



WATERTRACKS

DEVELOPER OF UNDERWATER ROBOTIC SOLUTIONS
AT THE SERVICE OF RENEWABLE ENERGIES AND THE WATER CYCLE

CASE STUDIES

WATERTRACKS

DREDGING UPSTREAM OF THE LA RANCE TIDAL POWER PLANT

PROJECT TITLE

**La Rance
tidal power plant**

CLIENT

**The Public
Territorial Basin
Authority
“Rance Frémur
Baie de Beausais”**

LOCATION

**La Richardais
Harbour (35),
France**

YEAR OPERATION

2021



PROJECT OVERVIEW

The tidal power plant of La Rance, in Brittany, is regularly blamed for causing a silting phenomenon in the upstream bay, affecting its harbours and beaches.

In 2021, the Public Territorial Basin Authority “Rance Frémur Baie de Beausais” carried out an experimental dredging operation in the harbour area of La Richardais, in order to test the deployment of the amphibious robot NESSIE®, developed by Watertracks.

The main objective was to reduce siltation in the navigation channel by extracting up to 20,000m³ of sediment, discharged offshore through the plant, while minimizing environmental impact on this sensitive site (close to Natura 2000 areas, fishing, and mooring zones).

Remotely operated from the shore, NESSIE® enabled precise hydraulic dredging, with sediment pumped through a 1.2km pipeline. The discharge point, ballasted on the seabed in the main channel, promoted dispersion into the ebb current at falling tide, ensuring natural transport offshore.

The project was subject to strict monitoring: pre- and post-dredging bathymetric surveys on both extraction and discharge areas to validate the experimental process, turbidity control, assessment of impacts on wildlife and local activities, and compliance with a tight schedule (March–April 2021).

This experiment made it possible to assess the efficiency and robustness of this innovative technology.



TECHNICAL APPROACH & IMPLEMENTATION

For this project, Watertracks proposed an innovative and environmentally friendly dredging solution using the underwater robot NESSIE®, designed for precise sediment removal without the use of a floating dredger with diesel engines.

NESSIE® operated directly on the sediment bed, thus reducing visual and noise disturbances, while being remotely controlled from the shore. The system integrates advanced navigation, real-time monitoring of production and bathymetric changes, and can be equipped with adaptive tools for different types of sediment.

Equipped with its hybrid GPS/RTK and acoustic navigation system, NESSIE® was able to operate with precision on the seabed of La Richardais harbour in total absence of visibility, adapting to tidal rhythms and water level variations, both day and night.

The generator used to supply the robot with electricity, located onshore and surrounded by a noise barrier made of hay bales, helped limit noise disturbance. Local residents expressed their appreciation for the absence of noise during the works.

“Watertracks’ added value lies in its technological innovation, operational flexibility, and strong commitment to safety, environmental protection, and continuous improvement.”

RESULTS & PERFORMANCE

- > **20,000m³**
of in-situ sediment discharged offshore.
- > Work in saltwater.
- > **Work day and night, 7/7,**
at falling tide.
- > **Zero** impact on migratory birds.
- > **Zero** accidents.

CLEANING OF THE SAINT-MARTIN- DE-LA-PORTE INTAKE THROUGH THE SIPHON TUNNEL

PROJECT TITLE

**Siphon Tunnel
of Saint-Martin-
de-la-Porte Intake**

CLIENT

**EDF (Électricité
de France)**

LOCATION

**Saint-Martin-
de-la-Porte (73),
France**

YEAR OPERATION

2021



PROJECT OVERVIEW

The Saint-Martin-de-La-Porte intake diverts a large part of the Arc River flow to feed the Arc-Isère hydropower scheme. The Arc Valley runs through nappes of marly and calcareous-schistose thrust sheets, whose highly erosive nature causes significant sediment transport in the river, leading to noticeable siltation in the various cascade hydropower facilities.

The operation entrusted to Watertracks by EDF pursued two main objectives:

- Dredging of the cofferdam guide rails and the sill of the left-bank sluice gate of the Saint-Martin-de La-Porte dam, by pumping sand and gravel accumulated immediately upstream of the diversion dam. This first phase aimed to ensure the possibility of installing cofferdams.
- Dredging immediately downstream of the intake trashracks, by accessing the submerged siphon tunnel through an existing hatch located about one hundred meters downstream of the dam. This second operation was intended to restore the hydraulic functionality of the structures by eliminating the head loss generated by sediment accumulation behind the intake trashracks.

In both cases, the operations had to be carried out without draining the reservoir, in order to avoid any production losses for the operator and to minimize ecological impact. The dredged materials were to be resuspended and discharged toward the central sluiceway, thereby restoring a natural sediment flow.



TECHNICAL APPROACH & IMPLEMENTATION

To meet the project requirements, Watertracks specifically developed the LISIE robot. LISIE was deployed by crane onto the reservoir bed, at a depth of 6m, to clean the left-bank sluice gate of the Saint-Martin-de-La-Porte dam over a width of 10m. This dredging of sand and gravel made it possible to clear the guide rails and sill for cofferdam installation.

The approach consisted of suctioning the materials using the dredging cutter mounted at the end of the arm of this underwater excavator and discharging them toward the dam's central sluiceway.

