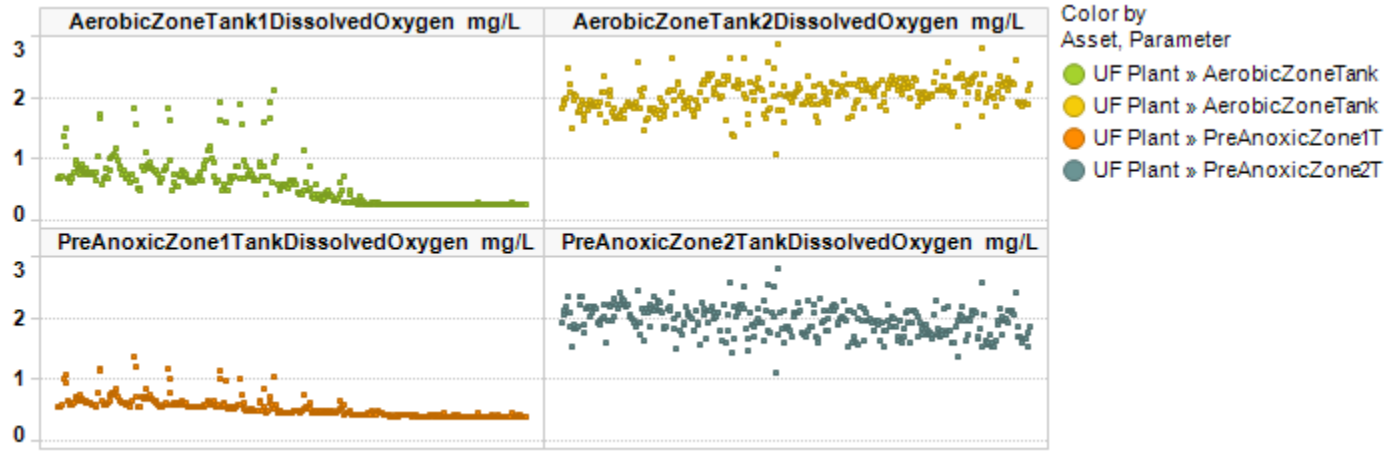




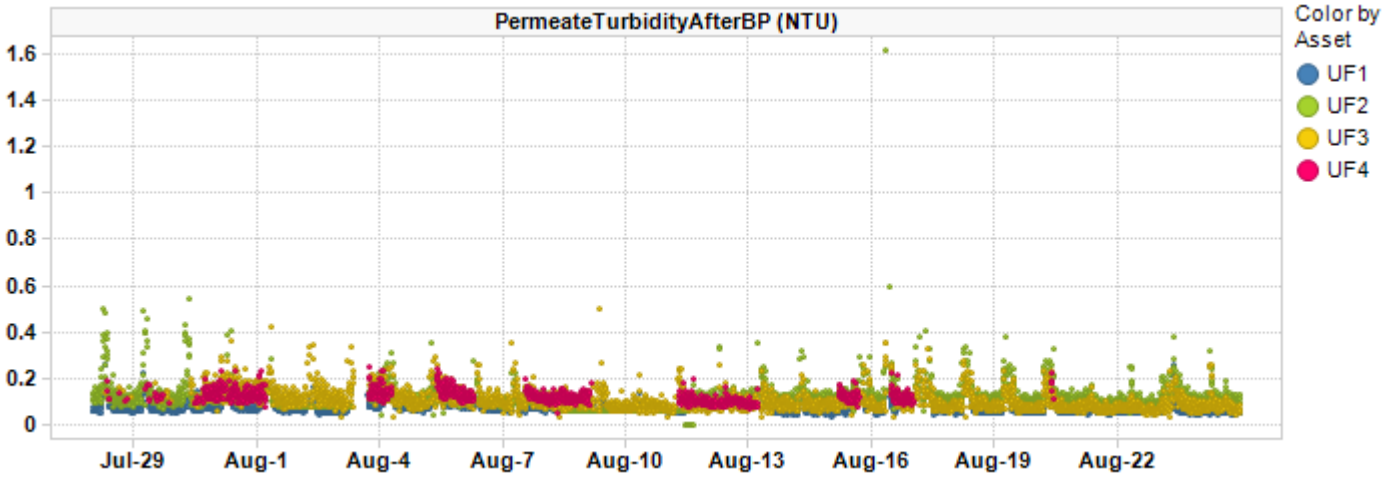




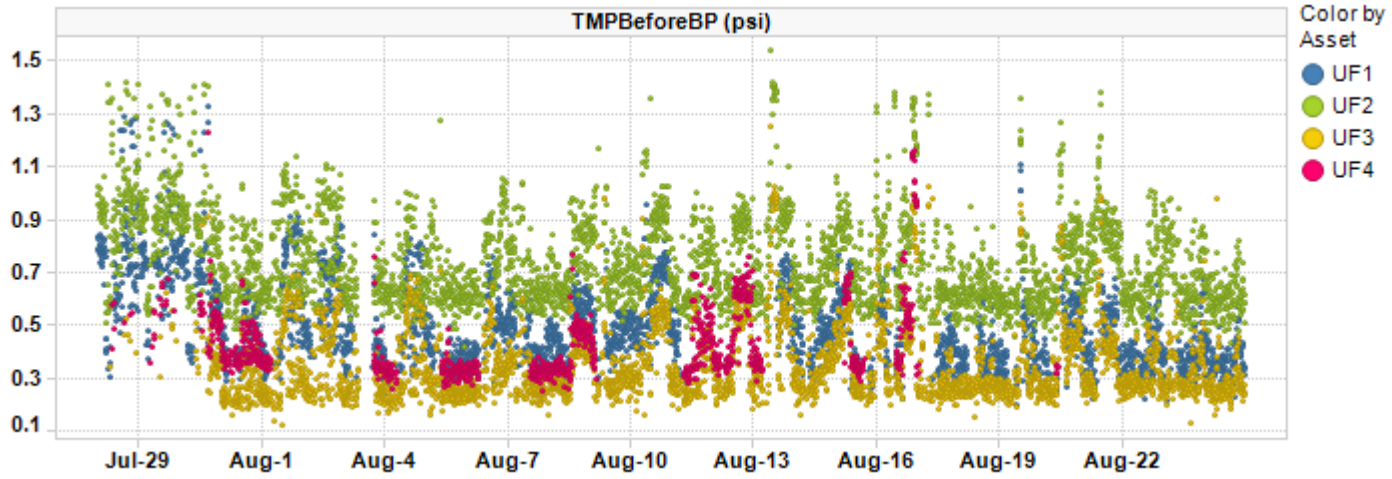
Bioreactor Dissolved Oxygen



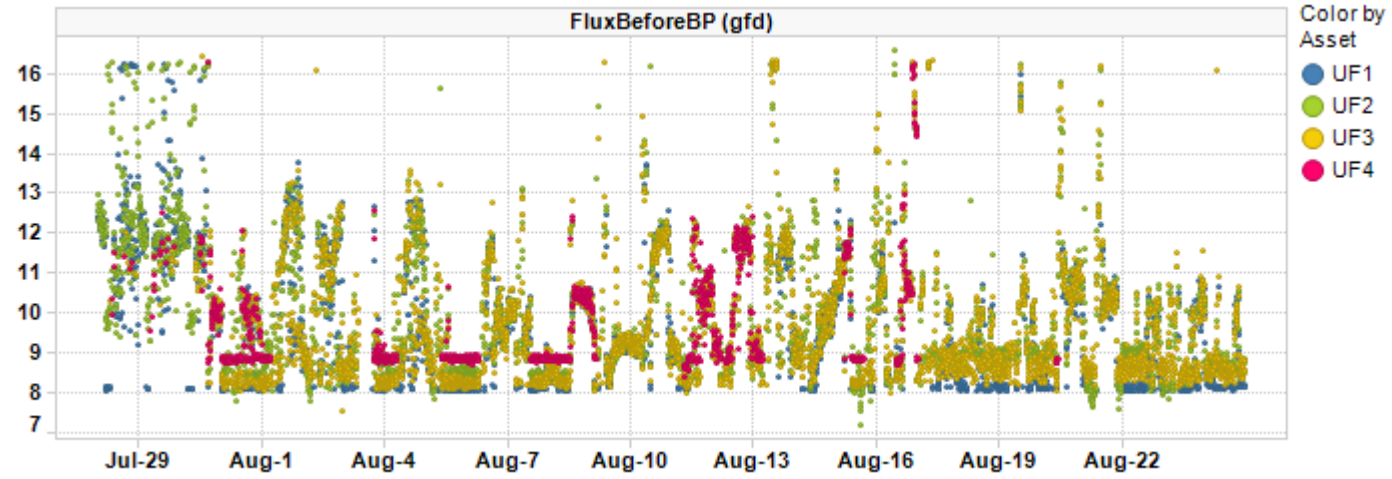
Permeate Turbidity Trend



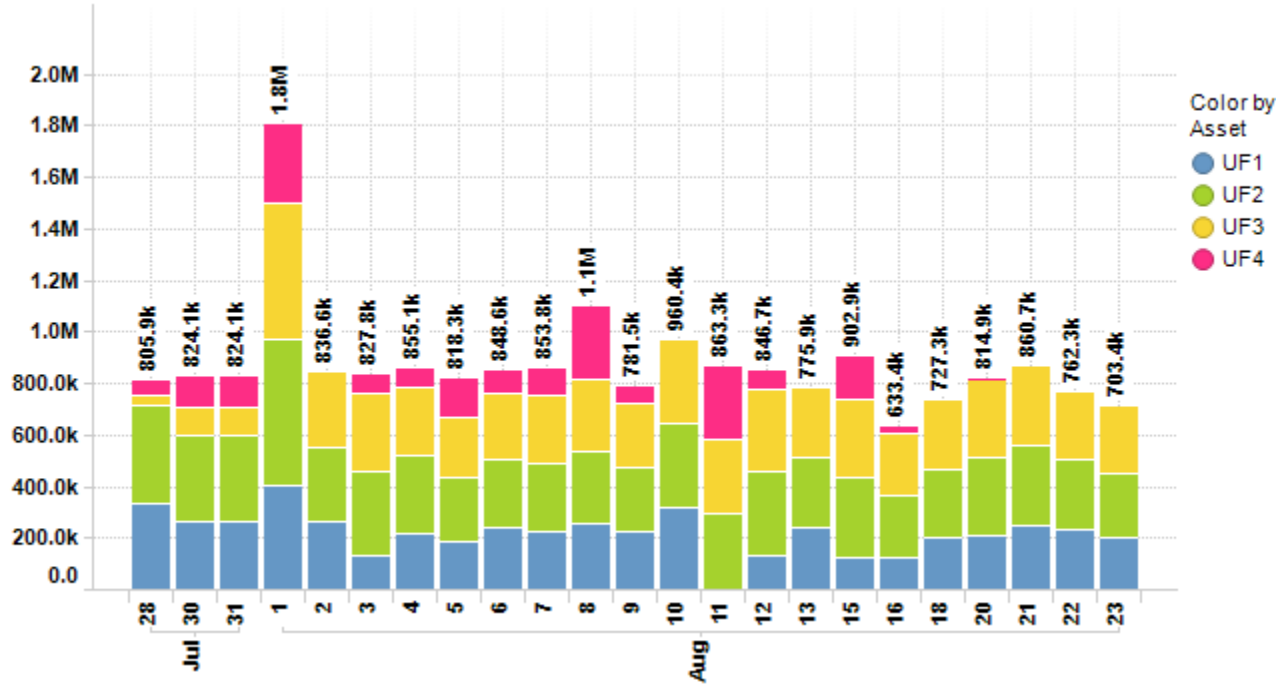
Before BPTMP Trend



Before BP Flux Trend



Daily Permeate Flow



Average Daily permeate flow from 8/11/2021 to 8/24/2021 is 785.9k gal with a maximum daily flow of 902.9k gal.

Asset Summary

KPI Parameters	Value/Change	UF1	UF2	UF3	UF4
FluxBeforeBP gfd	Value	9.11	9.81	9.69	10.19
	Change	-8.97 %	-3.54 %	1.34 %	8.42 %
FluxDuringBP gfd	Value	18.81	18.46	18.57	18.73
	Change	0.10 %	0.26 %	0.25 %	-0.04 %
PermeateTurbidityAfterBP NTU	Value	0.06	0.12	0.09	0.11
