

**SAMARCO**



# Biennial Report

2015-2016

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# INTRODUCTION

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In November 2015, Samarco's Fundão tailings dam in Mariana, Minas Gerais, suffered a major failure. The failure of the dam, investigated by Brazilian authorities and by an independent international consultant, resulted in severe social and environmental damage, including the loss of 19 lives (one person missing) and the destruction of the community of Bento Rodrigues and Paracatu de Baixo, in addition to the impact caused by the passage of the tailings plume to towns along the Doce River, from Minas Gerais to its mouth and estuarine area in Espírito Santo.

In order to cope with these impacts and slowly seek to rebuild the trust of Brazilian society, it is necessary to structure a new Samarco, with new competencies. The cornerstones of its new operational model are environmental and social recovery, safer operations, the lessons learned and the commitment to share them with the mining industry and society in general.

This 2015-2016 Biennial Report provides an account of a complex scenario, where,

more than ever, transparency is a priority among the obligations of the Company toward Brazilian society.

The document provides social, economic and environmental performance indicators for both years, in compliance with the guidelines of GRI – Global Reporting Initiative. It also details Samarco's response actions to the failure of the Fundão dam. This includes the set of emergency environmental and humanitarian relief measures, the structuring of the Framework Agreement (TTAC acronym in Portuguese) and the resulting constitution of Fundação Renova, an organization which shall be dedicated to repair, restore and reconstruct the impacted regions.

The narrative of the facts covers the activities of the Samarco in 2015 and 2016, in addition to the emergency actions undertaken by the company up to the start of activities of the Renova Foundation in August of last year. Actions carried out after that date will be outlined in the activity report of the Renova Foundation itself. (learn more at [www.fundacaorenova.org](http://www.fundacaorenova.org)).

In this report, the Company describes its actions in response to the tragic failure of the Fundão dam in Mariana (MG).

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## PACTO GLOBAL

As part of Samarco's commitment to a transparent rendering of accounts, this report also makes reference to its organizational performance with regard to the ten principles of the UN Global Compact. The correlation between the contents of the report and the principles is shown by icons placed at the beginning of each chapter.



Bento Rodrigues District impacted by passage of tailings from the Fundão dam.

Samarco deeply regrets the deaths associated with the failure of the Fundão dam. Below are the names of the community members as well as Samarco employees and contractors who lost their lives on 05 November 2015.

The feelings and prayers of each and every Samarco employee have been directed, since that day, to the families and friends of the victims.

### Local residents

***Antônio Prisco***

age 65

Bento Rodrigues

***Emanuele Vitória Fernandes***

age 5

Bento Rodrigues

***Maria Elisa Lucas***

age 60

Contagem – was visiting Bento Rodrigues

***Maria das Graças Celestino da Silva***

age 65

Bento Rodrigues

***Thiago Damasceno Santos***

age 7

Bento Rodrigues

### Samarco and contractor employees

***Ailton Martins Dos Santos***

Driver III, age 55

(Working on the Fundão dam)

Integral Engenharia Ltda

Deceased

***Claudemir Elias Dos Santos***

Driver III, age 41

(Working on the Fundão dam)

Integral Engenharia Ltda

Deceased

***Cláudio Fiúza Da Silva***

Laborer, age 41

(Working on the Fundão dam)

Integral Engenharia Ltda

Deceased

***Daniel Altamiro De Carvalho***

Machine operator III, age 53

(Working on the Fundão dam)

Integral Engenharia Ltda

Deceased

***Edinaldo Oliveira De Assis***

Machine operator III, 40 anos  
(Working on the Fundão dam)  
Integral Engenharia Ltda  
Deceased

***Edmirson José Pessoa***

Sr. Administrative Services Technician, age 49  
Samarco Mineração S.A.  
Missing\*

***Marcos Aurélio Pereira Moura***

Visitor, age 34  
Produquímica Indústria e Comércio S.A.  
Deceased

***Marcos Roberto Xavier***

Truck driver, age 32  
(Working on the Fundão dam)  
Vix Logística S.A.  
Deceased

***Mateus Márcio Fernandes***

Maintenance mechanic, age 29  
(Working on the Fundão dam)  
Manserv Montagem e Manutenção S.A.  
Deceased

***Pedro Paulino Lopes***

Maintenance mechanic, age 56  
(Working on the Fundão dam)  
Manserv Montagem e Manutenção S.A.  
Deceased

***Samuel Vieira Albino***

Driller, age 34  
(Working on the Fundão dam)  
Geocontrole Br Sondagens S.A.  
Deceased

***Sileno Narkievicius De Lima***

Driver III, age 46  
(Working on the Fundão dam)  
Integral Engenharia Ltda  
Deceased

***Vando Maurílio Dos Santos***

Driver III, age 37  
(Working on the Fundão dam)  
Integral Engenharia Ltda  
Deceased

***Waldemir Aparecido Leandro***

Drilling assistant II, age 48  
(Working on the Fundão dam)  
Geocontrole Br Sondagens S.A.  
Deceased

\* Situation at issue date of this report.

## MESSAGE FROM THE CEO G4-1, G4-2

For 40 years, Samarco had been writing a story of mutual growth and respect, together with its neighboring communities, employees and other publics in Minas Gerais and Espírito Santo. Unfortunately, 2015 stands out as the year in which the Company's bond of trust with Brazilian society was put to test with the failure of the Fundão tailings dam on 05 November, an event which we deeply lament. It unfortunately impacted several districts and municipalities in the region of Mariana (MG) and the entire path of the Doce River downstream, as far as the coast of Espírito Santo.

In order to respond as quickly as possible to the event, immediately after the dam failure, the Company first concentrated its efforts on providing emergency relief to the victims, their family members and the impacted communities, and supplying pertinent information to the competent authorities and agencies. Priority was also given to allocation of resources, both financial and human, the minimization of the impacts caused by the tailings along the Doce River, and the execution of works to reinforce the structures of the other two dams (Santarém and Germano). During the execution of these actions, we received the invaluable support of the Civil Defense and public entities, private organizations, volunteers and city administrations which participated in the rescue actions and emergency response. To all these, we extend our most sincere gratitude.

Samarco's management - myself included - and its shareholders are quite aware that there is still much to be done. We are mobilized to repair the damage to the extent possible and organize the terms and costs required to support the social and environmental actions, doing our utmost to compensate the losses sustained by the impacted families.

In March 2016, Samarco and its shareholders, Vale and BHP Billiton, signed a Framework Agreement (known by its acronym in Portuguese, TTAC) with the



**Roberto Carvalho,**  
diretor-presidente  
da Samarco

federal government and the state governments of Minas Gerais and Espírito Santo, as well as several regulatory and control entities and public authorities. This Agreement outlines the social, environmental and economic recovery actions for the regions impacted by the Fundão dam failure. Among other aspects, it provides for the constitution of a private foundation, which received the name of Renova Foundation and was launched on June 2016, lending continuity, on August 2016, to the actions which have been conducted by Samarco since the failure of the dam. In all, there are 42 programs divided into two main work fronts, one socioenvironmental and the other socioeconomic.

The involvement of the directly impacted people in the recovery actions

is a requirement stipulated in the TTAC and discussed throughout its construction. Fundação Renova follows a process of engagement, participation and joint development with the various stakeholders – the impacted population, experts from pertinent areas, and public agents. The Advisory Committee, formed by representatives of civil society and specialists, is responsible for defining and implementing the strategies which will assure this involvement of the communities. The other governance bodies are the Board of Governors, the Fiscal Committee, the Executive Leadership Team and the Interfederative Committee (CIF), the latter being an external and independent body of Fundação Renova, formed by representatives of public authorities to oversee the activities and execution of the programs

which are also subject to independent audit. The entire decision making process is overseen by the Public Prosecution Office for Foundations.

Since the occurrence of the event, Samarco have re-evaluated the organization, to define clearly the adjustments which will allow the Company to continue based on the painful lessons learned from the Fundão dam failure and also assuring social and environmental recovery. With this in mind, we reaffirm our commitment to work with respect for all those who are by our side on this journey. In addition to remediating and compensating the impacts generated, Samarco believes that the lessons learned from this tragic episode in the history of mining will allow the Company and the mining industry in general to operate with greater safety.

Once more, I want to say I am deeply sorry for the lives that were lost. I would also like to take advantage of this opportunity to thank each and every employee and their family members for mobilizing in behalf of the victims of the dam failure. In critical moments, values like solidarity are the cornerstones of our business practices.

Samarco has done its utmost to hold on to its work force, but regretfully we had to reduce it by some 40% in 2016, as part of the adjustments the Company had to make to the new situation. It expects to resume operations when it obtains the necessary environmental permits and social license, at only part of its operational capacity. The downsizing took place at the

end of the first semester of 2016 through negotiations with the pertinent unions, including the offering of a voluntary exit incentive program (PDV acronym in Portuguese) which involved all industrial units as well as the offices in Belo Horizonte in Minas Gerais and Vitoria in Espírito Santo.

In parallel, we initiated the negotiations to seek the resumption of operations of Samarco, considering our current capacity and the premise of maximum safety - something that we consider essential to continue generating employment and income for the people of Minas Gerais and Espírito Santo- and putting into practice the lessons learned after the failure of the Fundão dam, in favor of safer mining practices and lower operational risk.

In this context, I would like to highlight that we are engaged in the process of obtaining licensing for both the disposal of tailings, using the Alegria Sul open pit, as well as the Corrective Operating License (LOC) for the Germano complex, which puts us in constant dialogue with the public authorities, who are responsible for the granting of formal environmental and operating licenses, and with society as a whole, which is the one who gives us the social license to operate. With communities and other stakeholders, we have maintained our routine of dialog in the territories, in addition to the public hearings, which form part of the formal process of licensing.

Reflecting the Company's commitment to accountability, considering the communication of progress related to the UN

Global Compact ten principles, and given the natural complexity of the moment that we are experiencing, we decided to publish this report in a biennial format, showing clearly the indicators, projects, actions and results of the organization during the years of 2015 - including our routine operations prior to the failure of the dam - and of 2016, the latter dedicated to negotiations for the management of impact and emergency actions, as well as the plan of operational resumption.

Even in the face of a time of uncertainty, we believe it is crucial to describe the facts involving the failure of the Fundão dam, the impacts on the lives of people and the environment and what is being done to mitigate them and ensure the remediation of the damage caused. .

We believe that, as a Company involved in a tragedy of this dimension, it is essential to restore the confidence of all the stakeholders - this will be achieved with hard work and actions performed with the speed required, in search of the best solutions for all those with whom we interact. This 2015-2016 Biennial Report represents part of the process by which Samarco intends to demonstrate to society, with transparency, its commitment and its respect. On behalf of our employees, I thank you for your attention and hope you will find it enlightening with regard to the various subjects of your interest. Please do not hesitate to contact us should you desire any further clarification.

**Roberto Carvalho**  
CEO



The background, the governance principles, the commitments assumed, the plans for the future and the results of the investigation of the Fundão dam failure

# SAMARCO

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11 Corporate Governance  
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Samarco Mineração S.A. is a privately held corporation, whose control is shared equally by its shareholders BHP Billiton Brasil Ltda. and Vale S.A. It has operations in the states of Minas Gerais and Espírito Santo. Since it was founded in 1977, it has been in the business of producing iron ore pellets, exporting to steelmakers in some 20 countries. G4-3, G4-6, G4-7

At the end of 2016, the Company had about 1,830 direct hires and 923 outsourced employees working at its operational units, which were performed until November 2015, the extraction and beneficiation of iron ore, the pelletizing process and the outshipment from its own port.

In addition to its units of Germano (MG) and Ubu (ES), Samarco owns the hydro-power plant of Muniz Freire (ES) and is a member of the consortium which owns the hydropower plant of Guilman-Amorim, in Antonio Dias and Nova Era (MG). The Company's headquarters and administration center are located in Belo Horizonte, the capital of Minas Gerais, and it maintains two international sales offices – one in Amsterdam, Holland, and the other in Hong Kong, China. G4-5, G4-6

Samarco's products include two categories of iron ore pellets – for direct reduction (DR) and blast furnace (BF) processes. The other products are pellet feed and sinter feed. During 2015, up to the 12<sup>th</sup> of November, production had reached the level of 25.4 million tons\* of iron ore pellets, 1.5% more than in the previous year. However, as a result of the failure of the Fundão dam, on 5 November 2015, the operations have been shut down. In 2016, 24,607 thousand tons of pellet feed and 77,160 tons of pellets were shipped out from the Ubu facility (ES) that were still in the stockpile yards of the Company, as well as 51,265 tons of pellet screening. G4-13, G4-4

With themes such as safety, local development and efficient use of natural resources addressed by the strategy adopted, Samarco has sought to improve its processes in recent years. With its reputation deeply shaken, the company currently works for the resumption of its operations, which will depend on the lifting of the stop work orders in the Germano complex and the issue of the licenses necessary to resume operation.

*\*Note: all quantities cited in tons refer to metric tons.*

## Mission G4-56

Produce and supply iron ore pellets in a technologically intensive way to optimize the use of natural resources and generate economic and social development while respecting the environment.

## Values G4-56

- Respect for people
- Integrity
- Mobilization for results



Samarco's operations range from the extraction of the iron ore through its concentration and pelletizing, to the shipment abroad of the pellets from the Company's own port

**IN NUMBERS**

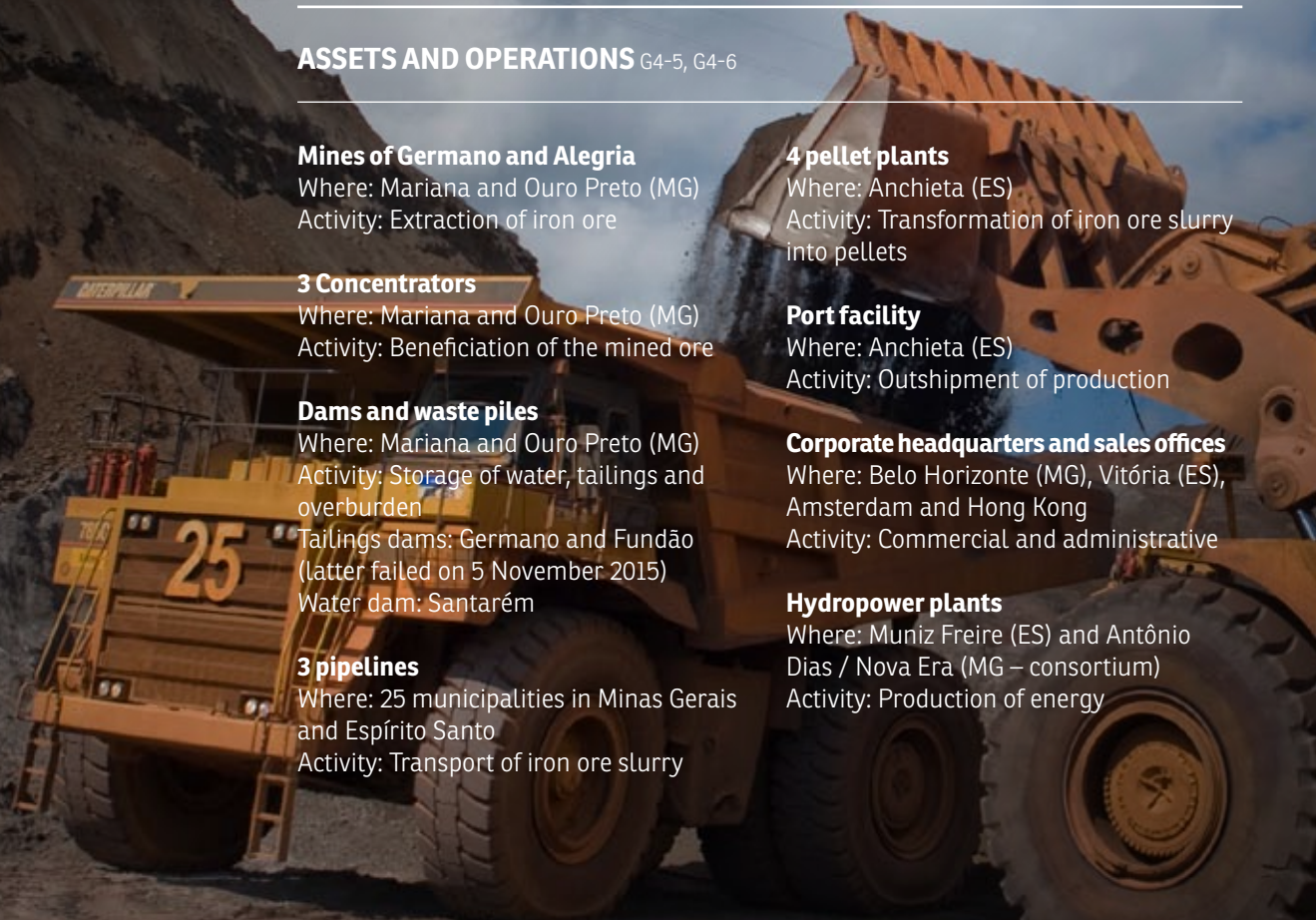
(DATA AS OF 31/12/2016) G4-8, G4-9

**40 years**

of history in 2017

**+ 25 MUNICIPALITIES****WITHIN THE AREA OF  
DIRECT INFLUENCE** withoperations in Minas Gerais  
and Espírito Santo  
e no Espírito Santo**1,830**

direct employees

**923**Outsourced/contractor  
personnel**30.5****million  
TONS PER YEAR**Nominal capacity of iron  
ore pellet production,  
considering 100 % of the  
Samarco industrial complex  
in full operation**20  
countries****WITH CUSTOMERS BUYING**Samarco products (data from  
2015)**400 km**Average length of each  
one of the three ore slurry  
pipelines**ASSETS AND OPERATIONS** G4-5, G4-6**Mines of Germano and Alegria**Where: Mariana and Ouro Preto (MG)  
Activity: Extraction of iron ore**3 Concentrators**Where: Mariana and Ouro Preto (MG)  
Activity: Beneficiation of the mined ore**Dams and waste piles**Where: Mariana and Ouro Preto (MG)  
Activity: Storage of water, tailings and  
overburdenTailings dams: Germano and Fundão  
(latter failed on 5 November 2015)  
Water dam: Santarém**3 pipelines**Where: 25 municipalities in Minas Gerais  
and Espírito Santo  
Activity: Transport of iron ore slurry**4 pellet plants**Where: Anchieta (ES)  
Activity: Transformation of iron ore slurry  
into pellets**Port facility**Where: Anchieta (ES)  
Activity: Outshipment of production**Corporate headquarters and sales offices**Where: Belo Horizonte (MG), Vitória (ES),  
Amsterdam and Hong Kong  
Activity: Commercial and administrative**Hydropower plants**Where: Muniz Freire (ES) and Antônio  
Dias / Nova Era (MG – consortium)  
Activity: Production of energy

# CORPORATE GOVERNANCE



Samarco's corporate governance model is based on the pillars of transparency, equity, accountability and corporate responsibility. Starting November 2015, the corporate structure adjusted to deal with the matters related to the dam failure, aligning shareholders and executive leaderships to respond actively to the socio-environmental demands and the processes of investigation, as well as dialogue with the impacted communities and representatives of public authorities.

Three spheres form the governance of Samarco – the shareholders, i.e. the owners, BHP Billiton do Brasil Ltda. and Vale S.A.; Samarco governance, composed of the Board of Directors and the advisory committees; and Samarco management, consisting of the Executive Board. This model seeks to allow the integration and dialogue among the hold-

ers of the Company equity and its main executives. The Company's By-laws, the Shareholders Agreement and the Code of Corporate Conduct are the main reference documents. G4-34

The Board of Directors is composed of four regular members and four alternate members, appointed by the shareholders. Meetings are held every four months to discuss and define strategy guidelines, approve business plans, investments and budgets, and supervise performance. The Board is also responsible for approving the allocation of profits from the period and deliberating on changes in the capital structure.

The Executive Board, in turn, is formed by the CEO and the officers in charge of Operations and Infrastructure, Finance, Projects and Ecoefficiency, and Commercial.



This structure allows shareholders, within the limitations established by law, an effective monitoring of the results of Samarco, ensuring compliance with laws and regulations and the alignment of values, goals and strategies of the Company.

The contacts between the Executive Board and the Board of Directors have been intensified due to the Fundão dam failure. As part of the response to the crisis caused by the failure, the Board of Directors and the Executive Board organized regular meetings with daily updates of events. Throughout 2016, the frequency of these meetings varied between once a week, twice a month or currently once a month, depending on the need.

Through weekly meetings with shareholders, we structured a channel for a fast update and alignment of actions, projects and negotiations related to the management of the impacts of the failure of the Fundão dam in its aftermath.

In 2016, the structure of the Board of Directors' advisory committees was revised in order to adapt it to the new reality, and the Company established seven committees and five subcommittees. Among these, was the Remediation Committee and three subcommittees – Socioeconomic, Socioenvironmental and Infrastructure – endowed with technical expertise to advise the Board of Directors and Executive Management, from the time of the failure of the dam to the handover of the programs to Fundação Renova.

## EXECUTIVE BOARD\* G4-34

ROBERTO LÚCIO NUNES DE CARVALHO	CEO
LEONARDO SARLO WILKEN	COMMERCIAL OFFICER
LUIS EDUARDO FISCHMAN	FINANCIAL OFFICER
MAURY DE SOUZA JÚNIOR	PROJECTS AND OPERATIONS RESUMPTION OFFICER
RODRIGO ALVARENGA VILELA	OPERATIONS AND INFRASTRUCTURE OFFICER

\*Structure as of December 2016, after changes made in the governance throughout the year. The Chief Executive Officer of Samarco until January 2016, Ricardo Vescovi, withdrew from the position to dedicate his time to providing the clarification required by police investigations, from the Civil Police of Minas Gerais and the Federal Police. For the same reasons, Kleber Terra, Director of Operations and Infrastructure, also stepped down. These departures took place in January 2016.

## BOARD OF DIRECTORS\* G4-34

BHP BILLITON BRASIL LTDA.

### REGULAR MEMBERS

FLAVIO DE MEDEIROS BOCAYUVA BULCÃO (CHAIRMAN)

BRYAN QUINN

### ALTERNATE MEMBERS

PIETER LE ROUX

SERGIO CONSOLI FERNANDES

VALE S.A.

### REGULAR MEMBERS

STEPHEN MICHAEL POTTER (DEPUTY CHAIRMAN)

SILMAR MAGALHÃES SILVA

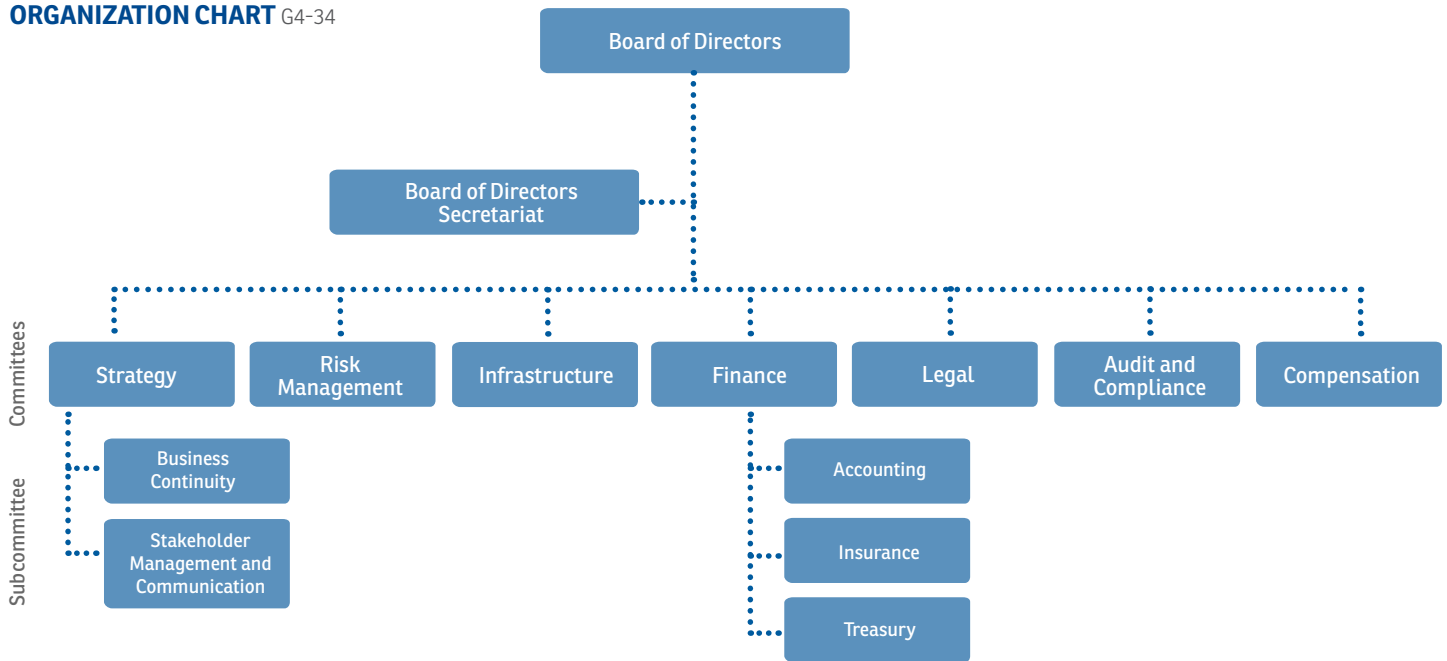
### ALTERNATE MEMBERS

LEONARDO EYER

JUAN MERLINI

\* Structure as of December 2016.

**ORGANIZATION CHART** G4-34



**FUNCTIONS OF THE GOVERNANCE BODIES** G4-34

**Board of Directors**

- Define business guidelines and strategy;
- Advise and approve business plans and budget, including capital investments;
- Approve distribution of dividends and reinvestments;
- Monitor the results;
- Ensure the integrity of management;
- Elect the Chief Executive Officer and evaluate the Executive Board;
- Define independent audit;
- Compliance with laws, by-law, regulations and the shareholders' agreement;
- Decide on changes in Samarco's capital structure.

**Advisory committees**

- **Strategy committee:** Supports the Board of Directors on strategic issues focused on the resumption of operations, the process of internal and external communication and reconstruction of dialogue with stakeholders in addition to managing the risks involved. To support the achievement of its objectives and technical guidance, two subcommittees were established:
  - Business Continuity subcommittee;
  - Stakeholder Management and Communication subcommittee.
- **Risk Management Committee:** supports the Board on subjects related to the assessment, implementation of control, monitoring and reporting of material risks which could impact the Company's strategy. No subcommittee has been formed to support this committee.
- **Infrastructure Committee** – supports the Board on subjects related to the safety of the dam structures, through technical evaluation and implementation of actions which seek to assure an increase in the safety level. No

subcommittee has been formed for this committee.

- **Finance committee:** supports the Board in matters relating to corporate finance. To support the achievement of its objectives and provide technical guidance, three subcommittees were established:
  - Accounting subcommittee;
  - Treasury subcommittee;
  - Insurance subcommittee.
- **Legal committee:** supports the Board in matters relating to legal issues. There are no subcommittees established for this committee.
- **Audit and compliance committee:** supports the Board in matters related to the compliance of its established policies and codes and the effectiveness of its internal controls. There are no sub-committees established for this committee.
- **Compensation committee:** supports the Board in the definition of remuneration policies for top executives at Samarco and general human resources policies. There are no subcommittees established for this committee.

# GOVERNANCE AND STRATEGY



Governance with focus on ethics and integrity is a highly relevant issue for the Company, representing a key role in the reconstruction of trust with Brazilian society.

Created in 2002, our Code of Conduct is the main guide for employees and contractors on issues such as environment, relations with stakeholders (clients, governments, suppliers, etc.), ethics, corruption, and health and safety. A new revision will be made in 2017. In addition to the Code, three other documents are an important reference in this area – the Policy of Corruption and Fraud Prevention, the Antitrust Policy, and the Gift and Hospitality Policy. Periodically training sessions are provided to disseminate their content among the employees.

G4-56, G4-S04

Samarco has a Compliance Program, with policies, communication channels and an annual schedule of training sessions which address issues such as corruption, fraud prevention and business ethics.

## OMBUDSMAN AND CONDUCT COMMITTEE

G4-56, G4-HR3, G4-S05

To monitor compliance with the policies and administer the application of the Code of Conduct, there is an Ombudsman office with a team dedicated to providing channels, verifying and receiving grievances and assuring their proper treatment, miti-

gating risks and mobilizing employees and partners to be aware of and comply with the internal regulations of the Company and the laws applicable to its business.

