

System Overview Report

| | | |
|--|---|--------------|
| Project | ALDEE\Sales7.jwm 90:Raj Water | |
| Case | 1 | New Case |
| Revision | 0 | New Revision |
| 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 : | Project Database : C:\Users\sales7.jwm\Documents\TorayDS2\App_Data\DS2.sdf(Ver:2.6) Membrane Database (V.20154) :. | |

| | | Overall | Pass 1 |
|------------------------|--------------------|---------------|---------------|
| Raw water TDS | mg/l | 270.9 | 270.9 |
| Feed EC @25C / @25.00C | uS | 528.8 / 528.8 | 528.8 / 528.8 |
| Feed Pressure | bar | 0.0 | 9.908 |
| Temperature | deg C | 25.00 | |
| Total DP | bar | 1.364 | 1.364 |
| Brine Pressure | bar | 8.543 | 8.543 |
| Flow Allowance | 3.00 yrs | | 0.848 |
| SP % Increase (Max) | 3.00 yrs | | 33.10% |
| Recovery | % | 70.00% | 70.0% |
| Feed Flow | m3/hr | 14.286 | 14.286 |
| Product Flow | m3/hr | 10.000 | 10.000 |
| Average Flux | l/m2/hr | 26.81 | 26.81 |
| Concentrate Flow | m3/hr | 4.286 | 4.286 |
| Product TDS | mg/l | 2.551 | 2.551 |
| Concentrate TDS | mg/l | 902.2 | 902.2 |
| Primary HP Pump kW | kilowatt | 4.912 | 4.912 |
| Power Consumption | kWh/m ³ | 0.491 | 0.491 |

| Ions | | Feed | Net Feed | Conc | Product |
|------------------------------|------------------|---------------|---------------|---------------|----------------|
| Ca | mg/l | 20.00 | 20.00 | 66.57 | 0.0416 |
| Mg | mg/l | 5.100 | 5.100 | 16.974 | 0.0106 |
| Na | mg/l | 66.56 | 66.56 | 221.1 | 0.330 |
| 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 | 12.700 | 12.700 | 44.34 | 1.422 |
| Cl | mg/l | 125.0 | 125.0 | 415.6 | 0.428 |
| SO4 | mg/l | 0.0 | 0.0 | 0.0 | 0.0 |
| NO3 | mg/l | 35.90 | 35.90 | 119.0 | 0.264 |
| 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 | 5.600 | 5.600 | 18.534 | 0.0562 |
| PO4 | mg/l | 0.0 | 0.0 | 0.0 | 0.0 |
| CO3 | mg/l | 0.0003 | 0.0003 | 0.0033 | 2.70E-06 |
| CO2 | mg/l | 59.56 | 59.56 | 58.61 | 59.31 |
| TDS | mg/l | 270.9 | 270.9 | 902.2 | 2.551 |
| Feed EC @25C / @25.00C | uS | 529 / 529 | 529 / 529 | 1,679 / 1,679 | 12.4 / 12.4 |
| pH | pH | 5.520 | 5.520 | 6.045 | 4.611 |
| Osmotic Press (DS1 / Pitzer) | bar | 0.197 / 0.21 | 0.197 / 0.21 | 0.650 / 0.61 | 0.001 / 0.03 |
| LSI / SDSI | | -3.48 / -3.48 | -3.48 / -3.48 | -2.00 / -1.94 | -9.40 / -10.37 |
| CaSO4 / SrSO4 % | % | 0.0% / 0.0% | 0.0% / 0.0% | 0.0% / 0.0% | 0.0% / 0.0% |
| BaSO4 / SiO2 % | % | 0.0% / 4.6% | 0.0% / 4.6% | 0.0% / 16.2% | |
| Pitzer % Solubility | Calcite/Dolomite | 0% / 0% | 0% / 0% | 1% / 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 | 10 | 5 | 5 |
| Total Vessels | 2 | 1 | 1 |
| Elements per Vessel | | 5 | 5 |
| Feed Flow | m3/hr | 14.286 | 9.030 |
| Product Flow | m3/hr | 5.256 | 4.744 |
| Average Flux | l/m2/hr | 28.18 | 25.44 |
| Brine Flow | m3/hr | 9.030 | 4.286 |
| Recovery % | % | 36.79 % | 52.54 % |
| Feed Pressure | bar | 9.908 | 8.967 |
| dP Elements | bar | 0.941 | 0.424 |
| 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 | 8.967 | 8.543 |
| Permeate Pressure | bar | 0.0 | 0.0 |
| Feed TDS | mg/l | 270.9 | 428.4 |
| Perm TDS | mg/l | 2.179 | 2.964 |
| Lead Element | Pass1 | Stage 1 | Stage 2 |
| Feed Flow | m3/hr | 14.286 | 9.030 |
| Product Flow | m3/hr | 1.101 | 0.986 |
| Product TDS | mg/l | 2.003 | 2.542 |
| Flux | l/m2/hr | 29.51 | 26.44 |
| Last Element | Pass1 | Stage 1 | Stage 2 |
| Product Flow | m3/hr | 1.006 | 0.909 |
| Product TDS | mg/l | 2.395 | 3.576 |
| Brine/Product Ratio | ratio | 8.978 | 4.714 |
| Brine Flow | m3/hr | 9.030 | 4.286 |
| Net Driving Pressure | bar | 8.695 | 7.844 |
| Beta | | 1.165 | 1.231 |