	Change	-20.63 %	8.82 %	-29.45 %	-20.67 %
TCPermeabilityBeforeBP gfd/psi	Value	18.72	11.63	24.43	18.74
	Change	14.94 %	1.83 %	-4.95 %	-11.81 %
TMPBeforeBP psi	Value	0.43	0.72	0.36	0.48
	Change	-30.00 %	-6.33 %	5.71 %	19.08 %
TotalPermeateFlowDaily gal	Value	177.49k	282.75k	275.53k	50.14k
	Change	-44.03 %	-13.60 %	9.54 %	-114.16 %

Plant Summary

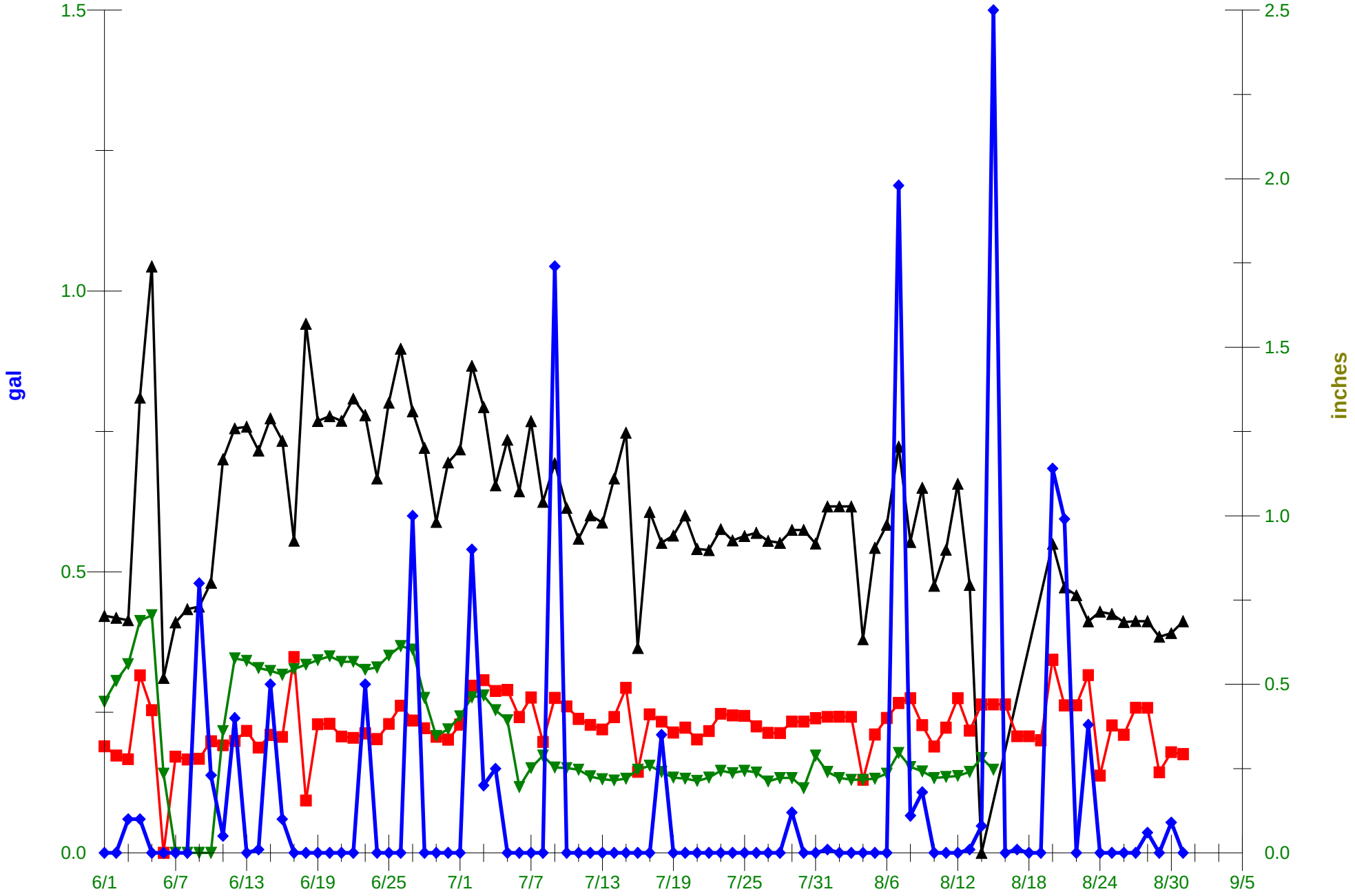
KPI Parameters	Value/Change	UF Plant
PermeateTemperature °F	Value	81.77
	Change	1.06 %
TotalPermeateFlowDaily gal	Value	899.10k
	Change	-17.19 %

Contract Expiry Date : **08/11/2021**

For InSight technical assistance please email insight.src@suez.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.