The Ombudsman can be reached by phone (0800 377 8002), e-mail ([ouvidoria@samarco.com](mailto:ouvidoria@samarco.com) / [compliance@samarco.com](mailto:compliance@samarco.com)) and electronic form on the Company site [www.canalconfidencial.com.br/ouvidoriasamarco](http://www.canalconfidencial.com.br/ouvidoriasamarco) (in English and Portuguese). The most sensitive grievances are directed to the Conduct Committee, composed of the CEO and other representatives of the areas of Human Resources, Legal, Compliance and Ombudsman office.

## HUMAN RIGHTS IN THE VALUE CHAIN

G4-42, G4-56

Samarco also disseminates and guides its actions in the value chain based on themes of ethics and conduct and human rights. In addition to providing four policies as a reference for its business partners, and required as part of the hiring process, the Company carries out preventive verification of Human Rights requirements among its suppliers since 2015. The Samarco Code of Conduct contains, in addition to other information, guidelines related to human rights. Compliance with the provisions of the Code is a prerequisite for suppliers to be included in the Company roster and be considered qualified to provide services or goods to Samarco.

## STRATEGIC PLANNING

To consolidate its long term planning, perform the management of risks and respond to market challenges, Samarco maintains periodic cycles of strategy review. In recent years, investments were made to adapt the Company to a new market reality, based on assumptions such as high productivity, responsible reduction of production costs and assurance of quality standards.

In 2015, prior to the Fundão dam failure, the strategy was undergoing a new review cycle, based on the methodology of Capability Based Planning (CBP). The objective was to prepare Samarco for a more complex business environment, based on the development of the three capabilities required for this context: adaptability, sustainability and governance.

Even though the work was interrupted, the concepts developed prove to be compatible with the current situation and the challenge of allowing the resumption of operations and rebuilding the trust of society, public authorities, employees, business partners and clients.



### What has changed in the Company's vision of the future?

The failure of the Fundão dam challenges Samarco to accelerate the quest for a new approach to safer operations, reducing the generation of tailings and developing optimized methods for their disposal and recycling. In addition, a new commitment is added to the already existing challenges – to generate sufficient cash\* flow to sustain the investments required for remediation and compensation of the impacts, providing financial resources for the Renova Foundation.

\*Note: as stipulated by the TTAC, should Samarco be unable to fund the remediation and compensation programs thereunder, BHP Billiton and Vale shall provide the necessary financial resources.

## RISK MANAGEMENT G4-2, G4-14

2015 was the year in which Samarco experienced, in practice, the impacts of the materialization of one of the principal risks of its business: the failure of a tailings dam. This fact turned out to be an environmental tragedy which marked the history of Samarco, thus requiring an enormous response capacity and exposing the Company to a series of other risks related to its reputation, its operating licenses and its actual continuity.

The model of risk management constructed by Samarco adopted practices of market reference (based on the Enterprise Risk Management – ERM model), of the Committee of Sponsoring Organizations of the Treadway Commission – COSO, and guidelines of the stockholders Vale S.A. and BHP Billiton Brasil. The Risk Management Policy and its manual establish the criteria for assessment and monitoring of the risks.

Risk management covers the steps of identification, assessment, treatment, classification and monitoring of risks which may impact the company and its stakeholders. The assessments are conducted in multidisciplinary seminars with the mapping of causes, impacts, controls, definition of probability and severity of that risk in terms of its occurring, and actions for improvement of the environment of control or reduction of risk level.

Up until 2015, Samarco classified risks according to their nature and level of criticality/materiality. The risks were organized in an analytic structure according to the production chain and business units, in addition to being categorized as strategic, operational, or project related.

After the failure of the dam, the risks continued being classified according to their nature and level of criticality/materiality, however their organization was changed into a structure involving \*clusters\*, which takes into account the new business environment of the Company. These clusters are divided into the following themes: geotechnical works, business continuity plan, financial, legal and compliance.

Until 2015, annual review processes were carried out for the business risks (operational and strategic). Starting 2016, in order to adjust to the new scenario at Samarco, the review process started being updated on a quarterly basis or after the occurrence of any significant event which could affect the last risk assessment made. In 2015, over 47 risk assessment seminars were held, with the participation of approximately 450 employees of key areas. In all, 26 risks were considered material and 49 non-material; more than 440 initiatives were listed for their treatment.

In 2016, these numbers increased substantially, reaching a total of over 87 risk assessment seminars, involving over 850 employees and contractors, totaling 81 material risks and 6 non material risks. In line with these activities, over 370 initiatives and actions for treating the fragilities encountered in these assessments were carried out.

Risk management is a fundamental process for supporting the Company's return to operation, strengthening, ever more, the management and planning for the future of Samarco's business. Controlling and managing the risks – not only those related to the dams – are a major prerequisite to assure the continuity of the Company's operations.



### Some examples of themes and risks monitored

- Interruption of operations;
- Access to water and energy resources;
- Dams;
- Occurrences of acts of corruption and fraud within Samarco and in its external relations;
- Institutional reputation and relations with the community;
- Fluctuation in iron ore market prices;
- Changes in scenarios and regulatory frameworks.

**DAM RISKS**

The design, construction and operation of the dam structures of Samarco in accordance with the legal and practical obligations of the mining industry are the assumptions historically adopted.

Up to the end of 2015, in complement to the risk assessment of the dams, carried out based on the Company's risk practices, we also used the Failure Modes and Effects Analysis (FMEA). The evaluated structures were further submitted to regular technical and independent audits (ITRB, Design Review, VIPs – Value Improvement Practices – and IPA, among others).

Dam risks in the design and construction phases were managed by project governance with the adoption of the FEL (Front-End Loading) methodology, which establishes maturity criteria for its development. In addition to this, external audits (IPA) were also held.

For the management of the risks related to the operation phase, Samarco's methodology of corporate risk was utilized

with re-assessments in annual cycles up to 2015. Starting 2016, they were intensified to adapt to the new scenario. For the implementation of the seminars, some documents inherent to the operation of the structures were also consulted, such as the Tailings Disposal Plan (PDR); the compliance guide for dams; and the Emergency Action Plan for Mining Dams (PAEBM).

Between 2011 and 2015, there were five risk assessments connected to the operation of dams, with mapping of the preventive and mitigation controls, in addition to identification of the actions for improvement. In 2016, there was a considerable increase in risk assessments which accompanied the evolution of the new and remaining geotechnical structures after the failure of the dam. These meant over 18 assessments and reassessments of risk carried out by the Samarco team, not to mention the various evaluations made by national and international entities which added more elements to the evaluation performed internally by the Company.



**+ 20**

risk assessments and reassessments related to the dams carried out between 2015 and 2016

The Company's dam structures are continually monitored





## SUSTAINABILITY PERSPECTIVE

Samarco, as a mining company, belongs to an industry which generates impacts but can also contribute to societal progress and technological, human and socioenvironmental development of the territories within its area of direct influence. As such, the Company has kept in place, for over ten years, mechanisms for dialogue and engagement with its stakeholders. In addition, it is a signatory to several agreements, such as the Global Compact and other commitments to sustainable development (see table).

It is no doubt a challenging task to adjust the business model to sustainability principles. Since 2012, the Company has been adopting as a reference the Sustainability Model, which is a management tool designed to construct trust relations with society based on four pillars – role leadership, innovation and technology, collaborative networking and responsible entrepreneurship.

Samarco has worked on the assumption that society will participate more and more in the decision-making process of corporations, in order to influence and make the difference in their strategy and operational plan to assure the generation of shared value, equity, and a social license to allow the company to operate and thrive.

In recent years, Samarco has worked on preparing for this new scenario, connecting the guidelines of the Sustainability Model with the strategic map. An example of this is the reinforcement of the studies focused on innovation and ecoefficiency as part of the development of competitive advantages (read more in Our Commitment to Brazilian Society). The failure of the Fundão dam, however, imposed a deep reflection about the model and its application in a new reality focused on the construction of a common purpose, to be discussed by the Company together with society.

The failure of the dam points to the need for deep reflection about the impacts, investments and projects to align Samarco's governance with sustainability requirements

## COMMITMENTS AND PACTS

G4-15, G4-16

### Global Compact

Samarco is a signatory to this compact to uphold the ten principles of the United Nations, since 2001. In this report, it outlines its main achievements and projects. Up to the dam failure, the Company had been a member of the UN Development Program (UNDP), but withdrew in 2016, with its return being conditioned to the progress in the plans related to impact management.

### Sustainable Development Goals (SDG)

Samarco is committed to the fulfillment of these goals, launched in 2015, as a follow up to the Millennium Development Goals proposed by the UN in 2000.

### Business Contributions to Promoting a Green and Inclusive Economy

When participating in the UN Conference on Sustainable Development (Rio +20), in 2012, Samarco became a signatory to this letter.

### Open Letter to Brazil on Climate Change

In 2009, Samarco signed this document together with 21 other companies committed to the reduction of their greenhouse gas - GHG emissions.

### Business Pact for Integrity and against Corruption

This pact was signed by Samarco in 2006, committing the Company to adhering to the best practices in fighting and preventing corruption.

## MATERIAL THEMES OF SUSTAINABILITY

As part of Samarco's adhesion to the reporting methodology of Global Reporting Initiative (GRI), the Company regularly performs materiality processes – an activity which combines, studies, document analyses and consultations with internal and external stakeholders in order to identify the impacts and the social, economic and environmental topics which are most relevant to the Company.

In 2016, under the impact of the Fundão dam failure, the option was made to perform a strategic revision of the current materiality matrix – developed in 2014 based on a consultation process which, at the time, included interviews with directors, officers, general managers and employees of Samarco, round tables with several publics (community, public authorities and suppliers) in Minas Gerais and Espírito Santo, as well as an online survey, with over 200 people having been contacted or consulted. G4-24, G4-25, G4-26

Recognizing the need to revisit the priority themes in light of the dam incident, the focus for 2016 was determined as the attempt to understand which subjects associated with the current moment of the Company were not considered material. To this end, a study was carried out which contemplated the examination of the following input documents:

- **Termo de Transação e de Ajustamento de Conduta** – TTAC (the Framework Agreement, or just Agreement) – to understand the responsibilities and commitments assumed over a period initially estimated at 15 years, on the socioenvironmental and socioeconomic fronts, with specific programs, timelines and definitions about the necessary attributions and measures.
- **Image Monitoring Survey** – carried out in 203 municipalities considering the area of direct influence of the Company's operations which had been impacted by the failure of the dam, in addition to other localities which had contact with the Company only after the incident. Over 4.4 thousand interviews were held, in order to identify the main aspects associated with the Samarco image, the perception of the public as to

the emergency actions carried out after the dam failure, and the impacts of the dam failure on the Company.

- **Objectives of Sustainable Development** – to identify the key themes of the commitments which are aligned with the strategy and the impacts generated by Samarco.
- **Ten main topics in the press and social networks** – to allow the mapping of the main demands for information that the press and society have with regard to Samarco. The Company has been performing a daily monitoring of the repercussion and the mentions in these channels.

As a result, we have arrived at a new list of themes, validated and analyzed by a leadership committee of the Company, which underlines the importance of aspects such as transparency and governance of the socioeconomic and socioenvironmental recovery programs; relations with communities and government entities; economic-financial sustainability; and full reports on the impacts of the dam failure on biodiversity, on the economies of the impacted regions, on the work force and on the future of the Company as a whole (see table). G4-43

Based on the topics, a definition was reached of the indicators which could express the challenges and projects for each work front, arriving at a scope of indicators considered material (connected to the 2016 themes) and some not material, but nevertheless important for accountability regarding environmental, labor and social aspects of various types.

**Material GRI G4 indicators:** EC1, EC6, EC7, EC8, EN8, EN9, EN12, EN14, EN22, EN26, EN27, EN29, EN30, EN31, EN34, SO1, SO2, SO8, SO11, MM2, MM3, MM7 and MM9;

**Additional non material GRI G4 indicators\*:** EN3, EN4, EN5, EN6, EN10, EN15, EN17, EN18, EN19, EN20, EN21, EN24, LA1, LA4, LA6, LA9, LA16, HR3, SO4, SO5, SO7, MM6 and MM10.

\*The non material indicator NR0302-14 (number and duration of non technical delays) is addressed throughout the text.

The Company is aware that the steps taken in 2016 are just the beginning, reflecting the efforts of an organization which is being rebuilt, which needs to dialogue with society and understand the most relevant priorities and demands based on the active voice of its stakeholders. In addition, the focus of the updated material themes is often on the socioenvironmental and socioeconomic actions performed after the failure of the dam, which

are included in the scope of this report only until August 2016, at which time the Renova Foundation took over the execution of these programs directly.

As a result, and considering the phase that Samarco is in, the expectation is to perform in 2018 a new materiality process, including external consultations and multistakeholder panels, thus defining a new matrix of themes for the coming years.

## OUR MATERIAL THEMES

MATERIAL THEMES 2016	WHAT WE WILL DO G4-27	MATERIAL ASPECTS G4-19	WHO WE IMPACTED G4-20, G4-21
Transparency in communication and business	Clear communication about the mitigation actions, present and future, and the progress of the investigation about the cause of the dam failure, broad and easily accessible dissemination of information, through Company site, press, etc.	Compliance Reestablishment Grievance mechanisms related to environmental and social impacts	Community, public authorities, NGOs and entities Employees Shareholders Contractors
Tailings – disposal management and mitigation of impacts caused by dam failure	Indicators to monitor the reliability of the dams, indicators goals and reporting of progress on removal of tailings from impacted location, reuse of waste	Effluents and waste	Community, public authorities, NGOs and entities Environment
Mitigation and recovery of land and water biodiversity	Indicators to monitor the programs and initiatives of environmental recovery, both land and water, with emphasis on the Doce River basis	Water Biodiversity Effluents and waste Products and services General	Environment Community Public authorities, NGOs and entities
Engagement and participation of communities in decision making	Participation of representatives of the impacted communities in discussions and decision making, in addition to ongoing dialogue and engagement	Local communities	Community Community, public authorities, NGOs and entities
Generation of employment and development of local economy	Encouragement of structuring of new businesses, independent from mining industry, and restoration of socioeconomic conditions of the impacted regions	Market presence Indirect economic impacts Local communities	Community Employees Contractors Suppliers
Recovery of infrastructure of impacted communities	Resources for public infrastructure, seeking to meet the needs of both new economic activities (highway and telecommunications improvements, etc.) and community needs, such as housing, schools and health services	Indirect economic impacts Transportation Local communities Reestablishment	Community
Financial sustainability	Economic-financial feasibility for resumption of Samarco operations, generating revenue for the shareholders and financial resources to work on the mitigation of the impacts caused by the dam failure	Economic performance	Employees Contractors Top leadership Suppliers Customers Shareholders

# OUR COMMITMENT TO BRAZILIAN SOCIETY



Samarco is committed to establishing a continuous dialogue process with public authorities, institutions, employees and the community in the pursuit of solutions to the challenges related to its business. This attention to the authorities and the impacted populations was necessary after the failure of the Fundão dam, when the Company mobilized to act in response to the humanitarian and environmental emergencies, contribute to the investigations and assure the safety of the remaining structures.

In the months following the failure of the Fundão dam, in parallel with the emergency actions, studies were initiated to promote the socioeconomic and socioenvironmental recovery of the impacted regions. The Company knows that these efforts will only be successful if there is dialogue and transparency with

its stakeholders. With the constitution of the Renova Foundation in June 2016, the transfer, in August 2016, of the oversight of the execution of the programs to this entity, and the preparation for the potential resumption of Samarco's activities, the Company seeks to demonstrate that it is fulfilling its obligations in the control of immediate impacts and is seeking safe and feasible alternatives for its restart.

Aware of the magnitude of the challenge to regain the confidence of Brazilian society, Samarco proposes to work on seeking good practices to recover the territory and restart its activities. As a result, it will expand its networking actions and work on contributing towards a safer mining operation, acquiring and sharing lessons learned and experiences with partners and with society.



Listening to the communities in the current scenario is one of the Company's main challenges and commitments

## THE FRAMEWORK AGREEMENT (TTAC)

Together with the emergency, humanitarian and safety actions, a series of dialogues were initiated with public authorities, civil society and other publics to study ways to formalize the commitment by Samarco and its shareholders to the long range compensation and recovery of the areas impacted by the Fundão dam failure.

The quest has been for the structuring of a set of objectives, actions and investments which would give society and the public authorities assurance of the Company's commitment. As a result, on 02 March 2016 a Framework Agreement was signed - Termo de Transação e de Ajustamento de Conduta (TTAC) – by the Company, the shareholders, the federal government, the governments of Minas Gerais and Espírito Santo, and several entities and organizations (see listed below) to carry out the social, environmental and economic recovery of the regions impacted by the dam failure.

The TTAC is the outcome of the negotiation related to Public Civil Action No. 0069758-61.2015.4.01.3400, between Samarco and its shareholders, the defendants in the claim, the federal government and the state governments of Minas Gerais and Espírito Santo and other public authorities, including environmental agencies, the claimants. Several meetings were held for the discussion, negotiation and drafting of the principles, guidelines and framework which in a singular manner define a multidisciplinary action plan for the full recovery and adequate compensation of the environmental and socioeconomic impacts. The construction of the TTAC did not affect the development of the other lawsuits and investigations, nor does it constitute a prerequisite or condition for Samarco to resume its operations.

The negotiations mobilized several meetings involving Samarco and public authorities. The demands of the communities were contemplated both through their assigned public authority responsibility as by the input collected by Samarco itself, in the periodic dialogue forums and the development of the emergency actions.

Although the TTAC has not been ratified as of September 2017, it is being used to define

the socioenvironmental and socioeconomic lines of recovery actions, underpinning the activities carried out by Samarco since 05 November 2015. As such, it will continue to be complied with, since it provides clear commitments, deadlines for execution of each project, and rules of transparency and accountability. It is important to point out that, with or without ratification, the actions outlined in the TTAC continue to be implemented.

Not to mention the fact that the Company and its shareholders are subject to severe penalties in the event they fail to comply with the directives of the TTAC (read more at Fundação Renova).

## PRELIMINARY AGREEMENT

The Federal Public Prosecution Service, Samarco and its shareholders signed a Preliminary Agreement on 18 January 2017, which was partially ratified by the 12th Federal Court of Justice of Minas Gerais in March. This Agreement outlined the process and the timetable for new negotiation of a settlement of the actions of R\$20 billion and R\$155 million. The Agreement provides for the appointment of experts to advise the federal prosecutors in relation to the actions of social and environmental remediation and monitoring of the programs under the TTAC (the Framework Agreement).

The conclusions of the expert advisors will be considered in the negotiations of a final settlement arrangement with the Federal Prosecutors. The Preliminary Agreement also includes the supply of a security (interim security) of R\$ 2.2billion to support the payment of the consultants and the holding of public hearings. This security will remain in effect until 30 October 2017 or until the date of the final settlement signed by the parties.

After acquiescence from the Public Prosecution Service, the courts granted the requests on 29 June 2017, suspending the public civil actions of R\$155 million and R\$20 million. The interim security in the amount of R\$ 2.2billion was also approved by the courts (read more at the Financial Statements, page 43, available on [www.samarco.com](http://www.samarco.com)).



# TTAC

this Agreement involves the Company, its shareholders and several public agencies and other institutions

## SOCIETY'S PARTICIPATION

The implementation of the TTAC programs requires respect for human rights and the engagement of the impacted people in decision making. To this end, the Agreement establishes as key principles both transparency and engagement of the impacted communities in the discussion and construction of the adopted actions.

Samarco worked on fulfilling this commitment since the early emergency and recovery phase, leading all related actions up to August 2016. Later, already under the direction of Fundação Renova, some 454 consultations open to the public were held in Mariana, Barra Longa, Rio Doce and Santa Cruz do Escalvado, in MG, between November and December 2016. These meetings had 14,519 participants (read more in Social performance).

Listening to the communities was an important instrument in defining priority actions and ways to accelerate the projects, and also for the Company to dialogue, together with the representatives of public authorities involved in the construction of the TTAC, about maintaining the participation of society in the processes which have been conducted by the Foundation since August 2016.

In addition to regular dialogues, another specific participative process was established with the three most impacted communities (Bento Rodrigues, Paracatu de Baixo and Gesteira, in Minas Gerais) regarding the choice of new sites for resettlement (read more in Future of the impacted communities).



# + 14 thousand

participants in open public hearings in 2016 already carried out by Fundação Renova to discuss the paths of the programs and actions

## EXPENDITURES MADE UP TO DECEMBER 2016

Between November 2015 and December 2016, Samarco spent R\$1.8 billion on various emergency and remedial actions, some included in the TTAC, others not. Regarding the amounts related solely to the TTAC, the sum was R\$1.3 billion. We believe that a proactive and transparent performance in the execution of the projects by the Renova Foundation in the long term will show that Samarco is working in alignment with the recovery plans.

## LOCAL LABOR

Another relevant item, complementing the TTAC principles, is the prioritization of local and regional manpower in the implementation of the actions. The intention is to contribute to the socioeconomic reactivation of the impacted municipalities. In September 2016, of the total number of outsourced personnel (3,176), over 1700 were local hires.

## PRINCIPLES OF THE TTAC - THE FRAMEWORK AGREEMENT

*Below you will find the main pillars for the fulfillment of the commitments specified in the TTAC:*

**Repair** – allow for the repair of all impacts caused by the failure of the Fundão dam.

**Transparency** – periodic reporting on the programs and the performance and management of Fundação Renova.

**Popular participation** – the community, the main public contemplated by the commitments in the TTAC, has an active participation through the Advisory Committee and the process of social dialogue, in the evaluation and monitoring of all of the programs.

**Responsible and effective execution of the programs** – allocation of resources with excellence, in order to assure projects and initiatives which generate

progress, development and socioeconomic and socioenvironmental renovation in the impacted regions.

**Constant oversight by the Public Authorities** – the federal government, the state governments of Minas Gerais and Espírito Santo and respective competent environmental entities are the active components in the process of defining and allocating resources, as well as in the monitoring of the effectiveness of the programs.

**Compliance with the sectoral public policies** – Fundação Renova\* adopts third sector practices, investing in the generation of knowledge, innovation and compliance.

\* In the next chapters of the report, the functioning and governance model of the Renova Foundation will be presented in more detail.

## SIGNING OF THE TTAC

The following parties participated in the negotiations related to this Agreement:

### Promisors – companies

- Samarco Mineração S.A.
- Vale S.A.
- BHP Billiton Brasil Ltda.

### Promisees – Public Authorities

- Federal Government, via the Office of the Attorney General (AGU), and the states of Minas Gerais and Espírito Santo;
- IBAMA – Instituto Brasileiro de Meio Ambiente e dos Recursos Naturais Renováveis;
- ICMBio – Instituto Chico Mendes de Conservação da Biodiversidade;
- ANA – Agência Nacional de Águas;
- DNPM – Departamento Nacional de Produção Mineral;
- FUNAI – Fundação Nacional do Índio
- IEF – Instituto Estadual de Florestas, agency subordinated to the Secretaria de Estado de Meio Ambiente e Desenvolvimento Sustentável (MG);
- IGAM – Instituto Mineiro de Gestão de Águas, agency subordinated to the Secretaria de Estado de Meio Ambiente e Desenvolvimento Sustentável (MG);
- FEAM – Fundação Estadual de Meio Ambiente;
- IEMA – Instituto Estadual de Meio Ambiente e Recursos Hídricos;
- IDAF – Instituto de Defesa Agropecuária e Florestal do Espírito Santo;
- AGERH – Agência Estadual de Recursos Hídricos.

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## PROGRAMS\*

Socioeconomic and socioenvironmental programs compose the recovery plan which, since August 2016, is under the responsibility of the Renova Foundation.

*\*Note. The TTAC originally outlined 41 recovery and compensation programs. However, as work developed, one of the programs was subdivided into two, to allow a more focused and effective management. As a result, the total number of programs under the management of Fundação Renova is now 42.*



Recovery of backyards in Barra Longa

## FUTURE OF THE IMPACTED COMMUNITIES<sup>G4-</sup>

MM9, G4-EC8, G4-SO1, G4-SO2

To start to address the impacts caused by the Fundão dam failure, Samarco worked to reestablish the well-being of the residents of Bento Rodrigues and other communities, such as Paracatu de Baixo and Gesteira, which belong, respectively, to the municipalities of Mariana and Barra Longa (Minas Gerais). The loss of homes and personal belongings represents a material, social and psychological loss for the population. Thus, this aspect was elected as a priority in terms of accelerating the reconstruction of the impacted localities, with the direct participation of the families involved. The entire resettlement process is being carried out with the oversight of the Public Prosecution Office and in compliance with the timeframes established in the TTAC, taking into account international standards such as IFC Standard 5.

In January 2016, work started on the identification of areas for the potential

reconstruction of the communities. This action, formalized in the TTAC, involved direct consultation of the population. Meetings were held with the resident committees and general townhall meetings with the communities for the approval of the criteria for the selection of the areas, in a democratic and participative manner.

On 07 May 2016 representatives of 223 families who used to live in Bento Rodrigues chose the place where the new district will be built. With 92% of the votes, the site called Lavoura was chosen. It is located 9 km away from the old Bento Rodrigues district, and 8 km from Mariana.

The criteria for the selection were defined together with the residents and representatives of the Minas Gerais Public Prosecution Service (MPMG). In compliance with a request of this entity, more detailed technical studies were carried out, including hydrogeological aspects and interference with the sanitary landfill of Mariana, the quality of the waters in the prospective site.

The study, already concluded and delivered to the MPMG, proved that there was no contamination of the waterways from the landfill.

The conceptual urban design, which consists in the design of the new district and the definition of its approximate size and boundaries, in addition to the layout of the streets and blocks, was presented by Fundação Renova and unanimously approved by the community of Bento Rodrigues in January 2017.

The same process was carried out with the residents of Gesteira, who visited the potential sites for relocation of their community. In addition to eight houses, a church, parochial hall and soccer field will also be built. Two areas were identified as potentialities, close to the center of the district, according to the wishes of the community. During the visits, the residents received a folder with the technical studies about the options for sites. In the voting held on 25 June 2016, 55 families participated and elected with 94% of the votes the site known as Macacos.

Site visits were included in the actions to assure the communities of their right to choose the location of the new towns, based on clear information and free will







### 3

communities impacted by the failure of the dam participate in the resettlement process

In June and July 2016, families from the subdistrict of Paracatu de Baixo visited three possible sites for the reconstruction of their community. In this process, information was provided about the quality of the soil, geology, vegetation, cavities and other technical characteristics. The options lie within a radius of 9 km of the old Paracatu and 35 km from the center of Mariana, and the voting process followed the criteria defined by the community itself – water supply, availability of electricity, closeness to Paracatu de Baixo, ease of access, organization similar to that Paracatu surroundings, access to public transportation and topography. Representatives of 103 families from Paracatu de Baixo elected, on 03 September 2016, the site called Lucila for the reconstruction of the district.

One of the main impacts related to this resettlement involves the characteristics of each community, which originally

blended urban and rural contexts. The livelihoods and routines of the community suffered significant changes after the physical displacement. The families had planted plots (vegetable garden and orchard) and livestock (pets, chickens, pigs, cattle), mostly for their own subsistence. The neighborhood ties were strong, in view of the small size of the communities and the location of the homes. As for work activities, the impact arose from the physical displacement of the rural workers, mainly, and loss of equipment and products, as well as loss of trade and services previously provided to the communities. G4-S02

The public infrastructure previously available in the community is operating provisorily in various locations in the municipality of Mariana. The two schools of the Bento Rodrigues and Paracatu de Baixo communities are functioning in houses adjusted to meet the needs of the

school community, without compromising the school calendar. The children finished the regular 2015 school year and had a normal school year in 2016.

Families which suffered economic impact and loss of income receive financial aid to assure their livelihood. Psychosocial assistance is being provided to promote the maintenance and strengthening of the social ties of the former community, and also to help the families adapt in the municipality of Mariana. Activities with elderly are in progress, and initiatives such as community vegetable gardens are being studied for implementation in this community.

## DELIVERY OF THE NEW COMMUNITIES

The timeframe established for the delivery of the new communities, as provided in the TTAC, is three years counted from the date of signing of the Agreement, therefore March 2019. Till then, the families will remain in temporary housing. After the delivery of the new communities, the resettled families will continue to be monitored, through programs of economic and productive restructuring for at least another two years.

