

SUPERSETTLER™ CLARIFIER FOR FILTER BACKWASH RECOVERY

Two-Stage Inclined Plate Recovery and Thickening to Decrease Solids Handling



Overview

The city and county of Butte-Silver Bow, Montana, built the Basin Creek Water Treatment Plant (WTP) in coordination with HDR, Inc., to meet the town of Butte's drinking water needs. Basin Creek Reservoir and Basin Creek have served as Butte's source waters for over one hundred years. However, these waters were previously unfiltered and only disinfected. Due to the town's rich mining history, the need arose for additional treatment to remove contaminants of concern. Additionally, the plant was starting to exceed the maximum contaminant level for certain disinfection byproducts. A state-of-the-art treatment plant was requested to ensure Butte could continue to use the two pristine mountain water sources for years to come. The treatment process selected for the new plant included a rough strainer, inline chemical dosing, ceramic membranes, two-stage [SuperSettler™ inclined plate clarification](#) for solids thickening, a backwash-recycling ceramic membrane system, and solids processing via a sanitary lift station.

Filter backwash from the membrane system is treated with a two-stage SuperSettler inclined plate clarification system, which consists of a stand-alone system and an in-floor plate pack system. The stand-alone system includes an integral rapid-mix and flocculation basin, where the light membrane backwash solids coagulate and flocculate to promote optimal solids settling. A thickening chamber at the bottom of the stand-alone unit allows settled solids to thicken before being discharged to an in-floor sedimentation basin. This second plate pack system was installed to not only further promote solids settling, but also to provide additional detention time for solids thickening. Supernatant from the in-floor basin is recycled to a backwash recovery membrane system, resulting in a 99.95 percent overall plant water recovery rate. ■

RESULTS

99.95%

Overall Plant Production Capacity

Two-Stage

Sedimentation for Thickening

> 80%

Smaller Than Conventional Sedimentation

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Project Summary

Basin Creek Water
Treatment Plant

Location:

Butte, Montana, USA

Application:

Drinking Water

Process:

Ultrafiltration

Backwash Recovery

Solids Capture and Thickening

Design Capacity:

Plant: 7 MGD (1,326 m³/h)

Stand-Alone SuperSettler:
50 gpm (11.4 m³/h)

In-Floor SuperSettler Plate Pack:
145 gpm (33 m³/h)

Design Loading Rate:

Stand-Alone SuperSettler:
0.31 gpm/ft² (0.76 m/h)

In-Floor SuperSettler Plate Pack:
0.5 gpm/ft² (1.22 m/h)

Highlights

- Two-stage settling with SuperSettler inclined plate systems achieves a thicker solids underflow for the solids-handling system.
- Inclined plates allow the projected settling area to fit in a smaller overall footprint.
- The integral rapid mix and flocculation tank promotes solids agglomeration for optimal settling of light filter waste solids.