The LISIE robot was also used to dredge the section located immediately downstream of the diversion intake of the Arc River, on the dam's right bank. Access to this dredging area was achieved by moving LISIE through the siphon tunnel connecting the headrace canal to the Saint-Jean-de-Maurienne powerhouse. The robot entered via a Jeep-gauge access hatch and advanced upstream inside the flooded tunnel for a distance of 100m to reach the sediment deposits to be removed.

A 3D reconstruction of the facility was carried out during the project preparation phase to help operators find their bearings and guide the robot "blind" in front of the dam and inside the tunnel. The robot's position was estimated based on its absolute heading and forward speed. Operators regularly corrected this positioning by measuring distances to distinctive points using the onboard sonar.

This solution was designed to operate efficiently while meeting the site's access, safety, and environmental constraints, ensuring both technical effectiveness and minimal disruption to dam operations.

"It was the size of the Jeep access hatch to the tunnel that constrained the sizing of the LISIE robot."

RESULTS & PERFORMANCE

- > **Underwater dredging** carried out in a highly confined environment and under structural works.
- > **Transformation** of an industrial challenge into a sustainable operational solution.
- > **Zero** accidents.

RESERVOIR CLEANING AT LA BALME- DE-RENCUREL

PROJECT TITLE

La Balme-de-Rencurel

CLIENT

**EDF (Électricité
de France)**

LOCATION

**La Balme-
de-Rencurel (38),
France**

YEAR OPERATION

2022



PROJECT OVERVIEW

The La Balme-de-Rencurel dam, an EDF gravity dam 22m high on the Bourne River (Isère) commissioned in 1912, has a reservoir of about 60,000m³. Its reservoir was partially silted immediately upstream of the plant intake, whose trashrack was obstructed up to 70% of its height, causing head losses that prevented the hydroelectric plant from operating at full capacity.

In 2022, a major dredging project was carried out in this small reservoir to restore its original hydraulic profile and recover the plant's full production capacity. The operation involved extracting about 14,050m³ of predominantly sandy-silty sediments over a length of 170m and a maximum width of 29m. As the reservoir could not be by-passed, the works had to be carried out with the dam in water.

It was therefore prescribed to perform dredging at depths reaching up to 18m. The main dredging was executed with direct discharge immediately downstream, into the bypassed reach, while maintaining the dam in overflow mode to flush sand and dilute fine sediments into the river flow.

Once a low threshold had been reached in this way, a cleaning of the sediments and woody debris obstructing the intake restored its full functionality. The project included strict environmental monitoring, particularly of turbidity at the downstream discharge point, as well as optimized risk management throughout the works.



TECHNICAL APPROACH & IMPLEMENTATION

To restore the La Balme-de-Rencurel reservoir, whose access is highly constrained by a narrow road and a steep track at the tail end of the reservoir, Watertracks deployed the NESSIE® underwater robot for the main dredging operation. Sediment discharge was carried out in a controlled manner immediately downstream over the dam crest.

Fine cleaning around the intake and trashrack clearing were performed using the LISIE mini-excavator, equipped with an air-lift suction tool and occasionally assisted by divers for the removal of larger woody debris.

The team overcame significant access and logistical challenges, adapted equipment and procedures, and ensured environmental protection by monitoring suspended matter in real time to comply with ecological and regulatory dilution thresholds. Strict safety protocols, daily coordination, and corrective actions were implemented, leading to the successful completion of the project and the renewal of the MASE safety certification.

“The site was very quiet thanks to the robots’ full-electric power supply connected to the local medium-voltage grid.”

RESULTS & PERFORMANCE

- > **Hard-to-access** site.
- > **19m depth**
in confined conditions.
- > **100%** of intake section restored.
- > **Full compliance**
with environmental thresholds.
- > **Zero-carbon** dredging.
- > **Zero** accidents.

DREDGING UPSTREAM OF THE HYDRO PLAN IN THE RHÔNE RIVER AT BOURG-LÈS-VALENCE

PROJECT TITLE
**Bourg-lès-Valence
Lock**

CLIENT
**CNR (Compagnie
Nationale du Rhône)**

LOCATION
**Bourg-
lès-Valence (26),
France**

YEAR OPERATION
2022



PROJECT OVERVIEW

The Bourg-lès-Valence hydroelectric plant, operated by CNR (Compagnie Nationale du Rhône), was commissioned in 1968 as part of the Rhône River development scheme. It operates as a run-of-river facility, with an installed capacity of about 180Mw distributed across six units.

The plant is regularly affected by sediment deposits carried by the Rhône, whose accumulation in front of the adjoining lock gate gradually reduces hydraulic efficiency.

To address this issue, a dredging campaign was undertaken to remove 15,000m³ of sediments located immediately upstream of the turbines.

The operation was particularly challenging as it had to be carried out without shutting down the generating units, thereby ensuring continuous power production while restoring optimal intake conditions at the lock.



TECHNICAL APPROACH & IMPLEMENTATION

The dredging operation was carried out using the NESSIE® underwater robot, capable of moving along the riverbed and precisely extracting sediments. Unlike traditional pontoon-based dredgers, NESSIE® did not require any floating vessel, thereby eliminating the risk for operators of falling into the turbine influence zone.

The sediments were transferred through one of the Kaplan turbines to be released downstream into the river.

The NESSIE® robotic system enabled real-time bathymetric monitoring, precise positioning (GPS/acoustic/inertial), and automatic adjustment of the dredging speed.