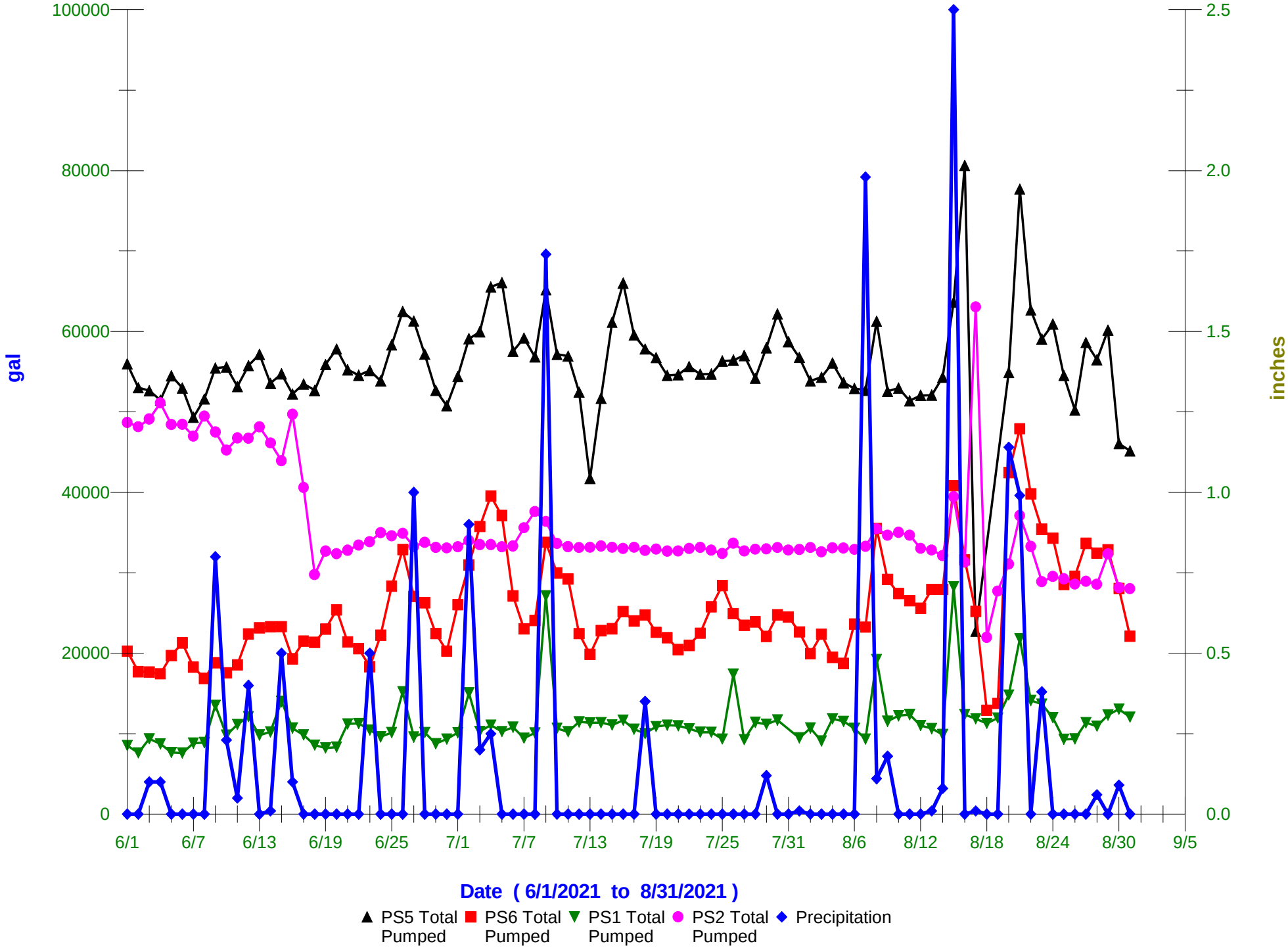
This review was prepared by SUEZ Water Technologies & Solutions solely to assist water treatment plant owners and/or operators in analyzing and optimizing plant performance and is not intended to be used or relied upon for regulatory compliance or any other purpose. The content of this review is based in whole or in part on operation data obtained from the plant using InSight software. SUEZ Water Technologies & Solutions makes no representations or warranties as to the accuracy of the plant data utilized in the preparation of this review. SUEZ Water Technologies & Solutions accepts no liability for consequences or actions taken in whole or in part by any person on the basis of this review or its contents