### Bento Rodrigues

 **New site:** Lavoura

 **Area:** 375 hectares

 **Resettled families:** 236\*

### Gesteira

 **New site:** Macacos

 **Area:** 7 hectares

 **Resettled families:** 8\*

### Paracatu de Baixo

 **New site:** Lucila

 **Area:** 230 hectares

 **Resettled families:** 103\*

*\*Estimated number based on emergency database and automatic aerial photo delimitation.*

Recovery of back yards in Barra Longa

## RECONSTRUCTION PHASES



Definition of sites



Design, together with the community, of the new layout of each district. This phase involves the conceptual design, defining the location of facilities such as churches, schools, health care units, squares and soccer fields. It also includes definition of criteria for determining the size of the lots and the construction standards for the residences – without individual customization.



Individual dialogue with each family to choose location and structure of each home and specifications for their finish.



Once the individual agreements are reached, reconstruction will start.



Moving to the new homes and providing support to the families.



# RESULTS OF THE INVESTIGATION

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In order to understand the reasons which led to the tragedy, shortly after the dam failure, Samarco, Vale and BHP Billiton decided to commission a US law firm, Cleary Gottlieb Steen & Hamilton LLP, based in New York, to provide a better understanding of the event as a whole. The firm was engaged under the condition of total independence and impartiality. Samarco collaborated fully with the external investigation, supplying all available information and free access to its units and employees. In addition, Samarco has the continued responsibility of contributing to the investigations carried out by competent authorities.

In conducting the independent investigation, Cleary Gottlieb formed a panel with specialists of the area of geotechnical engineering from Brazil, Canada, and the United States to provide support to the analysis. The leader of this panel was Professor Norbert Morgenstern, an internationally acclaimed authority in geotechnical engineering, Professor Emeritus of Civil Engineering at the University of Alberta. Field inspections, data analyses, laboratory tests, research modeling were carried out and interviews made with those closely involved.

The public release of the results was made at the end of August (2016) in Nova Lima (MG), in the metropolitan region of Belo Horizonte, at a press conference with the participation of executives from Samarco and the stockholders.

According to the final report of the investigation, of a technical and detailed nature, the first incident with the Fundão dam occurred in 2009, when it was found that the toe drain of the starter dike was having technical problems and not functioning in accordance with the initial design. After an external discussion and technical analysis, the recommended solution was to revise the original design of the design firm that included a toe

drain, and instead put in a drainage blanket at a higher level. This change was critical, for it made it possible to allow and accept the phenomenon of saturation of the beach area, introducing the liquefaction potential of sand in a dam which, till then, had been designed to operate with a drainage system that would keep the sand on the beach dry at all times.

The second incident described by the specialists occurred throughout 2011 and 2012, when it was ascertained that the main gallery should be plugged, for which it would be necessary to open a spillway channel on the left abutment to assure the outflow of rain water. During this period, it was found that a certain amount of mud had left through this channel together with the water, reaching the beach area of the dam.

Between 2011 and 2012, structural problems were identified with regard to the secondary gallery located on the left abutment, leading to the conclusion that no additional weight should be placed over that gallery. This required the plugging of this gallery as had been the case with the main gallery. The crest of the left abutment was then provisionally moved backwards, until the concrete plugging of the gallery could be concluded. Under this area, which became known as the \*setback\*, the presence of slime lenses was determined after the dam failed.

During the years of 2013 and 2014, seeps at the surface of the dam started to appear in the setback of the left abutment, at various elevations. In August 2014, the drainage blanket, responsible for the drainage of the tailings, reached its maximum capacity. It was also concluded that, over this period, the amount of mud/slimes located beneath the body of the dam was responding to the growing loading resulting from the repeated crest raisings, putting pressure on the sand tailings and pushing them in the direction

of the dam crest, while at the same time the saturation of the structure increased.

Due to this process of continuous loading, the slimes were compressed, and, at the same time, they deformed laterally, being squeezed out like toothpaste from a tube, in a process known as lateral extrusion. The sands just above were forced to adjust to this movement leading to lack of lateral confinement.

This allowed the sands to be dragged and lose cohesion in this process. Another aspect related to the failure was a series of three small seismic events which occurred about 90 minutes before. The computer modeling showed that the forces of the earthquake produced an incremental horizontal movement of the

slimes, which accordingly affected the overlying sand tailings. These additional movements, although small and associated with uncertainties, may have accelerated the failure process.

Samarco and its stockholders are analyzing all of the results, which were also shared with the Federal Police and the Public Prosecutor Service, among other agencies involved with the investigation processes. In addition to providing information for the police investigations in course and the reasonable legal measures, the information supplied will assist the Company and the mining sector as a whole in the search for stricter standards of operational safety, so that events of this nature may never occur again.

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## Read more

The full report of the investigation carried out by Cleary Gottlieb about the dam failure: <http://fundaoinvestigation.com>

### INDICTMENT BY THE FEDERAL PUBLIC PROSECUTOR

On 20 October of 2016, the Federal Public Prosecutor in Minas Gerais disclosed the findings of the task-force formed to investigate the failure of the Fundão dam. According to the prosecutors of the Republic, the indictment provides an overview of all the problems occurred at Fundão, since its licensing. A total of 26 persons were indicted, including four legal entities – Samarco, Vale, BHP and VOGBR – and 22 natural persons. In the following month, the Federal Court in Ponte Nova received an indictment made by the Federal Public Prosecutor, rendering the indicted parties defendants accused of environmental crimes. Samarco refutes the indictment of the Federal Public Prosecutor, which entirely failed to consider all of the clarification, evidence and testimonies presented during the investigations initiated right after the failure of the Fundão dam.

### RECLAMATION OF DEGRADED AREAS: THE FUTURE OF THE FUNDÃO VALLEY G4-EN12

Samarco will file in early 2017, with the State Secretariat for Environment and Sustainable Development (SEMAD), the Recovery Plan for Degraded Areas (PRAD) for Fundão.

Containing some of the remedial actions related to the dam failure, the document presents certain guidelines for the environmental reclamation of the site, such as the definitive stabilization of the slopes, structures and remaining tailings, in addition to the revegetation of the area, based on studies of the soils involved and the selection of the most suitable plants for the reclamation work according to the local environmental characteristics.

The actions outlined in the PRAD will depend on the review and approval of SEMAD, which is the agency responsible

for inspecting and authorizing activities in the region. Samarco's proposal includes the use of sandy material, stabilizing the area and create a smooth and safe surface for access to the revegetation actions.

The existing structures at the Germano Complex are stable. However, there are 13 million cubic meters of tailings still in Fundão, which need to be stabilized in a definitive manner. The filling with sandy material and subsequent revegetation was considered by Samarco to be the most efficient way to promote the environmental rehabilitation of the area.

If the PRAD is approved, the sandy material will be contained within Fundão by the Dike called "Axis 1", which will be built using the methodology of compacted soil. The structure will not use the same construction method as the old Fundão dam, which involved upstream raising using tailings.

# RESUMING OPERATIONS

From the business standpoint, Samarco believes that the computed costs of the emergency actions already undertaken are only the beginning of an extensive effort to remediate all the impact caused. This is why, in addition to the actions of remediation and compensation, there is the intent to promote the return of operations of the Company and, with this, fulfill the commitments assumed with the public authorities and the society in general.

Surveys carried out immediately after the failure of the Fundão dam, in January and February 2016, with the support of the Vox Populi Institute, showed that most of the population is of the under-

standing that the Company should continue operating, while at the same time assuming liability for the impacts caused by the incident. In addition to this, the Company has a significant influence over the economy of the country, having been, until the dam failure, one of the largest national exporters.

Having completed the works on the containment system for the tailings dam in Mariana (MG), which has a sediment retention capacity of 6 million cubic meters, as well as the comprehensive review of the safety factor of its activities - including instruments for the prevention of accidents, monitoring of dams, emergency communications and reducing

the generation of tailings (Learn more in About the Failure of the Fundão dam) -, the Company has developed a study for resumption of its activities, counting on the use of the mine pit at Alegria Sul for disposal of tailings. Licensing studies have been in progress since 2016, focused on obtaining the Corrective Operation License (LOC) required for the Germano complex in Minas Gerais.

## ECONOMIC IMPACT OF INACTIVITY

G4-EC8

Prior to the failure of the Fundão dam, Samarco ranked among the 15 largest exporters in Brazil (2015 data), generating R\$1.2 billion in tax revenue (R\$9.1 billion between 2010 and 2015). In 2014, the Company's revenue was on average equivalent to 6.4% of the GDP of Espírito Santo and 1.5% of the GDP of Minas Gerais.

In a study developed by Tendências Consultoria Integrada, commissioned by BHP Billiton, in December 2016, it was determined that Samarco's inactivity generates significant impacts on the country and the states of Minas Gerais and Espírito Santo. If the Company remains idle in 2017, for example, it puts at risk the existence of 4.1 thousand jobs in Espírito Santo and 14.5 in Minas Gerais, in other words, some 19 thousand countrywide.

In addition, in terms of exports, it calculated a loss of US\$766 million which would not be realized in 2017, which would mean a loss in the exports of Espírito Santo and Minas Gerais of 8% and 3%, respectively.

These data indicate how Samarco can contribute to create employment and income and drive regional economies, and how its inactivity negatively impacts the trade balance and the generation of employment and income in the states and in the country.

**R\$989 million**

Is the loss in tax revenue in 2017 with the Company's inactivity

**19,183**

direct and indirect jobs run the risk of disappearing with the suspension of Samarco's activities

**R\$4.4 bilhões**

Risk of impacting overall revenue with Samarco's inactivity, estimated for 2017

## NEW MODEL

Currently, the operational activities of the Germano unit are under a stop-work order. In the other facilities, such as the pipelines, the port facility and the pellet plants in Ubu, there is no restriction on activity, even though they are also stopped. After the failure of the Fundão dam, the activities of the Germano complex were suspended by order of the Núcleo de Emergência Ambiental (NEA) of the Fundação Estadual do Meio Ambiente (FEAM). In October 2016, SEMAD suspended the environmental licenses of all of the facilities in the Germano complex.

In order to place its units in operation again, the Company started working on studies to find alternatives to meet the expectations of society as to the safety of its processes and which meet the requirements of the regulatory bodies, government entities and other institutions.

Once it has obtained all of the authorizations from the competent bodies, according to law, Samarco believes it can gradually resume its activities at a lower production capacity, in line with water availability.

## CURRENT STATUS AND PROSPECTS

The proposal for environmental licensing (EIA/RIMA) for the disposal of tailings in the Alegria Sul pit, one of the main prerequisites for resuming operations, was submitted in June 2016 and is being reviewed by the competent agency, in order to provide more safety for the public authorities in terms of management of

the environmental impacts and will allow the population to monitor the process, including through public hearings such as the ones held in December 2016 in Ouro Preto and Mariana. The Alegria Sul structure is confined and is located on Company lands as part of the Germano complex.

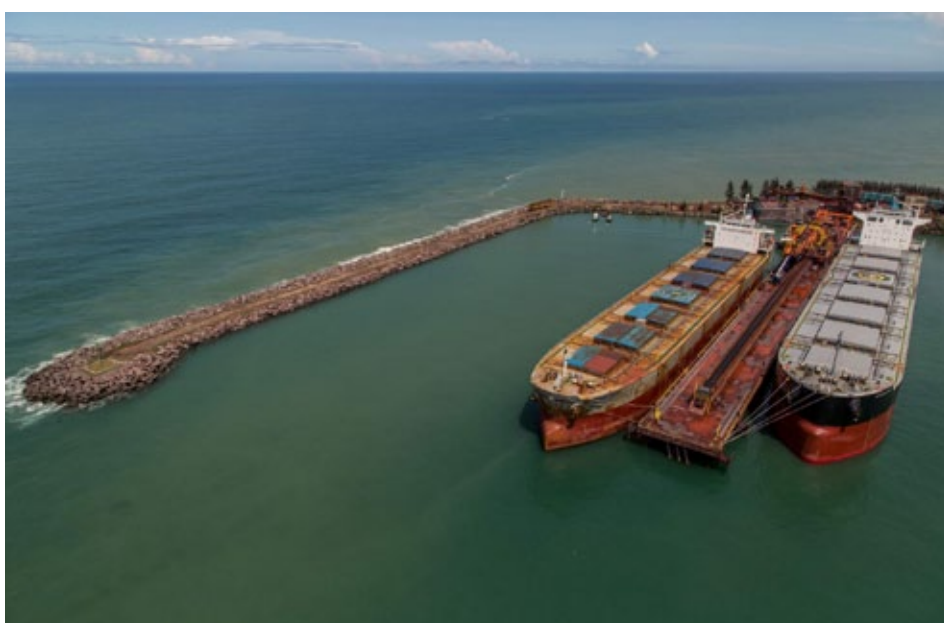
The aforementioned public hearings related to the licensing process were held on the 14<sup>th</sup> and 15<sup>th</sup> of December 2016 in Ouro Preto and Mariana, respectively. This process was preceded by a phase of dialogue and mobilization meetings, involving the overall participation of more than 680 stakeholders, including government authorities, entities and informal community leaderships, not only from Mariana and Ouro Preto, but also from nearby Santa Barbara and Catas Altas.

Samarco is applying for a Preliminary License together with an Installation License (known as LP+LI) for the Alegria Sul pit. After these have been obtained, the Company will embark upon a period of construction work and preparation of the pit, and subsequently apply for an Operating License (LO) for Alegria Sul in parallel with an all-encompassing Corrective Operating License (LOC) for the Germano unit.

The LP+LI permitting process is almost complete. In order for the formal request to be submitted to the Specialized Technical Chamber of Protection of Biodiversity and Protected areas (CPB) of SEMAD, responsible for voting on these licenses, Samarco is awaiting the acquiescence of the National Park of Gandarela, since the project is located inside the buffer zone of this conservation unit. The agreement of the other consenting parties has already been given, including Floresta Estadual do Uaimii (FLOE Uaimii), Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA-MG), Instituto do Patrimônio Histórico e Artístico Nacional (IPHAN) and Instituto Estadual do Patrimônio Histórico e Artístico (IEPHA).

Samarco is proceeding with the environmental studies for the Corrective Operating License - LOC for Germano, as outlined above, and after they are concluded the material will be reviewed by the technical team of SEMAD, following the usual process for this type of license.

As both licensing processes are currently being analyzed by the competent authorities, it is not possible at this moment to provide a reliable estimate of when the Company would be able to resume its operations.



Aerial view of the port facilities in Anchieta, ES

## A LONG RANGE VIEW: RESEARCH, TECHNOLOGY AND INNOVATION G4-EN27

The Samarco has been studying in recent years, among other topics, the exploitation of tailings (sandy and slimes) in its production process and in other industrial sectors - such as civil construction, paving, the chemical industry of sanitation and pigments. For these applications, partnerships were developed with universities, research centers, suppliers and companies from other industrial sectors.

In 2015, research was undertaken to understand how certain mining complexes work on the transformation of the tailings into by-products, involving governments, industry and academia; one of the technical visits made before the failure of the dam was to China, - a country whose industrial associations are a reference in circular economy applied to mining.

Several masters degree and doctoral dissertations and theses have been developed, over recent years, and the knowledge obtained has been put into practice. An example is the use of the sandy tailings as fine aggregate in the fabrication of paving blocks, which were used in both internal and external works of Samarco since 2013, in addition to the pigmentation of plastic wood with the slimes resultant from the iron ore, since 2014.

After the failure of the Fundão dam, several socio-environmental studies were conducted, including those with the purpose of promoting local technology and innovation using tailings released by the accident. The knowledge obtained in these studies served as a basis for some actions by the municipalities of Santa Cruz do Escalvado and Ponte Nova (MG). It was possible to utilize the material dredged from the Risoleta Neves HEP reservoir in the fabrication of inter-locking blocks for paving, which are being used in the reconstruction in the city of Barra Longa (MG) - (restoring the square of Manoel Lino Mol and avenue Beira Rio).

Another front adopted historically by Samarco in its direct commitment is operational excellence, with a focus on continuous improvement in the use of material resources, as well as natural and human resources. The following three methodologies are adopted: Lean Six Sigma (LSS), Kaizen and Lean Office. The first establishes a methodology for solution of problems of medium and high complexity, while the Kaizen focuses on rapid improvements. While the "Lean Office" approach is directed to areas of support. In 2015, there were 81 LSS projects and 1,366Kaizens. In 2016, the inactivity of the company resulted no new projects were oriented by the methodologies for operational excellence approach.



Alternatives for the use of the tailings are being studied and implemented by Samarco, such as the application of interlocking pavers in Barra Longa



A summary of Samarco's main social, economic and environmental data for these past two years

# 2015-2016 INDICATORS

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- 34 Economic-financial results
  - 37 Environmental performance
  - 45 Relations with society
-



This chapter presents Samarco's results for 2015 and 2016, as part of its economic-financial, social and environmental performance accounting cycles.

The indicators shown in this chapter refer to the period from 01 January to 31 December of these past two years, in line with the scope of this report and in conformity with the guidelines of the Global Reporting Initiative (GRI). Compliance with the GRI model also affects the presentation of the indicators, which is based on the last survey of material themes (read more in Governance and Strategy) and on the metrics historically adopted by the Company and its peers in these accountability reports.



Conveyor belt in the Germano unit

# ECONOMIC-FINANCIAL RESULTS

Summary of indicators (in R\$ million)	2016	2015	2014	2013	2012
Gross revenue	213	6,638.1	7,601	7,240	6,611
Net revenue	209	6,482	7,537	7,204	6,550
Gross margin (%)	(405.2)	44.4	58.0	62.8	61.3
Net profit (loss)	(3,362)	(5,837)	2,806	2,731	2,646
Ebit	(43)	(8,212)	3,410	3,653	3,357
Ebitda	143	(7,774)	3,762	3,870	3,554
Ebitda margin (%)	69.10	(119.9)	49.9	53.7	54.3
Capital expenditure	45	407	629	521	643
Capital expenditure (P4P)	-	33	660	2,160	2,709
Total assets	20,020	27,423	19,557	15,032	11,001
Net worth	(6,922)	(1,653)	4,313	3,758	3,274
Gross debt	13,747	15,179	11,648	9,030	5,987
Net debt	13,688	13,273	9,531	8,475	5,215
Gross debt/Ebitda	96.10x	-	3.1x	2.3x	1.7x
Roce (%)	(0.2)	(30.5)	17.6	22.5	29.3

The failure of the Fundão dam in November 2015 impacted Samarco's operating and financial performance. Until November 2015, results had been in line with the scenario that the mining industry had faced over the preceding years, – particularly in respect of fluctuations in price and demand.

After operations came to a halt due to the dam failure, financial management efforts have concentrated on allocating

resources for emergency response and remediation actions, and fulfilling the Company's obligations.

The expenditures made are reported in line with accounting standards and practices. In this context, it is important to mention that Samarco has established provisions for future disbursements which were accounted for and recorded in the Financial Statements for the years of 2015 and 2016 (click [here](#) to learn more).

From an operating viewpoint, at 31 December 2015, the volume of pellets and fines produced totaled 25,453 million tons – an 1.5% increase over the previous year (25,075 million tons), in spite of the impacts of suspended operations at Germano and Ubu. Sales of products reached 24,918 million tons.

In 2016, 24,607 thousand tons of iron ore fines and 77,160 thousand tons of pellets were shipped from the Ubu unit, material which was still in the Company's stockyards, in addition to 51,265 tons of pellet screening.

As to its economic-financial performance, Samarco's gross revenue in 2015 amounted to R\$6,638.1 million, down 12.7% from the previous year, influenced by the decline in the average selling price of pellets in US dollars, the adverse market scenario, the stoppage of operations in the two last months of 2015, and the drop in electricity revenue. In 2016, under the impact of total halt of production, there was a drop of 96.8% compared to 2015. The gross revenue of 2016 was R\$213 million.

The accounting loss of R\$5,836.5 million reported in 2015 is mainly justified by the creation of reserves for socioenvironmental and socioeconomic recovery projects (R\$9.8 billion in present value terms), recorded in the Financial Statements and intended to cover all expenses associated with efforts to prevent, repair, control and

compensate for the social and environmental impacts resulting from the failure of the Fundão dam. The amount of expenses incurred in 2015 totaled R\$144 million. In 2016, the accounting loss was R\$3,362 million.

In the coming years, there is still the challenge of resumption of operations to generate cash to honor the commitments made to remedy the consequences of the failure of the Fundão dam, as well as the generation of employment and income for the localities where the Company operates. In the second semester of 2017, shareholders Vale and BHP agreed to provide loans in order to assure the funding of the TTAC programs still under the responsibility of Samarco, in addition to supporting Samarco's operational needs.

#### INVESTMENTS

In 2016, the current investments of the Company came to R\$45 million, reflecting the suspension of the Company's operations.

#### RATINGS

After the failure of the Fundão dam, Samarco had its rating lowered by the three main risk assessment agencies: Fitch Ratings (RD), which has been rating it since 2005; Moody's (C), which started evaluating it in May 2015, and Standard & Poor's (D), which has been rating Samarco since 2012.

## + Information

See more details about indicators, reserves, loss and profit and other information regarding 2015 in the Financial Statements for the years ended 31 December 2015 and 31 December 2016. Access [www.samarco.com/Samarco/reports](http://www.samarco.com/Samarco/reports)

**VALUE ADDED** G4-EC1

The wealth generated by Samarco in 2016 totaled R\$285.9 million, far below its results of 2015 (R\$7,094.7 million), and the net added value produced by the Company was R\$443.6 million (2016) and R\$7,824.6 negative (2015).

Losses in 2015 and 2016 resulted in the non-distribution of R\$1,882.1 million in order to be able to cover taxes, charges and contributions in 2015 and R\$274.6 million in 2016, just as there was no distribution as return on equity of R\$5,836.5 in 2015 and R\$325.7 million in 2016.

**VALUE ADDED – CONSOLIDATED (IN R\$ MILLION)** G4-EC1

	2016	2015	2014
Revenue (wealth created)	285.9	7,094.7	9,242.2
Third-party consumables	343.8	(14,481.7)	4,890.3
Gross value added	629.8	(7,387.0)	4,351.9
Depreciation	(186.1)	(437.6)	(352.6)
Net value added created by the company	443.6	(7,824.6)	3,999.3
Financial revenues	1,505.2	2,490.2	678.5
Total value added to be distributed	1,948.9	(5,334.4)	4,677.8
Staff	417.3	373.9	469.5
Taxes, charges and contributions	(274.6)	(1,882.1)	597.7
Return on third-party capital	2,131.9	2,010.4	804.9
Return on own capital	(325.7)	(5,836.5)	2,805.5
Value added distribution	1,948.9	(5,334.4)	4,677.8

**ORE RESERVES**

The ore reserves covered by mining rights owned by Samarco are located in the municipalities of Mariana and Ouro Preto (MG), constituting geological resources in the order of 7.336 billion tons (not audited). Bearing in mind the technical and economic context, as well as the mineral resource and its specific characteristics, recoverable (or mineable) reserves were in the order of 2.867 billion (not audited) by October 2015. After the failure of the Fundão dam in November 2015 and the temporary suspension of operations, the Company is now reviewing its reserves (for more information, see Financial Statement on Samarco's website – [www.samarco.com/en/relatorios/](http://www.samarco.com/en/relatorios/)).

**CLOSURE PLAN** G4-MM10

Given the failure of the Fundão dam, the Company's Management, supported by external consultants, reviewed the closure plan for its operations in December 2016, which resulted in revisions to the Closure Plan of December 2015. The fair value of the liabilities at 31 December 2016 was R\$319,863,591.44 while at 30 November 2016 it was R\$425,053,146.78. The reduction in the liabilities reported in 2016 was of R\$105,189,555.34.

# ENVIRONMENTAL MANAGEMENT



The investment in technology, operational efficiency and rationalization of the use of natural resources is one of the value generating levers used by Samarco – which considers compliance and continuous evolution in the environmental area as a path to assure the longevity of its business. In the current scenario, these assumptions remain strategic for the reestablishment of society’s trust and to improve the socioenvironmental and operational results.

In 2015, up to the failure of the Fundão dam, the Company maintained its investment planning, giving priority to aspects such as atmospheric emissions, biodiversity and water. During the year, more than

R\$45 million were applied in environmental projects; the larger expenses were in industrial effluents and water, in the Ubu facility, and in the extension of the fourth spillway and in the auxiliary spillway of the Fundão dam, in addition to the system of internal and abutment drainages, at the Germano facility. From November on, the team of environmental management dedicated itself to the execution of the actions of prevention, monitoring and mitigation of the emergency impacts resultant from the failure. In 2016, investments in the environment totaled R\$6 million, going to the environmental monitoring and control actions.

G4-EN31



**+ R\$50 million**  
in environmental investments

## WATER USE

Currently the Company has right-of-use for the intake of surface water from three water courses in Minas Gerais – the rivers Piracicaba, Matipó, and Santa Barbara, totaling about 2,600 m<sup>3</sup>/h. This quantity of water is in line with the volumes supportable by the hydrographic basin without impacting substantially the flows of the rivers. G4-EN22

After the failure of the Fundão dam, the Company halted its operations. As a result, water consumption fell considerable, basically restricted to the need for maintenance of the systems.

## WATER USE AT SAMARCO (M<sup>3</sup>) G4-EN8

	2013	2014	2015	2016
<b>Surface water (rivers, lakes, wet areas, oceans)</b>	11,154,153.84	22,833,866	23,904,683	2016. no consumption of surface water
<b>Underground water</b>	5,814,007	6,726,975	5,542,482	6,162,823
<b>Total</b>	16,968,160.84	29,560,841	29,447,165	6,162,823

**LIST OF THE SOURCES OF WATER INTAKE (M<sup>3</sup>)** G4-EN9

Source <sup>1</sup> (MG)	2013	2014	2015	2016
River Piracicaba	3,653,784	2,834,125	2,197,890	No consumption in the year
River Matipó	592,737	1,335,193	643,668	No consumption in the year
River Gualaxo	6,907,633	7,465,712	6,757,167	Unavailable intake
Wells Alegria	5,814,007	6,726,975	5,542,482	6,162,823
River Brumal	-	8,680,039	10,231,667	No consumption in the year
River Santarém	-	2,518,798	4,074,291	Unavailable intake
<b>Total</b>	<b>16,968,161</b>	<b>29,560,841</b>	<b>29,447,165</b>	<b>6,162,823</b>
m <sup>3</sup> /TMSc <sup>2</sup>	0.76	1.12	1.16	No production

<sup>1</sup> None of these sources is within a protected area or with some value to Biodiversity. And all have importance for the local communities.

**RECYCLED AND RE-UTILIZED WATER** G4-EN10

Water recycled/re-utilized	2013	2014	2015	2016
Total Volume of water recycled/ re-utilized (m <sup>3</sup> )	154,256,000	186,061,148	171,294,294	No production
Rate of Recirculation (%)	90.10	86.29	85.58	No production

Assumptions: utilization of the balance of Santarém with part of new water (2,518,798 m<sup>3</sup>/yr.) and re-circulated (22,666,556.87 m<sup>3</sup>/yr).



Mãe-Bá lagoon, Anchieta-ES

## EFFLUENTS

The discharge of effluents is performed near the industrial units – in Germano (MG), into the creeks of João Manoel and Macacos; in Matipó, into the tributary on the right bank of the river Matipó; in Ubu (ES), the excess effluent is treated and dumped into the North dam, before being treated again by a treatment station after which it is released into the Mãe-Bá lagoon, in Anchieta. The water quality is monitored in the streams of Minas and in the river Piracicaba, including aspects such as physical-chemical and biological traces. In Ubu, the Mãe-Bá lagoon is submitted to analysis of its physical-chemical and biological aspects, considering 40 parameters.

## TOTAL DISCHARGE WATER, LISTED BY QUALITY AND DESTINATION<sup>1</sup> G4-EN22

2013	Volume (m <sup>3</sup> )	Treatment	Water quality and method of treatment	Destination
North dam (Ubu)	4,437,541.44	Physical-chemical treatment	Class 2 according to Conama 357/2005	Lagoon Mãe-Bá
2014	Volume (m <sup>3</sup> )	Treatment	Water quality and method of treatment	Destination
North dam (Ubu)	6,493,008.06	Physical-chemical treatment	Class 2 according to Conama 357/2005	Lagoon Mãe-Bá
Santarém dam (Germano) <sup>2</sup>	6,324,720	Physical-chemical treatment	Class 2 according to Copam n.º 01, 5 May 2008	Santarém Creek
2015	Volume (m <sup>3</sup> )	Treatment	Water quality and method of treatment	Destination
Santarém dam (Germano) <sup>2</sup>	6,324,720	Physical-chemical treatment	Class 2 according to Copam n.º 01, 5 May 2008	Santarém Creek
North dam (Ubu)	6,645,303.26	Physical-chemical treatment	Class 2 according to Conama 357/2005	Lagoon Mãe-Bá
2016	Volume (m <sup>3</sup> )	Treatment	Water quality and method of treatment	Destination
North dam (Ubu)	No discharge due to suspended operations	Physical-chemical treatment	Class 2 according to Conama 357/2005	Lagoon Mãe-Bá

<sup>1</sup> Water is not re-utilized by other organizations.

