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## Vale updates on recovery actions in Brumadinho

*R\$24 billion is the budget intended for indemnities, environmental interventions, social and economic projects, support to governmental measures and de-characterization of upstream dams in Minas Gerais*

Nearly one year since the breach of Dam I, at the Córrego do Feijão mine, in Brumadinho, Vale reports the actions and measures in progress aimed at repairing the damages.

Vale's focus in Brumadinho is and will always be the assistance to people. The company remains committed to implement measures that will restore the routine of families directly or indirectly affected by the dam breach. The goal is to repair the damage caused through social and environmental initiatives that will recover the affected municipalities, gearing efforts towards close dialogue with communities and the government.

The company has reserved R\$ 24.1 billion for reparation actions and indemnities due to the breach (expenses incurred included until 09/30/2019). This budget is intended for payment of indemnities, environmental interventions, social and economic projects, support to governmental measures and de-characterization of upstream dams in Minas Gerais.

To structure its work, on April, Vale created the Special Executive Board for Recovery and Development, which reports directly to the company's CEO. The whole structure is dedicated to ensuring close assistance to communities through open dialogue and actions on four recovery areas (social, environmental, construction works, and safety).

### Search for victims of the breach

The company understands the need to conclude the search for the 11 people still missing. To date, 259 victims have been identified (123 Vale employees, 117 third-party employees and 19 residents of the region).

Vale continues to support the efforts of the Fire Department and Civil Police. In October 2019, Vale completed the donation of 77 vehicles to the Security Forces of Minas Gerais (Military Police, Civil Police, Fire Department) and Civil Defense. The total amount invested in vehicles and other items acquired voluntarily and without tax consideration by the company amounts over R\$70 million.

To enable the Military Fire Brigade of Minas Gerais to continue the searches in this rainy season, Vale installed two tents that together cover an area of 15,000 square meters. The wettest tailings are removed by excavators and trucks and disposed inside the tents, making it feasible for firefighters to continue the search. The structures were assembled near the Ferro-Carvão stream. High-powered fans are used to inflate the tarp and change the air inside the tents up to three times per hour, maintaining the stability and environmental control of the tailings.

### Indemnities

Vale continues to act quickly to offer financial security and allow families to resume their routines. For this, also in January, Vale voluntarily donated R\$ 100,000.00 for 276 families of victims of the breach; R\$ 50,000.00 for 100 families

living in the Self-Rescue Zone (ZAS) of the B1 dam; and R\$ 15,000.00 for 91 rural producers and traders with productive activities at ZAS. The purpose was to cover short-term personal expenses incurred by the families, rural producers and merchants of Córrego do Feijão and Parque da Cachoeira, in Brumadinho, giving them some peace of mind to negotiate their respective individual damages.

In April, Vale and the Public Defender's Office of the State of Minas Gerais signed an agreement that allows the people affected by the Brumadinho dam breach to choose between individual or family-based agreements for compensation for material and moral damages. By January 16, 3,193 agreements had been accepted by the affected families.

On July 15, Vale and the Labor Prosecution Office of Minas Gerais signed, with the participation of unions, an agreement enabling relatives of victims (Vale employees and third-party employees) of the breach to qualify to receive the indemnity, initiating the fulfillment of individual agreements. By January 16, 1,541 labor agreements had been signed.

Between individual and labor indemnities, almost 5,000 agreements have already been signed. These persons are provided with the Full Assistance Program for Affected People, which aims to help the families plan for their future. The project offers financial planning and education; support for the purchase of real estate; technical assistance for rural activities, microentrepreneurs, and activities for supplemental income; in addition to social monitoring. So far, 1,090 persons have voluntarily joined the program.

In parallel to donations and indemnities negotiations – both civil and labor – on February 20, Vale signed a Preliminary Adjustment Agreement (TAP) providing monthly emergency payments for those who resided in the city of Brumadinho or within a 1km radius of the Paraopeba river channel, from Brumadinho to the city of Pompéu, at the Retiro Baixo plant, on January 25. By January 16, 2020, more than 108,000 people had received the benefit (one minimum wage per adult, 50% per adolescent, and 25% per child). As agreed with the Federal Prosecution Office, the emergency relief was paid out to 150 indigenous persons in 46 families from Pataxó indigenous community, who live on the banks of Paraopeba river.