The environmental impact was minimized thanks to low noise and limited visual disturbance. In addition, the robot adjusted its production rate to comply with regulations on sediment concentration at the downstream discharge point.

“Impeccable professionalism and responsiveness in every situation: the Watertracks team perfectly met our expectations.”

RESULTS & PERFORMANCE

- > **15m** depth in front of operating units.
- > **15,000m³** of sediments removed.
- > **Zero** operational constraints for the dam operator.
- > **Automatic production regulation** to ensure dilution at the discharge point.
- > **Zero human presence** on the water surface.
- > **Zero** accidents.

DREDGING AROUND THE INTAKE IN THE ALESANI IRRIGATION RESERVOIR

PROJECT TITLE

**Alesani
Irrigation reservoir**

CLIENT

**(OEHC)
Office d'Équipement
Hydraulique de Corse**

LOCATION

**Alesani (20),
Corsica Island
France**

YEAR OPERATION

2023



PROJECT OVERVIEW

The Alesani irrigation dam, located in Haute-Corse, supplies agricultural and drinking water to a large part of the eastern plain of the island. However, it is regularly affected by chronic sedimentation, which threatened to obstruct the screened intake tower.

The OEHC launched a call for dredging works around the dam intake, aiming to lower the sediment level by more than 10m (approximately 50,000m³) and to clear the accumulated debris. This precise dredging was intended to ensure the long-term operation and safety of the structure, while fully complying with the site's regulatory and environmental requirements.

Following the dredging, the replacement of the submerged valve actuators was scheduled, guaranteeing the long-term operation of the intake and the dam's drainage system.

The rocky nature of the in-situ sediments and the site configuration made both extraction and downstream discharge impossible. The selected project therefore consisted of creating a capacity within the existing reservoir by constructing a submersible dike, designed to confine the dredged sediments around the intake.



TECHNICAL APPROACH & IMPLEMENTATION

Watertracks' proposal was based on the complementary deployment of two underwater robots, NESSIE® and LISIE, in order to optimize large-scale dredging, fine cleaning of the intake screen, and the management of submerged wood. Thanks to their accurate positioning systems (GPS/RTK and acoustic), the robots were able to perform dredging and cleaning operations with high precision. Whenever a submerged log was encountered, it could be located with accuracy in the reservoir, even in the absence of visibility.

This precise localization enabled the marking of wood on the bathymetric map and the efficient use of a crane and grapple system equipped with GPS/RTK antennas from a barge, ensuring targeted extraction.

The two robots worked in synergy: NESSIE® carried out large-scale dredging, while LISIE was used for finishing work in confined areas. The extracted sediments were stored in a dedicated containment cell, previously constructed at the lower level of the reservoir, in accordance with the project requirements.

The dredging campaign began at a depth of 10m and extended to over 60m, following two storm events whose inflows were stored without constraint in the reservoir, thereby ensuring irrigation of the agricultural plain during the dry season.

“The NESSIE® robotic solution was chosen because it ensured the feasibility of dredging at all depths, without operational constraints and without the risk of losing a water storage opportunity.”

RESULTS & PERFORMANCE

- > **50,000m³** of sediments relocated.
- > **10m depth gain** achieved by dredging around the intake strainer.
- > **23 wood logs** removed.
- > **10 to 60m** working depth.
- > **Zero** accidents.

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 15,000m³, 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.

CLEANING OF THE BOTTOM OUTLETS AT THE CHAMBON DAM

PROJECT TITLE
Chambon dam

CLIENT
**EDF (Électricité
de France)**

LOCATION
**Mizoën (38),
France**

YEAR OPERATION
2024



PROJECT OVERVIEW

The Chambon dam, located in Isère on the Romanche River, is an EDF structure commissioned in 1935 for hydropower production and regulation of the valley's water flows. It faces a chronic sedimentation problem, which progressively reduces the reservoir's usable capacity and disrupts its hydraulic structures. The need to lower the water level for low-level works led to significant sediment remobilization, which obstructed the channel in front of the bottom outlet.

To restore the full functionality of this safety structure, it was necessary to urgently carry out large-scale dredging in order to re-establish a clear-water cone immediately upstream of the intake. Additional cleaning of the horizontal stoplogs protecting the guard gate then had to be performed, to minimize turbidity dispersion downstream of the dam during opening tests.

TECHNICAL APPROACH & IMPLEMENTATION

An initial trial with the LISIE robot revealed its pumping limitations compared with the volume of sediments to be extracted. The works were therefore continued using the NESSIE® robot, operating along a half-cone profile, with sediment extraction and transfer approximately 1km upstream of the intake. Nearly 20,000m³ of sediments were removed.



For this operation, a specific bypass device was developed on the dredging pump discharge, enabling a powerful clear-water jet to be projected ahead of the robot. This super-jetting made it possible to disaggregate and clear sediments accumulated between the horizontal stoplogs protecting the guard gate, which are spaced 2m apart.

A key advantage of the solution was the robot's ability to float on the water surface, be towed to the designated area, and then dive using its own ballasting system to reach the dredging zone at the bottom. This eliminated the need for a heavy crane or the construction of a large slipway, allowing the robot to operate regardless of the actual water level in the reservoir.

The project also included the installation of protective measures, management of site access, deployment of a bubble curtain to protect the environmental flow intake from turbidity, and strict monitoring of dredging results, achieved through bathymetric surveys and ROV inspections.

