'TORAY' Innovation by Chemistry

System Overview Report

Project	Zawayda DP - TORAY TDS	
Case	1	15m3/h Zawayda DP
Revision	9	15m3/h Zawayda DP
Feed Water Type	Brackish Well, Note: Auto Balance is ON	
Errors, Warnings, Cautions and Notices	Errors:0, Warnings:0,Cautions:0,Notices:0. See Important Notes at end /E	
Database Info :		

		Overall	Pass 1
Raw water TDS	mg/l	5,000.1	7,436.7
Feed EC @25C / @25.00C	uS	9,178.3 / 9,178.3	13,266.2 / 13,266.2
Feed Pressure	bar	0.0	21.86
Temperature	deg C	25.00	
Total DP	bar	0.411	0.411
Brine Pressure	bar	21.45	21.45
FLow Allowance	3.00 yrs		0.848
SP % Increase (Max)	3.00 yrs		33.10%
Recovery	%	75.00%	62.5%
Feed Flow	m3/hr	20.00	24.00
Recycle Flow	m3/hr	4.000	4.000
Product Flow	m3/hr	14.999	14.999
Average Flux	l/m2/hr	26.81	26.81
Concentrate Flow	m3/hr	5.001	5.001
Product TDS	mg/l	109.6	109.6
Concentrate TDS	mg/l	19,647	19,647
Primary HP Pump kW	kilowatt	18.308	18.308
Power Consumption	kWh/m^3	1.221	1.221

Ions		Feed	Net Feed	Conc	Product
Ca	mg/l	0.0067	0.01	0.0266	4.00E-05
Mg	mg/l	0.0	0.0	0.0	0.0
Na	mg/l	1,967	2,925	7,729	43.11
K	mg/l	0.0	0.0	0.0	0.0
Ba	mg/l	0.0	0.0	0.0	0.0
Sr	mg/l	0.0	0.0	0.0	0.0
NH4	mg/l	0.0	0.0	0.0	0.0
Fe	mg/l	0.0	0.0	0.0	0.0
HCO3	mg/l	0.100	0.145	0.375	0.0089
Cl	mg/l	3,033	4,511	11,918	66.48
SO4	mg/l	0.0	0.0	0.0	0.0
NO3	mg/l	0.0	0.0	0.0	0.0
F	mg/l	0.0	0.0	0.0	0.0
Br	mg/l	0.0	0.0	0.0	0.0
B(Boron)	mg/l	0.0	0.0	0.0	0.0
SiO2	mg/l	0.0	0.0	0.0	0.0
PO4	mg/l	0.0	0.0	0.0	0.0
CO3	mg/l	0.0004	0.0006	0.0026	3.63E-06
CO2	mg/l	0.0042	0.0059	0.0086	0.0067
TDS	mg/l	5,000	7,437	19,647	109.6
Feed EC @25C / @25.00C	uS	9,178 / 9,178	13,266 / 13,266	32,083 / 32,083	229.6 / 229.6
pH	pH	7.500	7.497	7.702	6.872
Osmotic Press (DS1 / Pitzer)	bar	4.093 / 3.97	6.051 / 5.87	15.722 / 15.40	0.092 / 0.09
LSI / SDSI		-6.50 / -7.37	-6.50 / -7.22	-6.15 / -6.66	-7.67 / -9.66
CaSO4 / SrSO4 %	%	0.0% / 0.0%	0.0% / 0.0%	0.0% / 0.0%	0.0% / 0.0%
BaSO4 / SiO2 %	%	0.0% / 0.0%	0.0% / 0.0%	0.0% / 0.0%	
Pitzer % Solubility	Calcite/Dolomite	0% / 0%	0% / 0%	0% / 0%	
Pitzer % Solubility	CaSO4/SrSO4	0% / 0%	0% / 0%	0% / 0%	

