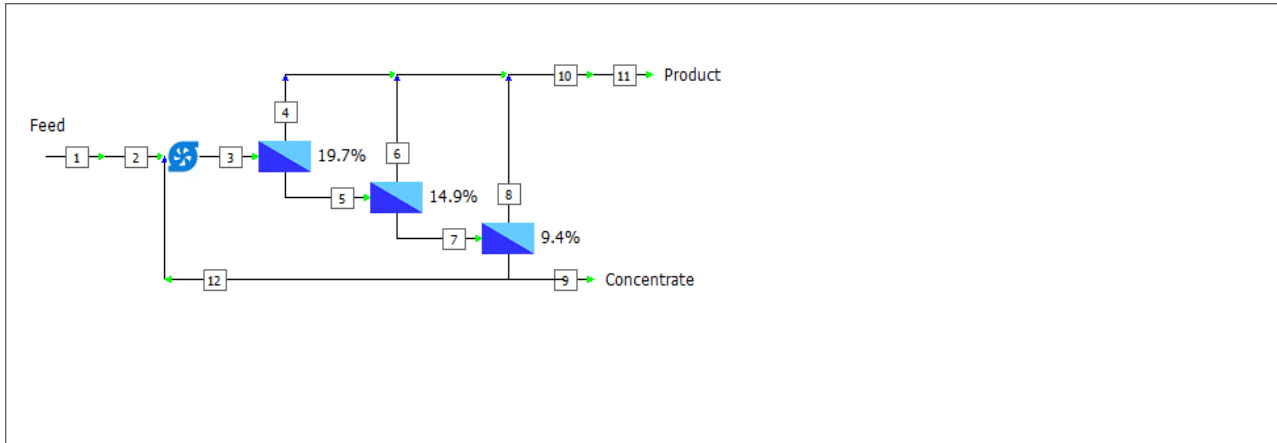


< Project Description >

FLOW DIAGRAM



| Tag | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------|---------|---------|---------|-------|---------|-------|---------|-------|
| Flow Rate (GPM) | 16.0 | 16.0 | 21.0 | 4.1 | 16.9 | 2.5 | 14.3 | 1.3 |
| Pressure (psig) | 0.0 | 0.0 | 105.0 | 0.0 | 102.8 | 0.0 | 95.2 | 0.0 |
| TDS (mg/l) | 3,070.2 | 3,070.2 | 3,752.9 | 193.4 | 4,626.8 | 328.3 | 5,381.2 | 493.5 |

| Tag | 9 | 10 | 11 | 12 |
|-----------------|---------|-------|-------|---------|
| Flow Rate (GPM) | 8.0 | 8.0 | 8.0 | 5.0 |
| Pressure (psig) | 86.1 | 0.0 | 0.0 | 86.1 |
| TDS (mg/l) | 5,886.2 | 286.2 | 286.2 | 5,886.2 |

SYSTEM CONFIGURATION

< Pass 1 >

| | | | |
|-------------------------|---|------------------------------|----------|
| Feed water type | Well Water SDI<3 | Designated Product Flow Rate | 8.00 GPM |
| No. of Pressure Vessel | 9 | No. of Element | 18 |
| Recovery Ratio | 50 % | Average Permeate Flux | 7.53 gfd |
| Array Configuration | 3 Array, 4-3-2 , 2 Elements/pressure vessel | | |
| Membrane Type and Model | RE4040-BLF | | |

PROJECT NOTES

CASE NOTE

< Projection Results >

PROJECTION DETAILS :

< Pass 1 >

| | | | |
|-------------------------------|------------------|------------------------------|--------------|
| Feed flow rate into RO system | 16.00 GPM | Membrane Age | 5.00 year(s) |
| Permeate Flow Rate | 8.00 GPM | Flux Decline Rate | 7.00 %/year |
| Pass Recovery | 50.00 % | Salt Passage Increase Rate | 10.00 %/year |
| Feed TDS | 3,752.89 mg/L | Average Permeate Flux | 7.53 gfd |
| Permeate TDS | 286.21 mg/L | Feed Osmotic Pressure | 27.21 psig |
| Concentrate TDS | 5,886.2 mg/L | Concentrate Osmotic Pressure | 41.94 psig |
| Salt rejection | 92.37 % | Chem. dose | 0.00 mg/L |
| Feed Pressure | 105.03 psig | Permeate Blending | 0.00 GPM |
| Temperature | 50.00 F | Softener | No |
| Feed water type | Well Water SDI<3 | | |
| Concentrate Recycle | 3 >> 1, 5.00 GPM | | |

