

CASE: BRIGHTWATER IN KING COUNTY, WASHINGTON, USA

## Using Kemira CEPT to deal with storm overflow

The Brightwater Wastewater Treatment Plant (WWTP) is third largest treatment facility in King County, located in the metropolitan area of Seattle, Washington. The plant discharges to the marine waters of Puget Sound and provides reuse quality water throughout the dry weather season.

However, during stormwater events a greater treatment effort is required from the plant. For this, Brightwater needed a flexible, fast and safe solution. As a solution to the problem Kemira offered the chemically enhanced primary treatment (CEPT) to increase the removal of suspended solid particles and organic pollution in the primary clarifier at high flow rates.

### CHALLENGE: DEALING WITH STORM OVERFLOW

King County selected membrane bioreactors (MBR) for their principal liquid stream treatment processes. Over 95% of the flows to the WWTP are within the membrane capacity and receive conventional primary treatment prior to the MBRs. However when the flows exceed membrane capacity, the CEPT is initiated and chemically enhanced primary effluent is combined with membrane permeate prior to disinfection and discharge.



### KEY BENEFITS



EFFLUENT PERMIT COMPLIANT



LOWEST ENERGY COST



MEET THE HIGHEST FLOW RATES



FIG. 1 Storm overflow effluent compliance was achieved at the Brightwater WWTP in King County, WA

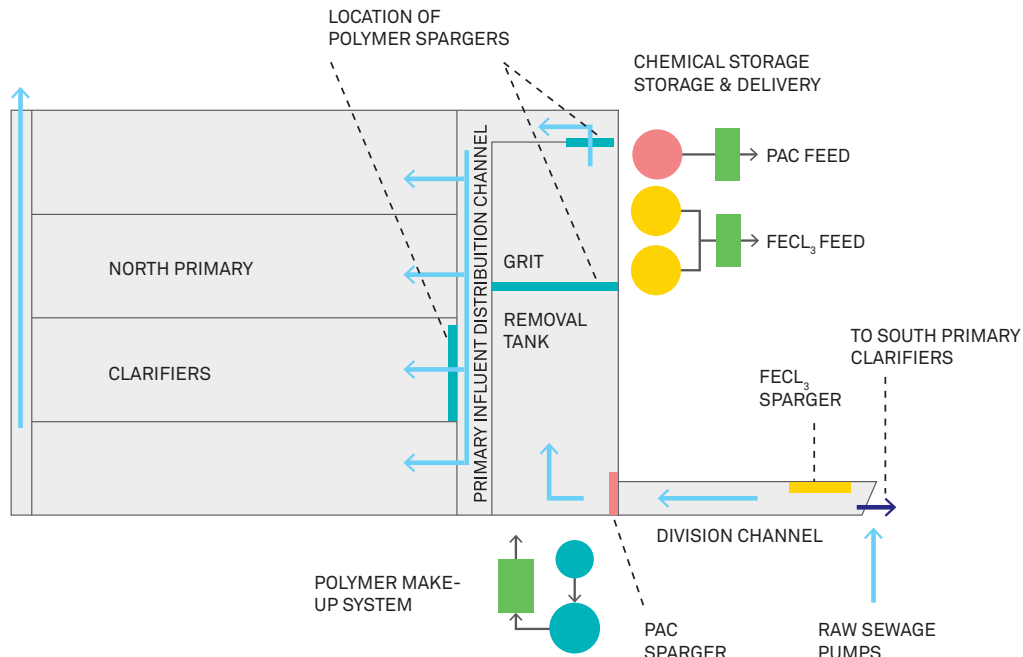
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Where water  
meets chemistry™

## SOLUTION: UTILIZING KEMIRA'S CHEMICALLY ENHANCED PRIMARY TREATMENT (CEPT)

Kemira tested several different doses and dosing points of different coagulant chemistries, as well as combinations with an anionic polymer, at initial laboratory and pilot scale trials. The addition of an anionic polymer was tested in three different locations. In the end, the most effective solution proved to be to add the chemicals at the entrance to the primary tanks.

As a result, the Kemira team determined that 60-65 mg/l ferric chloride (as  $\text{FeCl}_3$ ) and 10-15 mg/l PAX (as polyaluminum chloride) in concert with 0.3-0.5 mg/l ultra high weight molecular anionic polymer (as undiluted polymer) could achieve up to 90% TSS removal and 68% BOD removal.



## RESULT: IMPROVED EFFLUENT QUALITY

Side-by-side testing of Brightwater's primary clarifiers achieved:

SURFACE OVERFLOW RATE (SOR)	% TSS REMOVAL WITHOUT CEPT	% BOD REMOVAL WITHOUT CEPT	% TSS REMOVAL WITH CEPT	% BOD REMOVAL WITH CEPT
4.24 m/h (2,500 gpd/ft <sup>2</sup> )	72%	31%	95%	67%
5.26 m/h (3,100 gpd/ft <sup>2</sup> )	55%	16%	80%	74%

Comparison of data from our earliest jar tests, the subsequent pilot investigation, and the operation of the full-scale plant show consistency in performance in the efficiency of TSS and BOD removal.

CEPT offers an economic approach to doubling and, in some cases, even tripling the hydraulic capacity of the primary clarifiers. This makes it possible to treat wet weather flows without high capital investment costs.

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