Stage/Bank Data	Pass1	Stage 1	Stage 2
Lead Element Type		TM720D-400	TM720D-400

Last Element Type		TM720D-400	TM720D-400
Total Elements	15	9	6
Total Vessels	5	3	2
Elements per Vessel		3	3
Feed Flow	m3/hr	24.00	13.101
Product Flow	m3/hr	10.899	4.100
Average Flux	l/m2/hr	32.47	18.321
Brine Flow	m3/hr	13.101	9.001
Recovery %	%	45.42 %	31.30 %
Feed Pressure	bar	21.86	21.64
dP Elements	bar	0.222	0.189
Boost Pressure	bar	0.0	0.0
Piping Loss	bar	0.0	0.0
Net (Boost - dP piping)	bar	0.0	0.0
Brine Pressure	bar	21.64	21.45
Permeate Pressure	bar	0.0	0.0
Feed TDS	mg/l	7,437	13,564
Perm TDS	mg/l	71.45	211.0
Lead Element	Pass1	Stage 1	Stage 2
Feed Flow	m3/hr	8.000	6.550
Product Flow	m3/hr	1.414	0.845
Product TDS	mg/l	47.29	149.2
Flux	l/m2/hr	37.91	22.64
Last Element	Pass1	Stage 1	Stage 2
Product Flow	m3/hr	0.999	0.527
Product TDS	mg/l	107.7	307.8
Brine/Product Ratio	ratio	4.371	8.541
Brine Flow	m3/hr	4.367	4.500
Net Driving Pressure	bar	9.416	4.979
Beta		1.252	1.126

Chemicals 100%. Disclaimer: These estimated dose rates are provided as a courtesy to Toray DS2 users and are not guaranteed.

No Chemicals Added

Errors

Warnings

Cautions

Notices

Disclaimer : The program is intended to be used by persons having technical skill, at their own discretion and risk. The projections, obtained with the program, are the expected system performance, based on the average, nominal element-performance and are not automatically guaranteed.Toray shall not be liable for any error or miscalculation in the program.The obtained results cannot be used to raise any claim for liability or warranty. It is the users responsibility to make provisions against fouling, scaling and chemical attacks, to account for piping and valve pressure losses, feed pump suction pressure and permeate backpressure. For questions please contact us:

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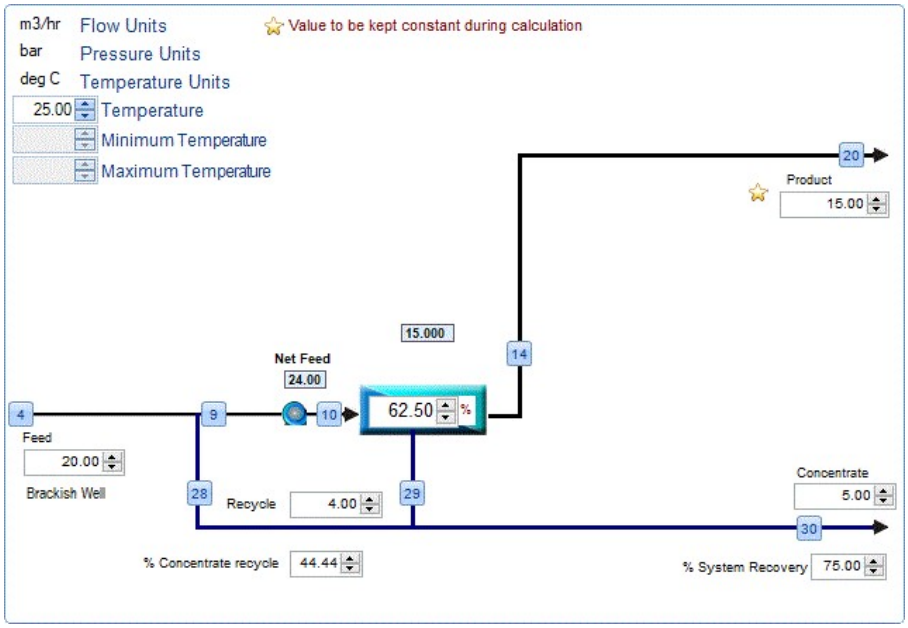
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Date/Time :	9/1/2020 10:01:33 AM
Project	Zawayda DP - TORAY TDS
Case :	1:15m3/h Zawayda DP
Revision :	9:15m3/h Zawayda DP
User name :	T.S