| Array | Element Model | No. of Pressure Vessel | Elements per PV | Boost pump pressure (psig) | Permeate back pressure (psig) |
|-------|---------------|------------------------|-----------------|----------------------------|-------------------------------|
| 1 | RE4040-BLF | 4 | 2 | 0.00 | 0.00 |
| 2 | RE4040-BLF | 3 | 2 | 0.00 | 0.00 |
| 3 | RE4040-BLF | 2 | 2 | 0.00 | 0.00 |

| Array/Element | Pressure Feed (psig) | Pressure Diff (psig) | Flow Rate Feed (GPM) | Flow Rate Perm. (GPM) | Rec.(%) | Flux (gfd) | TDS(mg/L) Feed | TDS(mg/L) Perm. | Conc. Pol. | Osm. Press. |
|--|----------------------|----------------------|----------------------|-----------------------|---------|------------|----------------|-----------------|------------|-------------|
| 1 | 105.03 | 2.23 | 21.00 | 4.14 | 19.71 | 8.77 | 3,752.9 | 193.35 | 1.077 | 31.540 |
| 1 | 105.03 | 1.21 | 5.25 | 0.53 | 10.19 | 9.06 | 3,752.9 | 159.57 | 1.074 | 28.500 |
| 2 | 103.82 | 1.01 | 4.72 | 0.50 | 10.60 | 8.47 | 4,160.5 | 229.48 | 1.077 | 31.540 |
| 2 | 97.81 | 2.60 | 16.86 | 2.52 | 14.93 | 7.11 | 4,626.8 | 328.27 | 1.056 | 37.000 |
| 1 | 97.81 | 1.39 | 5.62 | 0.43 | 7.72 | 7.35 | 4,626.8 | 300.92 | 1.056 | 34.400 |
| 2 | 96.42 | 1.21 | 5.19 | 0.41 | 7.81 | 6.87 | 4,988.7 | 357.55 | 1.056 | 37.000 |
| 3 | 90.20 | 4.09 | 14.34 | 1.34 | 9.37 | 5.69 | 5,381.2 | 493.52 | 1.035 | 40.920 |
| 1 | 90.20 | 2.13 | 7.17 | 0.35 | 4.85 | 5.89 | 5,381.2 | 460.48 | 1.035 | 39.200 |
| 2 | 88.07 | 1.96 | 6.82 | 0.32 | 4.75 | 5.49 | 5,631.8 | 528.96 | 1.034 | 40.920 |
| Total | 105.03 | 8.92 | 21.00 | 8.00 | 38.10 | 7.53 | 3,752.9 | 286.21 | 1.077 | 40.920 |
| Product (after blending, post treatment) | | | | 8.00 | | | | 286.21 | | |