"Watertracks' agility in adapting a powerful jetting system to its robot made it possible to clear the sediments from the gate's protective stoplogs, which would otherwise have been inaccessible."

RESULTS & PERFORMANCE

- > **24,000m³** of sediments extracted.
- > Use of a powerful water jet to clean the horizontal stoplogs.
- > **20 to 60m** variable working depth.
- > Launch by floating and self-ballasting immersion of the robot.
- > **Zero** accidents.

CLEANING OF THE BOTTOM OUTLETS AT THE LABARTHE DAM

PROJECT TITLE

Labarthe Dam

CLIENT

**EDF (Électricité
de France)**

LOCATION

**Brommat (12),
France**

YEAR OPERATION

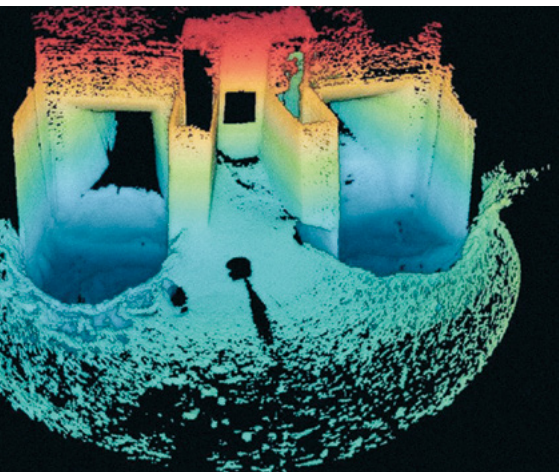
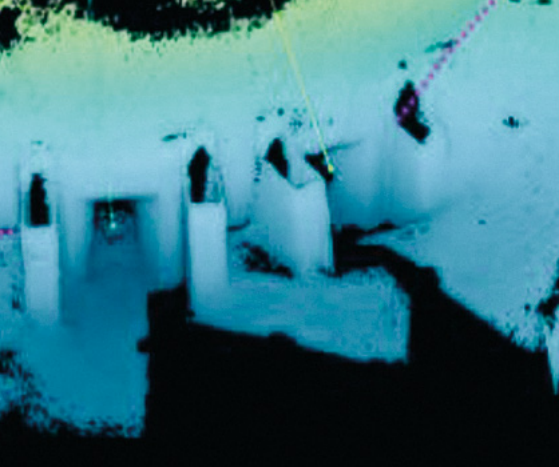
2024



PROJECT OVERVIEW

The Labarthe dam, a concrete arch commissioned in 1974 on the Truyère River, stands 72.5m high with a storage capacity of nearly 8 million m³. EDF has scheduled major maintenance and adaptation works starting in 2025. In preparation for these operations, which will require a complete reservoir drawdown in 2026, it was essential to clear the bottom outlet gates to perform a 3D reconnaissance survey.

The operation aimed to remove approximately 1,400m³ of sediments accumulated at the base of the dam, at a depth of 70m, in order to reach the sill of the bottom outlet gates. As road or crane access to the dam was not possible, dredging equipment had to be transported by waterway, from a launching site located 3km upstream at the reservoir tail. Sediment removal also had to be carried out with turbines in operation, without any restriction on the water level required for site operation.



TECHNICAL APPROACH & IMPLEMENTATION

To address these constraints, Watertracks proposed deploying the LISIE underwater suction excavator in combination with the modular pontoon FELICIE, dedicated to its operation and equipped with a launching gantry. This setup allowed installation at the reservoir tail, followed by direct navigation to the intervention area at the dam site.

Remotely operated entirely from the shore, LISIE provided high execution precision and enhanced safety for operators, working in two shifts per day. Its cutting and suction system, located at the end of the robotic arm, enabled the removal of up to 6m of sediment thickness between the side walls and the sill of the two intakes, without damaging the concrete structures.

“Watertracks’ approach stood out for its ability to combine adaptation to site constraints, technical mastery, and operational reliability — from remote piloting to the visual delivery of before/after results, clearly demonstrating the effectiveness of the intervention.”

RESULTS & PERFORMANCE

- > **70m** depth.
- > **3km** navigation to the work site.
- > A launching pontoon specifically designed for the operation.
- > **Zero** accidents.

DOWNSTREAM CLEARANCE OF THE RIGHT BANK UNIT AT THE SAINT-ÉGRÈVE DAM

PROJECT TITLE
Saint-Égreve dam

CLIENT
**EDF (Électricité
de France)**

LOCATION
**Saint-Egrève (38),
France**

YEAR OPERATION
2025



PROJECT OVERVIEW

The Saint-Égrève dam, a concrete gravity structure located on the Isère River north of Grenoble, supplies a powerhouse equipped with bulb units designed for a low head. Its configuration — deep outlets, narrow tailrace tunnel, and limited access — makes maintenance operations particularly complex and requires specialized technical solutions.

Following an exceptional flood carrying a high sediment load, the turbine tailrace tunnels became silted up over more than 80% of their section, preventing the downstream gates from opening. Both gates were blocked: one fully closed, the other 90% closed. EDF therefore launched an unscheduled emergency operation to clear the sediments downstream of the gates down to their sill. This intervention required the creation of a 16m access channel in each tunnel, followed by excavation of 6m of deposits to reach the gate floor.