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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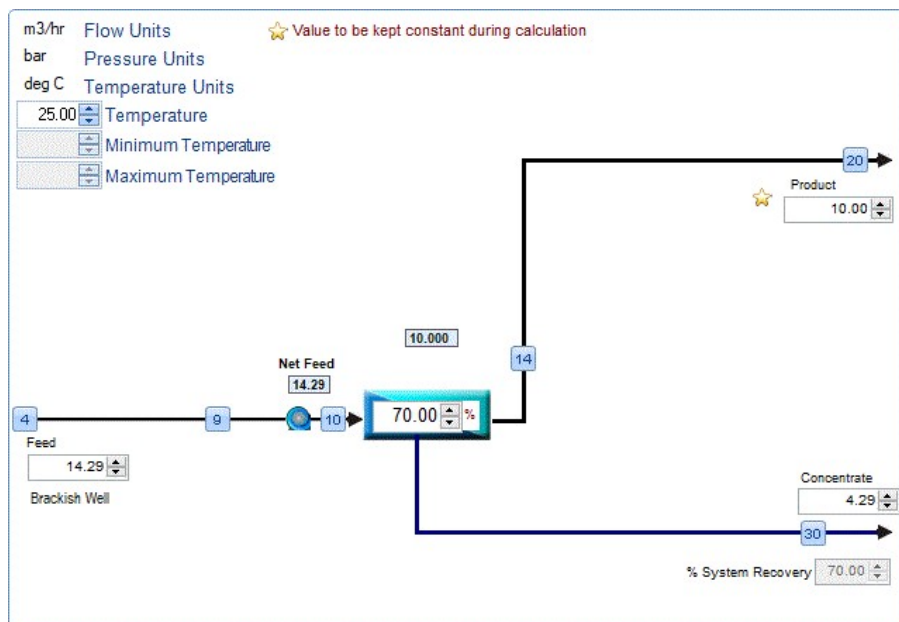
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| | |
|----------------|-------------------------------|
| Date/Time : | 23-05-2019 12:32:29 |
| Project | ALDEE\Sales7.jwm 90:Raj Water |
| Case : | 1:New Case |
| Revision : | 0:New Revision |
| User name : | ALDEE\Sales7.jwm |
| Prepared for : | |
| Notes : | 10m3 /hr |

| | |
|---------------------|----------------------|
| Membrane Database | |
| Version Number: | 20154 |
| ReleaseDate: | 09-04-2019 |
| UpdateBy: | YK |
| 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 | 10.000 | 0.0 | 2.551 | 12.4 | 4.611 |
| 4. Feed Net | 14.286 | 0.0 | 270.9 | 528.8 | 5.520 |
| 10. Feed to Pass 1 | 14.286 | 9.908 | 270.9 | 528.8 | 5.520 |
| 30. Conc to brine | 4.286 | 8.543 | 902.2 | 1,679.1 | 6.045 |