< Water Quality Details >

<Pass 1>

| | Unit | Raw Water | Feed Water | Concentrate | | | Permeate | | | Total | Product |
|----------|----------|-----------|------------|-------------|----------|----------|----------|--------|--------|--------|---------|
| | | | | Stage1 | Stage2 | Stage3 | Stage1 | Stage2 | Stage3 | | |
| Na | as Ion | 606.7 | 736.2 | 903.9 | 1,046.7 | 1,141.0 | 53.54 | 90.20 | 133.89 | 78.57 | 78.57 |
| K | as Ion | 22.5 | 27.4 | 33.7 | 39.1 | 42.6 | 1.56 | 2.94 | 5.10 | 2.59 | 2.59 |
| NH4 | as Ion | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ca | as Ion | 216.0 | 268.2 | 333.6 | 391.5 | 431.3 | 1.91 | 3.64 | 6.39 | 3.21 | 3.21 |
| Mg | as Ion | 85.5 | 106.2 | 132.2 | 155.2 | 171.1 | 0.53 | 1.01 | 1.77 | 0.89 | 0.89 |
| Fe | as Ion | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ba | as Ion | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sr | as Ion | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cl | as Ion | 414.0 | 509.1 | 629.8 | 735.0 | 806.2 | 17.48 | 30.15 | 46.02 | 26.26 | 26.26 |
| NO3 | as Ion | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SO4 | as Ion | 1,060.0 | 1,315.8 | 1,636.0 | 1,919.7 | 2,114.9 | 11.31 | 19.61 | 30.09 | 17.07 | 17.07 |
| F | as Ion | 1.3 | 1.6 | 1.9 | 2.2 | 2.4 | 0.14 | 0.24 | 0.37 | 0.21 | 0.21 |
| Br | as Ion | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PO4 | as Ion | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SiO2 | as Ion | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| B | as Ion | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| HCO3 | as Ion | 658.5 | 781.4 | 947.1 | 1,081.6 | 1,165.5 | 106.81 | 180.38 | 269.73 | 157.32 | 157.32 |
| CO3 | as Ion | 5.5 | 6.9 | 8.5 | 10.0 | 11.0 | 0.06 | 0.10 | 0.16 | 0.09 | 0.09 |
| CO2 | as Ion | 12.9 | 12.9 | 12.9 | 12.9 | 12.9 | 12.88 | 12.88 | 12.88 | 12.88 | 12.88 |
| pH | - | 7.7 | 8.0 | 8.1 | 8.1 | 8.2 | 7.22 | 7.44 | 7.61 | 7.38 | 7.38 |
| TDS | mg/L | 3,070.2 | 3,752.9 | 4,626.8 | 5,381.2 | 5,886.2 | 193.35 | 328.27 | 493.52 | 286.21 | 286.21 |
| Tot_Aky | | 538.7 | 635.8 | 765.0 | 870.3 | 936.2 | 99.67 | 165.94 | 244.93 | 145.29 | 145.29 |
| Hardness | as CaCO3 | 890.6 | 1,106.11 | 1,375.97 | 1,615.12 | 1,779.61 | 6.95 | 13.25 | 23.25 | 11.67 | 11.67 |

< Additional Information >

SCALE CALCULATIONS

| | PASS1 | | |
|------------------------|-----------|------------|-------------|
| | Raw Water | Feed Water | Concentrate |
| pH | 7.936 | 8.003 | 8.160 |
| LSI | 1.159 | 1.360 | 1.819 |
| Stiff & Davis Index | 0.756 | 0.956 | 1.395 |
| Ionic Strength (molal) | 0.065 | 0.080 | 0.126 |
| TDS (mg/L) | 3,070.200 | 3,752.890 | 5,886.238 |
| HCO3 (mg/L) | 658.540 | 781.444 | 1,165.523 |
| CO3 (mg/L) | 5.528 | 6.862 | 11.030 |
| CO2 (mg/L) | 12.877 | 12.877 | 12.877 |
| CaSO4 (Saturation%) | 30.498 | 40.865 | 75.411 |
| BaSO4 (Saturation%) | 262.112 | 341.439 | 595.720 |
| SrSO4 (Saturation%) | 0.000 | 0.000 | 0.000 |
| CaF2 (Saturation%) | 29.410 | 57.280 | 254.866 |
| SiO2 (Saturation%) | 0.000 | 0.000 | 0.000 |

<SCALE WARNINGS>

Warning! CaF2 saturation limit of concentrate water exceeded. Check antiscalants at <https://rpicalc.ropur.com%of Saturation>

Warning! BaSO4 saturation limit of concentrate water exceeded. Check antiscalants at <https://rpicalc.ropur.com%of Saturation>

Warning! High LSI, LSI > -0.2 Scale inhibitor and/or pH adjustment required. Check <https://rpicalc.ropur.com> for detailed calculation.

Warning! High S&DSI, S&DSI > 0.0 The Use of a Scale inhibitor and/or pH adjustment is required. Check <https://rpicalc.ropur.com> for detailed calculation.

CHEMICAL CONSUMPTION :

No Chemical.

COST ANALYSIS :

| | 1st Pass | 2nd Pass | Total |
|---------------------------------|----------|----------|-------|
| Energy Consumption (kWh/m3) | 0.717 | 0.000 | 0.717 |
| Capital Specific Cost (\$/m3) | 0.000 | 0.000 | 0.000 |
| Operating Specific Cost (\$/m3) | 0.000 | 0.000 | 0.000 |
| Total Specific Cost (\$/m3) | 0.000 | 0.000 | 0.000 |

ERRORS & WARNINGS :

No Error.

No Warning.