



CASE STUDY – LARGE WINERY

Winery Recycles 96% of wastewater with RWS Solution

A central coast winery produces 2.2 million cases of wine per year and 21 million gallons of winery wastewater. Winery wastewater production averages 58,000 gallons per day (gpd) but spikes to twice that during high usage periods such as harvest and bottling. The water composition is similar to that included in the winery general order, determined by Kennedy/Jenks Consultants in 2009. Analysis is included in appendix 1.

The winery has an existing membrane bioreactor (MBR). The aerobic digester/ultrafilter combination reduces biological oxygen demand (BOD) and volatile dissolved solids (VDS) by 99%, making the wastewater suitable for some limited irrigation and reuse applications.

Recovered Water Solutions (RWS) developed a process flow to recycle 99% of the winery wastewater. Along with upgrading the quality of its irrigation water, the winery found significant recycling options including cooling water tower make up and boiler feed water.

The initial step is processing the MBR effluent via electrodialysis reversal (EDR). The EDR system is designed specifically to effectively reduce total dissolved solids (TDS) in wastewater streams. The “reversal” in the design comes from the change in polarity of the anode and cathode, allowing for self-cleaning of the membranes. As a result, EDR is capable of processing streams that are relatively high in organic material or are turbid. EDR draws charged ionic species through the membrane toward their opposite pole. The result is a product with low TDS suitable for irrigation, cooling tower make up, boiler feed water or reintroduction to the wineries water source. Under these winery conditions, RWS recommends the Suez/Veolia EDR 2000-2L-S2 with four separate stacks of electrodialysis membranes. The system will provide 80% recovery of winery wastewater or up to 16.8 million gallons per year.

The winery will achieve further recovery by processing the EDR rejection stream with reverse osmosis (RO). A Suez/Veolia PROflex LT8-6 RO system will provide an additional 80% recovery of the EDR reject. Product water quality is similar to the EDR product and can be used in the same manner.

Under this scenario, at 96% recovery, the RO reject (concentrate) is approximately 2,300 gallons per day with potential for spikes of 4,600 gallons per day during more active periods. The winery can haul this to off-site disposal, utilizing a tank truck every 1 – 2 days.

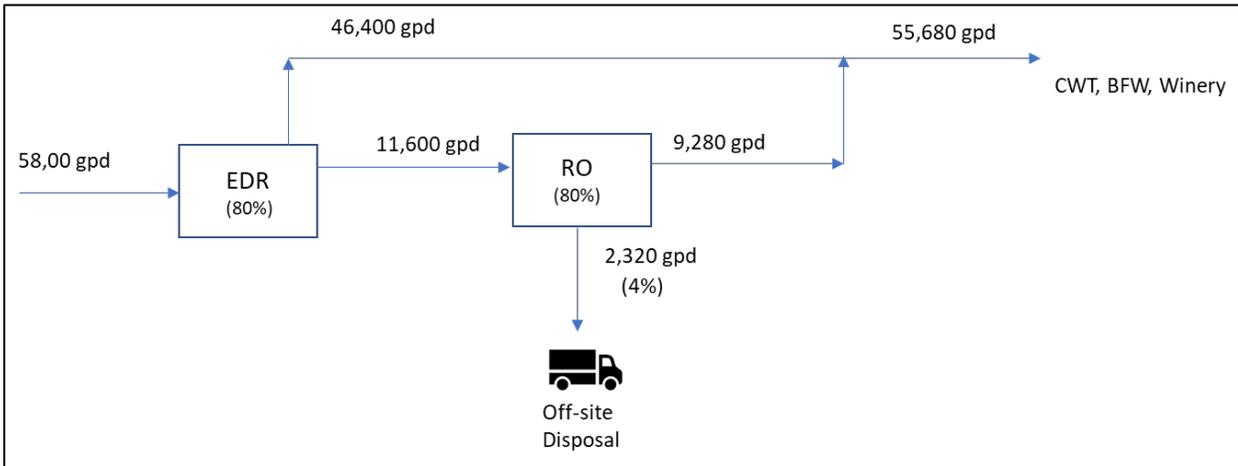


Figure 1: Process Flow with Electrodialysis Reversal

Of the 21 million gallons of wastewater created by this winery, RWS provides the systems to recycle over 20 million gallons. In an environment with bans on new well drilling and new regulations regarding water discharge, the path to expansion and trouble-free operations starts with RWS wastewater recycling systems.

Contact RWS today to discuss your opportunities to recycle winery wastewater.

Appendix 1

Parameter	Unit	Process water average ⁽¹⁾	Process water range ^(1,2)
pH	pH units	--	3.8 - 9.3
BOD	mg/L	2,767	190 - 9,100
EC	µS/cm	1,428	958 - 2,100
TDS	mg/L	1,356	520 - 2,270
FDS	mg/L	759	350 - 1,000
VDS	mg/L	598	100 - 1,290
TSS	mg/L	580	40 - 2,300
NH ₃ as N	mg/L	60	0.5 – 360
NO ₂ as N	mg/L	0.4	<0.1 - 1.6
NO ₃ as N	mg/L	1.8	<0.45 - 5.7
Organic N	mg/L	17	3 – 70
TKN	mg/L	64	<4 – 430
Total N	mg/L	78	5 – 430
B	mg/L	0.25	0.1 - 0.4
Na	mg/L	108	31 - 200
K	mg/L	144	36 - 369
Ca	mg/L	55	13 - 130
Mg	mg/L	21	8 - 44
Fe	mg/L	1.03	0.50 - 1.67
Mn	mg/L	0.10	<0.025 - 0.16
Cu	mg/L	0.16	0.04 - 0.62
Zn	mg/L	0.30	0.06 - 1.2
Cl	mg/L	85	5 - 180
S ²⁻	mg/L	3	<0.1 - 7.2
SO ₄	mg/L	149	56 - 359

Source: Wine Institute. 2009. Comprehensive Guide to Sustainable Management of Winery Water and Associated Energy. Prepared by Kennedy/Jenks Consultants.

"< [value]" = analytical result below reported detection limit

(1) Process water samples collected from two wineries during crush and non-crush periods; conditions at other wineries will vary.

(2) Maximum values in range are generally representative of crush operations.