TECHNICAL APPROACH & IMPLEMENTATION

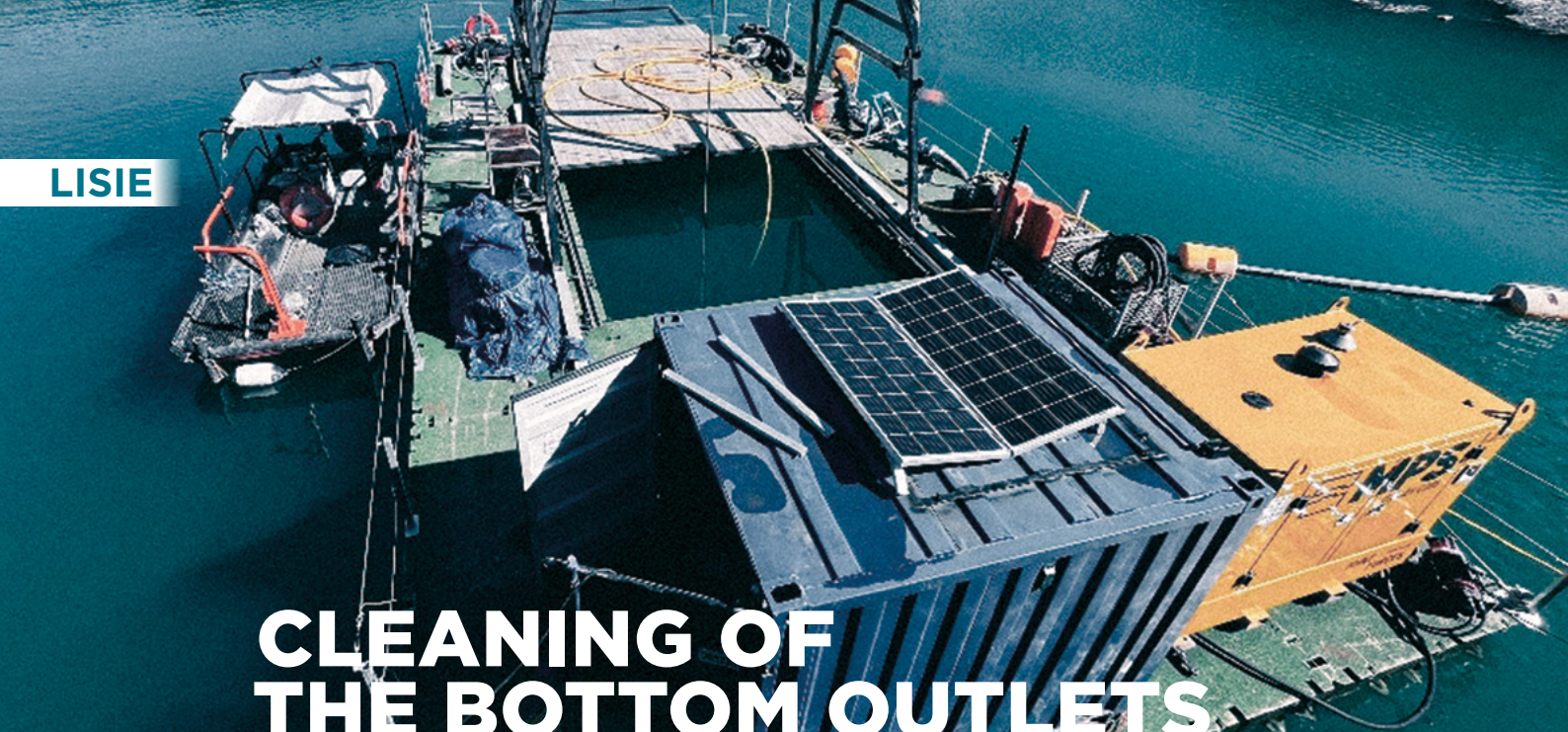
The LISIE machine was mobilized in a very short timeframe for this precision dredging operation. This small underwater suction excavator was launched by crane and remotely operated from the riverbank. It was able to progress through the tailrace tunnels by excavating its own access channel through the sediments. Once in front of each gate, it dug down to a depth of 6m to reach the concrete sill. The gates thus cleared could be reopened. LISIE was then used, with the gates open, to clean their guide rails.

The initial estimate indicated a volume of approximately 2,000m³ of sediments. Over 40 days, LISIE operated for a total of 350 hours to pump this volume and discharge it into the flow of the Isère downstream.

“The LISIE solution enables precision dredging of components or narrow conduits. At Saint-Égrève, it was one of the very few solutions that could be implemented to clear the outlet channel of the dam’s bulb units.”

RESULTS & PERFORMANCE

- > **2,000m³** of sediments to be removed.
- > **16m** of undercut excavation inside a tunnel.
- > **350h total** of precision underwater dredging.
- > **24h/5d** production.
- > **Zero** accidents.