Data Over Time



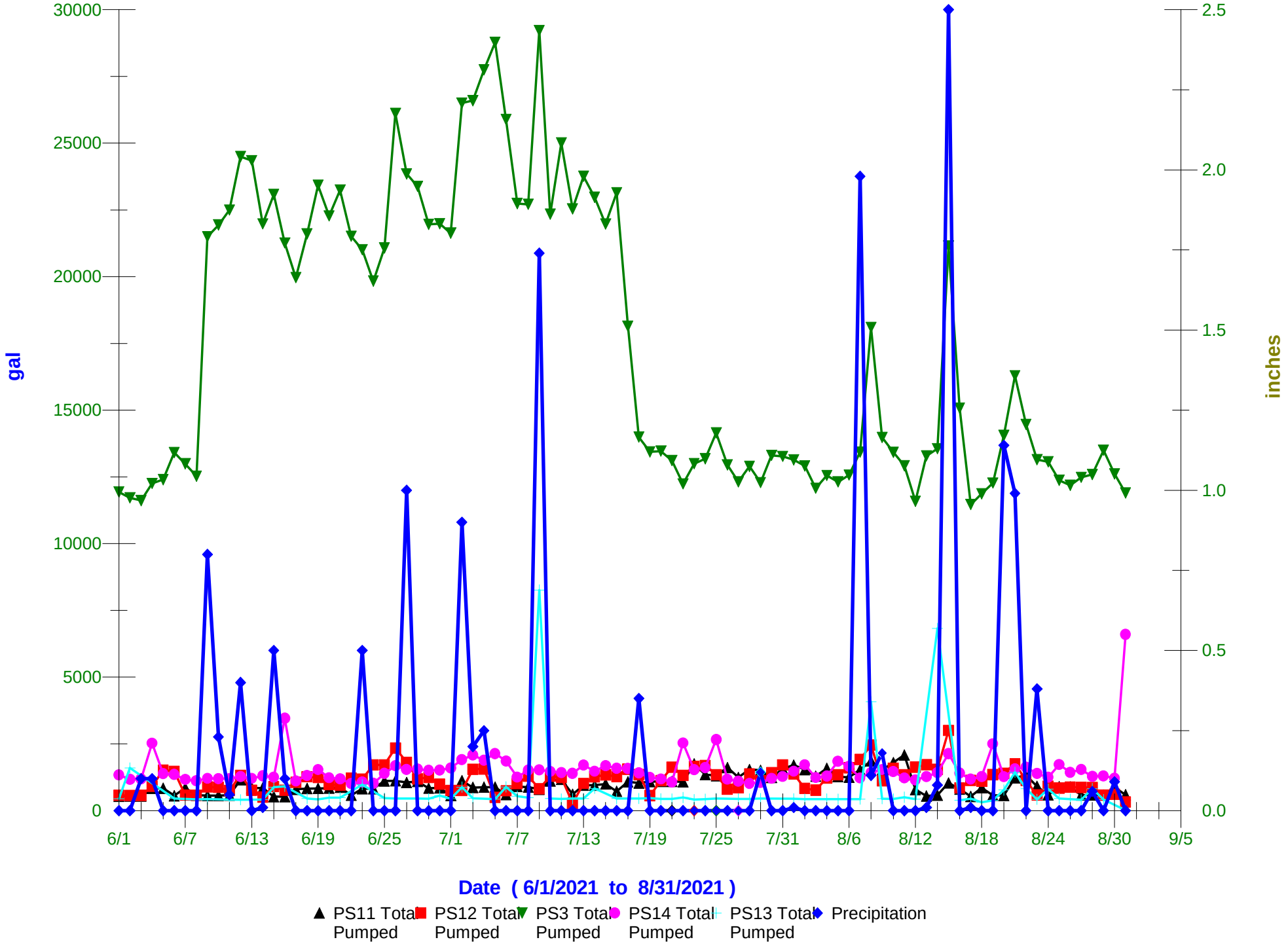
PS4,8 +County

Data Over Time



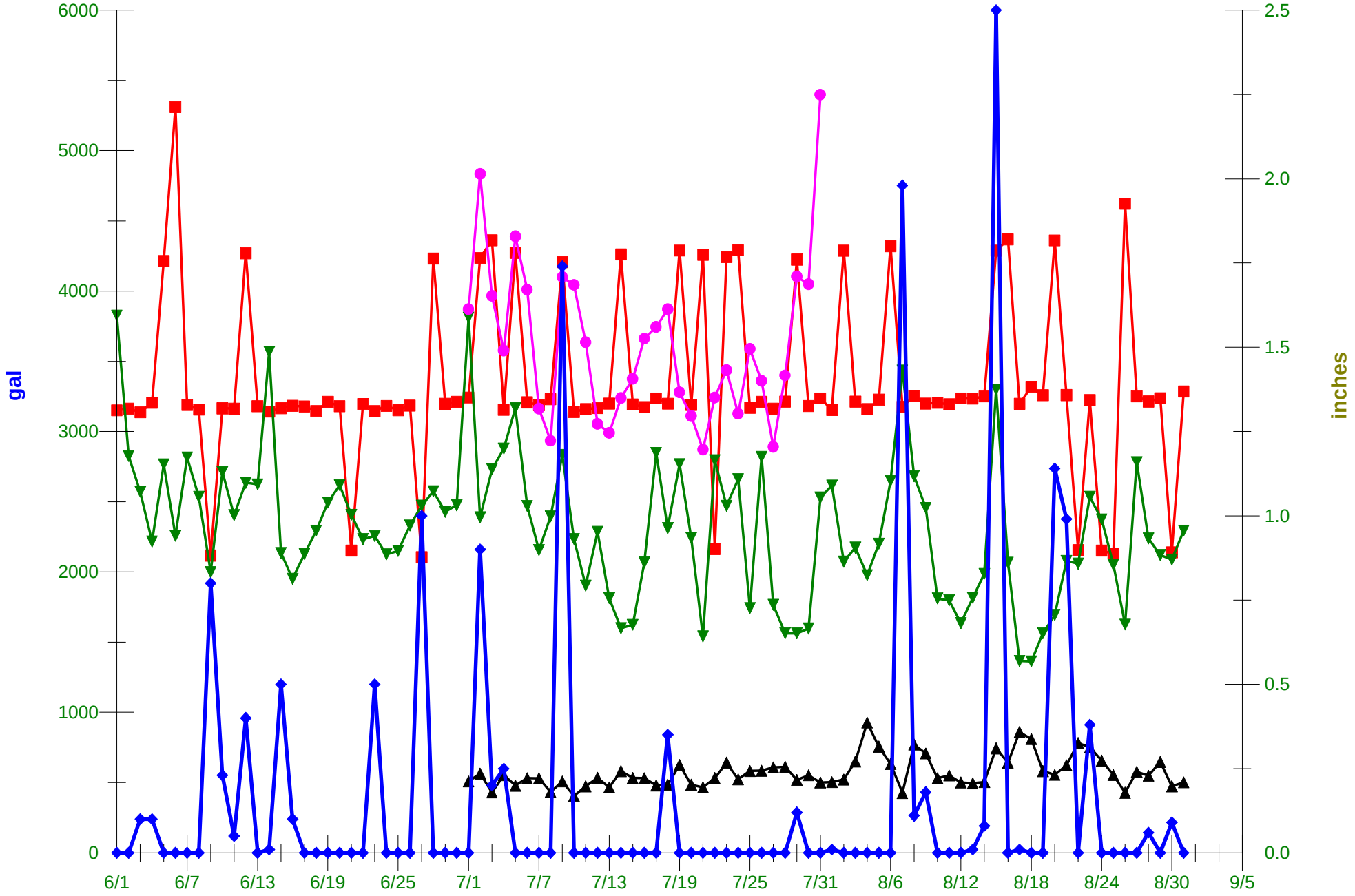
PS1,2,5,6

Data Over Time



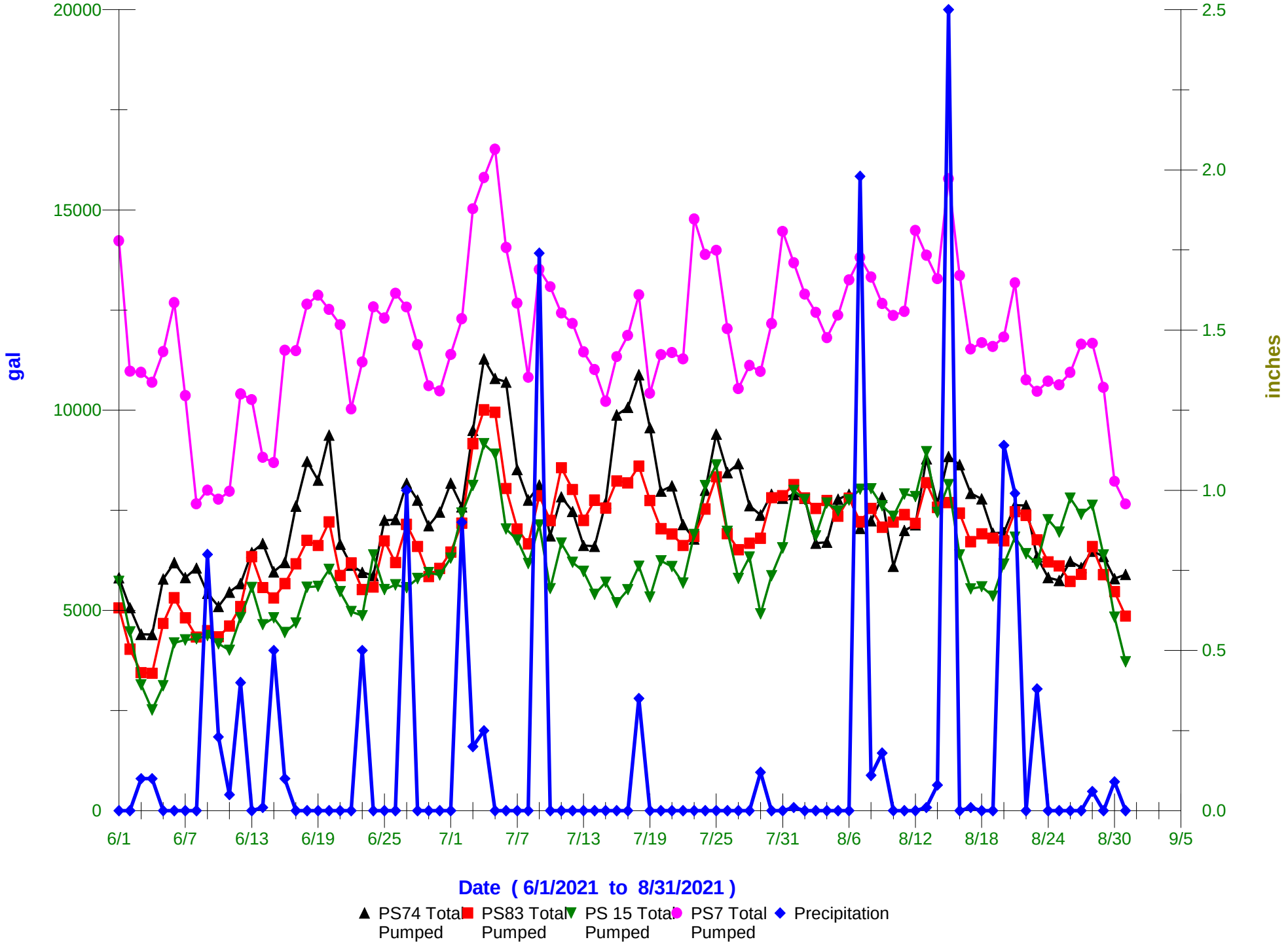
PS3,11,12,13,14

Data Over Time



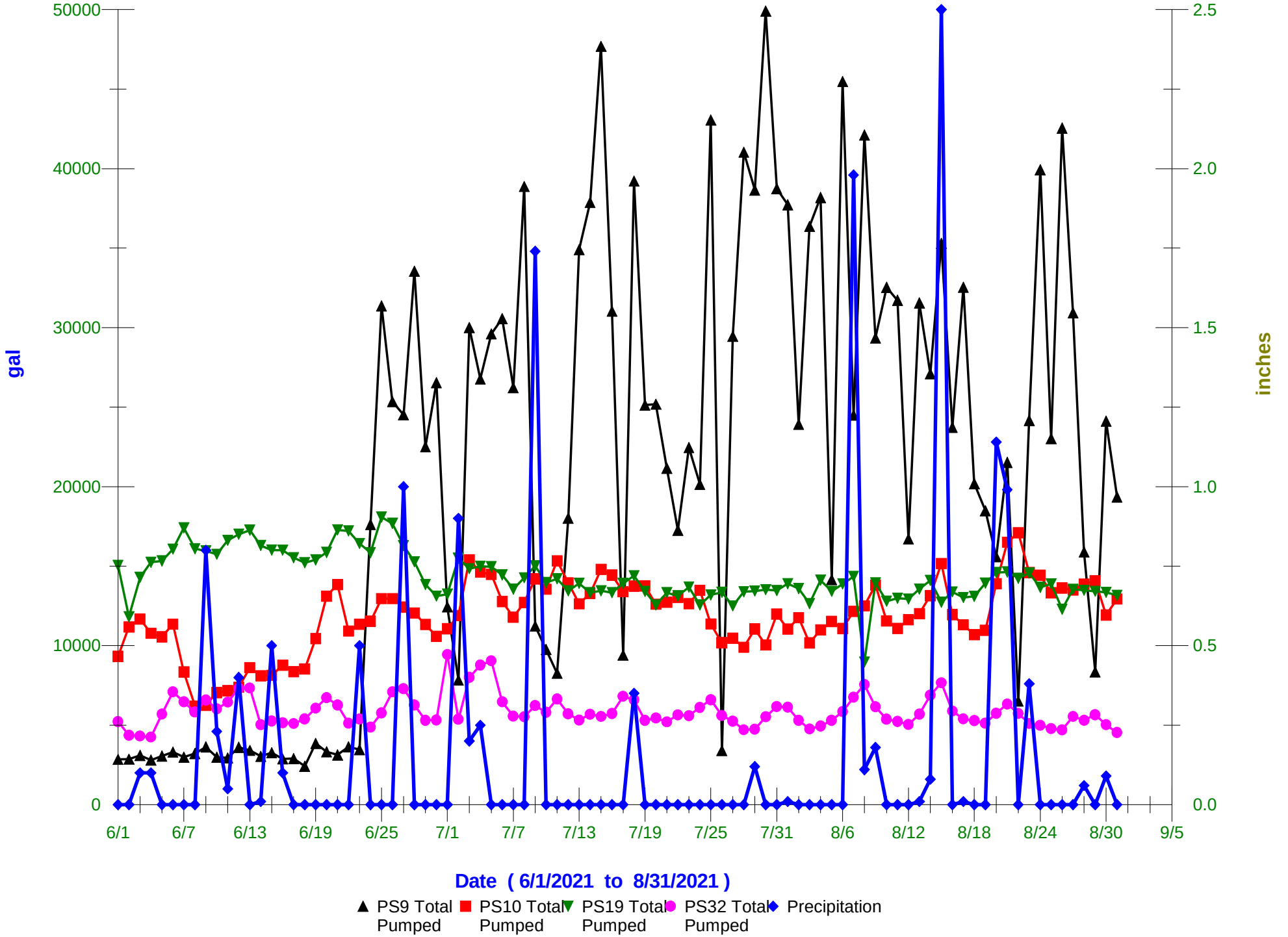
PS16,17,17b,18

Data Over Time



PS7.15,83,74

Data Over Time



PS9,10,19,32

September 17, 2021

Scott W. Getchell, PO
Director of Operational Services/Project Manager
GMB
206 West Main Street
Salisbury, MD 21801

Re: Lewes – Pump Station #4 Generator Load Review

Dear Scott,

Keystone performed a site visit on September 13, 2021, to review the existing electrical loads at Pump Station #4 located in Lewes, DE for the purpose of providing a sizing recommendation for the proposed generator replacement effort. The generator sizing recommendation is based on existing equipment nameplate data, the National Electrical Code full load ampere (FLA) requirements, Operator feedback, and approximations based on overcurrent protection for non-accessible equipment nameplates.

The recommended size for proposed generator replacement for Pump Station #4 is a 100 kW, 240/120 Volt, 3-Phase diesel-driven generator. The recommended size is based on two (2) 30 hp pump motors, proposed 10 kW electric unit heater, 1/2 hp ventilation fan, proposed fine screen, sump pump, wet well air scrubber, and control panel operating simultaneously. The anticipated steady-state operating amperes, 195.2 amperes, is indicated in the electrical load calculation spreadsheet titled "Future Operating Loads". As indicated in the 100 kW diesel-driven generator specification, a 100 kW generator with a 4R9X alternator is capable of producing 301 amperes, which provides the overhead capacity for starting the indicated electrical loads.