On November 28, the TAP was renewed for another 10 months, with a change in eligibility criteria. The company understands that the agreement's extension reinforces its commitment to repair the damage caused by the dam breach in a swift and comprehensive manner, with actions that reestablish the affected municipalities socially and environmentally, based on a close dialogue with communities and the Government.

The aforementioned amounts will be temporarily paid as emergency indemnity and will be deducted and considered as a possible future collective indemnity.

### **Psychological and social support**

This is Vale's primary focus in Brumadinho. Almost 600 families are being monitored by the Family Referral Program, to ensure assistance to those people directly affected by the breach. Given the collective mourning nature, efforts focused on emotional health should target not only family members, but the entire population. Therefore, the company signed a cooperation agreement with the city government transferring R\$ 32 million exclusively for the expansion of health and psychological and social care in the municipality. In 2019, Vale's medical care and psychological and social support services addressed more than 18,000 cases.

In addition to health care, Vale is bearing the costs of provisional housing for some of the affected residents. Currently, 100 families live in temporary housing.

Since the dam breach, Vale has maintained help centers for the population of Brumadinho and region, with specialized teams to care for the affected population. Over 50,000 requests have been received, of which 96% have already been responded and 3% are usual services.

## **The future of Córrego do Feijão**

After listening to the main demands from the community at Córrego do Feijão, Vale disclosed an urban requalification project named Park Territory. It is a concept that includes actions for infrastructure improvement (refurbishment, paving and urbanizing of streets, housing and structures), economic reactivation, and development of local tourism, as well as care for the memory of victims of the dam 1 breach.

The park territory proposed for Córrego do Feijão meets two objectives, primarily. The first is human, aimed at recovering the main region affected by the breach and allowing families to resume their routines. The second is to foster local economic development.

One of the main purposes of the actions is to boost tourism in Córrego do Feijão. The proposal is to convert the region into an ecological destination, helping to develop this aptitude. Thus, the company is implementing an Urbanization Plan for the central area, adding value to its tourism features. Public goods will be refurbished, after the required approvals, including improvement of the road infrastructure.

The complete project was based on actively listening to residents, who suggested enhancements and new work fronts.

The next phase is to develop preliminary plans based on values of the local community, climate, hydrography, local vegetation, fauna, and flora. The work fronts will comply with the dynamics of the community. All aspects of the plan were established by mutual agreement with the families. The proposal established that the first actions be completed and delivered to the community by December 2020.

## **Environmental recovery**

Vale launched the pilot project for environmental recovery of areas affected by the dam (B1) breach. Known as Zero Milestone, the program aims to re-establish the original conditions of Ferro-Carvão stream, revegetate the riparian forest with native plants, and recover Paraopeba river.

The project scope includes installation of the sheet pile wall next to the new bridge at Alberto Flores avenue; it goes 400 meters downstream the Ferro-Carvão stream and two kilometers after the confluence with Paraopeba river. Zero Milestone is a pilot project to be evaluated and adjusted and, once proven effective, can be replicated to other affected areas on a case-by-case basis.

## **Revitalization of the Paraopeba river**

Vale has been working on the environmental recovery of Paraopeba river and its surroundings. Its efforts are focused on both tailings containment and water treatment, having already treated and returned 5,5 billion liters of water to the river by means of two River Water Treatment Plants (ETAFs).

The company has built three major containment structures (two hydraulic filtration barriers and one dike), in addition to 25 small stabilizing barriers to contain sediment. A metallic pile curtain was also installed to contain tailings and clean the area where the highest concentration of tailings is located. With this measure, solids are no longer carried downstream by the river since May.

Vale has also been dredging tailings from the affected stretch of Paraopeba river, which is essential for its recovery. By means of this action, the material accumulated in the river's silted area is removed and dehydrated in geotextile bags. The water drained from these bags is pumped to a treatment plant and returned clean to Paraopeba river. Dredging activities are planned to continue until 2020, beginning at the confluence of the Ferro-Carvão stream and the Paraopeba river, and extending almost 2km downstream.

Vale has been monitoring the water quality of the Paraopeba river since January 2019. Currently, 90 monitoring points cover an area of more than 2,600km along the river, including the Ferro-Carvão stream, the Paraopeba river and ten of its

tributaries. The company also maintains 16 parametric probes that use telemetry to enable remote reading of physical and chemical parameters of water, from hour to hour, increasing the efficiency of information.