LISIE

CLEANING OF THE BOTTOM OUTLETS AT THE GÉNISSIAT DAM

⇒ PROJECT TITLE

Génissiat dam

👤 CLIENT

**CNR (Compagnie
Nationale du Rhône)**

📍 LOCATION

**Injoux-Génissiat (01),
France**

📅 YEAR OPERATION

2025



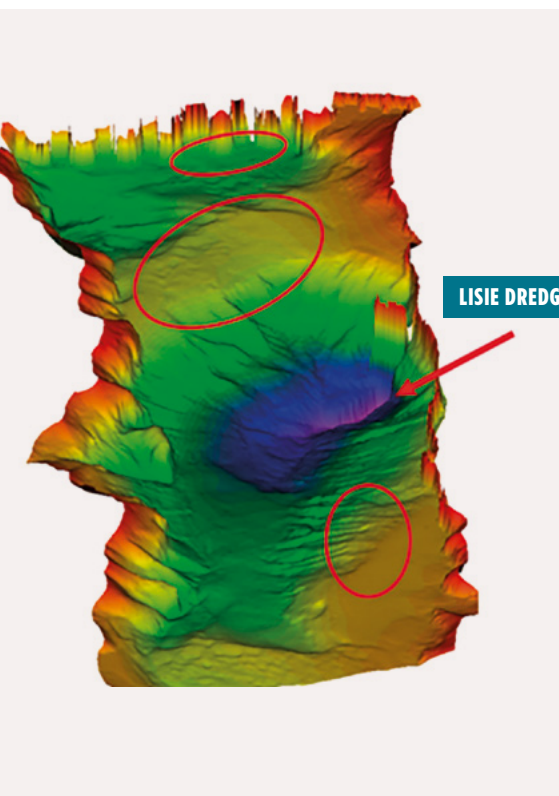
PROJECT OVERVIEW

The Génissiat Dam, commissioned in 1948 on the Rhône River, is the first dam built on the French section of the river and is often referred to as the “French Niagara.” Operated by the Compagnie Nationale du Rhône (CNR), it plays a key role in renewable electricity production, river regulation, and securing downstream water uses.

The client was faced with a cofferdam stuck in the closed position, due to a sediment deposit estimated at 1,000m³ upstream. Located at a depth of 65m, this cofferdam protects the bottom outlet gate, which needed to be opened as part of a large-scale sediment transfer operation. The client sought a solution that would minimize underwater human interventions to maximize safety.

TECHNICAL APPROACH & IMPLEMENTATION

Watertracks deployed the LISIE dredging solution, specially designed for confined hydraulic environments, to remove the sediments accumulated upstream of the cofferdam. Compact, remotely operated, and highly efficient, LISIE enabled a safe and precise intervention.



To lower and secure the robot at 65m depth, Watertracks used its dedicated floating pontoon, specifically designed to ensure the safety of LISIE's operations.

The extracted sediments were discharged 200m downstream, in an area where resuspension is not possible.

"The precision of the LISIE robot and its ability to operate continuously 24/7 ensured the success of this operation, in full compliance with all contractual commitments and with the strict schedule imposed by sediment transfers from Switzerland (APAVERS)."

RESULTS & PERFORMANCE

- > **1,000m³** of sediments to be removed.
- > **65m** Working depth.
- > **200h total** of precision underwater dredging.
- > **24h/5d** production.
- > **Zero** accidents.

DESILTING OF THE UPPER BASIN OF PUMPED STORAGE FACILITY **THE CHEYLAS/FLUMET**

 PROJECT TITLE

Flumet Basin

 CLIENT

**EDF (Électricité
de France)**

 LOCATION

**Allevard (38),
France**

 COMPLETED

2025 - 2028



PROJECT OVERVIEW

The Flumet reservoir, located in the French Alps, forms the upper basin of the Cheylas pumped-storage facility operated by EDF. Commissioned in 1978, it is continuously supplied by diverted waters from the Arc and the Glandon Rivers. Each year, a significant volume of fine material (30,000 to 60,000m³) is transported into the basin. Over time, more than 1.4 million m³ have accumulated, reducing its useful capacity, limiting production flexibility, and exposing sediment banks at low water levels.

To restore its storage potential and re-establish a sustainable sediment balance, EDF launched an unprecedented program combining civil engineering works and robotic dredging. A sediment transfer pipeline has been built, directly connected to the Isère River, along with a loading basin providing both hydraulic regulation and screening of sands and coarse material. Watertracks was entrusted with the dredging operation, spread over four annual five month campaigns (2025–2028), with a total target of 1.2 million m³ to be extracted.

TECHNICAL APPROACH & IMPLEMENTATION

The operation relies on the amphibious robot SUPER NESSIE®, developed by Watertracks.



This 35 ton, fully electric, remotely operated underwater machine is equipped with two cutting and suction heads as well as a 270 kW dredging pump. It enables the continuous extraction of *in situ* sediments at a nominal rate of 300m³/h.

The dredged sediments are directed to a loading basin, where a calming system reduces turbulence. Three draw-off hoppers separate particles larger than 300µm, which are returned to the reservoir, thus limiting wear on the sediment transfer pipeline.

The slurry is then conveyed through a 7km long buried pipeline with a 300m head, kept permanently under pressure to prevent water hammer, before being discharged into the Isère via a diaphragm-type energy dissipator. The entire system is controlled automatically, with real-time monitoring of flow, density, and turbidity, ensuring compliance with ecological and technical thresholds (< 0.5g/L over 24h, < 1g/L over 3h in the Isère, and < 400g/L in the pipeline).

“The on-board measurements of flow and dry matter concentration on the robot ensure the best balance between extraction rate and strict compliance with dilution thresholds in the Isère River. Thanks to its agility in moving from one area to another, the robot enabled dredging to be carried out without any water level constraints for the facility.”