<sup>2</sup> There was no measurement at the Santarém dam (Germano) in 2013. In 2014, the minimum flow of 722 m<sup>3</sup>/h was used at the dam spillway.

## OVERBURDEN AND TAILINGS

Until November 2015, the tailings (sandy materials and slimes – learn more about their composition in the chapter “*About the failure of the Fundão dam*”) generated by the activities of Samarco were stored in the dam system of Germano and Fundão and the storage piles in the Pit of Germano. The water resulting from the process was treated in Industrial Effluent Treatment Plants (ETEI) and stored in the Santarém dam, from where part of the water was re-circulated for utilization in the beneficiation plants and the rest was returned to the Santarém Creek, as per

the environmental licensing agreement. As for the overburden, the material was disposed along the piles of overburden João Manoel and Alegria Sul.

With the failure of the Fundão dam and the order to halt operations at the Germano unit, these processes were paralyzed, so their return is contingent upon the future re-start of the operations of the Company. In 2015, under the influence of the increase of production generated by the third concentrator – structure linked to the Project of the Fourth Pellet Plant (P4P) –, there was a growth in the generation of sandy tailings and slimes.

## TOTAL QUANTITIES (T) G4-MM3

	2014	2015	2016
<b>Overburden</b>	5,988,493	10,956,352	5,306,423
<b>Sandy Tailings</b>	16,426,012	17,493,753	-
<b>Slimes<sup>1</sup></b>	5,112,643	4,959,593	-

<sup>1</sup> Quantity of slimes generated, discounting the 995,669 tons of slimes from Vale in 2015 and 1,005,581 tons in 2014.

## ENERGY AND EMISSIONS

In 2015, the rate of energy intensity of Samarco was 0.324 GJ/dmt<sup>1</sup>. The data were measured in January through November, until the failure of the Fundão dam. There was no production in 2016. G4-EN5, G4-EN19

During the year, as a function of the severe restriction in water supply in the Southeastern region, Samarco recorded a significant reduction in the volume of energy of the hydro-electric plants of self-production. The units are the Muniz Freire hydro-electric, in Espírito Santo, and the participation the consortium of the Hydro-electric Plant of Guilman-Amorim, in Minas Gerais. Together, in 2015, they were responsible for 11.79% of the annual consumption of the Company.

## CONSUMPTION AND SELF-PRODUCTION OF ELECTRICAL ENERGY (GJ) G4-EN3, G4-EN4

Energy	2013	2014	2015	2016
<b>Annual consumption</b>	7,147,529	8,769,528	2,414,475.234 MWH 8,692,110 GJ	116,402.943 MWH 419,050 GJ
<b>Acquired from third parties</b>	6,471,002	9,348,293	2,572,404.51 MWH 9,260,654 GJ	181,238.934 MWH 652,460 GJ
<b>Generated by the Company</b>	1,347,144	1,173,866	243,930 MWH 878,148 GJ	266,635.00 MWH 959,886 GJ
<b>Energy sold</b>	657,275	1,902,365	401,859.276 MWH 1,446,692 GJ	331,470.99 MWH 1,193,295 GJ



### ATMOSPHERIC EMISSIONS G4-EN30

One of the principal environmental impacts of Samarco at the Ubu complex (ES) is the emission of particulate material, linked to the processes of transportation, storage and load-out of pellets. In the last years, projects such as the installation of Wind Fences (barriers for wind), electro-static precipitators and the enlargement and modernization of the Automatic Network of Monitoring of Air Quality permitted the enhancement of the emission control system.

In 2015, the State Legislature of Espírito Santo installed a Parliamentary Commission of Inquiry (CPI) of the black dust, with the objective of investigating complaints about supposed environmental damages in the greater Vitória and in the Anchieta region, in the south of the state. Together with the clarifications, Samarco presented its Plan of Atmospheric Management, which foresees investments of more than R\$130 million over the next five years, with the objective of reducing the emission of particulates from the Ubu complex, in Anchieta (ES) by 18.2%. On 18 January 2016, Samarco officially filed a letter with the State Legislature of Espírito

Santo informing about a momentary suspension of the investments, due to the shut-down of the pelletizing plants, of the mobilization of the employees still active in the reparation of the impacts and of the impossibility of executing the improvement projects according to the schedule previously outlined.

Samarco is also assessing the impacts of its emissions by means of periodic monitoring of the smoke emitted by various vehicles and equipment of its fleet. The emissions of the greenhouse gases of the vehicles of the company contracted for the transportation of the employees are also monitored and recorded annually in reports according to the Brazilian GHG standard protocol.

The significant reduction in atmospheric emissions in 2016 is attributable to the shutdown of the Company's operations after the failure of the Fundão dam. The emissions totaled for 2016 are based on the activities carried out in Ubu (outshipment of pellet feed, reslurrying from the slurry pond, etc.) and Germano (mine activities and work on the remaining dam structures).

### IMPACTS ON SOCIETY G4-S02

Due to the failure of the Fundão dam, there are also impacts of noise, emission of CO<sub>2</sub>, emission of Particulate Material (MP), damage to roadways and interference in traffic (slow-downs) in the cities impacted, such as Barra Longa, Mariana, Rio Doce and Santa Cruz do Escalvado, in Minas Gerais. The reason was the increase of vehicles of various sizes (pickups, trucks and tractors) circulating in these cities, in the rural areas and also on the highways for transportation of employees, material, street and access cleaning.

In 2015, the intensity rate of gas emissions of the greenhouse effect released 102 kg CO<sub>2</sub>e/t of pellets and fines produced (gases included in the calculation: CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub>). In 2016, the GHG emission rate reached 123kg CO<sub>2</sub>e/t. This emission rate includes, respectively, emissions from scope 1 and 2 of the GHG outlined in the Kyoto Protocol (tCO<sub>2</sub>e) and pellet feed production. G4-EN18

In spite of the shutdown of activities related to Samarco's production process, there was a production of pellet feed and considerable emission arising from the consumption of fuels, purchase of electric energy and dam construction works, which characterized scopes 1 and 2.

### EMISSIONS OF GREENHOUSE GASES (TCO<sub>2</sub>e)<sup>1</sup> G4-EN16, G4-EN17, G4-EN19

Scope	2013	2014	2015	2016
Scope 1	1,712,180	2,033,558	2,299,526	9,417
Scope 2	154,731	319,264	287,037	9,227
Scope 3	28,294,018	31,823,456	32,703,607	246,150
<b>Total</b>	<b>30,160,928</b>	<b>34,176,278</b>	<b>35,290,171</b>	<b>264,845</b>

<sup>1</sup> The quantities of emission of gases of the greenhouse effect were revised after external audit of certification of the GHG Protocol. In the year 2015, the audit was not performed nor record made of the GHG Protocol Brazil

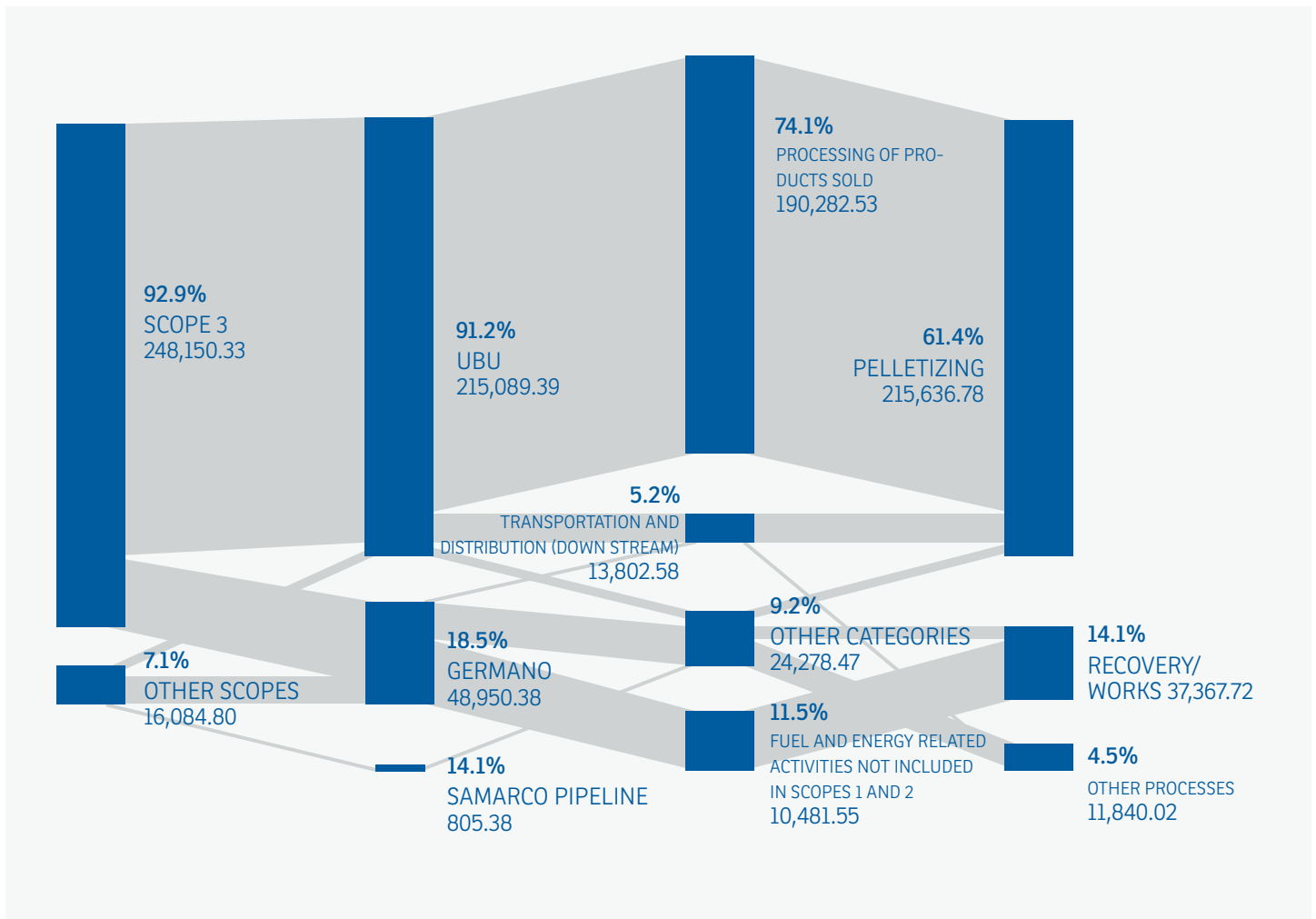
In 2016, Samarco’s GHG emissions were estimated at 264,845.14 tCO<sub>2</sub>e, of which 92.9% of the total emissions were Scope 3, i.e., not directly attributed to Samarco operations.

New emission sources not related to Samarco’s production were added in 2016. These new emissions refer to the emergency works in progress since the failure of the Fundão dam. Activities such as vegetation suppression, transportation of consumables, materials and people to and from the work sites, consumption of inputs, energy and fuel for the works, make up the list of new sources included in 2016. The recovery works related to the failure of the tailings dam represented 13.8% of the Scope 3 emissions, and mainly result from the use of fuel and energy, not computed in scopes 1 and 2.

**GASES INCLUDED IN THE CALCULATION** G4-EN15, EN16, EN17

Gases	Potential rate of global heating (or source GWP)
Carbon dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	25
Nitrous oxide (N <sub>2</sub> O)	298
Hydrofluorocarbons (HFCs)	3 - 14,800
Perfluorocarbons (PFCs)	6,500 - 17,700
Sulfur Hexafluoride (SF <sub>6</sub> )	22,800
Nitrogen Tri-fluoride (NF <sub>3</sub> )	17,200

**EMISSIONS IN 2016 (TCO<sub>2</sub>e)** G4-EN15, EN16, EN17



### EMISSIONS OF SUBSTANCES WHICH DESTROY THE OZONE LAYER G4-EN20

During conventional operation, the process of pellet production of Samarco does not emit substances destructive to the ozone layer. In addition to this, the Company acquires only products which comply with the CONAMA resolution 267/00.

### ATMOSPHERIC EMISSIONS

#### NO<sub>x</sub>, SO<sub>x</sub> AND PARTICULATE MATTER (T) G4-EN21

Scope	2013	2014	2015	2016
NO <sub>x</sub>	6,998	13,154	2,442	311
SO <sub>x</sub>	3,314	11,605	5,609	0.48
Particulate Material	1,433	3,047	3,622	2,279

Germano Unit,  
Mariana (MG)



## BIODIVERSITY

G4-EN12, G4-EN26, G4-MM2

Samarco units are inserted in the biomes "Mata Atlântica" (Atlantic forest) and "Cerrado" both considered hotspots of global biodiversity. Aware of the impacts generated by this proximity, the Company looks to invest in the recovery of the altered areas, in the conservation and preservation of the fauna and flora and consequent maintenance of the ecosystemic services.

In line with the current legislation, 20% of the properties are preserved as areas of legal reserve, in Minas Gerais and in Espírito Santo. In compliance with the new Law for Protection of Native Vegetation, established in 2012, the process of relocation of the Legal Reserves in Minas Gerais was concluded as well as its official ratification in Espírito Santo through the Rural Environmental Registry (CAR- Cadastro Ambiental Rural).

The management of the Biodiversity in the Company is related to the potential negative impacts in each region – aspects such as the suppression of vegetation in Minas Gerais, and the ichthyofauna and the quality of marine waters and of the coastal lagoons, in Ubu, as well as the river Pardo, in Muniz Freire. The Mãe-Bá lagoon, in Anchieta (ES), with 5,751,455.86 cubic meters, is a receiving body for the Company's treated effluents.

Among the projects developed in 2015 e 2016 are:

**Program of Reinforcement of the Fishery Stock in the Mãe-Bá lagoon:** a partnership with the Federal Institute of Espírito Santo (IFES – Alegre), accounts for the release of 150 thousand native fish (*Hoplias malabaricus* - Traíra, *Rhamdia quelen* - Jundiá and *Geophagus brasiliensis* - Acará) since its beginning, in 2008, until 2010; also includes actions of environmental education and monthly monitoring of the ichthyofauna which registered an increase of the biological indicators referent to the dominance and frequency of the species, in addition to the number of individuals of *Geophagus brasiliensis* in the period of 2011 to 2015.

**Program of Monitoring of turtles:** contributes to the conservation of the marine turtles, in a partnership with the Institute of Marine Preservation and Conservation (IPCMar). Between January and June 2016, 231 clutches were reported to have been laid, with hatching at 231 nests (96%) resulting in the birth of 21,700 baby sea turtles. These results demonstrate the effectiveness of the conservation work that is being performed on the cost of the Anchieta (ES) municipality.

**Project "Cação sem Dente" (Shark without Tooth):** initiated in 2013, with the participation of government agencies and organizations such as Institute "Peraó". The Federal Institute of Espírito Santo (IFES) of Piúma and the Foundation of Support to the Development of Science and Technology (Facto), foresees the fish farming of "beijupirá" in tanks-nets in the marine area, located in Meaípe (Guarapari/ES).

## Read more

About the emergency projects related to the failure of the Fundão dam in "Environmental Actions".



# RELATIONS WITH SOCIETY

G4-S01, G4-S02



## SCOPE

In its routine activities, Samarco has within its area of influence more than 840 thousand persons, in 81 communities distributed throughout 29 municipalities of Minas Gerais and Espírito Santo. This territory denominated Area of Direct Influence (AID), which covers communities near the industrial units of Germano and Ubu and, also, the pipelines and hydro-power plant of Muniz Freire.

With the failure of the Fundão dam, the Company had to face a still greater challenge: constructing relationships and maintaining a dialogue with a vast area impacted by the tailings, extending from the dam facilities in Mariana (MG) to the mouth of the Doce River, in Linhares (ES).

Differently from the Area of Direct Influence (AID) of the Company, the populations of this new area did not know Samarco under its normal operational conditions, but rather in a scenario marked by socio-environmental impacts. This required the Company to provide structured mechanisms to respond to the local, state and municipal demands and to work to reestablish the trust of the populace in relation to their investments and activities.

With the goal of responding to the emergency necessities in the area impacted by the failure of the dam, teams were structured to relate and communicate with the communities, in addition to the expansion of the team of government/institutional relations for interaction at all three government levels – municipal, state and federal.

To contribute toward systemic interaction with the stakeholders, communication plans were developed for the impacted regions (read more in "About the Failure of the Fundão Dam"), the AID and nationwide.

In parallel with this, one has looked to reinforce the dialogue with the AID, which was also impacted by the shutdown of activities and the consequences to the regional economies. Historically, Samarco guides its actions by the Policy of Socio-institutional Investment (PIS) and by the Strategy of Social Transformation, with focus on themes such as education and generation of employment and income. In 2015, this strategy had to be revised, generating a Model of Governance of the Social Strategy and Transformation, with new avenues of approach:

- **Institutional Relations** – including the preparation and the assistance for the implementation of the plans of territorial development;
- **Education** – programs oriented toward the basic and professional teaching;
- **Economy and Business** – formation of productive arrangements and sustainable businesses, local supply and incentive to vocational businesses;
- **Citizenship and Social Participation** – social scope and engagement and voluntary actions.

In 2015, R\$11.8 million were invested in projects and social incentives in the AID. Added to this value, the resources related

to terms of commitments and other conditions and compulsory contributions, totaling more than R\$20.4 million (See the actions of highlight in the box). In 2016, R\$3.9 million were invested in social projects and initiatives in the AID. One must add to this resources related to the terms of commitment and other mandatory prerequisites and financial inputs, totally some R\$7.6 million.

With the evolution of the emergency programs and measures and of the recovery, now structured around the performance of the Renova Foundation, already in 2016, the challenge of Samarco will be to examine the priority actions which must be developed with the objective of reconstructing relations with the population of the AID. This process is strategic, as well as, for the acquisition of the social licensing, basic requirement for the future re-start of the operations.



R\$15.7  
million

invested in projects and initiatives within the Company's area of influence in the past two years

**SOCIO-INSTITUTIONAL PROGRAMS OF 2015 AND 2016** G4-S01, G4-EC7**PROGRAM OF DEVELOPMENT OF THE RURAL PRODUCER**

Aimed at the skills development of the coffee growers and their families in the region of Caparaó, strengthening local productive chains, the Program reached 11 municipalities in 2015 and 9 in 2016, in Espírito Santo and Minas Gerais.

In 2015

**900**  
assisted producers  
and families

In 2016

**1,006**  
assisted producers  
and families

**CITIZEN OF THE FUTURE**

The program tries to contribute to the improvement of the quality of education in the municipalities of Minas Gerais and of Espírito Santo, on the fronts of knowledge development of teachers, enhancement of school management and complementary workshops in Portuguese language and mathematics.

In 2015

**23** managers  
**167** teachers and

**1,643** students of  
12 to 17 years involved

In 2016

**Program was not available.**

**PROGRAM OF ENVIRONMENTAL EDUCATION (PEA)**

Addresses the mobilization and the behavioral change of the students of public schools, by means of knowledge and actions about themes such as wastes and water.

In 2015

**36** schools involved

**667** teachers

**9,940** students

**8** municipalities

In 2016

**16** schools involved

**328** teachers

**3,240** students

**3** municipalities

**REGIONAL GOVERNANCE: SYSTEMS THINKING**

Since 2013, Samarco has supported a project of regional governance, based on the methodology of systems thinking, for municipalities of the area of direct influence. In conjunction with the public authority and the community, the Company identified the local themes and priorities, mapped future scenarios and designed strategies (avenues) of development and strengthening of the local management.

In 2014, the pilot project, carried out in Anchieta (ES), was produced, resulting in the delivery of the Plan for Growth and Sustainable Development – Anchieta 2030, launched in June of 2015. The same activity was carried out in Guarapari (ES), resulting in the Guarapari 2030 – Avenues for the Growth and Sustainable Development. The 2030 Plan for Mariana (MG) also was developed, but was not yet launched due to the dam failure.

In 2015

**3** municipalities involved

**2** strategic municipal plans  
for 2030 launched

**COMMUNICATION AND RECORD OF GRIEVANCES** G4-S01, G4-S011, G4-EN34, G4-LA16

The Company maintained, up to November 2015, for the communities, suppliers, employees, business partners, governments and other groups, the Samarco Relationship Center, available by telephone (0800-031-2303) and the Fale Conosco (relacionamento@samarco.com), who accepted requests for information, complaints, and grievances of several natures. After the failure of the Fundão dam, the channels also received input about this issue. With the start-up of the Fundação Renova ACS in August 2016, the Relationship Center migrated to the Foundation. In 2017, Samarco established its new toll-free number (0800 033 8485), but the access to Fale Conosco, through the Samarco site www.samarco.com, did not undergo any changes.

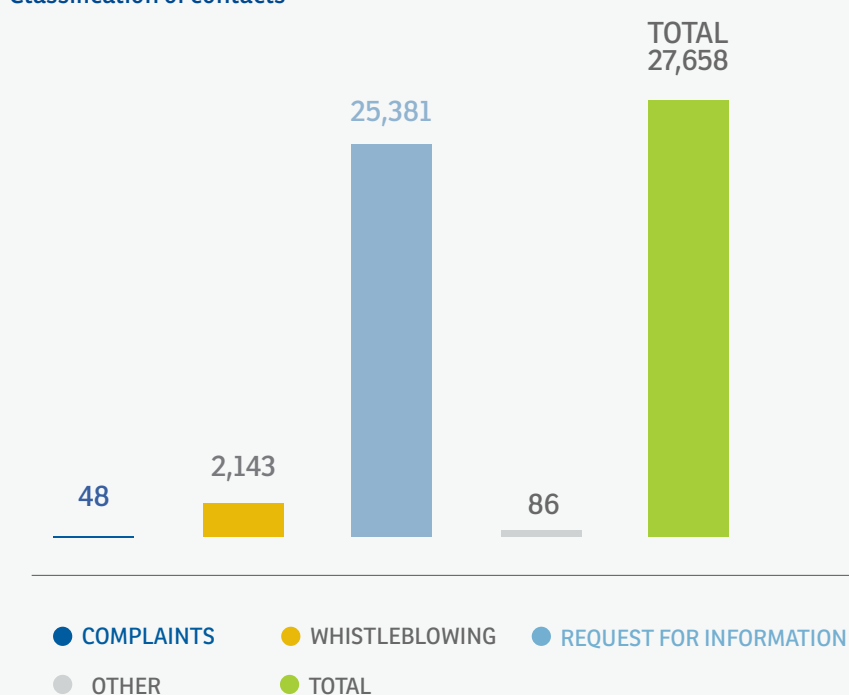
Samarco received a significant volume of contacts after the failure of the dam. Gradually, issues such as safety of the remaining structures, possible structural risks and new failures, forms of answering to the community with regard to the impacts of the failure of the Fundão dam and the response measures taken to manage the social and environmental impacts were directed to, received by and treated by the organization's public relations channels.

In August 2016, with the start of the activities of Fundação Renova, the 0800 toll free number was prioritarily reserved for this entity, to lend continuity to the response actions provided with regard to the Fundão dam failure since day 1 - November 05, 2015. The Samarco grievance response system will be revised in 2017, in order to allow a better organization of the data according to theme and category of complaint.

**PUBLIC RELATIONS CENTER – INDICATORS FOR 2016**

Type of contact	Total	Treated	In progress	Cancelled
Whistleblowing	48	32	16	0
Complaint	2,143	1,378	739	26
Request/information	25,381	21,748	3,546	87
Other	86	90	29	2
	27,693	23,248	4,330	115

**Classification of contacts**



\*Most of the contacts are related to the failure of the Fundão dam.

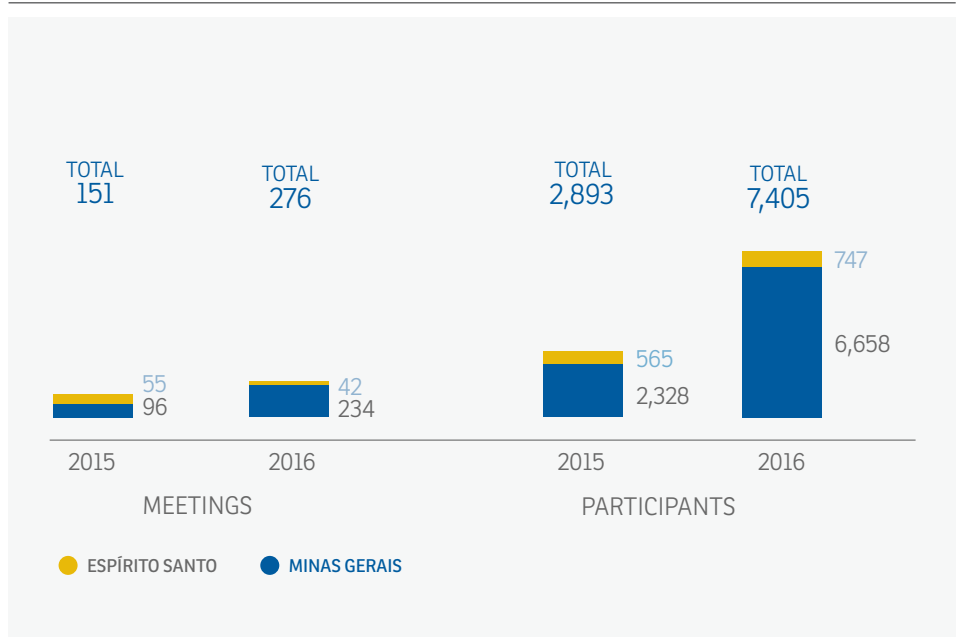
\*\* Others: Thanks; Emergency Warning; Threat; Invitation; Praise; Gratitude; Praise / Testimony; Sending of Invitation; Tribute; and Suggestion.

### RELATIONSHIP FORUMS

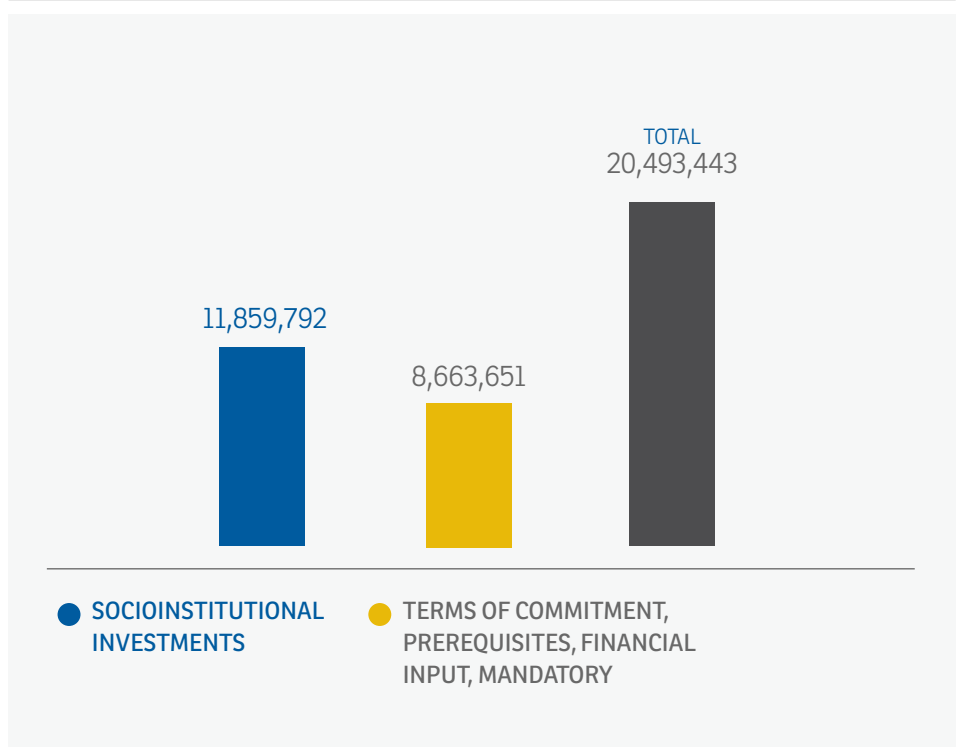
In addition to the channels of communication, Samarco maintains forums and face-to-face meetings with the communities of the Area of Direct Influence (ADI), to discuss investments and strategies and to know the specific demands of each locality. In 2015, more than 151 encounters were organized, mobilizing approximately 2,893 participants in Minas Gerais and in Espírito Santo. In 2016, 276 meetings were held in all, with 7,405 participants, where 231 meetings had 6,658 attendees in Minas Gerais, and 42 meetings with 747 attendees in Espírito Santo.

