



EPM and its contractors are moving forward on several fronts to protect communities downstream of the Ituango hydroelectric project, care for the environment, and overcome contingency at the future power plant, thus:

1. Dam

The structure, located at 418 meters above sea level (m.a.s.l.), is currently reinforced in its rock fill. In these works: upstream it has already reached 418 m.a.s.l., and downstream it is at 403 m.a.s.l. In the abutments, cement injections were finished to guarantee good performance in the contact between the massif and the dam.

In the dam's core, construction of the plastic screen or flow cutter, performed by the company Soletanche, is making progress. The work is done vertically, in panels 2.5 meters wide x 1 m thick and 38 m deep. This plastic screen is 500 meters long on average (between abutment and abutment). The concrete and bentonite screen will guarantee greater impermeability to the dam. Construction is expected to be completed by the end of 2018.

The construction of the plastic screen is a decision made with the advice of a *board* of domestic and international experts. These include specialists in hydraulic structures, electromechanics, geology, geotechnics, dams, construction methods and environmental protection, in addition to the presence of a world expert in screens, Donald Bruce, who advises EPM in the completion of this mega-structure.

The plastic screen was designed by the firm Integral, and its construction is being supervised by the auditor of the Ingetec-Sedic consortium.

It is expected that the final elevation of the dam, 435 m.a.s.l., will be reached in the first quarter of 2019. Achieving this milestone will allow those transporting to and from the township of Ituango, in northern Antioquia, to do so unrestricted along the crest of the dam, as originally envisaged in the project design.



2. Powerhouse

The closure of the powerhouse depends on several circumstances, among which are the behavior of the dam with the construction of the plastic concrete screen, the rainfall regime, the advances in the blockages of the right tunnel and the auxiliary gallery, which in turn will define the availability of the intermediate discharge.

The operation, in any case, will guarantee the ecological flow that must be maintained downstream of the dam, which is 450 cubic meters per second, set out in the environmental license.

3. Intermediate gallery and auxiliary diversion gallery

The basic function of the intermediate gallery is to guarantee the ecological flow in the Cauca River during the filling of the reservoir, which is now at 375.59 m.a.s.l. Guaranteeing the ecological flow is essential to make the decision to shut off the water flow through the powerhouse.

This discharge operates with two radial gates and two flat gates. The shielding of the gates, which are ready and operational, has been completed. Now, work is being done on primary and secondary concrete for lining and final reinforcement of the tunnel. Additionally, it is carried out: the depressurization of the chamber, the emptying of the infiltrated water and the reinforcement of existing plugs.

Once the reinforcement of the plugs is completed, the area of the floodgate chamber of the diversion's auxiliary gallery will be entered to check the floodgates, which are open. The operability of these gates will be evaluated to determine if they can be closed, or if, on the contrary, it is necessary to pour concrete and plug the auxiliary gallery from the chamber.

4. Right deviation tunnel closure

Tests are currently being carried out with cement injections to determine the effectiveness of the initial treatment for consolidating the gravel inside the tunnel, in order to proceed with its pre-plugging. At the same time, progress is being made in the excavation of the gallery to allow the construction of the second pre-plug of the right tunnel and to begin final sealing. In turn, the infiltration water is pumped in the left diversion tunnel downstream of the final plug.



At this moment, the diversion tunnel entrances are blocked by the collapse that occurred at the beginning of the contingency. In order to avoid water seepage from the reservoir into the tunnels through all the material that fell into the entrances, these seeps will be sealed with the release of granular materials of different gradation from the surface of the reservoir. This work will be done by the company Sedicón AS, which uses Norwegian technology.

5. Massif

Today we are working on the access road to the upper part of the slope of the water intake gates. These works will make it possible to begin the treatment and stabilization of the landslide in that area of the project, through controlled excavations (terraces), application of cast concrete and placement of tendons and bolts.

In the meantime, metal structures were installed in the water intake gates area to protect the closing system of the water intake gates from possible collapses.

6. Road tunnel

Reinforcement work on the tunnel is 95% complete. Among the advanced works are: installation of bolts, trusses and frames, pouring of concrete in the affected areas and repairing gutters and gullies.

It is true that EPM is working tirelessly to recover the Ituango hydroelectric project, a country project that will provide 17% of the electricity Colombia needs to continue growing and contributing to the quality of life of millions of people. However, the company continues to focus on the communities impacted downstream of the dam and spares no effort to ensure their well-being.