PROJECT CHARACTERISTICS

• Coordinator: CETaqua
• Associated beneficiaries: Sgab, Pentair and Dow
• Duration: 3 years (1st September 2010 – 31st August 2013)
• Budget: 2.156 k€
• Funding: 1.051 k€ - LIFE+ Programme of the EC

UFTEC direct ultrafiltration prototypes.

Sant Joan Despí drinking water treatment plant conventional pre-treatment (settlers).

Raw river water and direct ultrafiltration permeate obtained.

SUBSTITUTION OF CONVENTIONAL TREATMENT OF RAW RIVER WATER BY ULTRAFILTRATION MEMBRANE TECHNOLOGY

BENEFICIARIES:

CONFINANCED BY:

STAKEHOLDERS:

LIFE 09 ENV/ES/000467 UFTEC
**CONTEXT**

Drinking water treatment plants (DWTPs) need to be adapted according to current and future stringent water regulations (e.g., consumption of chemicals).

Ultrafiltration (UF) can be an appropriate technology to substitute and/or update conventional pre-treatment mainly for reverse osmosis (RO) in surface water treatment plants.

However, its long-term efficiency needs to be assessed at demonstration scale (with real surface water) not only in technical terms but also in environmental and economic ones.

**OBJECTIVES**

- To demonstrate that direct ultrafiltration (UF) can be an efficient alternative to conventional pre-treatment for reverse osmosis (RO) in drinking water treatment plants (DWTP)
- To evaluate the efficiency of 3 UF prototypes with different configurations and membrane materials as direct surface water pre-treatment
- To assess the impact of direct UF on the subsequent RO performance
- To evaluate reagents' needs, energy consumption and water yield of the conventional and direct UF pre-treatment
- To perform Life Cycle Assessment and Cost Efficiency Analysis of direct UF and conventional pre-treatment
- To disseminate the results obtained and transfer the knowledge gathered to other DWTPs in Europe

**Demonstration site:** Sant Joan Despí DWTP (Barcelona, Spain)

**Conventional scheme**

1. Dioxichlorination
2. Coagulation/flocculation – Settling
3. Sand filtration
4. Ultrafiltration
5. Reverse Osmosis + semirealization
6. Remineralisation
7. Ozonation
8. Activated Carbon filtration
9. Disinfection

**UFTEC concept**

1. Direct ultrafiltration (PT1, PT2, PT3)
2. Reverse osmosis
3. Remineralisation
4. Disinfection

**Direct ultrafiltration prototypes**

- **Prototype 1 (PT1)**
  - Pressurised inside-out membrane
  - Pentair X-Flow Aquaflex
  - Material: PES
  - Pore size: 20 nm
  - Filtration area: 55 m²
  - Prototype nominal capacity: 4.5 m³/h

- **Prototype 2 (PT2)**
  - Pressurised outside-in membrane
  - Dow Ultrafiltration SFD-2880
  - Material: PVDF
  - Pore size: 30 nm
  - Filtration area: 77 m² per module
  - Prototype nominal capacity: 5.0 m³/h per module

- **Prototype 3 (PT3)**
  - Submerged outside-in membrane
  - GE ZeeWeed 500D (10 modules)
  - Material: PVDF
  - Pore size: 40 nm
  - Filtration area: 40.9 m² per module
  - Prototype nominal capacity: 10.0 m³/h

**Reverse osmosis experimental unit**

- Spiral wound elements
  - Four RO lines, fed by:
    - PT1 UF permeate
    - PT2 UF permeate
    - PT3 UF permeate
    - Sand filtered water (SJD DWTP)
  - 4-inch element per line
  - Nominal feed capacity: 1.0 m³/h per line
  - Mean recovery: 15%