Adding the proposed electrical loads and modifying the operating sequence described above will require an upgrade to the electrical service equipment. Based on the conductor size, 2/0 AWG aluminum, exiting the 200 ampere main disconnect, the electrical lineup is designed to serve 150 amperes. Depending on the finalize operating scenario, upgrading the 2/0 AWG conductor size or a new electrical service installation will be required. This work is recommended to coincide with the replacement of the diesel-driven generator.

The existing 60 kW diesel-driven generator is adequately sized to serve the present pump station based on one (1) 30 hp pump motor operating. The present operating loads include one (1) operating 30 hp pump motor (duty with standby), wet well air scrubber, sump pump, and control panel operating simultaneously. The present steady-state operating amperes, 95.2 amperes, is indicated in the electrical load calculation spreadsheet titled "Existing Operating Loads". Please note, using the loading sequence with two (2) 30 hp pump motors in the generator sizing software results in an 80 kW diesel-driven generator.

When replacing the existing diesel-drive generator the following items need to be reviewed:

- The clearance requirements from an existing utility enclosure, that may house single-phase overhead/pad mount transformers, with the Lewes Electric Department
- Verify existing electrical service capacity for proposed loading
- The existing generator equipment pad measures 140” x 74”
- The proposed installation will require removal of overhead vegetation
- The use of a crane will require coordination to avoid overhead utility conductors
- Refer to NFPA 37 (2021 Edition), *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*, Section 4.1.4 Engines Located Outdoors for recommended clearance from buildings

Included in this letter is an electrical load calculation, utility records, the basis-of-design manufacturer software sizing report, and generator specification sheets.

Sincerely,

Curtis L. James, PE | Electrical Engineer
302.291.9093

LEWES - PUMP STATION #4
ELECTRICAL LOAD SUMMARY
FUTURE OPERATING LOADS

Electrical Service Voltage: **240/120 3Ø**

Count	EQUIPMENT	Equipment Number	UNITS							UNIT		TOT.CONN.		MAX.OPER.		MOTOR STARTERS		
			TOTAL	OPER.	H/D	HP	KW	VOLT	PHASE	FLA	KVA	FLA	KVA	FLA	KVA	FVNR	RVSS	VFD
			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1	Pump #1		1	1		30.00	28.31	230	3	80.0	31.9	80.0	31.9	80.0	31.9			●
2	Pump #2		1	1		30.00	28.31	230	3	80.0	31.9	80.0	31.9	80.0	31.9			●
3	Exhuast Fan (Note 1)		1	1		0.50	0.86	120	1	7.2	0.9	7.2	0.9	7.2	0.9	●		
4	Electric Unit Heater (Note 2)		1	1			10	240	1	24.8	6.0	24.8	6.0	24.8	6.0			
5	Lighting		1	1			1.3	120	1	11.0	1.3	11.0	1.3	11.0	1.3			
6	Bioair - Air Scubber (Note 3)		1	1			2.9	240	3	7.0	2.9	7.0	2.9	7.0	2.9			
7	Bubbler		1	1			0.6	120	1	5.0	0.6	5.0	0.6	5.0	0.6			
8	Sump Pump (Note 4)		1	1		2.00	2.72	240	1	12.0	2.9	12.0	2.9	12.0	2.9			
9	General Receptacles		1				1.08	120	1	9.0	1.1	9.0	1.1					
10	Fine Screen (Note 5)		1	1		2.00	2.72	240	1	12.0	2.9	12.0	2.9	12.0	2.9	●		
	Notes:																	
	1. Exhaust Fan motor sized for 6 Air Changes per Hour (ACH) to comply with NFPA 820.																	
	2. Electric Unit Heater estimated as maximum required to maintain 50 degree F setpoint.																	
	3. Nameplate was not accessible. Load approximated based on 15 ampere fusing.																	
	4. Nameplate was not verified. Horsepower based on Operator feedback and circuit breaker trip rating.											248.0	82.2	239.0	81.1		**TOTALS**	
	5. Future installation for Lakeside Raptor Fine Screen. Motor size estimated at 2 hp.											Amps	197.8	Amps	195.2			

LEWES - PUMP STATION #4
ELECTRICAL LOAD SUMMARY
EXISTING OPERATING LOADS

Electrical Service Voltage: **240/120 3Ø**

Count	EQUIPMENT	Equipment Number	UNITS							UNIT		TOT.CONN.		MAX.OPER.		MOTOR STARTERS		
			TOTAL	OPER.	H/D	HP	KW	VOLT	PHASE	FLA	KVA	FLA	KVA	FLA	KVA	FVNR	RVSS	VFD
			---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1	Pump #1		1	1		30.00	28.31	230	3	80.0	31.9	80.0	31.9	80.0	31.9			●
2	Pump #2		1			30.00	28.31	230	3	80.0	31.9	80.0	31.9					●
3	Exhuast Fan (Note 1)		1			0.50	0.86	120	1	7.2	0.9	7.2	0.9			●		
4	Electric Unit Heater (Note 2)		1				10	240	1	24.8	6.0	24.8	6.0					
5	Lighting		1	1			1.3	120	1	11.0	1.3	11.0	1.3	11.0	1.3			
6	Bioair - Air Scubber (Note 3)		1	1			2.9	240	3	7.0	2.9	7.0	2.9	7.0	2.9			
7	Bubbler		1	1			0.6	120	1	5.0	0.6	5.0	0.6	5.0	0.6			
8	Sump Pump (Note 4)		1	1		2.00	2.72	240	1	12.0	2.9	12.0	2.9	12.0	2.9			
9	General Receptacles		1				1.08	120	1	9.0	1.1	9.0	1.1					
10	Fine Screen (Note 5)		1			2.00	2.72	240	1	12.0	2.9	12.0	2.9			●		
	Notes:																	
	1. Exhaust Fan motor sized for 6 Air Changes per Hour (ACH) to comply with NFPA 820.																	
	2. Electric Unit Heater estimated as maximum required to maintain 50 degree F setpoint.																	
	3. Nameplate was not accessible. Load approximated based on 15 ampere fusing.																	
	4. Nameplate was not verified. Horsepower based on Operator feedback and circuit breaker trip rating.											248.0	82.2	115.0	39.6		**TOTALS**	
	5. Future installation for Lakeside Raptor Fine Screen. Motor size estimated at 2 hp.											Amps	197.8	Amps	95.2			