With the failure of the dam, new relationship strategies were developed, as described above, for the more than 600 kilometers of impacted territory along the basin of the Doce River, from the region of Mariana to the coast of Espírito Santo.

### RELATIONSHIP FORUMS (2015 AND 2016)



### TOTAL SOCIOINSTITUTIONAL INVESTMENT (R\$) 2015





## EMPLOYEES

The Samarco people management model is based on organizational culture and values, and governed by Climate, Culture and Reputation survey, used to define policies to improve the working environment and ensure business competitiveness.

The year 2015, however, ended in an unexpected and extremely difficult way, because of the failure of the Fundão tailings dam – which led to the loss of lives of some contractor employees and one Samarco employee, in addition to affecting the routine of the workforce and generating environmental and social impacts.

On the one hand, operations shut down – which gradually brought about uncertainties regarding employment stability, both in the support area and operations. On the other hand, since then there has been a scenario of intense mobilization of employees, in order to provide support to the impacted communities, and in the rendering of accounts on response measures.

After the failure, approximately one thousand Company professionals were mobilized to assist the impacted regions – both in Bento Rodrigues, Paracatu, Barra Longa, Pedras, Camargos, Ponte do Gama and Campinas and in Doce River basin up to its mouth, between Minas Gerais and Espírito Santo.

With the embargo of activities in Germano and the resulting interruption of activities at the Ubu unit, the routine of professionals and contractors was affected. Until November 29<sup>th</sup>, approximately 1,600 Samarco employees remained on paid leave. Between November 30<sup>th</sup> and December 29<sup>th</sup>, 1136 remained on collective vacations.

As of January 25, 2016, according to agreement approved by the employees and the Unions (Metabase - Mariana and Belo Horizonte, in Minas Gerais, and Sindimetal in Espírito Santo), a large portion of the employees entered the Temporary Employment Agreement Suspension system (layoff) for professional qualification, with the deadline of June 25<sup>th</sup>. The professional qualification program which at the end had the participation of 1,264 employees was created by processes and considered topics directly or indirectly related to professional activity, and also attractive to the market. Of all of the employees participating in the program, 1,199 were trained presentially and 65 received online training (e-learning). For the implementation of the program, 83% of these topics were taught by 70 internal instructors. At the end, 274,494.5 training hours were provided, representing 228.94 manhours. Everybody received a certificate of participation.

At first, the expectation was to have Samarco's future defined still in 2016 – however, the studies for obtaining the licenses required for the resumption of operations from the competent authorities indicated that the original size of the company would have to be revised, contemplating a reduction in its production capacity.

To adapt to this new reality, it has become necessary to carry out a reduction of 1,200 job stations, through the Own Staff Reduction Program – which comprises the Voluntary Resignation Program (PDV) and Involuntary Dismissal Plan, also aligned and negotiated directly with the Unions. Voluntary dismissals were carried out by the end of July 2016. The exception was for employees who were working in critical activities. In these cases, there was a request for postponement of the dismissal period by the company, in agreement with these professionals.

## THE PROGRAMS G4-LA4

The PDV, carried out in 2016, emerged from the dialogue between the Unions Metabase Mariana and Belo Horizonte (MG) and Sindimetal (ES) and Samarco, with discussions at four meetings held with union representatives. The Company and the Unions understood that this was a viable alternative, respectful and consistent with the scenario and the circumstances conditioned to the return of Samarco's activities.

Covering from technical-operational level employees to head of departments, at all units and offices, the PDV offered special conditions for employees who joined.

The plan was informed to employees with the position to offer support to those who join the PDV for replacement in the market, through recovery workshops, referrals and indications, to be made by the Human Resources team. Employees in the positions of heads of department, managers, general managers and alike were not eligible to the PDV. In such cases, the dismissals were decided by Samarco and the same conditions of the Program were considered.

At Samarco, there are no minimum time-frames for communication of operational changes set out in the legislation or collective bargaining agreements; however, it is customary for negotiations to start between five and six weeks before the base dates, with communications to employees at each phase of the dialogue. In 2016, matters such as suspension of employment agreement for qualification (called layoff under Brazilian labor law) and reduction of personnel, including the PDV were notified three and five weeks prior to effective implementation, respectively.

Although the PDV had been established in agreement with the unions in the most

respectful and transparent manner possible, and widely informed to all employees, in September 2016 the Public Prosecution Service of Minas Gerais (MPMG) and the Labor Public Prosecution Service (MPT) filed a public civil action against Samarco, demanding the annulment of the program or expansion of the benefit package granted.

Samarco signed, in the court files of said action, in November 2016, a consent to the expansion of the benefit package granted in the collective agreement reducing the workforce (PDV/PDI). The Company committed to not performing a collective dismissal before 31 March 2017. The signing of this agreement resulting in the closing of the public civil action brought by the MPT and the MPMG, as well as the other two actions filed by the unions (Metabase Mariana and Sindimetal ES) with regard to the profit sharing program of 2015.

Employees participate in alignment meetings about the Company's prospects



**TURNOVER** G4-LA1

Between the failure of the dam and December 2016, 1216 employees left the Company. In the same period, 75 people were hired, 24 through selection processes which were already in progress before the failure, and the others to address issues related to the dam failure and to replace, as needed, the personnel who chose to adhere to the voluntary dismissal program (PDV).

PDV driven resignations started on the first day of July and reached a total of 912 adhesions, with the termination of 836 employees effective immediately, corresponding to 29% of the staff before the PDV. The other 76 agreed with the Company to postpone their termination as they were working in relevant activities at the time of the adhesion.

Until 31 December 2016, 56 dismissals occurred with leaders – group of department heads and equivalent.



# 912

adhesions to the Voluntary Dismissal Program

**NUMBER OF EMPLOYEES PER FUNCTIONAL LEVEL** G4-10

Functional Level	2013		2014		2015		2016	
	Men	Women	Men	Women	Men	Women	Men	Women
Management	166	8	175	8	175	10	125	11
Technical / supervision	1,072	239	1,091	253	1,099	265	700	170
Operational	1,334	80	1,370	72	1,371	74	785	39
Trainees	0	0	0	0	0	0	0	0
Third parties	3,492		3,517		2,491*		923	
Interns	15	10	65	79	1	2	0	1
Total per gender (excluding third parties)	2,587	337	2,701	412	2,645	349	1,610	220
Total (excluding third parties)	2,924		3,113		2,937		1,831	
Total (excluding third parties and interns)	2,899		2,969		2,994		1,830	

\* Data up to October 2015.

**NUMBER OF EMPLOYEES PER REGION** G4-10

Region	2013		2014		2015		2016	
	Men	Women	Men	Women	Men	Women	Men	Women
ES	1,121	139	1,137	145	1,123	150	646	74
MG	1,451	188	1,499	188	1,522	199	964	146
Total per gender (excluding third parties)	2,572	327	2,636	333	2,645	349	1,610	220
Total (excluding third parties)	2,899		2,969		2,994		1,830	

**NUMBER OF EMPLOYEES PER TYPE OF CONTRACT** G4-10

Type of contract	2013		2014		2015		2016	
	Men	Women	Men	Women	Men	Women	Men	Women
Determined period	4	3	0	6	27	20	16	7
Undetermined period	2,568	324	2,636	327	2,618	329	1,594	213
Total per gender	2,572	327	2,636	333	2,645	349	1,610	220
Total	2,899		2,969		2,994		1,830	

**DISMISSAL RATE\*** G4-LA1

Dismissal rate	2013	2014	2015	2016
Men	4%	5%	6%	66%
Women	7%	8%	9%	66%
Below 30	1%	4%	2%	64%
Between 30 and 50	2%	5%	6%	60%
Over 50	1%	15%	18%	138%
ES	2%	6%	6%	76%
MG	2%	5%	6%	59%

\* Calculation: total dismissals/total employees at 31 Dec 15 and 31 Dec 16

**TOTAL OF DISMISSAL** G4-LA1

Total number of dismissals	2013	2014	2015	2016
Men	101	129	153	1062
Women	24	26	30	146
Below 30	32	29	16	209
Between 30 and 50	63	89	115	822
Over 50	30	37	52	177
ES	53	76	82	549
MG	72	79	101	659

**HIRING RATE** G4-LA1

Hiring rate	2013	2014	2015	2016
Men	17%	8%	3.5%	1.0%
Women	1%	8%	1.1%	0.9%
Below 30	11%	14%	1.5%	0.3%
Between 30 and 50	7%	6%	3.0%	1.4%
Over 50	0%	0%	0.11%	0.2%
ES	6%	8%	1.8%	0.1%
MG	12%	8%	2.8%	1.8%

**TOTAL HIRING** G4-LA1

Total number of hiring	2013	2014	2015	2016
Men	484	204	105	18
Women	30	28	32	17
Below 30	320	106	46	6
Between 30 and 50	192	125	89	26
Over 50	2	1	2	3
ES	177	108	53	2
MG	337	124	84	33

## OUR MANAGEMENT

Until 2015, the Company had a workforce of about 3,000 direct employees and of about 2,500 contractors, numbers similar to previous years. The management model was based on the five-year plan of the General Management of Human Resources, giving priority to issues such as professional qualification, productivity, climate management, formation of leaders, and talent retention.

In 2015, the Climate Survey - carried out before the dam failure - mapped a favorability level of 81.55%, 2.1 percentage points above that of the previous year, with 87% of employee participation. Some points identified as critical in the edition 2014 were worked out in open dialogue actions with internal stakeholders; one of them was career management, discussed at 44 workshop classes entitled "career friendly chat", with the participation of 1,171 people in Minas Gerais and Espírito Santo.

Another relevant action referred to the People committees, multidisciplinary groups with leaders which discuss the employee performance appraisal results, encouraging more transparent dialogues and decisions consistent with the established criteria. In 2015, there were 168 committees, from the first management level, of team head, to board level, ending the cycle with a result of 92% of evaluations completed at all planned phases.

In 2016, the challenges are linked to restructuring of internal environment after the PDV, focused on people engagement and alignment, topics worked directly with the leaderships.

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## LOCAL HIRING G4-EC6

Samarco adopts as an assumption the prioritization of hiring local workforce, to enhance the generation of job positions and income in neighboring communities. In 2015, 199 people were hired as Samarco own employees, 49.2% (98) covering professionals living in the area of direct influence. The indicator covers the hiring of residents of Anchieta, Guarapari and Piúma in Espírito Santo, and Mariana, Ouro Preto, Santa Bárbara, Catas Altas and Barão de Cocais, Minas Gerais. Considering this universe, of the 96 technical-operational professionals hired during the year, 80 came from such communities, corresponding to 83%.

Samarco's hiring in 2016 referred mainly to college level personnel, in the areas of environment, legal, geotechnics and socioinstitutional development. Of the 35 professionals hired directly, 31 had a university degree, one was technical/operational level and 3 of management level. These professionals are not from the area of direct influence, due to the technical requirements of the positions.

## TRAINING AND EDUCATION

The process of corporate education, entitled Saber Samarco was until November 2015 the main mechanism for development of employees, with focus on technical and behavioral improvement of people, their satisfaction and the resulting increase in productivity and results.

In 2015, Saber Samarco received R\$6 million in investments and generated a total of 123,619 hours of qualification (an average of 41 man-hours in training) for employees, leaders and third parties. In 2016, the investments were of the order of R\$5.267 million, of which R\$3.774

million for payment of professional skills training (required by the rules of the \*layoff\*), R\$793,000 for payment of ongoing master’s and doctorate studies, and R\$700,000 for payment of training in health and safety. The three fronts thus included the Schools of Technology and Excellence.

### HOURS OF TRAINING PER EMPLOYEE G4-LA9

Functional category	2013	2014	2015 <sup>1</sup>	2016 <sup>2</sup>
Management	62.9	45.75	3.02	7.90
Technical	46.2	34.55	13.99	8.92
Operational	100.5	116.03	22.07	166.86
Interns	63.9	83.13	0.54	12.15
Apprentice	67.4	1.43	0.15	0
<b>TOTAL</b>	<b>341</b>	<b>281.16</b>	<b>142.08</b>	<b>195.83</b>

<sup>1</sup> Personnel: 3,108 – considers trainees, apprentices and dismissed, different from data reported in the content GRI G4-10.

<sup>2</sup> Personnel: 2,198 – considers trainees, apprentices and dismissed, different from data reported in the content GRI G4-10.

In 2016, the central action focuses were health and safety training for professionals involved in the activities of structural reinforcement at the Germano unit, and training courses provided for in the layoff (in Brazil, this refers to a temporary suspension of the employment agreement to receive skills training) made in the first months of the year. In the second semester, the focus was on training in health and safety for the professionals who were working on the activities of maintenance and repair of the plants.



## HEALTH AND SAFETY

The implementation of a safe and healthy behavior culture with systems to ensure risk management and well-being of employees and contractors is a principle which support one of the main values of the Company. Samarco had been showing positive performance over the last few years; in light of the failure of the Fundão tailings dam, however, the Company believes that these principles should guide all of the activities in the future, assuring a safer and healthier operation for employees, contractors and society.

Based on three pillars - leadership, behavior and system - the Health and Safety Management System continues to operate in the implementation of control measures, mapping of improvements and promotion of safe and healthy behavior, in order to prevent occupational accidents and illnesses.

Samarco also participates in benchmarking groups, sharing and learning market safety practices, as well as incorporating the best practices of its shareholders. The knowledge acquire contributes to the review of the safety processes, thus contributing to the continuous quest for efficient, safe and practical system.

With regard to occupational health, the Company maintained the Occupational Health Monitoring Group (GASO) with strong performance in health prevention and promotion and management of contractor health, using its own methodology emphasizing the legal and regulatory requirements of occupational health and safety. In 2016, efforts were focused on control and prevention actions for employees working at the various assigned sites involved in the actions among the impacted communities, preserving well-being.

### PERFORMANCE 2015 AND 2016

In 2015, the safety indicators recorded a downward trend until November 5<sup>th</sup>. The overall rate for the year (with lost time + without lost time) was until the beginning of November below the target set by the Company (less than 1.00). However, under the impact of the registered deaths of employees and contractors and a lost-time accident, all of them related to the failure, the indicator reached 1.36.

In 2016, the labor scenario changed significantly on all front due to the failure of the dam. The safety team adopted the strategy of command and control, and, together with the Company's leaderships, applied preventive tools – such as

preliminary risk assessment, practice of verification by the employee of the work scenario/environment observing accident risks in front, behind, to the right, to the left, above and inside, in addition to the verification of the employees to see if they were fit for work, in addition to approvals and permits for more critical events.

The strategy was effective. The year of 2016 ended with over 16 million of manhours worked (16,627,596), with an accident report rate of 0.36, one of the Company's best results when taking into account all of the incidents which occurred among direct and outsourced employees.

### HEALTH AND SAFETY RATES OF EMPLOYEES (OWN EMPLOYEES AND CONTRACTORS), PER GENDER <sup>1</sup> G4-LA6

	2015		2016	
	Men	Women	Men	Women
<b>Total of lost days<sup>3</sup></b>	30,390	33	243	0
<b>Absenteeism rate <sup>2</sup></b>	0.62%	0.62%	0.33%	0.55%
<b>Total of fatalities <sup>3</sup></b>	5	0	0	0

<sup>1</sup> There is no information of MHW of contractors classified by gender.

<sup>2</sup> Only employees. Reference: January to November 2015.

<sup>3</sup> Employees and third parties. Reference: January to November 2015.



**HEALTH AND SAFETY RATES OF EMPLOYEES (OWN AND CONTRACTORS), PER REGION** G4-LA6

	2015		2016	
	MG	ES	MG	ES
<b>Injury rate<sup>1</sup></b>	0.25%	0.15%	0.06%	0.06%
<b>Injury rate<sup>2</sup></b>	0.91%	0.87%	0.51%	0.25%
<b>Total of lost days<sup>4</sup></b>	30,234	189	243	0
<b>Absenteeism rate<sup>3</sup></b>	0.69%	0.54%	0.47%	0.30%
<b>Total of fatalities<sup>4</sup></b>	5	0	0	0

<sup>1</sup> Employees and third parties - only recorded accidents.

<sup>2</sup> Employees and third parties - accidents recorded + SPT-AA - Simple Ambulatory Assistance). Period January to December 2015.

<sup>3</sup> Employees only. In absenteeism, the rate calculation method consists in the number of employees on leave with social security evidence over the annual average number of Samarco insured. Period January to December 2015.

<sup>4</sup> Employees and third parties. Period January to December 2015.

<sup>5</sup> Covers only fatalities related to operating activities, excluding major projects. Total fatalities remained in 14 deaths.

**ACCIDENT INDICATORS – SAMARCO AND CONTRACTORS**

	2013	2014	2015	2016
<b>Recorded accident rate (LTI + NLTI)**</b>	0.80	1.27	1.36*	0.36
<b>Lost Time Incidents Rate (LTI)**</b>	0.29	0.42	0.84	0.18
<b>Fatalities</b>	-	1	14***	0

\*rate related to accidents of operational areas (5 occurrences).

\*\*calculation of the accident rate: No. of accidents x 1,000,000 (either LTI or LTI + NLTI rate)/mh worked. LTI: lost-time incident; NLTI: no lost-time incident, personal injury which does not prevent the employee from returning to their activities on the day after the accident.

\*\*\* 13 confirmed deaths and 1 person missing.

## CRITICAL RISKS

In addition to the control of rates, management maps and identifies stations, activities and processes with critical health and safety risks. This work that began in mid-2010 categorizes all potential risks to which employees and contractors are exposed, considering five levels: trivial, tolerable, moderate, substantial and intolerable.

The Company up to 2015 had mapped 18 priority operational safety risks and six health risks, with a program for management thereof. In 2016, one more critical risk was identified – Helicopter Use, thus bringing the total up to 19. The calculation of the materiality of these risks results in the Safety Risk Factor and Health Risk Factor, in order to zero substantial and intolerable risks.

In 2015, the goal was to reach a 10% reduction in the Safety Risk Factor; until the dam failure, the reduction was 6.85%. The total investment for the year, in activities related to such management was R\$6.6 million. In 2016, it was not possible to make investments and calculate the safety risk factor of the operations considering that the operational units were stopped.

With regard to the Health Risk Factor. The reduction has greater impact on the actions of noise reduction and ergonomic improvement programs. Today, the health risk factor, according to the monitoring of 2015, is at 4.89. Due to the interruption of activities, a new evaluation will be made upon the actual resumption of operations.

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## SAFE BEHAVIOR

In 2015, the initiatives of awareness of health and safety issues among employees and contractors resumed:

**Responsibility Management Program** – launched in 2014, it is focused on health and safety, in the behavioral aspect, with topics such as risk perception, climate and culture. In 2015, more than 1.200 hours of qualification for employees and contractors' employees.

**Health and Safety Rituals** – several specific actions, such as inspections, observation of behavior, monthly meetings of general managers, meetings for evaluation of incidents, among others.

### Safe Work Observation Program (Pots)

– voluntarily, employees can monitor the implementation of their routine tasks, reinforcing behaviors which prevent accidents and mitigate risks.

**Sponsor Program** – This initiative ensures that more experienced professionals voluntarily operate as coaches of newly hired employees, integrating them into the safe behavior culture.

**Programs 'Disseminating The Value Of Safety To Contractors' And 'Organizing Occupation Health And Safety Management'** – both are intended for contractors, and seek to engage them in the implementation of the best practices of the industry. The second one is focused on companies interested in rendering services to Samarco.

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In 2016, with the interruption of the operations, in view of the work fronts in the field and many new contractor employees, the strategy adopted by the leaderships was the model Command and Control, thus assuring that the activities, whether critical or not, would

be performed without placing at risk the physical integrity of the people.

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## BUSINESS PARTNERS

Samarco has consistently endeavored to maintain a relationship with its customers and suppliers based on trust and reciprocity and joint efforts focused on aspects such as efficiency, sustainability and productivity. After the dam failure, focus was shifted to shedding light on the Company's future as well as planned investments and actions.

## CUSTOMERS

In these past two years, the Company conducted dealings with customers in about 20 countries in Europe, Americas, Africa and Middle East, and Asia. Sales of products reached 24.918 million tons in 2015, of which 97% were pellets and 3% fines (pellet feed/sinter feed). In 2016, some sales still occurred of pellets and pellet feed which were located in the Company's stockyard in Espírito Santo and at distribution centers abroad, totaling 660 thousand tons. With the depletion of its stock, the supply agreements in effect were handled pursuant to clauses of Force Majeure, without any cancellations or changes.

Historically, the Company has concentrated efforts on long-term supply contracts in its portfolio to ensure customer loyalty and mutual business benefits. It has also sought to maintain distribution of products within five geographical regions, thereby reducing risk exposure.

The year of 2015 was already a difficult year, with a sharp decline (35%) in the average selling price of pellets and the steel industry downturn in regions such as Southeast Asia. In 2016, the executive sales team met periodically with the clients and provided explanations on such topics as investigation processes, the Company's financial sustainability and operational resumption plans. The Company is committed to maintaining the highest standards of quality and financial sustainability after it is back in operation.

## SUPPLY CHAIN

The extremely challenging scenario faced by the Company after the failure of the Fundão dam impacted its relationship with its supply chain. Since the incident, the entire supply base has been reviewed due to the suspended operations. At the same time, the Company has called upon its suppliers, many of whom are from the impacted regions, to work on the emergency programs and their management.

Samarco has a broad chain of suppliers, comprising 7 thousand companies divided into three major categories: Services and Materials (indirect); Projects (Capex); and Consumables and Operating Supplies (direct). Given the suspension of its operations and the uncertainties over their restart, it was necessary to adjust the contracts to the new reality of the Company. In 2014 and 2015, Samarco purchased goods and services worth over R\$5.5 billion. In 2016, however, the volume was R\$1.2 billion. G4-12, G4-13

Until the fourth month of 2016, Samarco kept in effect service contracts which had personnel allocations and ongoing activities on 5/November/2015, as established in the agreement with the Federal Prosecution Service and the Labor Prosecution Service. After that, claims were reviewed and contracts renegotiated.

Under said agreement, the Company promised not to perform any early termination of any service contracts involving workers/contractors that were regularly working on 5 November 2015, other than contracts for specified periods which were scheduled for completion by March 1<sup>st</sup>, 2016 and contracts whose contractors had already been assigned to other work areas or to work with other contractors.

The Company sought to reinforce respect across its supply chain relationships, in order to leverage regional economies – one of the main positive socioeconomic impacts of the mining industry – and

prepare local companies for adverse scenarios. In 2016, 48% of the purchasing volume related to suppliers within Samarco's direct area of influence, namely, municipalities located in between Germano (MG), Ubu (ES) and the pipelines, as well as municipalities within the Vitória Metropolitan Area (ES).

In 2015, the Company went ahead with initiatives such as the Supplier Development Program (Prodfor) and the Supplier Development Plan (PDF), as well as the Supplier Meeting, which was held on 29/October in Belo Horizonte (MG) and brought together more than 100 companies to discuss topics such as business development and safety. These initiatives will be reviewed upon the resumption of the Company's activities.



The emergency response actions, the establishment of the programs and the constitution of Fundação Renova in detail

# ABOUT THE FAILURE OF THE FUNDÃO DAM

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## IN THIS CHAPTER

- 68 Emergency actions
  - 78 Fundação Renova
-



The failure of the dam was an unprecedented environmental tragedy in Brazilian mining

On November 5<sup>th</sup>, 2015, there was a sudden breach of the tailings containment structure of the Fundão Dam, at Samarco's Germano complex in Mariana (MG – State of Minas Gerais). Unfortunately, 19 persons, among them members of the communities and employees of Samarco and of subcontractors, went missing. Up until June of 2016, 18 bodies had been identified and one person remained missing. Of the confirmed dead, 13 were employees of companies contracted by Samarco and four were residents of Bento Rodrigues and one person was visiting there. All possible rescue efforts were made, and the Company gave total support to the families of the victims.

As part of the Company's dam system, which includes the structures of Germano (tailings dam) and of Santarém (a water reservoir) and drained overburden pile in the Germano pit, the Fundão dam held a volume of tailings of some 55 million cubic meters, within the limit allowed and licensed by the competent environmental agency (Regional Environmental and Sustainable Development Superintendency – SUPRAM), of up to 111 million cubic meters upon reaching the elevation of 920 m, as per the data presented in the Environmental Impact Study – EIA.

In terms of size and volume of tailings deposited, Fundão was the second largest dam of the Company, only surpassed by the Germano dam. As well as the society, Samarco has tried to understand what led to the unprecedented failure of the dam. In particular because, as of the last audit in July of 2015, in compliance with the federal law 12.334/2010, the decree 416/2012 of the DNPM and the state law DN 87/2005 of Copam, the Fundão dam was generally considered as stable.

To identify the causes of the dam failure, Samarco, Vale and BHP Billiton retained the services of the US office of Cleary Gottlieb Steen & Hamilton LLP to coordinate an independent investigation, with the support of a panel composed of geotechnical specialists, who identified that a combination of several factors led to the failure (read more in "Result of the Investigation").

Some of the tailings released by the failure of the Fundão dam flowed over the Santarém dam, used to store water and sediments, and thus caused a partial erosion of the body of the Santarém dam, and consequent damage to its structure. There was concomitant damage to the structures of the Selinha, and the Sela/Tulipa dikes, on the side walls of the Germano dam.

In all, some 43.7 million cubic meters of tailings were released from the Fundão dam. The material, composed of water, oxides and hydroxides of iron solid particles, minerals which are host to traces of aluminum, in addition to oxides of manganese and silica/ quartz, and, in lesser concentrations, trace quantities of lead, copper and zinc, overtopped the Santarém dam, which retained a large part of the tailings. After this, the remainder of this material reached Bento Rodrigues – a district of the municipality of Mariana (MG) situated 8 kilometers downstream of the Fundão structure.

After passing through this district, the tailings reached the rivers of Gualaxo do Norte - where they impacted the city of Barra Longa – and Carmo. Later, they reached the Doce River. On arriving at the hydroelectric plant of Risoleta Neves (whose reservoir is known locally as the Candonga dam), part of the tailings were retained by the overflow gates and reservoir of the plant. The plume formed by water and by the tailings continued its flow in the Rio Doce, reaching its mouth, in the district of Regência, municipality of Linhares (ES), on 21 November 2015.

In all, 11.1 million m<sup>3</sup> of tailings were carried past the Candonga dam, and diluted downstream along the Doce River, impacting some 680 km of waterways in this watershed area. The major impact occurred in the first 80 kilometers; in all, 39 municipalities were impacted by the passage of the material in the states of Minas Gerais and Espírito Santo (ES). A considerable number of families lost their homes. Rural properties comprising some 2.2 thousand hectares were flooded and unable to pursue their production activities.

The tailings plume temporarily affected the direct intake of water from the Doce River, thus interrupting the water supply of nine cities. Among the municipalities which suffered the impact are Governador Valadares

(MG) and Colatina (ES), which had to interrupt their affected intake of water from the river for eight and six days, respectively.

With the objective of minimizing the impacts on the region, Samarco installed barriers, along both banks of the river and around islands in the estuary, this action, however, did not impede the plume from spreading.

An emergency action plan was executed, with focus on the management of the environmental impacts – such as monitoring the water quality and rescuing ichthyofauna and emergency re-vegetation impacted areas with grasses – as well as of social impacts, including the emergency relief to the communities with regard to living quarters, income and psychosocial support. A concerted effort was made to strengthen the systems of monitoring and safety of the remaining dams and construction works were initiated for structural reinforcement to mitigate the risk of new occurrences. Several agencies, such as the National

Department of Mineral Production (DNPM), IBAMA, IEMA and the governments of Minas (MG) and Espírito Santo, accompanied these measures.

With the signing of the Framework Agreement (TTAC) among Samarco and its stockholders and the Federal government and state governments of Minas Gerais and Espírito Santo, the emergency actions are being maintained and expanded, as part of the socioeconomic and socioenvironmental recovery plans in execution by the Renova Foundation (read more in the chapters Our commitment to Brazilian society).

In the next pages, the reader will be presented with a summary of the recovery actions made, up to the month of August of 2016, by Samarco to mitigate and remedy the impacts of the failure of the Fundão dam. After that, the data of environmental and socioeconomic programs managed by the Renova Foundation must be accessed in the activity report of that entity, or at the site [www.fundacaorenova.org](http://www.fundacaorenova.org).

