06/26/2019

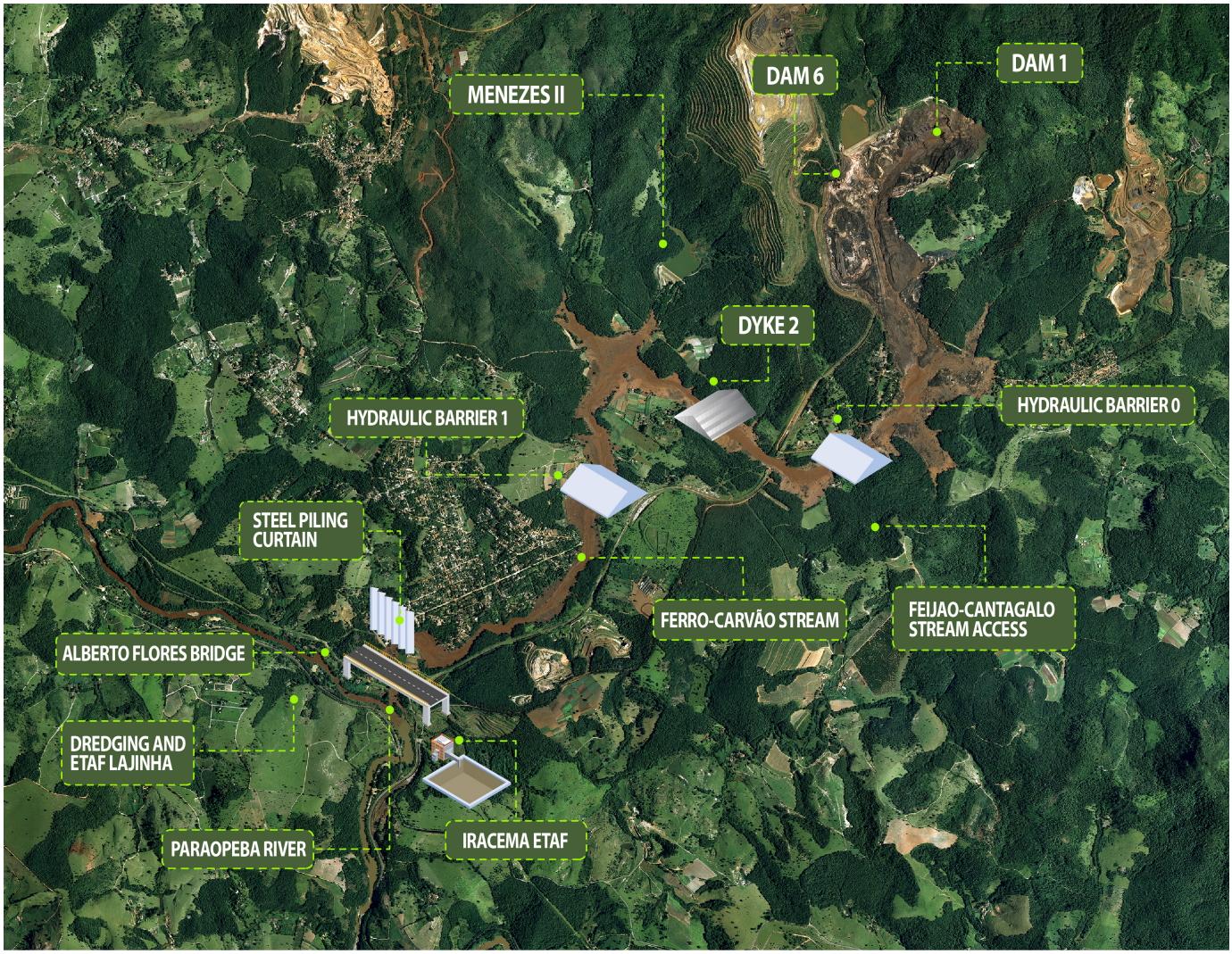
R$ 1.8 billion package to generate 2,500 jobs in Brumadinho

Vale's actions aim to reduce tailings flow into the Paraopeba river, stabilize structures, and rebuild public facilities

Vale has begun several projects to ensure the geotechnical safety of remaining structures at the Córrego do Feijão mine in the rural area of Brumadinho (Minas Gerais), the removal and proper disposal of tailings, as well as part of the environmental repair, especially along the affected stretch of Paraopeba river.

At the Córrego do Feijão mine, Vale is undertaking projects to strengthen the stability of the remaining structures, - B6 dam, for instance -, and the remaining residue in Dam 1 (B1). In addition, actions are being taken to repair and rebuild public facilities of the affected communities. Some projects have already been completed, such as the construction of a bridge on Alberto Flores Avenue and the refurbishment of Nossa Senhora das Dores church.

In total, R$1.8 billion will be spend by 2023, of which about R$ 400 million to R$ 500 million will be this year.



Watch the video and learn more about these actions. Click here.

Careful Removal of Tailings

The most critical projects comprise a ten kilometer stretch between the B1 dam, at the Córrego do Feijão mine, and the confluence of the Ferro-Carvão stream and Paraopeba river, in Brumadinho. There are 23 integrated structures that aim to significantly reduce the flow into the Paraopeba river.

This set of actions is part of Stretch 1 of the Tailings Containment Plan that was presented by the company to public authorities, shortly after the dam breach. The Projects incorporate 28 contracted companies. At peak times, we estimate 2.5 thousand jobs. Currently, 1.3 thousand are already working, and 700 of them are from the Brumadinho region.

The thickest tailings are concentrated in this area. It is estimated between 6 and 7 million m3 of tailings that leaked from the B1 Dam are deposited in this area. The waste removal must be carefully carried-out, and the planning of this activity has been developed together with the Fire Department.