RESULTS & PERFORMANCE

- > **307,000m³** of in-situ sediments removed in 2025
(initial target for campaign 1 = 270,000m³).
- > **No exceedances**
of natural watercourse discharge limits.
- > **Average productivity:**
267m³/h in-situ sediment.
- > **Client highly satisfied:**
targets exceeded, environmental commitments met.
- > **Zero** accidents.

DREDGING OF SEDIMENTS FROM THE PUNT DAL GALL BOTTOM OUTLET

PROJECT TITLE

Damm of Punt dal Gall

CLIENT

**EKW Engadiner
Kraftwerke**

LOCATION

**Zernez,
Switzerland (CH).**

YEAR OPERATION

2026



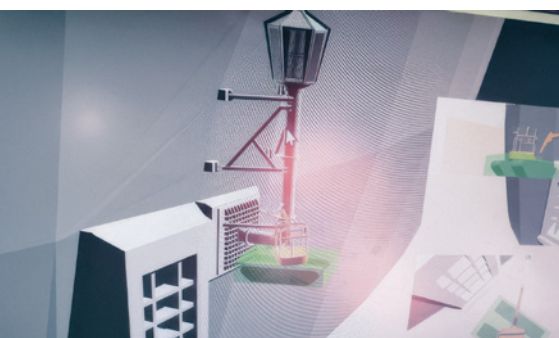
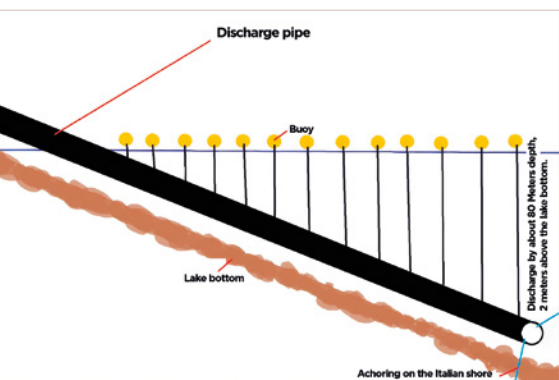
PROJECT OVERVIEW

The Punt dal Gall dam is located at an altitude of approximately 1,800 meters, in the heart of the Swiss and Italian national parks. The dam is operated by the company EKW. The company could no longer operate its bottom outlet, as PCB contamination had occurred in 2016. The accumulated sediments therefore represented an urgent problem that needed to be resolved in order to keep the bottom outlet clear and functional, without re-contaminating the Spöl River with PCB-laden sediments.

These sediments were removed over the course of one month of intensive work, before winter, and deposited in an excavation at the bottom of the lake using a technique that minimized their dispersion.

TECHNICAL APPROACH & IMPLEMENTATION

The operation required 3D remodelling by the Watertracks team of the environment surrounding the bottom outlet, located 100 meters below the waterline. It also required a very precise operating procedure for the lifting operations, which were made difficult by the need to place the Lisie system in the water 120 meters below the dam crest using a crane, as well as by very tight spatial constraints.



This allowed the team to model and determine the exact location of the bottom outlet and to define, in three-dimensional space, a shaft that would enable the safe deployment of the Lisie system—both for the system itself and, in particular, for the intake screen—while positioning it precisely over the sediment area to be dredged.

After 404 hours of pumping at 77% efficiency, operating 24 hours a day, 6 days a week, the team freed the bottom outlet before the critical winter period. This enabled the operator to achieve administrative compliance while ensuring that the sediments were deposited in a controlled manner, thereby preventing any pollution of the Spöl River downstream. A challenge that was both technical and ecological, aimed at ensuring the continued production of low-carbon energy.

« The Lisie system proved to be the only solution capable of reaching great depths beneath the dam to free the bottom outlet within a reasonable time for the client. Its flexibility, reliability, and medium size were decisive, as was the expertise of the multilingual Watertracks specialist teams, which was crucial in achieving the client's objectives. »

RESULTS & PERFORMANCE

- > **1,400m³** dredged sediments.
- > **404 hours** totally precise underwater dredging work with **73%** efficiency.
- > **100m** work deepness.
- > **Work day and night, 6/7.**
- > **Zero** accidents.



LISIE AND PENDULAR DREDGING

RELEASE OF THE BOTTOM OUTLET ZMUTT DAM

PROJECT TITLE

Zmutt Dam



CLIENT

Hydro Exploitation

LOCATION

**Zermatt,
Switzerland (CH).**



YEAR OPERATION

2025



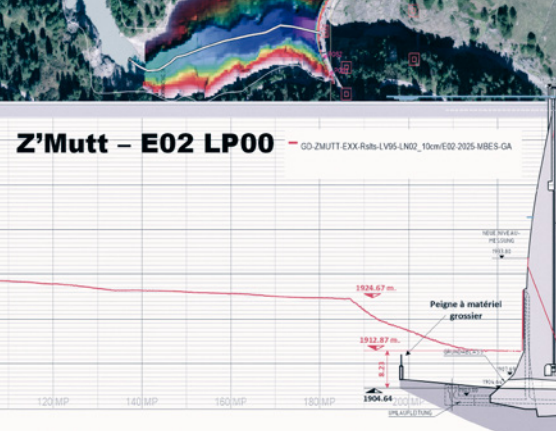
PROJECT OVERVIEW

The Z'Mutt Dam is an arch dam with a capacity of 800,000 m³, fed by the Bis and Schali glaciers. It is located in the canton of Valais at the end of a remote valley beneath the Matterhorn, at an altitude of approximately 2,000 meters.

