NESSIE®

DREDGING SEDIMENT, RESTITUTION DOWNSTREAM THROUGH THE TURBINES AT THE PLAN D'AVAL RESERVOIR

PROJECT TITLE
Plan d'Aval Dam

CLIENT
EDF (Électricité de France)

LOCATION
Aussois (73), France

YEAR OPERATION
2023

PROJECT OVERVIEW

The Plan d'Aval dam is an EDF structure located in Haute-Maurienne (Savoie, France), commissioned in the 1950s as part of the Arc River hydroelectric development. It also supplies the mechanical turbine of Europe's largest wind tunnel, operated by ONERA.

Chronic sedimentation of the reservoir poses a risk of high suspended solids concentrations in the Saint-Benoît stream, a reach bypassed by the hydroelectric scheme, in the event of a drawdown. The project aimed to remove the sediments accumulated in front of the bottom outlet tower of the dam by reshaping a preferential channel 230m long, 20m wide, and 3m deep.

The volume of sediment to be extracted was 15,000m^3, equivalent to 23,700 tons of dry matter, to be routed through one of the generating units with a 700m head, during the summer shutdown of the wind tunnel.
To reduce the risk of wear on the Pelton runner, a fine screening of sediments was implemented, preventing the passage of particles larger than 300µm.

TECHNICAL APPROACH & IMPLEMENTATION

Watertracks' technical proposal for this dredging project stood out through the use of the NESSIE® underwater robot, coupled with a gravity screening system prior to sediment injection into the headrace channel of the penstock.

Thanks to its navigation system, NESSIE® was able to move along the reservoir floor, suction sediments, and discharge them through a 426m floating pipeline equipped with a screening system removing particles larger than 300µm. This system consisted of two intersecting hoppers of about 1m³ each, enabling the gravity extraction of coarse particles before injection into the penstock.

Real-time monitoring of production and bathymetry, as well as automatic control of dilution and suspended solids concentration in the Arc River, were ensured by the physical sensors embedded on the robot and its control systems.

The entire system was transported up to the dam, located at 2,000m altitude, via mountain tracks. The robot, which can be dismantled into three 6-ton modules compliant with road gauge, was delivered to the site by construction trucks.

"Watertracks' intervention demonstrated outstanding technical expertise in a complex context marked by the dam's altitude and significant water level variations. The professionalism and responsiveness of the team ensured a safe operation while guaranteeing compliance with technical and environmental concentration thresholds."

RESULTS & PERFORMANCE

- **23,700t** of dry sediments discharged in a controlled manner through the turbine.
- **2,000m** altitude.
- **10 to 38m** variable depth.
- **< 300µm** sediments screened before injection to protect the runner from wear.
- **Zero** accidents.

WATERTRACKS

TEASER – Photos credit: Watertracks – 10/2025