Element Details in Pass 1

| Pass 1 Stage 1 | Element 1 | Element 2 | Element 3 | Element 4 | Element 5 |
|--------------------------------|------------|------------|------------|------------|------------|
| Model | TM720D-400 | TM720D-400 | TM720D-400 | TM720D-400 | TM720D-400 |
| Area m ² / dia inch | 37.30 / 8 | 37.30 / 8 | 37.30 / 8 | 37.30 / 8 | 37.30 / 8 |
| Age | 3 | 3 | 3 | 3 | 3 |
| SPI %/yr | 10 | 10 | 10 | 10 | 10 |
| SPI Applied | 33.10 | 33.10 | 33.10 | 33.10 | 33.10 |
| Flow Allowance | 0.848 | 0.848 | 0.848 | 0.848 | 0.848 |
| Recovery % | 7.706 | 8.144 | 8.662 | 9.280 | 10.022 |
| Feed Flow(m3/hr) | 14.286 | 13.185 | 12.111 | 11.062 | 10.035 |
| Perm Flow(m3/hr) | 1.101 | 1.074 | 1.049 | 1.027 | 1.006 |
| Conc Flow(m3/hr) | 13.185 | 12.111 | 11.062 | 10.035 | 9.030 |
| Flux(l/m2/hr) | 29.51 | 28.79 | 28.13 | 27.52 | 26.96 |
| Beta | 1.145 | 1.149 | 1.153 | 1.159 | 1.165 |
| Feed Press(bar) | 9.908 | 9.669 | 9.458 | 9.271 | 9.108 |
| DP(bar) | 0.238 | 0.212 | 0.187 | 0.163 | 0.141 |
| Conc Press(bar) | 9.670 | 9.458 | 9.271 | 9.108 | 8.967 |
| Perm Press(bar) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pi_Feed(bar) | 0.197 | 0.213 | 0.232 | 0.254 | 0.280 |
| Pi_Memb(bar) | 0.234 | 0.255 | 0.280 | 0.308 | 0.343 |
| Pi_Conc(bar) | 0.213 | 0.232 | 0.254 | 0.280 | 0.310 |
| Pi_Perm(bar) | 0.001 | 0.0011 | 0.0011 | 0.0012 | 0.0013 |
| Net Press(bar) | 9.555 | 9.309 | 9.086 | 8.882 | 8.695 |

| Perm mg/l Pass 1 Stage 1 | Element 1 | Element 2 | Element 3 | Element 4 | Element 5 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|
| Ca | 0.0228 | 0.0253 | 0.0283 | 0.0319 | 0.0361 |

| | | | | | |
|------|----------|----------|----------|----------|----------|
| Mg | 0.0058 | 0.0065 | 0.0072 | 0.0081 | 0.0092 |
| Na | 0.181 | 0.201 | 0.225 | 0.253 | 0.286 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ba | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NH4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fe | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HCO3 | 1.384 | 1.391 | 1.398 | 1.407 | 1.414 |
| Cl | 0.235 | 0.261 | 0.292 | 0.328 | 0.372 |
| SO4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NO3 | 0.145 | 0.161 | 0.180 | 0.203 | 0.230 |
| F | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Br | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| B | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SiO2 | 0.0301 | 0.0334 | 0.0372 | 0.0418 | 0.0472 |
| PO4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CO3 | 2.53E-06 | 2.56E-06 | 2.59E-06 | 2.63E-06 | 2.66E-06 |
| CO2 | 59.56 | 59.53 | 59.49 | 59.50 | 59.45 |
| pH | 4.598 | 4.600 | 4.603 | 4.605 | 4.608 |
| TDS | 2.003 | 2.080 | 2.168 | 2.272 | 2.395 |

| Feed mg/l Pass 1 Stage 1 | Element 1 | Element 2 | Element 3 | Element 4 | Element 5 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|
| Ca | 20.00 | 21.67 | 23.59 | 25.82 | 28.46 |
| Mg | 5.100 | 5.525 | 6.015 | 6.584 | 7.257 |
| Na | 66.56 | 72.10 | 78.48 | 85.90 | 94.66 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ba | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NH4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fe | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HCO3 | 12.700 | 13.797 | 15.076 | 16.492 | 18.241 |
| Cl | 125.0 | 135.4 | 147.4 | 161.4 | 177.8 |
| SO4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NO3 | 35.90 | 38.89 | 42.32 | 46.32 | 51.03 |
| F | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Br | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| B | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SiO2 | 5.600 | 6.065 | 6.600 | 7.222 | 7.957 |
| PO4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CO3 | 0.0003 | 0.0003 | 0.0003 | 0.0004 | 0.0005 |
| CO2 | 59.56 | 59.53 | 59.49 | 59.50 | 59.45 |
| pH | 5.520 | 5.553 | 5.590 | 5.628 | 5.670 |
| TDS | 270.9 | 293.5 | 319.5 | 349.7 | 385.4 |