Mouth of the  
Doce River,  
Linhares (ES) –  
November 2015



### THE PATH OF THE TAILINGS

#### SAMARCO

5/Nov - 15h45

Failure of the tailings containment structures of the Fundão dam

43.7 million cubic meters of tailings leave the Fundão dam and overtop the Santarém dam

Tailings reach the community of Bento Rodrigues and then the rivers of Gualaxo do Norte and do Carmo

#### Rio Gualaxo do Norte

#### BELO HORIZONTE

#### MG

- Bento Rodrigues
- Camargos
- Paracatu de Cima
- Mariana
- Paracatu de Baixo
- Pedras
- Claudio Manoel
- Gesteira
- Borba
- Campinas
- Barra Longa
- 5/Nov - 23h
- Arrival at Barra Longa
- Santa Cruz do Escalvado
- Rio Doce
- 6/Nov - 11h38
- Arrival at the municipality of Rio Doce

- Governador Valadares
- 9/Nov - 12h
- Turbidity plume arrives at Governador Valadares (MG), affecting the water intake is temporarily paralyzed for eight days
- Baguari
- 09/11/15 - 8h38
- Pedra Corrida
- 09/11/15 - 1h48
- Periquito
- Belo Oriente
- Ipiranga
- 08/11/15 - 1h
- Ipaba
- 08/11/15 - 6h34
- Alpercata
- Tumiritinga
- Galiléia
- Resplendor
- Quatituba
- Aimorés
- 15/11/15 - 19h49
- Conselheiro Pena
- Itueta
- Marilândia
- Linhares
- 20/11/15 - 18h34
- Povoação
- 21/11/15 - 11h23
- Regência
- 21/11/15 - 17h
- Colatina
- 18/Nov - 18h40
- Arrival at Colatina (ES), where the water supply from the Doce River was also affected for six days
- Baixo Guandu
- 16/11/15 - 18h
- Itapina
- 18/11/15 - 7h

#### Rio Doce

#### ES

#### VITÓRIA

#### ESPÍRITO SANTO'S SEA



## DAM STRUCTURES

Samarco maintained, up until 5 November of 2015, two dams for the storage of the tailings generated by the extraction and beneficiation of iron ore in its Germano Complex (MG). The newer one was the Fundão dam, inaugurated in 2008, with a storage capacity of 55 million cubic meters.

The dams were constructed strictly in accordance with the National Policy of Dam Safety (Law 12.334/2010), with proper safety inspections and teams operating in 24 hour shifts for maintenance and monitoring. The operating licenses were validly granted by the Regional Regulatory Superintendency of the Environmental - (SUPRAM) – the last inspection before the failure was performed in July of 2015. In September of the same year, reports were issued to the proper authorities, indicating safe condition operational for the dams. Unfortunately, even with the implementation of procedures of risk management associated with the dams (read more in "Risk Management"), these measures were not capable of foreseeing the failure.

After the failure of the dam, Samarco executed its Emergency Action Plan of the Mining Dams, presented to the National Department of Mineral Production (DNPM), and the production process of Germano was immediately halted.

There were two embargoes placed against Germano: one by DNPM, about the operations of the dams and the Ore Treatment Facilities (UTM's), and the other by the State Environmental Foundation (FEAM) in conjunction with the Secretary of the Environment and Sustainable Development (SEMAD), about the operations as a whole, except for those activities considered to be of emergency nature (such as construction work for reinforcement of structures). At the Ubu facility, in Anchieta (ES), there was no embargo as a result of the failure.

### REINFORCEMENT OF SAFETY FEATURES

In order to comply with the guidelines of the Civil Defense and the Fire Department and seek a reduction of risks, the Company adopted additional measures and began construction to ensure the safety of remaining structures and stem the flow of tailings. Check out the stage of initiatives in each structure:

Operations in Germano suffered two mandatory stoppages determined by state and federal agencies. In Ubu, there is no operational impediment related to the dam failure

Samarco maintains actions to reinforce the safety of the remaining structures







Work on the structures continued throughout 2016, with some activities already concluded

- **Selinha Dike:** Works of structural reinforcement were completed in December 2015. At the moment, construction of surface drainage in the area is being conducted, to prevent the occurrence of erosion. The conclusion is scheduled for April 2017.

- **Sela and Tulipa:** The works were divided into three phases; phases 1 and 2 of structural reinforcement were completed in September and November 2016 and the phase 3, filling and leveling, with sandy tails the area near these dikes was concluded in February 2017.

- **Germano dam** – Construction of strengthening the toe of the Germano dam was completed in June 2016. In December of the same year, improvements in the drainage of the structure were completed.

- **Containment barriers of the tailings dam remnants** (section 1, 2 and 3) all barriers were completed in 2016. Section 4 was finished in the beginning of 2017.

- **Dikes S1 and S2** – the barriers are right below the Santarém dam and have been concluded and silted up. The structures are responsible for the containment of the sediments existing in the Fundão and Santarém areas.

- **Dikes S3 and S4** – this dikes, together with the new Santarém dam and dikes S1 and S2, form the containment system for the tailings remaining in the Fundão valley and improvement of the water quality of the Santarém creek.

- **New Santarém dam** – the first interventions at this site, concluded in February 2016, were to reinforce the old dam. The improvements assured a higher factor of safety for this structure. Subsequently, work was started on the first phase of the construction of the new Santarém dam, which should be concluded in December 2016. This will be one of the major milestones in achieving Samarco's goal to contain the remaining tailings from the Fundão valley. In this phase, the reservoir will have an impoundment capacity of over 5 million m<sup>3</sup>. In the second and last phase, to be executed between March and June of 2017, the capacity of the reservoir will be raised to 7 million m<sup>3</sup>.

The sediment containment system implemented by Samarco in Mariana (MG) has brought results considered to be positive. Already at the beginning of 2017, the monitoring of the water in the area indicates a significant reduction in the turbidity levels. Since mid-January, the indices of water turbidity just downstream of the S4 dike are under the limit of 100 NTUs (nephelometric turbidity unit), as established by Resolution 357 of the National Environmental Council (Conama). In the case of dike S4, for example, the average turbidity of the water fell to 25.7 NTUs on 15 February 2017. The S4 dike is intended as much as possible trace of solids from the area of Bento Rodrigues to the Gualaxo River.

## EMERGENCY PLAN

After the failure of the Fundão dam, Samarco developed and supported specific training actions among the community to respond to emergency situations. In addition, it made improvements in the communication systems for such situations and in the monitoring of the structures. In 2016, actions were carried out that represented important lessons learned for Samarco.

With relation to the communication and mobilization for abnormal situations, Samarco teams assisted the Civil Defense in the supply of information about the risk scenarios, flooding maps, and the emergency procedures, which contemplate the location of the installation of fixed sirens and the definition of locations of meeting points.

Sirens, mobile and fixed, were installed on the dams of Germano and Santarém and in the communities of Bento Rodrigues, Ponte da Gama, Camargos, Paracatu de Baixo, Paracatu de Cima, Pedras, Campinas, Gesteira and Barra Longa. The 24 hour on-line monitoring was also rein-

forced by means of cameras, large screens, drones and radars, instrumentation of dams, field inspections and visual accompaniment of the remaining structures.

Another approach to proactiveness was the performance of drills – an opportunity to prepare communities, public authorities and Samarco itself to deal with hypothetical situations of dam failure. Two events occurred in 2016, one in March and another in November, in which the Civil Defense of municipalities of Mariana and Barra Longa, together with the Civil Defense of Minas Gerais have done exercises in simulated emergencies in the 10 affected communities in Mariana and Barra Longa, a joint effort with the Samarco, Military Police, the Fire Department and departments of health, education and environment. A new simulation is expected to occur in the second half of 2017.

The main objective of the simulated exercises is to stimulate community engagement to promote an atmosphere of greater tranquility, increasing the capacity of the society to react to adverse events, such as a dam break or flooding.



A drill held in the community of Barra Longa

Samarco supported the organization and execution of these drills, communicating to the local populace the execution plans and promoting explanatory meetings with active participation, in addition to local radio spots and vehicle mounted PA-systems. In all, 742 residents got involved in November 2016. In addition to Samarco, several representatives of the municipalities influenced by mining activities participated, as well as other companies which also have dams, seeking to share experiences and lessons learned from the simulations. Two technical training sessions were held in the offices of Herkenhoff & Prates, in Mariana, on 17 and 20 October 2016, conducted by the main team of the consultant and by analysts from Fundação Renova.

It is an important initiative to bring to public attention, with transparency and practicality, the optimized emergency procedures for the areas affected in the event of a hypothetical dam failure. These actions represent an enormous learning process for the Company and may serve to stimulate safer models of operation for the mining industry, including regulatory framework regarding the communication and management of emergency situations.

A multidisciplinary commission – formed by several civil protection agencies and Samarco – has assessed the results of the training and possible opportunities for improvement. The alarm system is configured to perform two self-tests (silent) every 24 hours on all electronic sirens. In the event of any abnormality, a message is generated to inform of the malfunction.

## DAMS

### Fundão (tailings)

- Began operations: 2008
- Volume of tailings (until 5 November of 2015): 55 million m<sup>3</sup>

### Germano (tailings)

- Began operations: 1976
- Volume of tailings (in October 2015): approximately 129.6 million m<sup>3</sup>

### Santarém (water)

- Began operations: 1994
- Volume of sediments (on 5 November of 2015): approximately 6.9 million m<sup>3</sup>

Aerial view of the region of the dam before the failure



# EMERGENCY ACTIONS



With the support of BHP Billiton and Vale, Samarco mobilized immediately after the dam failure to provide: assistance to the impacted communities, accommodations for the people who lost their homes, support in searches for missing people and clarifications to the authorities and the government. Samarco recognizes its

legal and moral obligation to mitigate, compensate and remediate the impacts on the population of Minas Gerais and Espírito Santo.

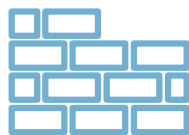
Resettlement of those who lost their homes, distribution of drinking and mineral water, animal rescue, psychosocial

care and restoration of damaged accesses, among others, were the main work fronts of the emergency actions. Below, the Company shows an overview of the actions all the way to the start of activities of the Renova Foundation, in August 2016. After that period, please refer to the site [www.fundacaorenova.org](http://www.fundacaorenova.org).

## OVERVIEW OF THE ACTIONS (UP TO AUGUST, 2016)



The families that lost their homes were installed in houses or accommodated adequately.



### Reconstruction

The families of Bento Rodrigues, Gesteira and Paracatu de Baixo have already chosen the sites for reconstruction of their communities. A third sector institution (Caritas), indicated by the federal Public Prosecution Service and the community, will provide technical support to the residents in the overall resettlement and compensation process.



**818**

of the students of the communities impacted in the region of Mariana and Barra Longa completed the school year of 2015 and started the school year of 2016 without delays, according to the school calendar.



**7,705**

Emergency financial aid cards delivered to over 16 thousand people, among heads of family and dependents.



**120**

Water monitoring points, of which 38 are on the Doce River, 11 on its tributaries, 31 in the marine environment, 26 checking on turbidity and another 14 in Bento Rodrigues and wastewater treatment plans in Governador Valadares.



**835**

hectares revegetated on an emergency basis in the municipalities of Mariana, Barra Longa, Rio Doce and Santa Cruz do Escalvado, in order to control erosion and entrainment of solids during the rainy period.



**7 bridges**

Which were damaged were rebuilt in 90 days (one every 15 days).

### ACCOMMODATION OF THE FAMILIES

The families of Bento Rodrigues and Paracatu de Baixo in Mariana and Barra Longa who had their homes damaged were accommodated in houses rented and equipped by Samarco. The transfer to the new housing followed the criteria and prioritization defined by the Committee of Representatives of the Impacted Communities and the Secretariat for Social Action, with monitoring by the Public Prosecutor's Office. The new houses received furniture, appliances, utensils and bed/table linen. Before the families moved in, the Company purchased items, such as food, water and personal hygiene materials. In Barra Longa, these items were provided through donations.

### MEETINGS WITH COMMUNITIES

Two to five meetings were held each week with representatives of the communi-

ties, with the Public Prosecutor's Office of Minas Gerais and other competent agencies. The purpose was to listen to the opinions of the directly impacted community and have them participate in the decisions and the planning of actions. In addition to the field dialogue teams, service stations were installed in Minas Gerais (Mariana, Galileia, Tumiritinga, Itueta, Barra Longa and Santa Cruz do Escalvado) and in Espírito Santo (Baixo Guandu, Marilândia, Colatina - closed in early February 2016 - and Linhares - discontinued in June 2016). A relationship channel was also created ([assistencia.es@samarco.com](mailto:assistencia.es@samarco.com)) to receive the comments of residents of the cities in Espírito Santo, in addition to the Call Centre and the Ombudsman. The Company's Facebook page also served as a channel for relationship and clarifications.

### FINANCIAL AID

A total of 7,705 emergency financial aid cards were delivered to over 18 thousand people, among heads of households and dependents in Minas Gerais and Espírito Santo, up to August 2016. The aid is equivalent to the monthly minimum wage for each person in the household who lost their source of livelihood as a direct result of the dam failure, plus an additional 20% of the minimum wage for each dependent, in addition to a stipend corresponding to the official staple food basket value.

## INDIGENOUS PEOPLE G4-MM6, G4-MM7

After the failure of the Fundão dam, Samarco started to interact more with indigenous peoples who had not till then been part of the communities within its direct area of influence. In Minas Gerais, in the region of Resplendor, the Krenak people live in a traditional territory on the banks of the Doce River and, in view of the emergency measures related to water use, they received drinking water for human consumption and raw water for animal consumption. They receive 3 thousand liters of mineral water every day, in addition to the supply to 140 water tanks of 2000 liter capacity every two days.

In order to provide a more structured and permanent service for abstraction and distribution of water, Samarco, along with the Special Secretariat of Indigenous Health (SESAI), the National Indian Foundation (FUNAI) and Krenak people, is studying viable alternatives. In addition, it has paid a monthly stipend of 9 minimum wages per family, provided mineral salt, silage and feed for livestock, purchased two boats, contributed R\$20 thousand to health support, supplied 100 drinking spots with daily water supply, as well as fencing along the Doce River.

The emergency aid to the Krenak people in Minas Gerais and the Tupiniquim and Guarani living on the indigenous lands of Tupiniquim, Caieiras Velha II and Comboios, in the municipality of Aracruz in Espírito Santo, is implemented by emergency programs based on the three fundamental pillars of food and water safety and financial security. Since June 2016, Samarco has been providing financial support to 915 Tupiniquim and Guarani families. Vila do Riacho, also a municipality of Aracruz, ES, between the Comboios river and the sea, is home to the Tupiniquim people of TI (Indigenous Land) Comboios. The water supply to this community was not affected by the dam failure, but, in view of

the restrictions on fishing as far as Barra do Riacho, they receive as emergency financial support of two and a half minimum wages plus 20% for each dependent, and a staple food basket. The support to the Tupiniquim of this TI has been provided since March 2016. In the scope of compliance with the Framework Agreement (TTAC), Samarco received the Term of Reference (TR) sent by Funai that guides the impact studies in these indigenous lands. In a specific meeting with Funai, the Company has already presented the technical consultants hired to prepare the studies and will soon begin field work, expected to start in 2017.

The studies have the main purpose of identifying the environmental, socio-cultural and economic impacts on the territories and way of life of this population and to build, in a participative manner, the permanent programs (according to the TTAC - specific Program aimed at recovering and improving the quality of life of indigenous populations) which shall dialogue with the reestablishment of systemic functions of the Doce River basin.

As to the mechanisms for participation, with Funai's monitoring, Renova Foundation will submit to the indigenous peoples a proposal to build a Dialogue Plan. This instrument proposes to the Krenak, Tupiniquim and Guarani peoples the development of an official document to present their community rules and laws, so that the relationship with the Foundation is based on the comprehensive participation of the community in the actions and programs; through intercultural dialogue permeated by good faith and respect for the rights of indigenous peoples to participate in decisions that affect them, with binding effect, by making the State and the Foundation incorporate that dialogue in the decision-making. The document will be governed by the guidelines of the Convention 169 of OIT on Indigenous and Tribal Peoples, which is law in Brazil since 2004 (Presidential Decree No. 5051).

## HEALTH

The Samarco provided hospital supplies, medicines and medical equipment, as well as various health professionals (more than 100 professionals - doctors, psychologists and others) to care for communities impacted in Mariana and Barra Longa (MG). Currently, some professionals are still acting in Mariana and others in Barra Longa. In the first half of 2016, health agents of endemics were also made available, which acted particularly in combating outbreaks of dengue mosquito in the municipalities of Mariana, Long Bar and Governador Valadares, Minas Gerais, and Colatina, in the Espírito Santo. Medical assistance was carried out in partnership with the municipal public authorities.

## COMPENSATION OF FAMILY MEMBERS AND IMPACTED COMMUNITIES

The families who lost relatives received special care after the confirmation of the disappearance of the victims. Professionals specialized in the psychosocial area, experts in risk situations, gave support to the family members. In addition to the psychological support, the company has borne all the costs with documentation and funerals and, in case of outsourced employees, provided accommodation to people from outside the region and financial supplement to life insurance to cover the cost of funeral expenses. Relatives of the victims have received advance compensation on account of death.

In November 2016, a Mediated Indemnity Program (PIM) was created, open to all individuals and micro and small businesses who suffered property damage or pain and suffering, or losses in terms of their livelihood. Adhering to this program is entirely optional and free of charge. In order to disseminate the broad availability of the program and strengthen relations with the impacted areas, Fundação

Renova created 14 centers to provide information and services in the two states (MG and ES).

These centers will allow Fundação Renova personnel to evaluate each individual case, based on the criteria of the Program, and expedite its implementation.

## OCCUPATION, EMPLOYMENT AND INCOME G4-EC8

Samarco was, until 2015, responsible for part of the revenues of municipalities in which it operates; taxes generated directly by the operation are important to municipalities, such as Mariana (MG) and Anchieta (ES), belonging to the former Area of Direct Influence (AID) of the Company. With the failure of Fundão dam, there were also different types of impact on the economies of the basin of the Doce River, in a new area of influence. There was damage to riparian communities and fishermen livelihoods, for example.

Knowing this, the Company has supported the creation of a work front for occupa-

tion, employment and income, visiting families impacted to gather professional profiles and develop reintegration projects. In addition, the work front related to occupation and income was also active in the recovery of small businesses so they could resume operation. In all, 285 processes were evaluated, of which 249 have already been concluded.

## EDUCATION

We sought to expedite the return of students impacted by the dam failure to school activities. The resumption of classes occurred 11 days after the failure and, in 2016, 818 of students from Barra Longa, Claudio Manoel, Campinas, Pedras, Borba, Gesteira, Bonito, Bento Rodrigues and Paracatu resumed their school activities within the planned schedule, receiving school kits. Spaces have been renovated and transportation to school provided to students (by court order), as well as educational material for teachers and psychological support for teachers and students.

Return to school started 11 days after the failure of the dam





Ceremony of the delivery of Praça Manoel Lino Mol in Barra Longa

#### WORKS AND INFRASTRUCTURE G4-EC7

Samarco promoted the cleaning and renovation of schools, real estate (residential and commercial), public areas and is performing the dredging of the tailings retained in the reservoir of the Risoleta Neves Hydropower Plant (known as Candonga). In total, nine bridges of access to communities were rebuilt and released for traffic, one every 15 days. In Barra Longa, until October 2016, 95 of 112 houses were renovated and 17 are being repaired; 31 of 36 commercial establishments have been renovated and 5 are in progress; and the cleaning and reconstruction work of the public spaces of city continue in 2017. On 30 October of 2016, Samarco delivered the main town square - Praça Manoel Lino Mol – and the avenue of Beira Rio, public spaces which had been impacted by the failure of the Fundão dam. After that date, the transition of the activities in progress to the Renova Foundation was made.

To reconstruct the square according to the wishes of the Barra Longa community, Samarco held open meetings, between February and March of 2016, to obtain the opinions of children, adolescents, adults and elderly, tradespeople and public authorities. About 200 people participated in this process.

The architectural design kept the former character of the square, while at the same time offering improvements in the infrastructure and landscaping, and installing a playground and an outdoor gym. New rainwater drainage systems were built, the sidewalks received modern pavement material and the electrical system was renovated. Public lighting is provided by 61 led light fixtures, installed around the square and along the avenue.

The cleaning of the Risoleta Neves Hydropower Plant (Candonga dam), in Santa Cruz do Escalvado (MG), is based on court agreement signed on February 6<sup>th</sup>, 2016 between Samarco, the Public Prosecutor's Office of Minas Gerais and the Government of Minas Gerais. The structure had received approximately 10.5 million cubic meters of tailings after the failure of the Fundão dam and is being dredged in order to ensure the safety of the reservoir, the filling of the lake and consequently the feasibility of resuming the hydro-electric operations. The implementation of dredging measures was ratified under the TTAC.

In July 2016, dredging of the first 400 meters from the Candonga dam was intensified and about 600,000 m<sup>3</sup> of tailings had been dredged from it by the end of November of 2016. The tailings are deposited in areas licensed and authorized by the competent agencies. After the end of the dredging, these areas will be recovered and revegetated with native plant species of the region. Due to the entrainment of sediments, the net result of the dredging efforts was about 200 thousand m<sup>3</sup>.

In parallel, three farms were bought downstream of the hydropower plant, about 3.6 km away, to for the disposal of the dredged sediments. The group of these farms is called Fazenda Floresta. Currently, geotechnical investigations are being carried out in the area to serve as a basis for the engineering design of the dikes, piles and other structures necessary for the transportation and dewatering of the sediments.



**95 out of 112**  
renovated homes in Barra Longa by October 2016 – 17 renovations are in progress



Rescue of animals and distribution of feed and other consumables were some of the actions adopted in the impacted communities

The mitigation plan for the containment of sediments along the Doce River involves the installation of three metal barriers. The first will be driven into the soil 400 meters upstream of the Candonga dam, and should be concluded by mid 2017. The second barrier, completed in March 2017, was built at a distance of 5,100 meters upstream from the dam of the Risoleta Neves HPP. The third barrier is in studies for installation at 6,4km upstream of its dam, with completion scheduled for the second half of 2017.

#### RURAL PROPERTIES G4-EC7

One of the plans initiated in response to the socioenvironmental impacts of the tailings is the Agribusiness Resumption Plan, comprising 172 rural properties mapped to receive support and thus resume their activity (up to April 2016). Zootechnical experts, agronomists and agricultural engineers and technicians were hired to perform soil analysis, preparation and soil amendment of the properties. Among the measures adopted for recovery is the installation of fences. In total, approximately 198,000 meters (up to October 2016) of fences have been erected on rural properties impacted between Mariana and Candonga.

#### ANIMALS

Samarco assisted 5,639 animals between November 2015 and July 2016. Large animals were taken to farms in Mariana and Acaiaca. Those recognized by their owners were returned to them, others are still awaiting, under the care of Fundação Renova, for families to get resettled or the rural properties to be renovated. Feed was distributed to animals of 11 communities (Barra Longa, Pedras, Barretos, Paracatu de Baixo, Paracatu de Cima, Camargos, Ponte do Gama, Campinas, Mariana, Bento Rodrigues and Águas Claras), amounting to more than 5,500 tons.

With the support of animal protection NGOs, the Company held an action for the adoption of rescued dogs and cats in the region impacted by the failure of Fundão. Approximately 90% of the animals found a home. More information at the site [www.fundacaorenova.org](http://www.fundacaorenova.org).

#### RELIGIOUS HERITAGE

Approximately 2 thousand religious artifacts have been rescued from the chapels of São Bento and Nossa Senhora das Mercês (Bento Rodrigues), Santo Antônio (Paracatu de Baixo) and Nossa Senhora da Conceição (Gesteira), among icons, documents and pieces of fabric. More than 280 people were trained to work on rescue activities, including community members.



**2 thousand**  
treasured religious artifacts  
were rescued in Bento  
Rodrigues, Paracatu de  
Baixo and Gesteira



## ACCESS TO WATER: EMERGENCY ACTIONS G4-EC7

One of these actions was the temporary suspension of the water supply - the critical point of the impact on communities of the Doce River basin after the failure of the Fundão dam. Still in 2015, the supply was re-established in the impacted cities.

In the subsequent months, several measures were taken to guarantee the access to water along the Doce River, such as the construction of water mains and the drilling of wells. The distribution of water was also carried out to some river-dwelling families, as in Linhares (ES). In addition to these actions, dialogues are being developed in several municipalities and with the Interfederative Committee, which coordinates the implementation of the Framework Agreement (TTAC), for the installation of alternative water supply systems, such as in the cases of Linhares (ES) and Colatina (ES) – where the construction works are already in progress -, Governador Valadares and Resplendor (MG).

Below is a description of the actions carried out in the individual municipalities:

**Governador Valadares (MG)** – it was possible to resume the intake and treatment of water from the Doce River through the use of an organic coagulant (Tanfloc) which accelerated the decantation of solids, particularly when during periods of high turbidity. Subsequently, once again aluminum sulfate was used, for the turbidity parameters of the river returned to their level prior to the passage of the turbidity plume. The use of this coagulant in the water treatment plant accelerated clarification and allowed the water to undergo the conventional treatment normally applied by the local water utility company (SAAE). This decision was reached jointly by the technical teams of Samarco and SAAE, in addition to other consultants and companies. A 2.5 km wa-

ter main was built to bring water from the Suaçui Grande river to the Recanto dos Sonhos water treatment plant (ETA), as part of the emergency plan for water supply in cases of significant change in the turbidity of the water from the Doce River. Currently, a new alternative intake system is being studied to supply the Central ETA, with the participation of the local government and SAAE. Several improvements have been and continue to be made in the ETAs, such as the maintenance and acquisition of devices for automatic dosage of inputs, online meters, assembly of agitators to increase the flocculation capacity, assembly of filters, creation of operation procedures, technical support and weekly tests, among others.

**Colatina (ES)** – Water supply is gradually being reestablished. Laboratório Tom-masi, accredited by Inmetro, performed inspections to assure the potability of the water.

**Baixo Guandu (ES)** – local needs have been met by water abstracted from the Guandu river, made possible by the installation of three water mains, in a joint construction effort of the local government and SAAE, with the support of Samarco in the supply of material and technical supervision.

**Belo Oriente** – Cachoeira Escura (MG) – Three wells were drilled.

**Alpercata (MG)** – Two wells drilled.

**Galileia (MG)** – Four wells drilled.

**Tumiritinga** – São Tomé do Rio Doce (MG) – One well drilled, infrastructure being completed.

**Aimorés** – Mauá (MG) – Two wells drilled and available to local government, with sufficient flow rate to supply the locality.

## ACCESS TO WATER: RAINY PERIOD OF 2016/2017 G4-EC7

Samarco developed preventive actions to reduce the risk of lack of supply in several municipalities during the rainy period, in several municipalities impacted by the failure of the Fundão dam.

Another critical point is the risk of flooding and of the alteration of the aspect of the rivers affected. The work was intensified, with the development of a specific plan to deal with the prevention and preparation of contingencies. The document has been shared with environmental bodies, public authorities and Civil Defense.

The plan foresees actions to deal with the possibility of flooding and damage to homes, commercial real estate and rural properties; obstruction of roads and streets; outage of electrical energy; and loss of source of income. For each existing risk, response actions are foreseen related to the impacts and contingency of the damage. Improvements will be made in accordance with the progress and the lessons of the implementation of the plan, which seeks to minimize the risks to the maximum and ensure the well-being of the population.

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## Learn more

All of the updated actions for the rainy period are described in [www.fundacaorenova.org/periodo-chuvoso](http://www.fundacaorenova.org/periodo-chuvoso)

## ENVIRONMENTAL ACTIONS

The failure of the Fundão tailings dam generated a series of environmental impacts in the states of Minas Gerais and Espírito Santo. All impacts, such as those related to land and water biodiversity, water quality of water bodies, silting of rivers, estuaries and mangroves at the mouth of the Doce River and conservation units, were identified and are now covered by the Framework Agreement (TTAC).

Samarco Environment teams have been assessing the effects of the tailings plume on water bodies - especially the rivers Gualaxo do Norte, Carmo and Doce - and took measures for emergency revegetation of river banks and rescue of fish and other animals along the basin of the Doce River. These measures have met the demands of the federal and state environmental agencies, such as Ibama, ICMBio, State Foundation for the Environment (FEAM) and State Institute of Environment and Water Resources (IEMA).

Among the various actions taken, the Company hired Golder Associates Brasil Consultoria e Projetos Ltda. to develop a recovery and monitoring plan in the impacted area, from the dam of Santarém to the mouth of the Doce River. Golder Associates, an internationally renowned company, has previous experience in recovery plans. The developed plan is a methodological framework which coordinates diagnosis, recovery and monitoring actions, structured so that the results of the diagnosis and monitoring obtained in one phase subsidize the detailing of the following actions. Thus, this plan connects directly to long-term initiatives built within the scope of the TTAC, when basing itself on an adaptive methodology where the information of the monitoring and instructions received from the different environmental institutions are incorporated to the extent in which the actions are detailed and executed.