Prepared for :	Mercy Corps
Notes :	
Membrane Database	
Version Number:	20154
ReleaseDate:	4/9/2019
UpdateBy:	
Toray DS2 version :	2.1.7.166(1.0.6.109)

Flow Diagram:



Stream Details					
Stream Number	Flow	Pressure	TDS	Est uS	pH
20. Final Product	14.999	0.0	109.6	229.6	6.872
4. Feed Net	20.00	0.0	5,000.14	9,178.3	7.500
28. Pass 1 Recycle	4.000	21.45	19,647.49	32,083.2	7.500
29. Pass 1 Conc	9.001	21.45	19,647.49	7.702	
10. Feed to Pass 1	24.00	21.86	7,436.72	13,266.2	7.497
30. Conc to brine	5.001	21.45	19,647.49	32,083.2	7.702
Element Details in Pass 1					

Pass 1 Stage 1	Element 1	Element 2	Element 3
Model	TM720D-400	TM720D-400	TM720D-400
Area m^2 / dia inch	37.30 / 8	37.30 / 8	37.30 / 8
Age	3	3	3
SPI %/yr	10	10	10
SPI Applied	33.10	33.10	33.10
FLow Allowance	0.848	0.848	0.848
Recovery %	17.674	18.528	18.617
Feed Flow(m3/hr)	8.000	6.586	5.366
Perm Flow(m3/hr)	1.414	1.220	0.999
Conc Flow(m3/hr)	6.586	5.366	4.367
Flux(l/m2/hr)	37.91	32.71	26.78
Beta	1.286	1.276	1.252
Feed Press(bar)	21.86	21.77	21.70
DP(bar)	0.0959	0.0721	0.0537
Conc Press(bar)	21.77	21.70	21.64
Perm Press(bar)	0.0	0.0	0.0
Pi_Feed(bar)	6.052	7.320	8.941
Pi_Memb(bar)	8.537	10.296	12.344
Pi_Conc(bar)	7.320	8.941	10.928
Pi_Perm(bar)	0.04	0.0589	0.0908
Net Press(bar)	13.319	11.494	9.416

Perm mg/l Pass 1 Stage 1	Element 1	Element 2	Element 3	Stage 1
Ca	1.72E-05	2.54E-05	3.92E-05	2.60E-05
Mg	0.0	0.0	0.0	0.0
Na	18.599	27.43	42.37	28.10
K	0.0	0.0	0.0	0.0
Ba	0.0	0.0	0.0	0.0
Sr	0.0	0.0	0.0	0.0
NH4	0.0	0.0	0.0	0.0
Fe	0.0	0.0	0.0	0.0
HCO3	0.0069	0.0078	0.0091	0.0078
Cl	28.68	42.30	65.34	43.34
SO4	0.0	0.0	0.0	0.0
NO3	0.0	0.0	0.0	0.0
F	0.0	0.0	0.0	0.0
Br	0.0	0.0	0.0	0.0
B	0.0	0.0	0.0	0.0
SiO2	0.0	0.0	0.0	0.0
PO4	0.0	0.0	0.0	0.0
CO3	2.39E-06	2.86E-06	3.62E-06	2.89E-06
CO2	0.0059	0.0063	0.0068	0.0063
pH	6.840	6.857	6.880	6.856
TDS	47.29	69.74	107.7	71.45

Feed mg/l Pass 1 Stage 1	Element 1	Element 2	Element 3	Stage 1
Ca	0.01	0.0122	0.0149	0.01
Mg	0.0	0.0	0.0	0.0
Na	2,925.37	3,549.39	4,350.33	2,925.37
K	0.0	0.0	0.0	0.0
Ba	0.0	0.0	0.0	0.0
Sr	0.0	0.0	0.0	0.0
NH4	0.0	0.0	0.0	0.0
Fe	0.0	0.0	0.0	0.0
HCO3	0.145	0.175	0.213	0.145
Cl	4,511.20	5,473.50	6,708.63	4,511.20
SO4	0.0	0.0	0.0	0.0
NO3	0.0	0.0	0.0	0.0
F	0.0	0.0	0.0	0.0
Br	0.0	0.0	0.0	0.0
B	0.0	0.0	0.0	0.0
SiO2	0.0	0.0	0.0	0.0
PO4	0.0	0.0	0.0	0.0
CO3	0.0006	0.0007	0.001	0.0006
CO2	0.0059	0.0063	0.0068	0.0059
pH	7.497	7.540	7.582	7.497
TDS	7,436.72	9,023.09	11,059.19	7,436.72