PUMP STATION #4 - DEMAND (KW)											
Billing Period	Adjusted	Account	Service	Pres Rdg Dt	Usage	Demand Rdg		Volt	Phase	PF*	Amps
21-Aug	FALSE	2764001	ELEC	8/17/2021	7,936	31.05		240	3	0.9	82.99
21-Jul	FALSE	2764001	ELEC	7/16/2021	9,709	35.23		240	3	0.9	94.17
21-Jun	TRUE	2764001	ELEC	6/16/2021	7,922	34.56		240	3	0.9	92.38
21-May	FALSE	2764001	ELEC	5/18/2021	8,751	19.71		240	3	0.9	52.68
21-Apr	FALSE	2764001	ELEC	4/16/2021	13,681	32.1		240	3	0.9	85.80
21-Mar	FALSE	2764001	ELEC	3/16/2021	12,717	33.69		240	3	0.9	90.05
21-Feb	FALSE	2764001	ELEC	2/17/2021	10,217	33.55		240	3	0.9	89.68
21-Jan	FALSE	2764001	ELEC	1/19/2021	10,192	34.42		240	3	0.9	92.00
20-Dec	FALSE	2764001	ELEC	12/16/2020	11,206	33.1		240	3	0.9	88.47
20-Nov	FALSE	2764001	ELEC	11/17/2020	13,268	33.67		240	3	0.9	90.00
20-Oct	FALSE	2764001	ELEC	10/16/2020	8,365	29.73		240	3	0.9	79.47
20-Sep	FALSE	2764001	ELEC	9/16/2020	7,510	29		240	3	0.9	77.51
20-Aug	FALSE	2764001	ELEC	8/18/2020	7,937	32.97		240	3	0.9	88.13
20-Jul	FALSE	2764001	ELEC	7/16/2020	10,231	33.19		240	3	0.9	88.71
20-Jun	FALSE	2764001	ELEC	6/17/2020	10,853	24.39		240	3	0.9	65.19
20-May	FALSE	2764001	ELEC	5/18/2020	7,357	24.54		240	3	0.9	65.59
20-Apr	FALSE	2764001	ELEC	4/17/2020	8,774	24.62		240	3	0.9	65.81
20-Mar	FALSE	2764001	ELEC	3/18/2020	10,740	24.75		240	3	0.9	66.15
20-Feb	FALSE	2764001	ELEC	2/17/2020	9,569	24.18		240	3	0.9	64.63
20-Jan	FALSE	2764001	ELEC	1/15/2020	5,648	23.8		240	3	0.9	63.62
19-Dec	FALSE	2764001	ELEC	12/17/2019	7,468	23.8		240	3	0.9	63.62
19-Nov	FALSE	2764001	ELEC	11/19/2019	7,424	23.83		240	3	0.9	63.70
19-Oct	FALSE	2764001	ELEC	10/21/2019	5,687	26.42		240	3	0.9	70.62
19-Sep	FALSE	2764001	ELEC	9/20/2019	7,450	23.84		240	3	0.9	63.72
19-Aug	FALSE	2764001	ELEC	8/19/2019	8,757	29.64		240	3	0.9	79.23
19-Jul	FALSE	2764001	ELEC	7/16/2019	7,551	24.6		240	3	0.9	65.75
19-Jun	FALSE	2764001	ELEC	6/18/2019	8,943	31.99		240	3	0.9	85.51
19-May	FALSE	2764001	ELEC	5/14/2019	9,080	26.99		240	3	0.9	72.14
19-Apr	FALSE	2764001	ELEC	4/16/2019	10,793	28.84		240	3	0.9	77.09
19-Mar	FALSE	2764001	ELEC	3/18/2019	15,621	28.34		240	3	0.9	75.75
19-Feb	FALSE	2764001	ELEC	2/15/2019	14,462	35.95		240	3	0.9	96.09
19-Jan	FALSE	2764001	ELEC	1/16/2019	13,334	28.9		240	3	0.9	77.25
18-Dec	FALSE	2764001	ELEC	12/17/2018	13,809	30.45		240	3	0.9	81.39
18-Nov	FALSE	2764001	ELEC	11/15/2018	10,145	30.45		240	3	0.9	81.39
18-Oct	FALSE	2764001	ELEC	10/17/2018	8,553	28.28		240	3	0.9	75.59
18-Sep	FALSE	2764001	ELEC	9/18/2018	8,632	35.6		240	3	0.9	95.16
18-Aug	FALSE	2764001	ELEC	8/17/2018	7,247	27.3		240	3	0.9	72.97
18-Jul	FALSE	2764001	ELEC	7/17/2018	6,462	27.3		240	3	0.9	72.97
18-Jun	FALSE	2764001	ELEC	6/19/2018	7,541	22.95		240	3	0.9	61.34
18-May	FALSE	2764001	ELEC	5/21/2018	7,624	29.6		240	3	0.9	79.12
18-Apr	FALSE	2764001	ELEC	4/17/2018	7,170	22.95		240	3	0.9	61.34
18-Mar	FALSE	2764001	ELEC	3/14/2018	5,419	21.91		240	3	0.9	58.56
18-Feb	FALSE	2764001	ELEC	2/15/2018	4,760	22.72		240	3	0.9	60.73
18-Jan	FALSE	2764001	ELEC	1/17/2018	5,033	20.15		240	3	0.9	53.86
17-Dec	FALSE	2764001	ELEC	12/18/2017	5,621	23.55		240	3	0.9	62.95
17-Nov	FALSE	2764001	ELEC	11/16/2017	4,218	21.51		240	3	0.9	57.49
17-Oct	FALSE	2764001	ELEC	10/19/2017	4,880	20.97		240	3	0.9	56.05
17-Sep	FALSE	2764001	ELEC	9/18/2017	5,966	25.27		240	3	0.9	67.54
17-Aug	FALSE	2764001	ELEC	8/17/2017	4,880	24.13		240	3	0.9	64.50
17-Jul	FALSE	2764001	ELEC	7/14/2017	5,744	21.46		240	3	0.9	57.36
17-Jun	FALSE	2764001	ELEC	6/14/2017	5,607	20.3		240	3	0.9	54.26
17-May	FALSE	2764001	ELEC	5/15/2017	4,655	21.06		240	3	0.9	56.29
17-Apr	FALSE	2764001	ELEC	4/13/2017	5,130	17.93		240	3	0.9	47.93

PUMP STATION #4 - DEMAND (KW)											
17-Mar	FALSE	2764001	ELEC	3/16/2017	4,029	32.6		240	3	0.9	87.14
17-Feb	FALSE	2764001	ELEC	2/14/2017	3,600	7.7		240	3	0.9	20.58
17-Jan	FALSE	2764001	ELEC	1/19/2017	4,876	20.13		240	3	0.9	53.81
16-Dec	FALSE	2764001	ELEC	12/14/2016	3,586	11.69		240	3	0.9	31.25
16-Nov	FALSE	2764001	ELEC	11/17/2016	5,510	17.37		240	3	0.9	46.43
16-Oct	FALSE	2764001	ELEC	10/14/2016	5,752	22.8		240	3	0.9	60.94
16-Sep	FALSE	2764001	ELEC	9/16/2016	9,753	21.36		240	3	0.9	57.09
16-Aug	FALSE	2764001	ELEC	8/16/2016	181	12.11		240	3	0.9	32.37
16-Jul	FALSE	2764001	ELEC	7/14/2016	5,168	20.2		240	3	0.9	53.99
16-Jun	FALSE	2764001	ELEC	6/14/2016	5,533	22.34		240	3	0.9	59.71
16-May	FALSE	2764001	ELEC	5/16/2016	5,967	21.15		240	3	0.9	56.53
16-Apr	FALSE	2764001	ELEC	4/14/2016	5,393	17.88		240	3	0.9	47.79
16-Mar	FALSE	2764001	ELEC	3/16/2016	5,911	18.54		240	3	0.9	49.56
16-Feb	FALSE	2764001	ELEC	2/18/2016	8,804	26.79		240	3	0.9	71.61
16-Jan	FALSE	2764001	ELEC	1/14/2016	6,038	19.09		240	3	0.9	51.03
15-Dec	FALSE	2764001	ELEC	12/14/2015	4,464	18.69		240	3	0.9	49.96
15-Nov	FALSE	2764001	ELEC	11/16/2015	4,614	23.23		240	3	0.9	62.09
15-Oct	FALSE	2764001	ELEC	10/16/2015	4,511	24.3		240	3	0.9	64.95
15-Sep	FALSE	2764001	ELEC	9/18/2015	4,834	16.76		240	3	0.9	44.80
15-Aug	FALSE	2764001	ELEC	8/17/2015	5,804	24.54		240	3	0.9	65.59
15-Jul	FALSE	2764001	ELEC	7/14/2015	5,704	25.38		240	3	0.9	67.84
15-Jun	FALSE	2764001	ELEC	6/16/2015	4,741	16.1		240	3	0.9	43.03
15-May	FALSE	2764001	ELEC	5/15/2015	4,966	18.92		240	3	0.9	50.57
15-Apr	FALSE	2764001	ELEC	4/20/2015	7,890	26.07		240	3	0.9	69.68
15-Mar	FALSE	2764001	ELEC	3/12/2015	5,947	19.82		240	3	0.9	52.98
15-Feb	FALSE	2764001	ELEC	2/20/2015	11,033	25.42		240	3	0.9	67.95
15-Jan	FALSE	2764001	ELEC	1/13/2015	6,279	17.47		240	3	0.9	46.70
14-Dec	FALSE	2764001	ELEC	12/16/2014	6,079	25.01		240	3	0.9	66.85
14-Nov	FALSE	2764001	ELEC	11/17/2014	5,017	22.07		240	3	0.9	58.99
14-Oct	FALSE	2764001	ELEC	10/16/2014	4,780	20.89		240	3	0.9	55.84
14-Sep	FALSE	2764001	ELEC	9/15/2014	5,405	17.65		240	3	0.9	47.18
14-Aug	FALSE	2764001	ELEC	8/15/2014	5,850	26.71		240	3	0.9	71.39
14-Jul	FALSE	2764001	ELEC	7/16/2014	4,677	27.49		240	3	0.9	73.48
14-Jun	FALSE	2764001	ELEC	6/18/2014	7,152	25.07		240	3	0.9	67.01
14-May	FALSE	2764001	ELEC	5/14/2014	5,673	25.07		240	3	0.9	67.01
14-Apr	FALSE	2764001	ELEC	4/17/2014	5,730	21.44		240	3	0.9	57.31
14-Mar	FALSE	2764001	ELEC	3/20/2014	5,615	17.16		240	3	0.9	45.87
14-Feb	FALSE	2764001	ELEC	2/21/2014	9,856	24.64		240	3	0.9	65.86
14-Jan	FALSE	2764001	ELEC	1/17/2014	7,057	18.18		240	3	0.9	48.59
Notes:											
* - Estimated Power Factor.										Max. Amperes:	96.09
										Avg. Amperes:	65.69

KOHLER Power Systems

Sizing Report

Project information

Project name: Lewes PS #4
Customer's name: GMB
Customer contact: Scott

Site requirements

Voltage:	120/240
Phase:	3
Frequency:	60Hz
Alt. Temp. Rise Duty:	130°C Standby @40C
Qty of Gensets:	1
Fuel type:	Diesel
Country :	United States

Application:	Construction
Emissions Requirement:	Stationary emergency (US EPA)
Altitude:	500 Feet
Max. Ambient Temp.:	77 Degrees F
Min. Genset Loading :	25 %
Max. Genset Loading :	85 %

Site load requirements summary

Running kW:	73.36
Running kVA:	79.58
Running P.F.:	0.92

Max. Starting kW:	66.28 in step 2
Max. Starting kVA:	77.66 in step 2

Generator selection

Genset Model:	100REOZJF
Engine:	4045HF285I
Emission level:	EPA Tier 3
BHP:	158.00
Displacement:	276.00
RPM:	1800

Alternator:	4R9X
Alternator Leads:	12
Alt. Starting kVA at 35% V dip:	289.00
Cal Alt Temp rise with site loads:	80C
Excitation System :	PMG

Rated kW :	100.00
Site Alt / Temp De-Rated kW :	100.00
UL 2200 Certified	

Generator Performance Summary

Voltage Dip Limit:	30.00 %
Frequency Dip Limit:	10.00 %
Harmonic Distortion Limit:	10.00 %

Calculated Voltage Dip:	16.30 %
Calculated Frequency Dip:	9.20 %
Calculated Harmonic Distortion:	9.49 %
Calculated Genset % Loaded:	73.36 %

