

Treating High Fluoride Groundwater to Produce Potable Water

Challenge

The City of Suffolk, Virginia needed to meet rapidly expanding water demands associated with a growing population. Various water supply alternatives were considered including enlarging an existing reservoir. Groundwater desalination was selected as the preferred treatment alternative and a 916-foot deep well was constructed which would allow groundwater to be fed into a membrane desalination process. The challenge was that the raw well water was high in sodium and fluoride, exceeding Suffolk’s water quality guidelines for potable water and the maximum contaminant level for fluoride.



Figure 1: Suffolk, Virginia

Solution

Employing the right technology from The GE Water & Process Technologies Toolbox* to cost-effectively address the high fluoride content in Suffolk’s raw well water was at the heart of the GE solution. Three technologies were evaluated including activated alumina, reverse osmosis (RO) and electrodialysis reversal (EDR). Activated alumina was rapidly eliminated as an alternative as it would not effectively decrease sodium and other undesired minerals, leaving RO and EDR to be compared and contrasted on the basis of cost, operating perform-

ance and flexibility for future expansion. GE EDR was selected as the process of choice due to its high water recovery rates and lower operating costs.

Since 1990, the unique GE EDR process has enabled the City of Suffolk to produce high quality potable water with 94% water recovery.

End-user:	City of Suffolk
Location:	Suffolk, Virginia
Commissioned:	July 1990
Application:	Potable water
Feedwater source:	Groundwater
Feedwater quality:	560 mg/l TDS, 4.8 mg/l fluoride, 185 mg/l sodium
Product quality:	140 mg/l TDS, 1.2 mg/l fluoride, 50 mg/l sodium
Water recovery:	94%
Capacity:	3,800,000 gpd
Technology:	Electrodialysis reversal (EDR)



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