So far, almost 550,000 cubic meters of tailings have been removed. After the Fire Department inspection, it is being transferred to an area (within the Córrego do Feijão mine) that has been previously defined and approved by the competent authorities.

Impoundment Structures

The actions include the construction of 15 small containment structures that are up to 5-meters in height. The Hydraulic Filtration Barrier, knowns as BH0, will be installed below them. BH0 will be built using almost 30 thousand cubic meters of rock, and will be a 100-meter long structure. All these structures were designed to contain the thickest sediments and reduce the speed of water flowing through Ferro-Carvão stream.

After BH0, Dike 2 reservoir is being built with the approximate capacity of 750-million-liters. In this area, the tailings water is decanted, then the tailings settle at the bottom of the reservoir. Dike 2 will contain the material deposited along the Ferro-Carvão stream, thus reducing water turbidity.

Below Dike 2, another Hydraulic Filtration Barrier (BH1) is being installed using almost 60 thousand cubic meters of rock, and will be a 280-meter long structure. BH1 was designed to contain thick sediment.

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Water Treatment

After flowing through the impoundment structures, the water from the Ferro-Carvão stream will finally be contained in a reservoir, which consists of a curtain of steel pilings (barrier made of metal plates), before the new bridge along the Alberto Flores Avenue and the confluence of Paraopeba river. From this reservoir, the water is pumped to the Fluvial Water Treatment Plant (ETAF, Estação de Tratamento de Água Fluvial), which is already in operation.

At the ETAF, water goes through sediment removal and filtration processes and is then returned to Paraopeba river via the Casa Branca stream, in compliance with the legal standards of Conama (National Council for the Environment) and turbidity standards (up to 100 NTU). The plant can treat approximately 2 million liters of water per hour. The average index of inlet water is above 20 thousand NTU and outlet water is below 15 NTU.

The water that contains the solid pieces is decanted in the sedimentation basin of the ETAF, then this material is sent to large pockets known as geotextile tubes that are designed to contain, store, and dewater the tailings. The water drained from these ponds returns to the filtration system of the plant, and then is discharged back into the river after treatment. The solid material in the geotextile tubes is removed and transferred to an area (within Córrego do Feijão mine) previously defined and approved by the competent authorities.

The work to reduce the flow of solid material into the Paraopeba river is active in two stretches along the river. Stretch 2 comprises the area between the confluence of Ferro-Carvão stream and Paraopeba river, and the municipality of Juatuba

(Minas Gerais). The actions for this stretch are still being discussed with the affected communities. Tailings will be dredged along two kilometers of the river below the bridge on Alberto Flores Avenue. The material removed will also be transferred to the geotextile tubes for dewatering. Stretch 3 is between Juatuba and Retiro Baixo plant, in the municipality of Pompéu (Minas Gerais); it is approximately 170 kilometers from the Paraopeba River. In this area, Vale's actions aim to reduce the fine tailings flow along the Paraopeba river's course.

The company had five turbidity curtains installed, along this stretch, by the end of May. They were installed as an emergency action to contain ultrafine sediment, thus reducing the turbidity plume flow. On June 3, Vale began the curtain deconstruction. After the emergency phase and due to the drought period, this technology is no longer required alonng this stretch of the river.

The river is being monitored daily. Currently, 66 monitoring points cover an area of more than 2,600 kilometers. There are monitoring points upstream of B1 Dam, along Ferro-Carvão Stream, from Paraopeba and São Francisco rivers to the mouth of the Atlantic Ocean, in the reservoirs of Retiro Baixo and Três Marias plants, as well as in the main tributaries of the Paraopeba river.

By the end of May, approximately 1.4 million water, sediment, and tailings analyses had been carried out, and 393 parameters tested. In addition to surface water analysis, samples were also collected at a depth of two meters. The results, compared to the surface water analysis, were within normal levels. The analysis is being done by five specialized laboratories, involving approximately 250 specialists.

The construction of all these structures is integral to sediment containment and tailings flow prevention along Paraopeba River. The actions were duly communicated and approved by the public authorities and Military Fire Brigade of Minas Gerais.

Infrastructure of the Communities

Vale's project package was designed to repair the damage quickly. These actions were defined and improved through dialogue with the communities and competent authorities. Check out some on-going and completed actions:

. The new bridge on Alberto Flores Avenue is complete and two-way traffic has been flowing freely since April 10. The pedestrian walkway is under construction.

. Nossa Senhora das Dores church, at Córrego do Feijão, used as a help center for the Fire Department after the breach of the B1 Dam, has been refurbished and revitalized. Approximately 200 families (800 people) live in the region. Normal use resumed on April 21, Easter Sunday.

. Construction of a new access road from Córrego do Feijão to Alberto Flores Avenue will allow the community to access the center of Brumadinho. It will be a 3.5-km-long road. This access road, known as Estrada do Cantagalo, will be paved, as well as other roads that are part of the actions to improve people movement around Córrego do Feijão and the community's traffic will be safer.

. Maintenance and improvements along 700 kilometers of access roads in Brumadinho and other affected cities, such as São Joaquim de Bicas and Mário Campos. It is continuous work, seven days a week, on a 12-hour a day basis. It aims to mitigate the impact of heavy vehicle traffic on the local roads.

. The railway branch line affected by the breach of B1 is in the final disassembly phase. A 3.6-kilometer access road will be constructed in this area, for works vehicles only and for the handling of tailings, specifically. From 80 to 100 heavy vehicles will use the access road instead of the local roads, mitigating the possible impact on traffic within the communities.

Click here to watch a video about the containment works and environmental repair of the Brumadinho region.

More information

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