Report prepared by: Curtis James

TOTAL SYSTEM INTEGRATION
GENERATORS | TRANSFER SWITCHES | SWITCHGEAR | CONTROLS

Software version: 1.0042.7.11

Wednesday, September 15, 2021

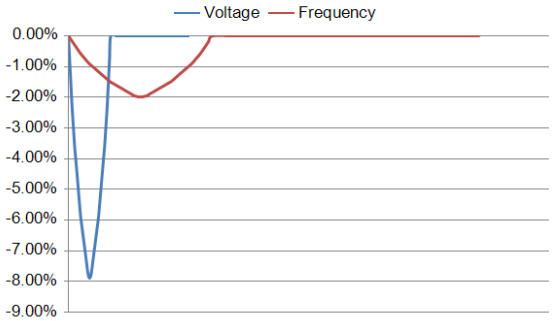
KOHLER Power Systems

Sizing Report

Model : 100REOZJF, Alternator : 4R9X

Load Profile

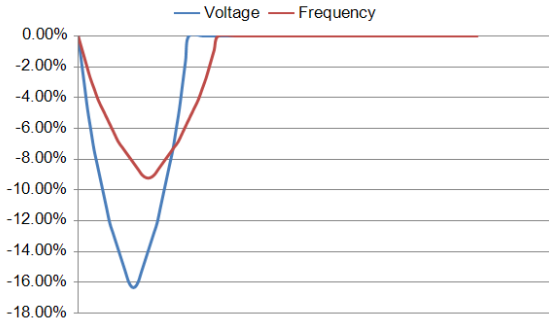
Step # 1	Qty	Run			Start			Volt Dip %	Freq Dip %	Volt. Dist. %
		kW	kVA	PF	kW	kVA	PF			
Motor **Pump #1** **30.00 HP** **3 Phase** **Motor code : G** **Loaded** **NEMA Design** **VFD** **Load Turns On/Off**	1	27.94	31.04	0.90	27.94	31.04	0.90			
Motor **EF-1** **0.50 HP** **Phase A-B** **Motor code : L** **Loaded** **NEMA Design** **across the line**	1	0.54	0.54	1.00	4.75	4.75	1.00			
Misc. Linear Load **Electric Unit Heater** **3 Phase** **Load Turns On/Off**	1	10.00	10.00	1.00	10.00	10.00	1.00			
Misc. Linear Load **Control Panel - Bubbler** **Phase C-N**	1	0.60	0.60	1.00	0.60	0.60	1.00			
Step Total		39.08	41.35	0.94	43.29	45.36	0.95	7.86	1.99	4.74
Cum.Total		39.08	41.35	0.94						



Report prepared by: Curtis James

TOTAL SYSTEM INTEGRATION
GENERATORS | TRANSFER SWITCHES | SWITCHGEAR | CONTROLS

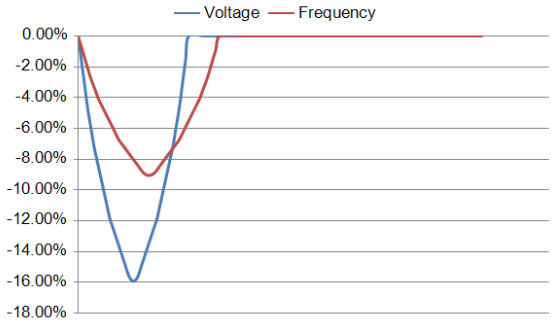
Step # 2	Qty	Run			Start			Volt Dip %	Freq Dip %	Volt. Dist. %
		kW	kVA	PF	kW	kVA	PF			
Motor **Bioair - Scubber** **2.00 HP** **3 Phase** **Motor code : K** **Loaded** **NEMA Design** **across the line**	1	1.91	2.69	0.71	10.37	17.00	0.61			
Motor **Sump Pump** **2.00 HP** **Phase B-C** **Motor code : K** **Loaded** **NEMA Design** **across the line**	1	1.91	1.91	1.00	17.00	17.00	1.00			
Misc. Linear Load **Receptacles** **Phase B-N**	1	0.60	0.60	1.00	0.60	0.60	1.00			
Motor **Screen** **2.00 HP** **3 Phase** **Motor code : K** **Loaded** **NEMA Design** **across the line**	1	1.91	2.69	0.71	10.37	17.00	0.61			
Motor **Pump #2** **30.00 HP** **3 Phase** **Motor code : G** **Loaded** **NEMA Design** **VFD** **Load Turns On/Off**	1	27.94	31.04	0.90	27.94	31.04	0.90			
Step Total		34.28	38.41	0.89	66.28	77.66	0.85	16.30	9.20	9.49
Cum.Total		73.36	79.58	0.92						



Report prepared by: Curtis James

Report prepared by: Curtis James

Loads Turning OFF and ON	Qty	Run			Start			Volt Dip %	Freq Dip %	Volt. Dist. %
		kW	kVA	PF	kW	kVA	PF			
Motor Pump #1 30.00 HP 3 Phase Motor code : G Loaded NEMA Design VFD Load Turns On/Off	1	27.94	31.04	0.90	27.94	31.04	0.90			
Misc. Linear Load Electric Unit Heater 3 Phase Load Turns On/Off	1	10.00	10.00	1.00	10.00	10.00	1.00			
Motor Pump #2 30.00 HP 3 Phase Motor code : G Loaded NEMA Design VFD Load Turns On/Off	1	27.94	31.04	0.90	27.94	31.04	0.90			
Step Total		65.88	71.22	0.92	65.88	71.22	0.92	15.88	9.03	
Cum.Total		73.36	79.58	0.92						
Grand Total		73.36	79.58	0.92				16.30	9.20	9.49



Report prepared by: Curtis James

KOHLER

Model: 100REOZJF

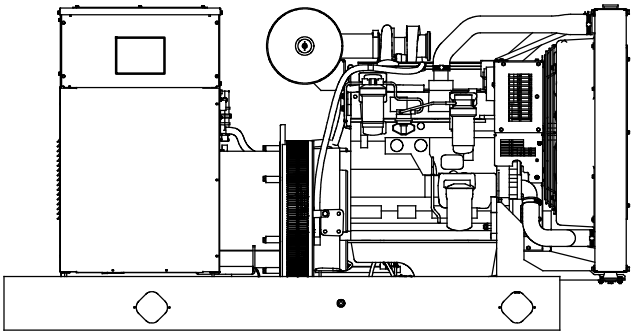
208- 600 V **Diesel**

ISO 9001 KOHLER NATIONALLY REGISTERED

Tier 3 EPA-Certified for Stationary Emergency Applications

Ratings Range

		60 Hz
Standby:	**kW**	77- 102
	kVA	77- 128
Prime:	**kW**	71- 92
	kVA	71- 115



Generator Set Ratings

Alternator	Voltage	Ph	Hz	130°C Rise Standby Rating kW/kVA	130°C Rise Standby Rating Amps	105°C Rise Prime Rating kW/kVA	105°C Rise Prime Rating Amps
4R9X	120/208	3	60	100/125	347	90/113	312
	127/220	3	60	100/125	328	90/113	295
	120/240	3	60	100/125	301	90/113	271
	120/240	1	60	77/77	321	71/71	296
	139/240	3	60	100/125	301	90/113	271
	220/380	3	60	100/125	190	90/113	171
	277/480	3	60	100/125	150	90/113	135
	347/600	3	60	100/125	120	90/113	108
4R12X	120/208	3	60	102/128	354	92/115	319
	127/220	3	60	102/128	335	92/115	302
	120/240	3	60	102/128	307	92/115	277
	120/240	1	60	91/91	379	84/84	350
	139/240	3	60	102/128	307	92/115	277
	220/380	3	60	102/128	194	92/115	175
	277/480	3	60	102/128	153	92/115	138
	347/600	3	60	102/128	123	92/115	111
4T12X	120/240	1	60	100/100	417	90/90	375

Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A one-year limited warranty covers all generator set systems and components. Two- and five-year extended limited warranties are also available.
- Alternator features:
  - The unique Fast-Response® X excitation system delivers excellent voltage response and short-circuit capability using a rare-earth, permanent magnet (PM)-excited alternator.
  - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
  - Kohler designed controllers for one-source system integration and remote communication. See Controllers on page 3.
  - The low coolant level shutdown prevents overheating (standard on radiator models only).
  - Integral vibration isolation eliminates the need for under-unit vibration spring isolators.
  - Mount up to three circuit breakers to allow circuit protection of selected priority loads.

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. *Standby Ratings:* The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. *Prime Power Ratings:* At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory. Obtain technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Rare-Earth, Permanent-Magnet
Leads: quantity, type	
4RX	12, Reconnectable
4TX	4, 120/240 V
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	Controller Dependent
One-step load acceptance	100% of Rating
Unbalanced load capability	100% of Rated Standby Current

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.