To date, approximately 4.5 million water, soil and sediment analyzes have been carried out in more than 40,000 samples, enabling analyzes of several parameters, including the presence of metals in water, pH and turbidity. Vale and Igam analyzes show that the plume of sediments that leaked from B1 stopped at the reservoir of the Retiro Baixo plant in the city of Pompéu (Minas Gerais), and have not reached the Três Marias Reservoir and the São Francisco River.

### **Water supply**

Vale began construction of the new system to re-establish the withdraw of water from the Paraopeba river previously affected by the breach, which is expected to complete in September 2020. The construction works are carried out almost 12 km upstream of the currently interrupted water withdrawal facility – from the Sanitation Company of Minas Gerais (Copasa, Companhia de Saneamento de Minas Gerais) – in the rural area of Brumadinho. The pipeline system will connect the new water withdrawal point to the existing utility company. This new system will provide the same flow rate – 5,000 liters per second, which has been interrupted – and will comply with the same engineering procedures.

In October, Vale started construction works on the new pipeline system at Pará river, located between Pará de Minas and Conceição do Pará, in the midwest region of the state. This structure provides a water flow rate of 1 million liters per hour – the same rate collected by the municipality at Paraopeba river before the breach. The project is expected to be complete by July 2020, when it will be delivered to the City Government of Pará de Minas and operated by the utility company Águas de Pará de Minas (Capam).

Vale also installed 22 artesian wells in the cities supplied by Paraopeba basin, ensuring a supply of drinking water to the local communities. These wells are supplementary to the daily emergency distribution of water by almost 100 water trucks. Over 560 million liters of water have already been delivered.

### **Animal care**

Vale maintains a structure for rescuing, identifying, caring, and sheltering domestic and wild animals from the affected areas. In addition to a veterinary hospital with first aid and diagnostic equipment, the company maintains the fauna shelter farm in Brumadinho, which assists 865 animals. Of these, 340 have already been adopted, returned to their guardians, or returned to their natural habitat.

### **Dam monitoring, safety and de-characterization**

On February 2019, Vale inaugurated its first Geotechnical Monitoring Center to support the company's geotechnical operations in Minas Gerais. The center currently monitors 111 structures. The geotechnical staff read the devices installed in each location and sends the information to the Monitoring Center. Backed the information provided by radars and cameras, Vale can monitor and make decisions more safety and assertively.

Vale is striving to eliminate the risks of all its upstream dams. In November, the company completed the de-characterization of the 8B dam, located at Águas Claras Mine, in Nova Lima – the first of the upstream dams to be de-characterized. The structure has no raising structures and does not serve as a dam anymore. The area was revegetated with 1,100 native plant seedlings, reintegrating it with the environment.

Before the de-characterization of the other dams commences, Vale is working to increase the Factor of Safety of these structures by lowering the water level through pumping, drilling wells (to avoid groundwater), and building channels to divert rainwater.

### **Risk management and alternative to dams**

In the months after the breach, Vale created a new risk governance structure – consisting of four executive committees to provide an in-depth analysis of the risks inherent to the business –, in addition to a Safety and Operational Excellence

executive board reporting directly to the CEO. This new structure aims to enforce compliance with best management practices and provide technical expertise in management of operational risks and strategic assets. The committees also play a normative role, acting with total independence from the business activities.

Vale has also reaffirmed its commitment to develop safe alternatives to dams. By 2023, 70% of its production will benefit from dry processing methods, which do not require use of these structures. To this end, it will be the first mining company to use magnetic fine separation technology on an industrial scale, developed by NewSteel, a company acquired this year by Vale. \$100 million will be invested per year to process 1.5 million metric tons, starting in 2022.

The tailings stacking technology will be applied to 16% of production by 2024 – in locations such as Brucutu and Itabira –, with investments amounting to US\$ 1.8 billion over the next five years.

### **Institutional support**

Vale transferred R\$382 million to public authorities. This amount includes transfers to the City Government of Brumadinho and to ten other mining municipalities in Minas Gerais that had their revenues adversely affected by the interruption of activities, plus amount for purchasing vehicles and equipment as well as professional training for the Military Police, Fire Department, Civil Police, and Civil Defense of Minas Gerais.

For further information on Vale's works and actions, go to [www.vale.com/repair](http://www.vale.com/repair)

### **More information**

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