The first geomorphological study of Golder Associates has identified 16 priority areas for recovery, and improved the estimates of floods as support for the detailed design of river engineering. The works executed to date on the major waterways, because of their emergency nature, focused on the protection of river banks, the protection of the roads and the safety of the communities.

### REVEGETATION G4-EN12, G4-EN26

Samarco performed an emergency revegetation initially planned along the rivers Doce, Carmo and Gualaxo do Norte in Minas Gerais. This step has the purpose of improving soil conditions and help in the containment of sediment in order to prevent its entrainment into the waterways creating bases for their future recovery, and reducing the dispersion of dust. For the most up-to-date assessment of recovery activities as planned and carried out, visit the website of the Renova Foundation.

The actions described in the following pages served to contain the tailings along the waterways, preserving the quality of the resource and mitigating impacts on flora and fauna



## WATER QUALITY

Since November 6<sup>th</sup>, 2015, monitoring actions of the quality of water and sediments were performed by Samarco. Along with environmental agencies and other authorities involved, Samarco defined a total of 120 monitoring points, of which 38 on Rio Doce, 11 on its tributaries, 31 in the marine environment, 26 relative to turbidity and another 14 in Bento Rodrigues and wastewater treatment plants in Governador Valadares. Requirements are analyzed, such as physical and chemical quality of water, sediment and tailings, ecotoxicological tests, water potability test within the parameters of Ordinance 2,914/11 of the Ministry of Health and quality of water for animal consumption and irrigation. The analyses are performed by laboratories accredited by INMETRO.

Overflights are made in the region where the plume is present to check on its movement and provide input regarding the issues related to bathing water standards of beaches, the conditions for fishing and risks of entry in estuaries and preservation areas.

In August 2016, in response to the technical

note DT/Marine Monitoring n° 013/2016-IEMA, dated 19/07/2016, the frequency changed from three flyovers per week in the region of Foz do Rio Doce to two flyovers per week (Tuesdays and Fridays), in addition to a monthly flyover (usually on the last Friday of each month), with coverage of the entire coast of the Espírito Santo.

The action is taken with the support of a professional oceanographer and representatives of environmental agencies (IEMA, Ibama or ICMBio). Based on georeferenced records and observations made by these professionals during the flight, a report is generated with a characterization of the tailings plume in the sea, in accordance with the standard established in the referenced technical note.



## CONTINGENCY AND PREVENTIVE PLAN FOR RAINY SEASON

Samarco hired Golder Associates to prepare a contingency plan for the rainy season of 2016/2017, completed in September 2016. The purpose of this plan is to comprise all monitoring and control guidelines associated with environmental remediation works. The plan addresses the initiatives and sediment containment structures as well as preventive and corrective measures required for the rainy season.

The action plan for the rainy period is part of the Integrated Environmental Recovery Plan (PRAI), aimed at the long range process of environmental recovery. In PRAI are treated the pillars of the reclamation of the river, safety of the structures, containment and control of the erosion, expansion of storage capacity for the tailings and scientific basis of the risk assessment of the recovery process, in addition to the works related to the dam structures and to the Hydroelectric Plant of Risoleta Neves – Candonga dam (read more in About the Failure of the Fundão Dam).

To avoid new entrainment of sediments in the river channels, tailings containment works were undertaken between the Fundão valley and Dike S4, located near the old district of Bento Rodrigues and the Gualaxo river. The sediment containment system installed by Samarco in Mariana brought results which were considered positive. In the beginning of 2017, water monitoring in the area showed a significant reduction in the turbidity levels (Read more in About the failure of the Fundão dam).

In addition to this region, another 16 areas have been mapped, in the stretch between the dams and the Hydroelectric Plant of Risoleta Neves, with greater potential of availability of sediments for the rivers by rainwater erosion, considered priority for the recovery process.

Teams are working in the field, involved in the mobilization and intermediation with landowners.

The environmental recovery plan of the impacted areas, in the municipalities of Mariana, Barra Longa, Rio Doce, and Santa Cruz do Escalvado

(MG), requires immediate re-vegetation of the Areas of Permanent Preservation (APP's) with bushes and shrubs; recovery of the impacted tributaries, by means of rock armoring, bio-engineering and re-vegetation; re-conformation and control of erosion of the flood plains; regularization of the principal river banks; re-vegetation of the banks and flood plains of the impacted rivers and planting of the riparian vegetation.

On an emergency basis, the planting of grasses and leguminous species was carried out in 808 hectares of the APP's impacted by the deposition of tailings on the flood plains of the rivers, aimed at controlling wind erosion and solids entrainment with the rain runoff. In addition to the planting, an on-going maintenance effort was carried out to assure the integrity of the saplings and areas planted. In the last quarter of 2016, the reclamation effort of the impacted tributaries was also in progress.

**BIODIVERSITY** G4-EN12, G4-MM2

Samarco hired expert advice (Acqua Consulting and Recovery of Aquatic Environments Ltd.) to understand the impact of the passage of the plume of the tails of the waste along the Doce River on local fish populations of the Doce river. The work covered the stretch between its mouth and the hydroelectric plant Risoleta Neves, municipality of Santa Cruz Escalvado (MG), and was conducted in two stages - in December 2015 and in March 2016. The results of the first expedition confirmed the existence of schools of fish, with 471 records over 670 square kilometers in all areas assessed, whether they were impacted or not by the turbidity plume.

To perform this analysis, a sonar coupled to a boat propelled by an outboard motor was utilized. Each section of the river, of a total of 20, was covered in order to cover a path in Z format, which would allow a better coverage of the area studied. The course was simultaneously recorded on GPS (Global Positioning System) and video with images of the sonar recording along with the water column.

Other relevant actions focused on the theme of biodiversity were required by environmental agencies and / or the terms of Social and Environmental Commitments signed between Samarco and the Public Prosecutor's Office comprise. They are:

- **Fish and shellfish** – In areas of Baixo Guandu, Colatina and Linhares (ES), more than 1,700 fish and shellfish were rescued before the arrival of the plume in Espírito Santo, from November 13 to November 19, 2015. The rescued species were taken to fish farming tanks of Federal Institute of Espírito Santo (IFES) of Itapina, Colatina (ES), for development of study with focus on supporting a future scientific study about of native fish in the Doce River. In Aimorés (MG), the rescue of fish populations took place between November and December 2015, at the intake channel of Aimorés Hydropower Plant. The release of the rescued fish occurred on the riverbank of Manhauçu.



## Learn about

All the actions of Fundação Renova for the rainy season at [www.fundacaorenova.org/periodo-chuvoso](http://www.fundacaorenova.org/periodo-chuvoso)

Biodiversity management actions include monitoring of local fauna



- **Turtle eggs** – To minimize the impact of the arrival of the turbidity plume at the mouth of the Doce River, in Linhares (ES), the Tamar project, in partnership with Samarco, preventively collected the turtle eggs as of November 2015 on the beaches of Comboios and Povoação, taking them to an area away from the plume. The number of open nests was higher in January and February 2016, decreasing at the end of the breeding season (in March), corresponding to the last weeks monitored by Tamar. In total, 465 nests were marked and 1,247 nests were opened by staff hired to strengthen the monitoring. The work of opening these nests amounted to 87,018 protected cubs. Samarco supported the initiative with 24-hour monitoring of the beaches and with equipment, such as tricycles.
- **Monitoring of marine fish populations** – started in April 2016, it consists in monitoring fish populations, carcinofauna and ichthyoplankton in the marine region adjacent to the mouth of the Doce River. This monitoring is associated with the assessment of the impact on marine biological community caused by the turbidity plume. Among the main results of this monitoring (April to June 2016), we emphasized the following:
  - The region presented a high density of eggs and moderate density of larvae. The results show that the presence of tailings is not affecting the Ichthyoplankton in terms of eggs and larvae density in addition to the ecological indexes;
  - So far, no families of rare, exotic, endemic or endangered fish larvae have been registered in this region;



Revegetation actions are among the measures adopted to mitigate the impacts on the biodiversity of the affected regions

- The region showed a high richness of species. The abundance of fish showed significantly similar results upon the application of statistical tests between areas that were impacted more strongly by tailings and those where there was no deposition thereof;
  - Of the species found, 42 have commercial importance, three are on the National List of Endangered Species (Ordinance MMA nº 445/2014), five are threatened by over-fishing (IN nº 05/2014), and four are on the Red List of IUCN. G4-EN14
  - In general, a variety of shellfish was observed in the monitored area, and five species of commercial importance shrimps, in addition to Red Lobster were found. The abundance of carcinofauna in the monitored area was strongly influenced by the presence of the species *Xiphopenaeus kroyeri* (Seabob shrimp), and plenty of carcinofauna was significantly higher in the area of thicker deposition, indicating that the species were not impacted by the presence of tailings.
  - **Removal, transportation and disposal of dead fish during the passage of the turbidity plume** – finished in May 2016, consisted of the collection of specimens of aquatic fauna species, in line with the Environmental Framework Agreement signed in March, as well as information on the removal of dead fish and its transportation, identification and disposal.
  - **Wildlife Rescue and Management and Fauna Monitoring** – since before the plume's arrival at Doce River in Espírito Santo, the rescue and management and systematic monitoring of wildlife along the municipalities of Baixo Guandu, Colatina, Marilândia and Linhares/ Regência/ Povoação was performed. The purpose of this program is to rescue, manage and rehabilitate birds, amphibians, reptiles and wild mammals along the Doce River and its banks in the area of Espírito Santo, as a result of failure of the Fundão dam, in addition to recording and monitoring the occurrence of wildlife and investigating the list of dead animals. The results related to the occurrences cover the period from November 10th, 2015 to October 31st, 2016: 225 animals were rescued along the Doce River, of which 95 birds, 82 mammals, 37 reptiles, 06 amphibians and 05 spiders. Through systematic monitoring, 15,831 independent records of wildlife were performed along the Doce River, considering the number of times each species was recorded, the birds were the most representative group in the sample, representing 90.8% of these records.
- In all, 170 species of wildlife were recorded, of which seven are endemic to the Mata Atlantia and six are endangered species. The endemic species are: opossums (*Didelphis aurita*), maned sloth (*Bradypus torquatus*), marmoset (*Callithrix geoffroyi*), black Capuchin monkeys (*Sapajus nigritus*), red browed amazon parrot (*Amazona rhodocorytha*), Green-billed toucan (*Ramphastos dicolorus*) and the saffron toucanet (*Pteroglossus bailloni*). The endangered species are the maned sloth, the As espécies ameaçadas são: a preguiça-de-coleira (*Bradypus torquatus*), the oncilla (*Leopardus tigrinus*), the margay or tree ocelot (*L. wiedii*), the jaguarundi or eyra cat (*Puma yagouaroundi*), the maguari stork (*Ciconia maguari*) and the red browed amazon parrot (*Amazona rhodocorytha*).
- A large amount of information on the health of potentially impacted animals as well as mortality data was collected. However, there is a dearth of information on the levels of toxic elements in wild species in the scientific literature.

# FUNDAÇÃO RENOVA

Fundação Renova, a not for profit private foundation, was constituted on 30 June 2016 and started of activities on 02 August 2016 in conformity with the requirements of the TTAC, the Framework Agreement signed by Samarco, its shareholders and public authorities in order to assure the implementation of the actions required to treat the impacts of the failure of the Fundão dam. It has autonomy to administer and execute all of the remediation and compensatory measures provided in the recovery plans for the next few years.

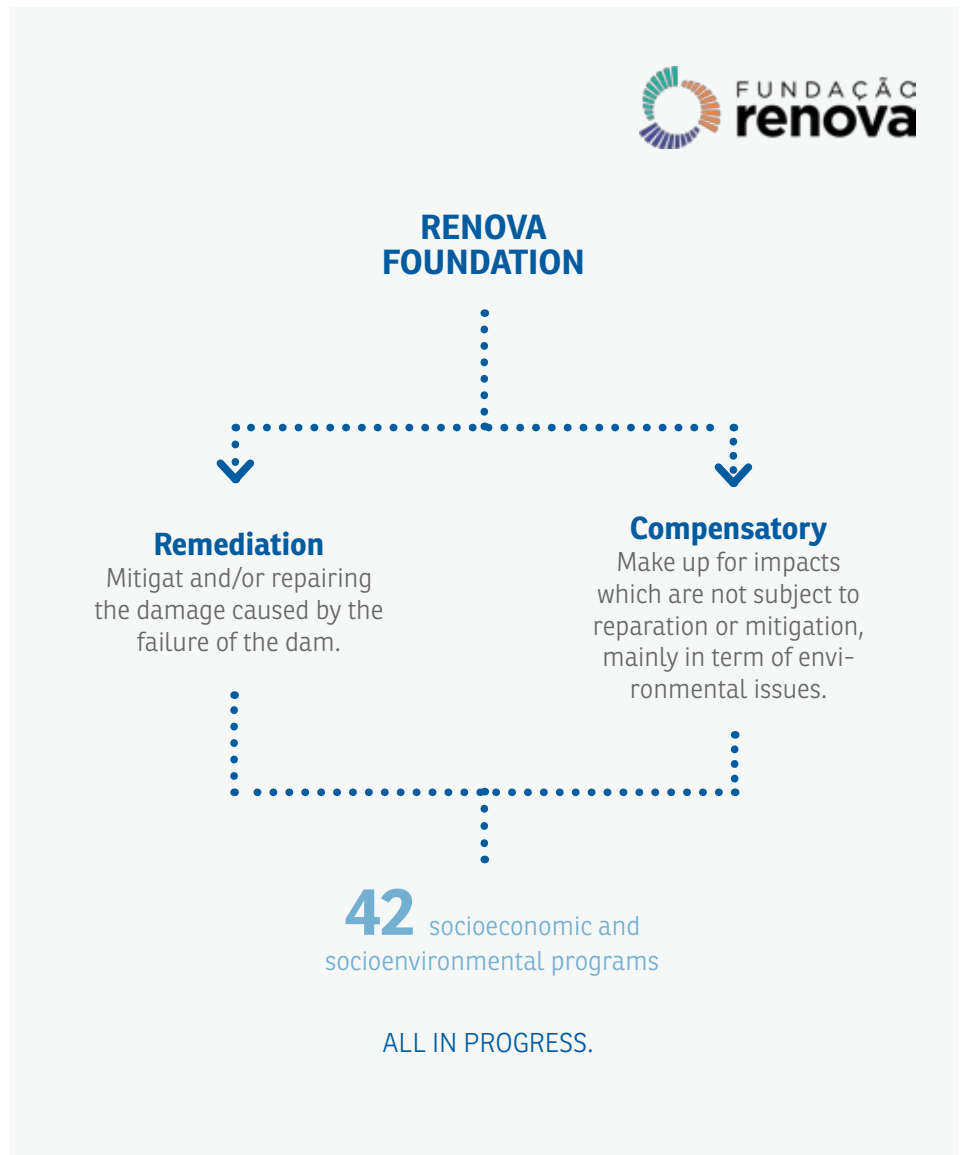
The Foundation was created as a result of the process of discussion and negotiation with the pertinent representative and regulatory authorities who participated in the construction of the TTAC (read more about the TTAC in Our commitment to Brazilian society).

The Foundation is based in Belo Horizonte, Minas Gerais, and has offices in Mariana and Governador Valadares (MG) as well as Linhares and Vitoria (ES). It operates as an independent organization with its own structure of governance, oversight and control. The Foundation has accountability for the implementation of the socioeconomic and socioenvironmental programs, that are designed based on scientific studies, and social dialogue and participation.

Under the TTAC principles, the Foundation is required to work with transparency, fulfill its commitments with responsibility, assure public participation and oversight by public authorities, comply with sectoral public policies. This in practice means that its actions will be focused more on the understanding of the needs of the impacted regions, dialogue with public authorities, and a planning that takes into account the strategic definition

of allocation of resources, investments deliverables and measuring of results achieved, rather than on the execution of the programs and projects.

The Fundação Renova programs serve all the individuals and legal entities which, under the terms of the TTAC, have been directly impacted by the dam failure, in the socioeconomic area, and which have been duly registered for participation.



Until the Foundation started its activities, in August 2016, the socioeconomic and socioenvironmental initiatives had been conducted by Samarco. From then on, the transition phase started, handing over the execution, management and planning of the programs and their respective projects to the Foundation, which is now overseeing the execution of all 42 programs under the TTAC.

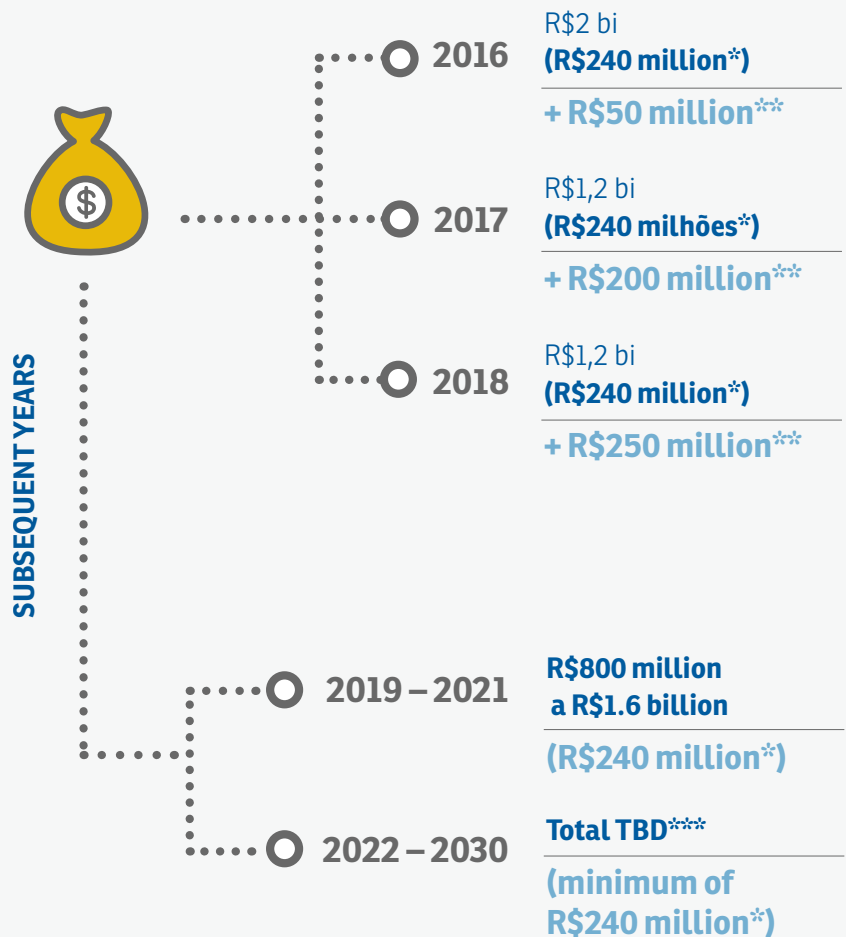
Funding can be summarized as follows:

- In the first three years, the Foundation will receive an input equivalent to R\$4.4 billion.
- In 2019, 2020 and 2021, the resources applied will amount to between R\$800 million and R\$1.6 billion.
- Starting 2019, the annual contributions will be defined according to the forecast of annual execution of the projects.
- Between 2016 and 2030, R\$240 million will be invested every year in compensatory actions.
- Additionally, R\$500 million will be provided as a specific compensatory measure for basic sanitation works, which are to be executed by the administrations of the impacted cities by the end of 2018.

## DESCRIPTION OF THE FOUNDATION'S FINANCIAL MANAGEMENT

# R\$4.4 billion

+ R\$500 million for sanitation to be disbursed in the first three years



\* For compensatory actions:

This amount is included in the Foundation's annual budget.

\*\* Amount included in the total of R\$500 million allocated for basic sanitation

This amount is not part of Fundação Renova's annual budget

\*\*\* On the basis of detailing of the technical studies and analyses.

## GOVERNANCE MODEL

The governance of Fundação Renova is constituted by a Board of Governors, an Advisory Committee, a Fiscal Committee and the Executive Leadership Team, with autonomy to manage and execute the actions of recovery and compensation of the damages caused by the failure of the Fundão dam. According to the guidelines of the TTAC, the organization will also be supported by technical experts and independent auditors to oversee its management and provide recommendations about the allocation of resources and the execution of the programs. There are also outside governance bodies, such as the Interfederative Committee (CIF), to provide support and oversight. G4-34

The Board of Governors constituted in June 2016, is composed of two Governors appointed by Samarco, two by Vale, two by BHP Billiton and one by the CIF. The Board will develop the strategies and long term planning of the Foundation. The Executive Board, responsible for the

development and execution of the programs, was structured and start-up of activities in August (see list of members below). The Advisory and Fiscal Committees commenced its activities in 2017.

The actions of the Foundation are directly overseen by the CIF, which is independent of the Foundation and is formed by 13 members who are representatives of public authorities, including state and municipal government, the Federal Public Defender's office, and the River Basin Committee.

## TRANSPARENCY AND COMPLIANCE

Governance, transparency and ethics are crucial to the work of the Renova Foundation. Clarity of accountability is also part of the clauses of the Agreement: access to information implies that all programs executed should be public domain and disseminated in language accessible to impacted people and should be presented in a transparent, clear and objective manner, through the publication of reports.

Also published on the Foundation's website ([www.fundacaorenova.org](http://www.fundacaorenova.org)), are all programs and their evolution. A Call Center and an Ombudsman, both with access via 0800 toll free number and specific e-mails have also been deployed so that any citizens can send their suggestions or make complaints about the implementation of initiatives.

Another important pillar is ethical conduct. Aware of the challenges of carrying out the proper management of resources applied and promoting a transparent and balanced dialogue with representatives of federal, state and local public authorities, as well as regulators, the Renova Foundation will prepare its own compliance policies and manuals, including anti-corruption aspects.

## FORMS FOR COMMUNITY PARTICIPATION

- Advisory Council.
- Planning and execution of the programs providing for social participation.
- Channels and mechanisms to handle grievances (such as the Ombudsman).

## ADVISORY COUNCIL

Due to the nature of its attributions, the Renova Foundation is supported by an Advisory Council, to provide opinions on plans, programs and projects under the TTAC, as well as indicate potential solutions for present and current scenarios in view of the dynamic nature of the impacts of the failure of the Fundão dam. This Council may engage the impacted communities, with regard to the socio-economic and socioenvironmental programs. To this end, it has the responsibility of establishing channels for the participation of civil society, through meetings and active listening to organizations who have opinions on the plans, initiatives and projects.

## ADVISORY PANEL OF EXPERTS

During the development of the activities, the Renova Foundation and the CIF may submit doubts and potential conflicts to an advisory panel of experts, formed by three members, who are appointed in the following manner: one by CIF, one by the Foundation and the third jointly by these two members. The panel is constituted as needed to help resolve any lack of agreement between CIF and the Foundation.



The division of action per territory allowed Samarco to develop programs according to the specific needs of local communities and environment



## GEOGRAPHIC SCOPE

By assuming the execution and management of socioeconomic and socioenvironmental remediation and compensation programs provided for in the TTAC, the Renova Foundation started to interact with the communities where Samarco has been active since the dam failure.

On the environmental front, the areas are divided between the municipalities bordering the Rio Doce and the impacted parts of the Gualaxo do Norte and Carmo rivers; and the areas impacted by the deposition of tailings in the channels and banks of the Gualaxo do Norte, Carmo and Doce rivers, as well as estuarine, coastal and marine regions around the mouth of the Rio Doce, on the Espírito Santo coast.

As for what is called Area of Socioeconomic scope, the work comprises localities and communities adjacent to the channel of the Rio Doce and other impacted water bodies, in an area with about 40 municipalities in Minas Gerais and Espírito Santo.

## ENVIRONMENTAL AREA 1

**What:** areas impacted by the deposition of tailings.

**Where:** channels and banks of the rivers Gualaxo do Norte, Carmo and Doce, considering stretches of its tributaries, as well as estuarine, coastal and marine regions (mouth of the Rio Doce).

## ENVIRONMENTAL AREA 2

**What:** municipalities bathed by Doce River and impacted stretches of the rivers Gualaxo do Norte and Carmo.

**Where:** municipalities in Espírito Santo and Minas Gerais - Mariana, Barra Longa, Rio Doce, Santa Cruz do Escalvado, Sem-Peixe, Rio Casca, São Pedro dos Ferros, São Domingos do Prata, São José do Goiabal, Raul Soares, Dionísio, Córrego Novo, Pingo d'Água, Marliéria, Bom Jesus do Galho, Timóteo, Caratinga, Ipatinga, Santana do Paraíso, Ipaba, Belo Oriente, Bugre, Iapu, Naque, Periquito, Sobrália, Fernandes Tourinho, Alpercata, Governador Valadares, Tumiritinga, Galiléia, Conselheiro Pena, Resplendor, Itueta, Aimorés, Baixo Guandu, Colatina, Marilândia and Linhares.

## AREA OF SOCIOECONOMIC SCOPE

**What:** localities and communities related to the rivers Doce, Carmo, Gualaxo do Norte and the Santarém creek, in addition to estuarine, coastal and marine areas.

**Where:** Municipalities of Minas Gerais – Mariana, Barra Longa, Rio Doce, Santa Cruz do Escalvado, Rio Casca, Sem-Peixe, São Pedro dos Ferros, São Domingos do Prata, São José do Goiabal, Raul Soares, Dionísio, Córrego Novo, Pingo-D'Água, Marliéria, Bom Jesus do Galho, Timóteo, Caratinga, Ipatinga, Santana do Paraíso, Ipaba, Belo Oriente, Bugre, Iapu, Naque, Periquito, Sobrália, Fernandes Tourinho, Alpercata, Governador Valadares, Tumiritinga, Galiléia, Conselheiro Pena, Resplendor, Itueta and Aimorés.

Municipalities of Espírito Santo – Baixo Guandu, Colatina, Barra do Riacho (Aracruz), Marilândia and Linhares, in addition to estuarine, coastal and marine areas impacted.

## PROGRAM SUMMARY

Are 42 programs being executed by the Renova Foundation, covering all impacted areas. These are projects with varying timelines - short, medium and long term - according to the characteristics and specificities of the action fronts. This characteristic is natural, given the complexity of the set of initiatives that will be implemented in different locations, using different objectives, methodologies and planning.

With regard to items / clauses of the TTAC, the way each project is implemented depends on technical assumptions - studies and scientific analysis - and will have the participation of related communities. In addition to a specific program focused on the process of relationship and the communication of other programs, the Renova Foundation will make use of consultation mechanisms and the rendering of accounts to the population, the same mechanisms that guided, for example, the selection of the reconstruction sites of Bento Rodrigues, Paracatu and Gesteira in Minas Gerais.

On the socioeconomic front, there are 22 programs defined in the Agreement, developed and executed by Fundação Renova, divided into seven major themes - social organization infrastructure, education, culture and recreation, health, innovation, economy and management of action plan. On this front, there is a series of actions with the objective of supporting the revitalization of local economies, allowing the generation of employment and income, the resumption and/or reinforcement of activities part of the local vocation, the recovery of the infrastructure damaged by the failure of the dam, the respect for local identity, heritage and culture - including traditional and indigenous communities - and the valuation of social dialogue, engaging the public authorities, the private sector and the communities.

As for the socioenvironmental front, the programs have the objective of managing the impacts caused by the failure of the Fundão dam through projects focused on recovery and compensation themes such as conservation of biodiversity, generation of knowledge, environmental education and water safety. The 20 programs are divided into eight major themes - reclamation of forests and production of water, conservation of biodiversity, water safety and quality, education, communication and information, environmental preservation and safety, management and sustainable use of the land, and management of the action plan. Some of the socioenvironmental and socioeconomic programs had already been organized and started being carried out by Samarco since November 2015.

## Read +

Read more about the details and progress of each one of the 42 socioeconomic and socioenvironmental programs at [www.fundacaorenova.org](http://www.fundacaorenova.org)



Monitoring of the evolution of each program will be carried out by the communication tools of Fundação Renova



In this document, Samarco carries out the task of reporting its indicators in the context of the failure of the Fundão dam

# ABOUT THIS REPORT

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## IN THIS CHAPTER

85 Summary of GRI content

95 Assurance report

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Samarco is making public, through this 2015-2016 Biennial Report, the main social, economic and environmental indicators which translate its performance in this period. With the challenge of maintaining the cycle of accountability, and, at the same time, clarify the initiatives undertaken to treat the impacts of the failure of the Fundão dam, once again we followed the guidelines of the GRI (Global Reporting Initiative), version G4, in the option Essential. G4-29, G4-30, G4-32

These have been particularly difficult years for the Company and all its stakeholders, especially communities, employees, contractors, suppliers and government entities. Trust, an essential element of its business strategy, was thoroughly shaken by the dam failure. As a result, Samarco is trying to gain it back through transparency, acknowledgment of the impacts and its responsibilities, and investment in social and environmental recovery.