The project initially involved pumping 1,000 m³ and releasing the bottom valve. The construction site was particularly demanding and complicated due to the highly varied nature of the sediments, as well as the remoteness from any human infrastructure and the very limited access, which required the use of helicopter transport—already constrained by the altitude.

TECHNICAL APPROACH & IMPLEMENTATION

The project involved between 6 and 15 people over a period of 7 months, working 24 hours a day, 7 days a week, after which the bottom valve was released. The operation required combining different sediment management methods: submersible and Lisie pumping systems, grab crane operations, pendulum pumping, and the use of explosives.



The operation was further complicated by heavy snowfall and unpredictable weather at this altitude, as well as by massive and diverse sediment deposits, including rock blocks, wood, sand, and silt.

The pendulum pumping system was eventually implemented, allowing a peak throughput of approximately 900 m³/h with a slurry concentration ranging from 10 to 50%, resulting in a final volume of around 50,000 m³.

« A monumental project, both in scale and working conditions. Z'Mutt showcases Watertracks teams' exceptional ability to undertake extraordinary projects by combining expertise and knowledge related to water, depth, the mastery of specialized equipment, engineering, mechanics, as well as organization and persevering work under highly challenging conditions. »

RESULTS & PERFORMANCE

- > **50,000m³** dredged sediments.
- > About **6,000** dredging hours.
- > **66m** work deepness.
- > **Work day and night, 7/7.**
- > **Zero** accidents.

RELEASE OF THE BOTTOM GATE LAGO DI SPECCHERI

PROJECT TITLE
Speccheri Dam

CLIENT
AGSM

LOCATION
**Martini,
Italy (IT).**

YEAR OPERATION
2026



PROJECT OVERVIEW

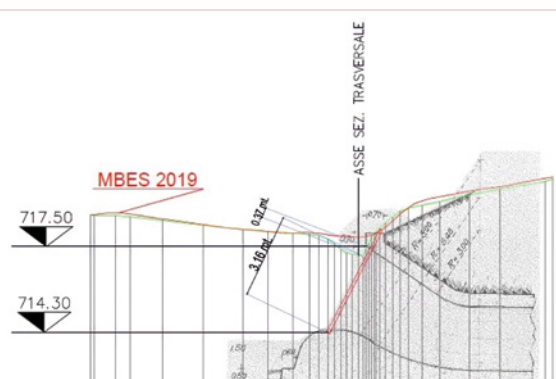
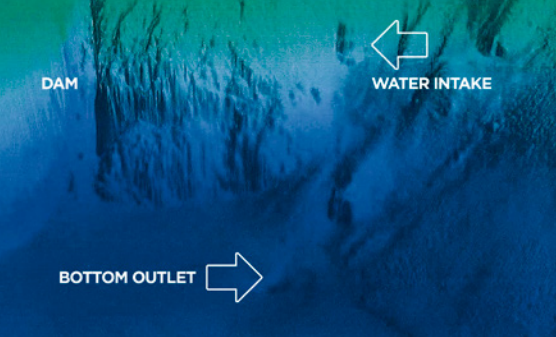
The Speccheri dam is located at an altitude of 810 meters in a steep valley of the Trentino province. Remote and difficult to access, mobilizing the worksite on the water can only be achieved with the support of a Super Puma helicopter following a three-stage logistical operation. The goal is to clear the bottom outlet gate buried under sediment and to create a dredged, sediment-free area of 770 m² in front of the bottom outlet gate while pushing the sediment upstream into the lake.

The presence of walls dating back to the dam's original construction adds to the complexity of the project. Strict adherence to ecological specifications—particularly regarding turbidity and the required recovery time for the underwater environment—was also a major challenge at Speccheri.

TECHNICAL APPROACH & IMPLEMENTATION

Following a meticulously planned logistical operation, Lisie was deployed at a depth of approximately 85 meters under intense winter conditions.

The project's objective was to clear the bottom outlet gate by pushing sediment through an oblique pipe into a fissure located 300 meters upstream, and to recreate a 330 m² area at the base of the bottom outlet gate, as well as a 770 m² area with a slope of approximately 1:2.



The underwater operation required operators to precisely locate numerous critical points in order to position Lisie, and then the pendular system, for effective dredging. As dredging progressed, the unexpected discovery of walls not accounted for in the preliminary plans introduced a new challenge, requiring rapid adaptation.

Ecological specifications and expectations demanded a gradual increase in dredging resources to continuously monitor and assess the impact on the lake's environment. This ensured strict compliance with turbidity standards and the protection of underwater life. The project thus represented both a technical and ecological challenge, essential for maintaining the continuity of operations and the production of decarbonized energy.

« The expertise of Watertracks teams in managing complex mobilization and in finding, adapting, and implementing diverse dredging solutions enabled the successful completion of the project. The Lisie system, due to its size, once again proved decisive, allowing precise and careful access and dredging to clear the bottom outlet gate, thereby demonstrating its significant added value.. »

RESULTS & PERFORMANCE

- > **3,600m³** dredged sediments.
- > About **577** dredging hours.
- > **85m** work deepness.
- > **Work day and night, 6/7.**
- > **Zero** accidents.