Pass 1 Stage 2	Element 1	Element 2	Element 3
Model	TM720D-400	TM720D-400	TM720D-400
Area m^2 / dia inch	37.30 / 8	37.30 / 8	37.30 / 8
Age	3	3	3
SPI %/yr	10	10	10
SPI Applied	33.10	33.10	33.10
FLow Allowance	0.848	0.848	0.848
Recovery %	12.893	11.894	10.481
Feed Flow(m3/hr)	6.550	5.706	5.027
Perm Flow(m3/hr)	0.845	0.679	0.527
Conc Flow(m3/hr)	5.706	5.027	4.500
Flux(l/m2/hr)	22.64	18.195	14.127
Beta	1.180	1.154	1.126
Feed Press(bar)	21.64	21.57	21.50
DP(bar)	0.0749	0.062	0.0523
Conc Press(bar)	21.57	21.50	21.45

Perm Press(bar)	0.0	0.0	0.0
Pi_Feed(bar)	10.928	12.497	14.128
Pi_Memb(bar)	13.761	15.307	16.758
Pi_Conc(bar)	12.497	14.128	15.722
Pi_Perm(bar)	0.126	0.179	0.258
Net Press(bar)	7.969	6.408	4.979

Perm mg/l Pass 1 Stage 2	Element 1	Element 2	Element 3	Stage 2
Ca	5.44E-05	7.77E-05	0.0001	7.71E-05
Mg	0.0	0.0	0.0	0.0
Na	58.69	83.72	121.1	83.01
K	0.0	0.0	0.0	0.0
Ba	0.0	0.0	0.0	0.0
Sr	0.0	0.0	0.0	0.0
NH4	0.0	0.0	0.0	0.0
Fe	0.0	0.0	0.0	0.0
HCO3	0.0104	0.0121	0.0144	0.012
Cl	90.51	129.1	186.7	128.0
SO4	0.0	0.0	0.0	0.0
NO3	0.0	0.0	0.0	0.0
F	0.0	0.0	0.0	0.0
Br	0.0	0.0	0.0	0.0
B	0.0	0.0	0.0	0.0
SiO2	0.0	0.0	0.0	0.0
PO4	0.0	0.0	0.0	0.0
CO3	4.39E-06	5.60E-06	7.50E-06	5.59E-06
CO2	0.0074	0.0078	0.0082	0.0077
pH	6.892	6.920	6.957	6.917
TDS	149.2	212.8	307.8	211.0

Feed mg/l Pass 1 Stage 2	Element 1	Element 2	Element 3	Stage 2
Ca	0.0183	0.021	0.0239	0.0183
Mg	0.0	0.0	0.0	0.0
Na	5,335.80	6,116.85	6,931.31	5,335.80
K	0.0	0.0	0.0	0.0
Ba	0.0	0.0	0.0	0.0
Sr	0.0	0.0	0.0	0.0
NH4	0.0	0.0	0.0	0.0
Fe	0.0	0.0	0.0	0.0
HCO3	0.261	0.298	0.337	0.261
Cl	8,228.31	9,432.76	10,688.73	8,228.31
SO4	0.0	0.0	0.0	0.0
NO3	0.0	0.0	0.0	0.0
F	0.0	0.0	0.0	0.0
Br	0.0	0.0	0.0	0.0
B	0.0	0.0	0.0	0.0
SiO2	0.0	0.0	0.0	0.0
PO4	0.0	0.0	0.0	0.0
CO3	0.0014	0.0017	0.0022	0.0014
CO2	0.0074	0.0078	0.0082	0.0074
pH	7.625	7.652	7.680	7.625
TDS	13,564.39	15,549.93	17,620.40	13,564.39