The loss of lives, the impacts to the environment, the losses suffered by the regional economies because of suspended operations, are critical themes which will be marked in the history of the communities and also of the Company and the Brazilian mining industry. This report, therefore, is the portrayal of a Samarco being reconstructed, which has a repercussion on the approach to the themes and the scope of the content.

In the development of the document, we considered the base of indicators and management themes which had already been used in past years, and the topics related to the failure of the Fundão dam – identified in the revision of materiality.

The updated list of relevant themes and the topics associated with the socioeconomic and socioenvironmental issues have guided the definition of the content and the base of GRI indicators of this report – in addition to certain sectoral indicators and others related to the methodology of Sustainability Accounting Standards Board (SASB). In addition, we also opted to report some non material indicators which nevertheless directly meet the demands of society and the most critical matters for management. G4-18

Contrary to other previous reporting cycles, the Company has chosen to publish a report containing information on two years of activity. The first year, 2015, still saw Samarco operating normally and following its conventional routines up to the month of November. In 2016, on the other hand, we went through a critical period, with operations shut down and efforts to carry out the complex work of responding to emergencies, developing construction work, and implementing safety measures and dialogue with society and public authorities in order to allow the execution of long term recovery and remediation plans for the impacted areas.

Considering the moment of publication of this report (september 2017), the decision to issue a biannual report on an exceptional basis seeks to enhance the quality and scope of the information reported, clarifying to society all of the Company's work fronts. However, the track record and comparability of Samarco's performance in its GRI indicators were compromised, as described throughout the report – since some performance data are null or widely discrepant from those of 2015, due to the interruption of operations. The description of variations in the scope or reformulation of data is provided throughout the report, and also with graphic representation of the indicators which cover these two years. G4-22, G4-23, G4-28

The indicators refer to all Samarco operations in Brazil – in Minas Gerais and Espírito Santo – which is the same basis of the Financial Statements, available on [www.samarco.com](http://www.samarco.com). The scope includes the Company's facilities, in addition to the emergency actions carried out up to August 2016. After this date, the progress of the socioenvironmental and socioeconomic actions will be communicated to society through Fundação Renova ([www.fundacaorenova.org](http://www.fundacaorenova.org)).

As for external verification, as in former years we have provided for a limited assurance report about the compilation of the socioenvironmental information of the document (more information about the scope and procedures adopted in the Assurance Report). G4-17, G4-33

In terms of structuring of the content, we sought to focus on the current status of the Company, its plan for resuming operations, its results and the description of the failure of the Fundão dam, the emergency measures taken, the Framework Agreement (TTAC) and the constitution of Fundação Renova, which are themes essential in the view of the directly impacted stakeholders and society at large.

As in previous years, the 2015-2016 Biennial Report will be supplied in a digital version, in Portuguese and English. We hope that over the next years we will be able to continue communicating about Samarco's performance through this publication.

At this time of enormous pressure from society to receive more information about what has been and will be done to mitigate the impacts, Samarco has the duty of keeping an open dialogue and providing all clarification. Therefore, any doubts related to the content of this document shall be responded to via e-mail [relacionamento@samarco.com](mailto:relacionamento@samarco.com) or through the Company's other social dialogue channels. G4-31

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## NEXT STEPS

Samarco continues to believe in the relevance of being accountable for its relations and its impacts. As a result, it plans to maintain its commitment of the past ten years or so and public performance reports, based on international standards and methodologies of transparency.

The Company will include in this report its social, environmental and economic results related to its operation, communicating as well the investments and resources allocated to Fundação Renova.

## SUMMARY GRI CONTENT



### CONTENT – GENERAL STANDARDS

STANDARD CONTENT	PAGE/RESPONSE	EXTERNAL VERIFICATION	SUSTAINABLE DEVELOPMENT GOALS *
<b>Strategy and analysis</b>			
<b>G4-1</b> Provide a statement from the most senior decision-maker of the organization (such as CEO, chair, or equivalent senior position) about the relevance of sustainability to the organization and the organization's strategy for addressing sustainability	6, 7		
<b>G4-2</b> Description of the main impacts, risks and opportunities: focus on main impacts of organization on sustainability and its effects on stakeholders.	6, 7, 15, 16		
<b>Organizational profile</b>			
<b>G4-3</b> Name of the organization	9		
<b>G4-4</b> Primary brands, products and services	9		
<b>G4-5</b> Location of the organization's headquarters	9		
<b>G4-6</b> Number of countries where the organization operates, and names of countries where either the organization has significant operations or that are specifically relevant to the sustainability topics covered in the report	9		
<b>G4-7</b> Nature of ownership and legal form.	9		
<b>G4-8</b> Markets served (including geographic breakdown, sectors served, and types of customers and beneficiaries)	10		
<b>G4-9</b> Scale of the organization	10		
<b>G4-10</b> Total number of employees UNGC	51, 52		
<b>G4-11</b> Percentage of total employees covered by collective bargaining agreements UNGC	100%		
<b>G4-12</b> Organization's supply chain	59		
<b>G4-13</b> Significant changes during the reporting period regarding the organization's size, structure, ownership, or its supply chain	9, 59		
<b>G4-14</b> Whether and how the precautionary approach or principle is addressed by the organization.	15		
<b>G4-15</b> List externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses	17		
<b>G4-16</b> List memberships of associations (such as industry associations) and national or international advocacy organizations	17		

### Identified material aspects and boundaries

<b>G4-17</b> List all entities included in the organization's consolidated financial statements or equivalent documents	84
<b>G4-18</b> Explain the process for defining the report content and the Aspect Boundaries	84
<b>G4-19</b> List all the material Aspects identified in the process for defining report content	19
<b>G4-20</b> For each material Aspect, report the Aspect Boundary within the organization	19
<b>G4-21</b> For each material Aspect, report the Aspect Boundary outside the organization	19
<b>G4-22</b> Report the effect of any restatements of information provided in previous reports, and the reasons for such restatements	84
<b>G4-23</b> Significant changes from previous reporting periods in the Scope and Aspect Boundaries	84

### Stakeholder engagement

<b>G4-24</b> List of stakeholder groups engaged by the organization	18
<b>G4-25</b> Basis for identification and selection of stakeholders with whom to engage	18
<b>G4-26</b> Organization's approach to stakeholder engagement, including frequency of engagement by type and by stakeholder group, and an indication of whether any of the engagement was undertaken specifically as part of the report preparation process	18
<b>G4-27</b> Key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns, including through its reporting. Report the stakeholder groups that raised each of the key topics and concerns	19

### Report profile

<b>G4-28</b> Reporting period (such as fiscal or calendar year) for information provided	84
<b>G4-29</b> Date of most recent previous report (if any)	84
<b>G4-30</b> Reporting cycle (such as annual, biennial)	84
<b>G4-31</b> Contact point for questions regarding the report or its contents	98
<b>G4-32</b> 'In accordance' option chosen by the organization.	84
<b>G4-33</b> Organization's policy and current practice with regard to seeking external assurance for the report.	84

**Governance**

<b>G4-34</b> Governance structure of the organization, including committees of the highest governance body. Identify any committees responsible for decision-making on economic, environmental and social impacts.	11, 12, 13, 80
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**Ethics and integrity**

<b>G4-56</b> Organization's values, principles, standards and norms of behavior such as codes of conduct and codes of ethics	9, 14
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**SPECIFIC STANDARD DISCLOSURES**

**Economic category**

MATERIAL ASPECTS	DMAS AND INDICATORS	PAGE/RESPONSE	OMISSION	EXTERNAL VERIFICATION	SUSTAINABLE DEVELOPMENT GOALS *
<b>Economic performance UNGC</b>	<b>G4-DMA</b> Management method	34, 35, 36			
	<b>G4-EC1</b> Direct economic value generated and distributed	36			
<b>Market presence</b>	<b>G4-DMA</b> Management method	29, 54			
	<b>G4-EC6</b> Ratios of standard entry level wage by gender compared to local minimum wage at significant locations of operation	54			
<b>Indirect economic impacts</b>	<b>G4-DMA</b> Management method	29, 45, 46			
	<b>G4-EC7</b> Development and impact of infrastructure investments and services supported	45, 46			
	<b>G4-EC8</b> Significant indirect economic impacts, including the extent of impacts	29			

**Environmental category UNGC**

MATERIAL ASPECTS	DMAS AND INDICATORS	PAGE/RESPONSE	OMISSION	EXTERNAL VERIFICATION	SUSTAINABLE DEVELOPMENT GOALS *
<b>Energy</b>	<b>G4-DMA</b> Management method	40, 41			
	<b>G4-EN3</b> Energy consumption within the organization	40			
	<b>G4-EN4</b> Energy consumption outside the organization	40			
	<b>G4-EN5</b> Energy intensity	40			

<p><b>Energy</b></p>	<p><b>G4-EN6</b> Reduction of energy consumption</p>	<p>On the reduced consumption front, a project was initiated for the re-design of the lighting of one of the floors of the Samarco offices in Belo Horizonte, by means of the substitution of dichroic and fluorescent light bulbs with LED bulbs; the initiative generated a reduction of 4 % with relation to the consumption levels of 2013. In 2016, due to the dam failure and the relocation of personnel to support the emergency response actions, the workforce at the units was reduced. As a result, there was a concentration of people in given locations, contributing toward the reduction of the overall consumption of energy.</p>
<p><b>Water</b></p>	<p><b>G4-DMA</b> Management method</p>	<p>37, 38, 39</p>
	<p><b>G4-EN8</b> Total water withdrawal by source</p>	<p>37</p>
	<p><b>G4-EN9</b> Water sources significantly affected by withdrawal</p>	<p>38</p>
	<p><b>G4-EN10</b> Percentage and total volume of water recycled and reused</p>	<p>38</p>
<p><b>Biodiversidade</b></p>	<p><b>G4-DMA</b> Management method</p>	<p>44, 74, 76, 77</p>
	<p><b>G4-EN12</b> Description of significant impacts of activities, products and services on biodiversity in protected areas and areas of high index of biodiversity located outside the protected areas</p>	<p>44, 74, 76</p>
	<p><b>G4-EN14</b> Total number of IUCN red list species and national conservation lists with habitats located in areas affected by the Company organization's operations, subdivided according to extinction risk level</p>	<p>77</p>



<b>Biodiversidade</b>	<b>G4-MM2</b> Number and percentage of operational units which require plans of biodiversity management according to the established criteria, and number (percentage of these units with plans in effect	44, 76, 77
<b>Emissions</b>	<b>G4-DMA</b> Management method	40, 41, 42, 43
	<b>G4-EN15</b> Direct greenhouse gas (GHG) emissions (scope 1)	41, 42
	<b>G4-EN16</b> Energy indirect greenhouse gas (GHG) emissions (scope 2)	41, 42
	<b>G4-EN17</b> Other indirect greenhouse gas (GHG) emissions (scope 3)	41, 42
	<b>G4-EN18</b> Greenhouse gas (GHG) emissions intensity	41
	<b>G4-EN19</b> Reduction of greenhouse gas (GHG) emissions	40, 41
	<b>G4-EN20</b> emissions of ozone-depleting substances (ODS)	43
<b>G4-EN21</b> NOx, SOx, and other significant air emissions	43	
<b>Effluents and waste</b>	<b>G4-DMA</b> Management method	37, 38, 44, 74
	<b>G4-EN22</b> Total water discharge by quality and destination	37, 38
	<b>G4-EN24</b> Total number and volume of significant spills	With regard to the specific issue of spills, there were no significant oil spills in 2015 and 2016.
<b>G4-EN26</b> Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the organization's discharges of water and runoff	44, 74	

<b>Effluents and waste</b>	<b>G4-MM3</b> Total quantities of waste, tailings, and slimes and their associated risks	40
<b>Products and services</b>	<b>G4-DMA</b> Management method	37
	<b>G4-EN27</b> Extent of impact mitigation of environmental impacts of products and services	One of the relevant themes for Samarco in the last years has been water – an essential resource for the beneficiation and transport of iron ore, in the current business model. Impacted in recent years by the prolonged drought of the Brazilian Southeast, in the states in which it operates, the Company has prioritized actions for the rationalization of the use of water since 2014, to handle possible scenarios of restricted water availability.
<b>Compliance</b>	<b>G4-DMA</b> Management method	14
	<b>G4-EN29</b> Monetary value of significant fines and total number of non monetary penalties applied due to failure to comply with environmental laws and regulations	Between January 2015 and December 2016, 164 violation notices, fines and other notices were active, involved a total amount of some R\$ 838.8 million. Most are related to the Fundão dam failure and were filed by entities such as DNPM, Ibama, Iema, Secretaria de Estado de Meio Ambiente e Desenvolvimento Sustentável (Semad) and ICMBio.
<b>Transport</b>	<b>G4-DMA</b> Management method	41
	<b>G4-EN30</b> Significant environmental impacts of transporting products and other goods and materials for the organization's operations, and transporting members of the workforce	41
<b>General</b>	<b>G4-DMA</b> Management method	37
	<b>G4-EN31</b> Total investments and expenditures with environmental protection, by type	37

<b>Environmental impact grievance mechanism</b>	<b>G4-DMA</b> Management method	47
	<b>G4-EN34</b> Number of grievances related to environmental impacts, logged and processed and solved by means of formal mechanism.	47

**SOCIAL CATEGORY – LABOR PRACTICES AND DECENT WORK UNGC**

MATERIAL ASPECTS	DMAS AND INDICATORS	PAGE/RESPONSE	OMISSION	EXTERNAL VERIFICATION	SUSTAINABLE DEVELOPMENT GOALS *
<b>Employment</b>	<b>G4-DMA</b> Management method	51, 52, 53			
	<b>G4-LA1</b> Total number and rates of new employee hires and employee turnover by age group, gender and region	51, 52, 53			
<b>Labor relations UNGC</b>	<b>G4-DMA</b> Management method	49, 50			
	<b>G4-LA4</b> Minimum period for notification about operational changes and if they are specified in collective negotiation agreements	50			
<b>Occupational health and safety</b>	<b>G4-DMA</b> Management method	56			
	<b>G4-LA6</b> Types and rates of injuries, occupational diseases, lost days, absenteeism and number of work related deaths, by region and gender	56			
<b>Training and education</b>	<b>G4-DMA</b> Management method	55			
	<b>G4-LA9</b> Average hours of training per year per employee by gender, and by employee category	55			
<b>Grievance mechanisms related to labor practices</b>	<b>G4-DMA</b> Management method	47			
	<b>G4-LA16</b> Number of complaints related to labor practices that are logged, processed and solved by means of a formal mechanism	47			

## Social category – human rights UNGC

MATERIAL ASPECTS	DMAS AND INDICATORS	PAGE/RESPONSE	OMISSION	EXTERNAL VERIFICATION	SUSTAINABLE DEVELOPMENT GOALS *
Non discrimination UNGC	<b>G4-DMA</b> Management method	14			
	<b>G4-HR3</b> Total number of incidents of discrimination and corrective actions taken	14			

## Social category - society

MATERIAL ASPECTS	DMAS AND INDICATORS	PAGE/RESPONSE	OMISSION	EXTERNAL VERIFICATION	SUSTAINABLE DEVELOPMENT GOALS *
Local communities UNGC	<b>G4-DMA</b> Management method	24, 25, 26, 47, 69			
	<b>G4-SO1</b> Percentage of operations with implemented local community engagement, impact assessments, and development programs	24, 45, 46, 47			
	<b>G4-SO2</b> Operations with significant actual and potential negative impacts on local communities	24, 25, 26			
	<b>G4-MM6</b> Number and description of significant disputes relating to land use, customary rights of local communities and indigenous peoples	69			
	<b>G4-MM7</b> To what extent mechanisms for the referral of complaints and demands were used to resolve disputes relating to land use, customary rights of local communities and indigenous peoples, and the results	69			
Anti corruption UNGC	<b>G4-DMA</b> Management method	14			
	<b>G4-SO3</b> Evaluation of corruption risks	In 2016, Samarco conducted an internal seminar to discuss the risk of corruption with the participation of representatives of various areas, such as legal, finance, sales, communication and socioinstitutional development and ombudsman. The main internal controls were mapped, and structuring actions for improvements were initiated.			
	<b>G4-SO4</b> Communication and training on anti-corruption policies and procedures	14			

<b>Anti corruption UNGC</b>	<b>G4-S05</b> Confirmed incidents of corruption and actions taken	14
<b>Anti competitive behavior</b>	<b>G4-DMA</b> Management method	14
<b>Anti competitive behavior</b>	<b>G4-S07</b> Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes	In 2015 and 2016, there was no lawsuit related to the aspects of violation of anti-competitive laws.
<b>Compliance</b>	<b>G4-S08</b> Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations	In December 2016, the active claims and notices started since July 2016 at Samarco related to the labor issues totaled 295, of which 292 were judicial and 03 administrative, resulting mainly from a divergence in the interpretation of application of law, which are monitored by the legal and financial areas and audited and reflected in the financial statements which are periodically published. There was no payment of significant fines in the period (January 2015 to June 2016, nor were there any relevant monetary sanctions. And just one case of warning. In the proceedings mentioned above, 16 claims/notices were identified between July 2016 and December 2016 considered to be relevant with regard to the laws governing occupational health and safety (thus considered, all those related to the Germano dam incident).

<b>Grievance mechanisms for Impacts on society</b>	<b>G4-DMA</b> Management method	47
	<b>G4-SO11</b> Number of grievances about impacts on society filed, addressed, and resolved through formal grievance mechanisms	47

**Sector disclosures - mining**

MATERIAL ASPECTS	DMAS AND INDICATORS	PAGE/RESPONSE	OMISSION	EXTERNAL VERIFICATION	SUSTAINABLE DEVELOPMENT GOALS *
<b>Resettlement</b>	<b>G4-DMA</b> Management method	24, 25, 26			
	<b>G4-MM9</b> Sites where resettlements took place, the number of households resettled in each, and how their livelihoods were affected in the process	24, 25, 26			
<b>Planning for closure</b>	<b>G4-DMA</b> Management method	36			
	<b>G4-MM10</b> Number and percentage of operations with closure plans	36			

**\*SUSTAINABLE DEVELOPMENT GOALS:**

- 1. No poverty
- 2. Zero hunger
- 3. Good health and well being
- 4. Quality education
- 5. Gender equality
- 6. Clean water and sanitation
- 7. Affordable and clean energy
- 8. Decent work and economic growth
- 9. Industry, innovation and infrastructure
- 10. Reduced inequalities
- 11. Sustainable cities and communities
- 12. Responsible consumption and production
- 13. Climate action
- 14. Life below water
- 15. Life on land
- 16. Peace, justice and strong institutions
- 17. Partnerships for the goals

## INDEPENDENT AUDITORS'

Independent auditors' limited assurance report on the information included in the Samarco Biennial Report for 2015-2016

To the Board of Directors  
and Stockholders  
Samarco Mineração S.A.  
Belo Horizonte – MG

### INTRODUCTION

We have been engaged by Samarco Mineração S.A. ("Company") to present our limited assurance report on the compilation of the information included in the Samarco Biennial Report for 2015-2016 of Samarco Mineração S.A. for the years ended December 31, 2015 and 2016.

### RESPONSIBILITIES OF THE COMPANY'S MANAGEMENT

The Company's management is responsible for the preparation and fair presentation of the information included in the Samarco Biennial Report for 2015-2016 in accordance with the guidelines of the Global Reporting Initiative (GRI-G4) and for such internal control as management determines is necessary to enable the preparation of information free from material misstatement, whether due to fraud or error.

## INDEPENDENT AUDITORS' RESPONSIBILITY

Our responsibility is to express a conclusion on the information included in the Samarco Biennial Report for 2015-2016, based on our limited assurance engagement carried out in accordance with the Technical Communication CTO 01, "Issuance of an Assurance Report related to Sustainability and Social Responsibility", issued by the Brazilian Federal Accounting Council (CFC), based on the Brazilian standard NBC TO 3000, "Assurance Engagements Other than Audit and Review", also issued by the CFC, which is equivalent to the international standard ISAE 3000, "Assurance engagements other than audits or reviews of historical financial information", issued by the International Auditing and Assurance Standards Board (IAASB). Those standards require that we comply with ethical requirements, including independence requirements, and perform our engagement to obtain limited assurance that the information included in the Samarco Biennial Report for 2015-2016, taken as a whole, is free from material misstatement.

A limited assurance engagement conducted in accordance with the Brazilian standard NBC TO 3000 and ISAE 3000 mainly consists of making inquiries of management and other professionals of the entity involved in the preparation of the information, as well as applying analytical procedures to obtain evidence that allows us to issue a limited assurance conclusion on the information, taken as a whole. A limited assurance engagement also requires the performance of additional procedures when the independent auditor becomes aware of matters that lead him to believe that the information taken as a whole might present significant misstatements.

The procedures selected were based on our understanding of the aspects related to the compilation and presentation of the information included in the Samarco Biennial Report for 2015-2016, other circumstances of the engagement and our analysis of the areas in which significant misstatements might exist. The following procedures were adopted:

- (a) planning the work, taking into consideration the materiality and the volume of quantitative and qualitative information and the operating and internal control systems that were used to prepare the information included in the Samarco Biennial Report for 2015-2016;
- (b) understanding the calculation methodology and the procedures adopted for the compilation of indicators through interviews with the managers responsible for the preparation of the information;
- (c) applying analytical procedures to quantitative information and making inquiries regarding the qualitative information and its correlation with the indicators disclosed in the information included in the Samarco Biennial Report for 2015-2016.
- (d) comparing the financial indicators with the financial statements and/or accounting records.

The limited assurance engagement also included tests to assess compliance with the guidelines of the Global Reporting Initiative (GRI-G4) and the preparation criteria applicable to the compilation of the information included in the Samarco Biennial Report for 2015-2016.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our limited assurance conclusion.

## SCOPE AND LIMITATIONS

The procedures applied in a limited assurance engagement are substantially less detailed than those applied in a reasonable assurance engagement, the objective of which is the issuance of an opinion on the information included in the Samarco Biennial Report for 2015-2016. Consequently, we are not able to obtain reasonable assurance that we would become aware of all significant matters that might be identified in an assurance engagement, the objective of which is the issue of an opinion. If we had performed an engagement with the objective of issuing an opinion, we might have identified other matters and possible misstatements in the information included in the Samarco Biennial Report for 2015-2016. Therefore, we do not express an opinion on this information.

Non-financial data is subject to more inherent limitations than financial data, due to the nature and diversity of the methods used to determine, calculate and estimate these data. Qualitative interpretations of the relevance, materiality, and accuracy of the data are subject to individual assumptions and judgments. Furthermore, we did not consider in our engagement the data reported for prior periods, nor future projections and goals.

## CONCLUSION

Based on the procedures performed, described herein, no matter has come to our attention that causes us to believe that the information included in the Samarco Biennial Report for 2015-2016 of Samarco Mineração S.A. has not been compiled, in all material respects, in accordance with the guidelines of the Global Reporting Initiative (GRI-G4).

## EMPHASIS OF MATTER

We draw attention to the item "Current status and prospects" included in the Samarco Biennial Report for 2015-2016, which describes that, due to the rupture of the Fundão Dam, on November 5, 2015, the Company's operations were suspended and have not been resumed up to the date of this report. The Company states that there is no reliable estimate as to when it will obtain the required licenses to operate. Our conclusion above is not altered in respect of this matter.

Belo Horizonte, September 8, 2017

PricewaterhouseCoopers  
Auditores Independentes  
CRC 2SP000160/O-5 "F" MG

Carlos Augusto da Silva  
Contador CRC 1SP197007/O-2 "S" MG



## GLOSSARY

In view of the technical content of some of the sections of this report, a Samarco presents below additional details about some of the terms used to describe the governance model and the actions related to the failure of the Fundão dam.

### AREA OF DIRECT INFLUENCE (AID – ACRONYM IN PORTUGUESE)

This is how Samarco calls its area of influence, which includes communities neighboring the Germano and Ubu industrial units, as well as the pipelines and the hydropower plant of Muniz Freire. In these locations, even though operations are suspended, the Company continues minor internal activities, maintaining an operation routine (transportation, meals, maintenance program on the plants which are shut down, and purchases in the regions).

### AREA OF INFLUENCE

These are the territories impacted by the Fundão dam failure which are being assisted by the programs and activities of Fundação Renova (read more in Area of Actions)

### TAILINGS PLUME

Water mixed with high concentrations of suspended solids carried along the water ways.

### NOMINAL CAPACITY/INSTALLED CAPACITY

Nominal (rated or nameplate) capacity is the intended full-load sustained output of a system or facility.

Installed capacity is understood here as the maximum possible output of the system.

### IN-PIT TAILINGS DISPOSAL

Operational system presented by Samarco as an alternative for its potential resumption of operations. This tailings handling system proposes that, instead of using dams, the disposal be made in the Alegria Sul mine pit which has no physical connection with the tailings dams.

### BERMS

Berms are benches built into the embankments to balance the weight of the body of the main land fill.

### DREDGING

Method adopted for the removal of the tailings from the Candonga dam of the Risoleta Neves Hydropower Plant.

### TRIBUTARIES

A tributary is a freshwater stream that feeds into a larger stream, river or other body of water.

### TURBIDITY

Physical property of fluids which translates into the reduction of their transparency due to the presence of materials in suspension.

### MINERAL RIGHTS

The right to extract minerals from a piece of land.

### CIRCULAR ECONOMY

Term used to designate an industrial organization model where various sectors stop accumulating waste (in some cases, pollutant) for all waste from production is used, either internally through recycling and reuse, or externally, in other business chains. This new approach is more sustainable than the linear “take, make, dispose” economic model. In Samarco’s case, it would mean using its tailings to make something else.

## EDITORIAL STAFF

### RESPONSIBILITY

Rosangela Laurentina dos Santos

### GENERAL MANAGEMENT, CORPORATE COMMUNICATION AND INSTITUTIONAL RELATIONS

#### Coordination/Technical communication staff

Fabíola Boghi

Fernanda Valente

Flávia Bueno

### SUPPLIERS

#### Independent audit

PricewaterhouseCoopers Auditores Independentes

#### Editorial Communication and design / GRI Consultancy

Sustainability Report

Staff: Ana Souza (project and relations management), Fabiola Nascimento (GRI consulting), Guto Lobato and Estevam Pereira (editing), Guto Lobato and Rejane Lima (text production), Fernando Rocha (graphic design), and Juliana Kaminaga (scheduling).

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Light Press

Requests for additional information about the Samarco 2015/2016 Biennial Report should be sent to [relacionamento@samarco.com](mailto:relacionamento@samarco.com) G4-31

## ADDRESSES

### Belo Horizonte – corporate headquarters

Rua Paraíba, 1122 - 9º, 10º, 13º, 19º e 23º and.

Ed. das Américas - Funcionários

30130-918 - Belo Horizonte / MG / Brazil

Tel.: +55 (31) 3269-8787

Avenida Getúlio Vargas, 671, 4º andar – Funcionários

30112-021 – Belo Horizonte / MG / Brazil

### Ouro Preto Unit

Fazenda Usina Alegria, s/n - Zona Rural

35400-000 - Ouro Preto / MG / Brazil

Tel.: +55 (31) 3559-5000

### Germano Unit

Rodovia MG-129, km 117,5, s/n

Caixa Postal 22

35420-000 - Mariana / MG / Brazil

Tel.: +55 (31) 3559-5000

### Matipó

Estação de Bombas II, s/n

Distrito de Padre Fialho - Zona Rural

35367-000 - Matipó / MG / Brazil

Tel.: +55 (31) 3559-5000

### Vitória – sales office

Rua José Alexandre Buaiz, 300 – sala 802

Ed. Work Center – Enseada do Suá

29050-545 – Vitória / ES Brazil

Tel.: +55 (27) 3145-4411

### Ubu unit

Rodovia ES-060, km 14,4 s/n - Ponta Ubu

29230-000 - Anchieta / ES / Brazil

Tel.: +55 (28) 3361-9000

Fax: +55 (28) 3361-9480

### Muniz Freire – hydropower plant

Rodovia Muniz Freire-Itaici, s/n

km 8 - Cachoeira do Rio Pardo

29380-000 - Muniz Freire / ES / Brazil

Tel.: +55 (28) 3560-3318

**SAMARCO** 

[www.samarco.com](http://www.samarco.com)