| Pass 1 Stage 2 | Element 1 | Element 2 | Element 3 | Element 4 | Element 5 |
|---------------------|------------|------------|------------|------------|------------|
| Model | TM720D-400 | TM720D-400 | TM720D-400 | TM720D-400 | TM720D-400 |
| Area m^2 / dia inch | 37.30 / 8 | 37.30 / 8 | 37.30 / 8 | 37.30 / 8 | 37.30 / 8 |
| Age | 3 | 3 | 3 | 3 | 3 |
| SPI %/yr | 10 | 10 | 10 | 10 | 10 |
| SPI Applied | 33.10 | 33.10 | 33.10 | 33.10 | 33.10 |
| Flow Allowance | 0.848 | 0.848 | 0.848 | 0.848 | 0.848 |
| Recovery % | 10.923 | 12.033 | 13.422 | 15.192 | 17.502 |
| Feed Flow(m3/hr) | 9.030 | 8.043 | 7.076 | 6.126 | 5.195 |
| Perm Flow(m3/hr) | 0.986 | 0.968 | 0.950 | 0.931 | 0.909 |
| Conc Flow(m3/hr) | 8.043 | 7.076 | 6.126 | 5.195 | 4.286 |
| Flux(l/m2/hr) | 26.44 | 25.95 | 25.46 | 24.95 | 24.38 |
| Beta | 1.173 | 1.183 | 1.196 | 1.211 | 1.231 |
| Feed Press(bar) | 8.967 | 8.846 | 8.745 | 8.662 | 8.595 |
| DP(bar) | 0.120 | 0.101 | 0.0833 | 0.0668 | 0.0518 |
| Conc Press(bar) | 8.846 | 8.745 | 8.662 | 8.595 | 8.543 |
| Perm Press(bar) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pi_Feed(bar) | 0.310 | 0.348 | 0.396 | 0.456 | 0.537 |
| Pi_Memb(bar) | 0.386 | 0.439 | 0.508 | 0.600 | 0.728 |

| | | | | | |
|----------------|--------|--------|--------|--------|--------|
| Pi_Conc(bar) | 0.348 | 0.395 | 0.456 | 0.537 | 0.650 |
| Pi_Perm(bar) | 0.0014 | 0.0015 | 0.0017 | 0.0017 | 0.0021 |
| Net Press(bar) | 8.522 | 8.358 | 8.197 | 8.030 | 7.844 |

| Perm mg/l Pass 1 Stage 2 | Element 1 | Element 2 | Element 3 | Element 4 | Element 5 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|
| Ca | 0.0413 | 0.0479 | 0.0564 | 0.0578 | 0.0773 |
| Mg | 0.0105 | 0.0122 | 0.0144 | 0.0147 | 0.0197 |
| Na | 0.328 | 0.379 | 0.447 | 0.458 | 0.612 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ba | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NH4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fe | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HCO3 | 1.420 | 1.442 | 1.448 | 1.453 | 1.475 |
| Cl | 0.425 | 0.492 | 0.580 | 0.594 | 0.794 |
| SO4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NO3 | 0.262 | 0.304 | 0.358 | 0.366 | 0.489 |
| F | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Br | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| B | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SiO2 | 0.0539 | 0.0623 | 0.0732 | 0.088 | 0.109 |
| PO4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CO3 | 2.69E-06 | 2.78E-06 | 2.81E-06 | 2.84E-06 | 2.94E-06 |
| CO2 | 59.35 | 59.22 | 59.07 | 58.96 | 58.77 |
| pH | 4.610 | 4.618 | 4.620 | 4.623 | 4.630 |
| TDS | 2.542 | 2.740 | 2.976 | 3.032 | 3.576 |

| Feed mg/l Pass 1 Stage 2 | Element 1 | Element 2 | Element 3 | Element 4 | Element 5 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|
| Ca | 31.62 | 35.50 | 40.35 | 46.59 | 54.93 |
| Mg | 8.064 | 9.052 | 10.288 | 11.881 | 14.007 |
| Na | 105.2 | 118.0 | 134.1 | 154.8 | 182.5 |
| K | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ba | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sr | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NH4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fe | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HCO3 | 20.40 | 23.08 | 26.43 | 30.67 | 36.41 |
| Cl | 197.6 | 221.8 | 252.0 | 291.0 | 343.0 |
| SO4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| NO3 | 56.69 | 63.61 | 72.27 | 83.42 | 98.30 |
| F | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Br | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| B | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SiO2 | 8.838 | 9.915 | 11.262 | 12.997 | 15.310 |
| PO4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| CO3 | 0.0006 | 0.0008 | 0.0011 | 0.0015 | 0.0022 |
| CO2 | 59.35 | 59.22 | 59.07 | 58.96 | 58.77 |
| pH | 5.718 | 5.770 | 5.827 | 5.890 | 5.962 |
| TDS | 428.4 | 480.9 | 546.8 | 631.4 | 744.5 |