Specifications		Alternator
Peak motor starting kVA:		(35% dip for voltages below)
480 V	4R9X (12 lead)	385
480 V	4R12X (12 lead)	448
240 V	4T12X (4 lead)	275

Application Data

Engine

Engine Specifications	
Manufacturer	John Deere
Engine model	4045HF285I
Engine type	4-Cycle, Turbocharged, Charge Air-Cooled
Cylinder arrangement	4 Inline
Displacement, L (cu. in.)	4.5 (276)
Bore and stroke, mm (in.)	106 x 127 (4.19 x 5.00)
Compression ratio	19:1
Piston speed, m/min. (ft./min.)	457 (1500)
Main bearings: quantity, type	5, Replaceable Insert
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	118 (158)
Cylinder head material	Cast Iron
Crankshaft material	Forged Steel
Valve material:	
Intake	Chromium-Silicon Steel
Exhaust	Stainless Steel
Governor: type, make/model	JDEC Electronic L16 Denso HP3
Frequency regulation, no-load to full-load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Exhaust

Exhaust System	
Exhaust manifold type	Dry
Exhaust flow at rated kW, m^3/min. (cfm)	22.8 (805)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	580 (1076)
Maximum allowable back pressure, kPa (in. Hg)	7.5 (2.2)
Exhaust outlet size at engine hookup, mm (in.)	98 (3.86)

Engine Electrical

Engine Electrical System	
Battery charging alternator:	12 Volt
Ground (negative/positive)	Negative
Volts (DC)	12
Ampere rating	65
Starter motor rated voltage (DC)	12
Battery, recommended cold cranking amps (CCA):	
Quantity, CCA rating each	One, 640
Battery voltage (DC)	12

Fuel

Fuel System	
Fuel supply line, min. ID, mm (in.)	11.0 (0.44)
Fuel return line, min. ID, mm (in.)	6.0 (0.25)
Max. lift, fuel pump: type, m (ft.)	Engine-Driven, 1.8 (6.0)
Max. fuel flow, Lph (gph)	74.6 (19.7)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel prime pump	Manual
Fuel filter	
Primary	30 Microns
Secondary	2 Microns @ 98% Efficiency
Water Separator	Yes
Recommended fuel	#2 Diesel

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.) §	14.7 (15.5)
Oil pan capacity with filter, L (qt.) §	15.6 (16.5)
Oil filter: quantity, type §	1, Cartridge
Oil cooler	Water-Cooled

§ Kohler recommends the use of Kohler Genuine oil and filters.

Application Data

Cooling

Radiator System	
Ambient temperature, °C (°F) *	50 (122)
Engine jacket water capacity, L (gal.)	8.5 (2.25)
Radiator system capacity, including engine, L (gal.)	20.1 (5.3)
Engine jacket water flow, Lpm (gpm)	182 (48)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	62 (3544)
Heat rejected to air charge cooler at rated kW, dry exhaust, kW (Btu/min.)	20 (1127)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	600 (23.6)
Fan, kWm (HP)	6.6 (8.8)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H_2O)	0.125 (0.5)

* Enclosure with enclosed silencer reduces ambient temperature capability by 5°C (9°F).
Snow package enclosure with enclosed silencer reduces ambient temperature capability by 10°C (18°F).

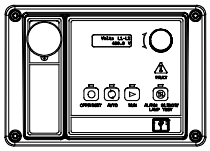
Operation Requirements

Air Requirements	
Radiator-cooled cooling air, m^3/min. (scfm)‡	142 (5000)
Combustion air, m^3/min. (cfm)	8.2 (288)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	25.0 (1420)
Alternator, kW (Btu/min.)	11.6 (660)

‡ Air density = 1.20 kg/m^3 (0.075 lbm/ft^3)

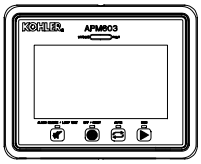
Fuel Consumption		
Diesel, Lph (gph) at % load	**Standby Rating**	
100%	31.0	(8.2)
75%	25.0	(6.6)
50%	17.8	(4.7)
25%	9.5	(2.5)
Diesel, Lph (gph) at % load	**Prime Rating**	
100%	27.6	(7.3)
75%	22.7	(6.0)
50%	14.4	(3.8)
25%	7.6	(2.0)

Controllers



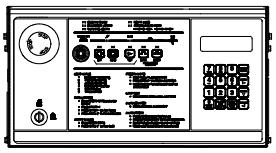
APM402 Controller
Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.
- Digital display and menu control provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or serial configuration
- Controller supports Modbus® protocol
- Integrated hybrid voltage regulator with ±0.5% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

Refer to G6-161 for additional controller features and accessories.



APM603 Controller
Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.
- 7-inch graphic display with touch screen and menu control provides easy local data access
- Measurements are selectable in metric or English units
- Paralleling capability to control up to 8 generators on an isolated bus with first-on logic, synchronizer, kW and kVAR load sharing, and protective relays
  Note: Parallel with other APM603 controllers only
- Generator management to turn paralleled generators off and on as required by load demand
- Load management to connect and disconnect loads as required
- Controller supports Modbus® RTU, Modbus® TCP, SNMP and BACnet®
- Integrated voltage regulator with ±0.25% regulation
- Built-in alternator thermal overload protection
- UL-listed overcurrent protective device
- NFPA 110 Level 1 capability

Refer to G6-162 for additional controller features and accessories.



Decision-Maker® 6000 Paralleling Controller
Provides advanced control, system monitoring, and system diagnostics with remote monitoring capabilities for paralleling multiple generator sets.
- Paralleling capability to control up to 8 generators on an isolated bus with first-on logic, synchronizer, kW and kVAR load sharing, and protective relays
  Note: Parallel with other Decision-Maker® 6000 controllers only
- Digital display and keypad provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or modem configuration
- Controller supports Modbus® protocol
- Integrated voltage regulator with ±0.25% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

Refer to G6-107 for additional controller features and accessories.

Modbus® is a registered trademark of Schneider Electric.

BACnet® is a registered trademark of ASHRAE.

KOHLER

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the US and Canada, phone 1-800-544-2444
KOHLERPower.com

Standard Features

- Alternator Protection
- Battery Rack and Cables
- Customer Connection (standard with Decision-Maker® 6000 controller only)
- Local Emergency Stop Switch
- Oil Drain Extension
- Operation and Installation Literature

Available Options

Circuit Breakers

Type

- ❑ Magnetic Trip
- ❑ Thermal Magnetic Trip
- ❑ Electronic Trip (LI)
- ❑ Electronic Trip with Short Time (LSI)
- ❑ Electronic Trip with Ground Fault (LSIG)

Rating

- ❑ 80%
- ❑ 100%

Operation

- ❑ Manual
- ❑ Electrically Operated (for paralleling)

Circuit Breaker Mounting

- ❑ Generator Mounted
- ❑ Remote Mounted
- ❑ Bus Bar (for remote mounted breakers)

Enclosures for Remote Mounted Circuit Breakers

- ❑ NEMA 1
- ❑ NEMA 3R

Approvals and Listings

- ❑ California OSHPD Approval
- ❑ CSA Certified
- ❑ IBC Seismic Certification
- ❑ UL 2200 Listing
- ❑ Hurricane Rated Enclosure

Enclosed Unit

- ❑ Snow Enclosure (sound enclosure with enclosed critical silencer, intake hood, and electrical package)
- ❑ Sound Enclosure (with enclosed critical silencer)
- ❑ Weather Enclosure (with enclosed critical silencer)

Open Unit

- ❑ Exhaust Silencer, Critical (kit: PA-354809)
- ❑ Flexible Exhaust Connector, Stainless Steel

Fuel System

- ❑ Flexible Fuel Lines
- ❑ Fuel Pressure Gauge
- ❑ Subbase Fuel Tanks

Controller

- ❑ Common Failure Relay (Decision-Maker® 6000 and APM603 controllers only)
- ❑ Decision-Maker® Paralleling System (DPS) (Decision-Maker® 6000 controller only)
- ❑ Dry Contact (isolated alarm) (Decision-Maker® 6000 controller only)
- ❑ Two Input/Five Output Module (APM402 controller only)
- ❑ Four Input/Fifteen Output Module (APM603 controller only)
- ❑ Lockable Emergency Stop Switch
- ❑ Remote Emergency Stop Switch
- ❑ Remote Serial Annunciator Panel
- ❑ Run Relay (standard with APM603, optional with others)
- ❑ Manual Key Switch (APM603 controller only)
- ❑ Manual Speed Adjust (APM402 controller only)

Cooling System

- ❑ Block Heater, 1500 W, 90- 120 V, 1 Ph Required for ambient temperature below 0°C (32°F)
- ❑ Radiator Duct Flange

Electrical System

- ❑ Generator Heater
- ❑ Battery
- ❑ Battery Charger, Equalize/Float Type
- ❑ Battery Heater

Miscellaneous

- ❑ Air Cleaner, Heavy Duty
- ❑ Air Cleaner Restriction Indicator
- ❑ Certified Test Report
- ❑ Crankcase Emissions Canister
- ❑ Engine Fluids Added
- ❑ Rated Power Factor Testing
- ❑ Rodent Guards

Literature

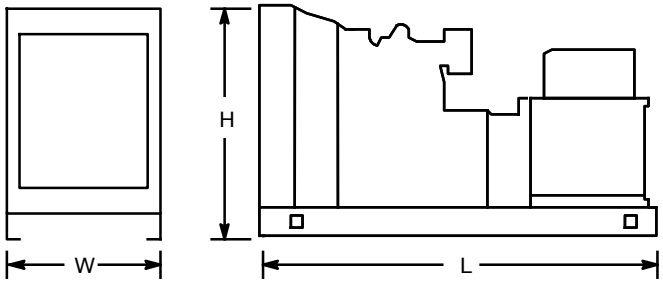
- ❑ General Maintenance
- ❑ NFPA 110
- ❑ Overhaul
- ❑ Production

Warranty

- ❑ 2-Year Basic Limited Warranty
- ❑ 5-Year Basic Limited Warranty
- ❑ 5-Year Comprehensive Limited Warranty

Dimensions and Weights

Overall Size, L x W x H, mm (in.):
Wide Skid: See Enclosure ADV Drawing
Narrow Skid: 2334 x 864 x 1216 (91.89 x 34.02 x 47.90)
Weight (radiator model), wet, kg (lb.): 1234 (2720)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

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