Samarco case: legal, economic and social implications of the greatest environmental disaster in Brazil

Prepared by Natasha Schmitt Caccia Salinas¹ (2016)

On November 5, 2015, around 4 p.m., the iron ore tailings dam known as Fundão, owned by Samarco Mineração S.A. (“Samarco”), located in the city of Mariana, collapsed and caused about 50 million cubic meters of mining waste to wash the Rio Doce valley. Of this released volume of waste, 16 million cubic meters traveled 600 kilometers through the territory of 39 cities to reach the Atlantic Ocean.

The disaster killed 19 people, destroyed the architectural and historical heritage of many local communities, made hundreds of individuals homeless and displaced, interrupted the water supply to many cities, destroyed hydroelectric power plants and infrastructure works, reached indigenous communities, compromised regional trade and production activities such as fishing and agriculture, and caused environmental damage to the Rio Doce Basin, which will affect several generations to come.

Although this event has been neither the only one nor the first accident involving mining dams in Brazil, the calamitous collapse of the Fundão Dam is considered by many the greatest environmental disaster in Brazil and one of the greatest mining-related accidents in the world.²

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² In terms of released volume and run out (distance traveled by mining waste) and costs incurred by the damage, the Fundão dam collapse is considered by some experts the largest accident of its kind in the world. BOWKER ASSOCIATES. Samarco Dam Failure Largest by Far in Recorded History, 2016. Available at: https://lindsaynewlandbowker.wordpress.com/2015/12/12/samarco-dam-failure-largest-by-far-in-recorded-history/. Retrieved in: November, 2016.
**Mariana, Samarco and Mining Activities prior to the disaster**

Mariana is a city of 58,802 inhabitants located in the northeastern part of the *Quadrilátero Ferrífero* (Iron Ore Quadrangle) of the state of Minas Gerais, a region that has the largest production of iron ore in Brazil.\(^3\) Within its territory and that of its neighboring city, Ouro Preto, lies the *Alegria* iron ore complex, whose iron ore reserves are estimated at 4 billion tons.

The *Alegria* iron ore complex holds the Germano mine, whose iron ore reserves are estimated at 400 million tons. Samarco\(^4\) settled down in the Germano unit in 1977 to build an iron ore extraction, processing and transportation system suitable for large-scale production. The company developed a system that at the moment of the accident provided a production capacity of approximately 30 million tons of iron per year (MILANEZ, 2015).

In Germano, Samarco extracts the iron ore from three main slopes. Then, the extracted material is processed\(^5\) to remove any undesired materials\(^6\) and increase iron concentration.

In the Germano unit, there are three iron ore concentration or primary processing plants.\(^7\) The tailings generated are stored in dams, which are nothing but earthen structures built to store mining waste on an ongoing basis. The ore concentrate, in turn, undergoes a thickening or solidification process before being conveyed through ore pipelines to the Ubu Unit, located in the city of Anchieta, state of Espírito Santo. The ore pipelines, whose installation was pioneered in Brazil by Samarco, consist of three lines of parallel ore pipes, each 400 km long, running through 25 cities, in both states of Minas Gerais and Espírito Santo, with individual pumping capacity of up to 15 tons of ore per year. (REIS

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3 Brazil has the world’s second largest iron ore pellet reserve. A significant portion of these reserves is located in the iron ore quadrangle.

4 Samarco was founded in 1973 as a privately held corporation. Since 2000, its ownership is held equally between Vale S.A (50%) and BHP Billiton Brasil Ltda (50%), the latter being a Brazilian subsidiary of the Anglo-Australian group BHP Billiton.

5 The processing consists of crushing, grinding, floting and desliming iron ore, whose initial iron content is 46%. The amount of expendable ores is reduced in this process, turning it into a concentrate with 67% iron content. In the Germano unit, there are three iron ore concentration or primary processing plants. SAMARCO. Production Process. Available at: <http://relatoweb.com.br/samarco/www/pt/processo-produtivo.html>. Retrieved in: September, 2016.

6 The ore extracted from the Samarco mines is mostly composed of quartz and hematite particles. Quartz particles are undesirable to subsequent steelmaking process and should therefore be removed. REIS et. al (2006, p. 161).

et al, 2006, p. 163). One of the ore pipelines has operated since Samarco began its activities, in 1977. In the Ubu unit, the ore slurry conveyed by the ore pipelines is transformed into iron pellets by four pellet plants. In the Ubu Port, in the city of Anchieta, state of Espírito Santo, Samarco acquired its own sea terminal, from where its entire production is distributed. The iron ore exported by Samarco is directed to all continents in the following proportion: Africa and Middle East (23.1%), Asia, except China (22.4%), Europe (21%), the Americas (17%) and China (16.5%) (WANDERLEY et. al., 2016, p. 31).

**Figure 1 – Germano and Ubu Units**

**Flowchart of Germano and Ubu Units**

**GERMANO**


**UBU**

Samarco operations in more than three decades of activity contributed to the economic growth of Mariana. In 2010, Mariana’s GDP per capita was BRL 114,347.90, much higher than the national equivalent of BRL 26,445. Mariana ranked 31th in the nationwide GDP per capita and 5th statewide. From 2010 to 2013, Mariana’s GDP grew by almost 80%, from 3.7 billion to 6.59 billion per year, and the industrial sector (consisting mostly of mining) accounted for 70% of the value added of the city’s GDP. That was a period in which Samarco increased its production capacity by 37% to avoid profitability losses due to the fall in the iron ore prices in the international market.

The presence of Samarco in the region also contributes to the financial support to the city of Mariana. From 2011 to 2015, the funds raised from mining royalties, which are referred to in Brazil as “Financial Compensation for Mineral Resource Exploration” (CFEM), and from the value-added tax “Tax on Operations Relating to the Movement of Goods and Interstate and Intermunicipal Transportation Delivery and Communication Services” (ICMS), accounted for over 70% of the city’s revenue. In 2015, Mariana was the mining city that collected the highest amounts in CFEM, and in its tax collection base year (2014), Samarco’s net income amounted to BRL 2.81 billion (Porto et al., 2016). Mariana’s high tax collection rates allowed it to have a government employment rate (6.29% of the population) higher than the average of the state of Minas Gerais (3.36%) and the Brazilian average (3.20%) (Porto et al., 2016).

Economic data indicate, however, that the population of Mariana does not benefit from the presence of Samarco as much as the City’s Administration is. The ore industry’s contribution to the number of active jobs in Mariana is not significant. The iron ore mining industry accounted for 12% of the active jobs in Mariana (Porto et al., 2016). The 2010 Brazilian Census showed that the average income of individuals employed in

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9 PORTO et al. (2016) note that all mining cities with production specialization and dependence profile similar to that of Mariana have a government employment rate higher than the state and national average.
Mariana was below the national average. Moreover, despite the high budget revenue of Mariana, it is still a city that does not provide wastewater treatment to its population.

Over the more than three decades Samarco has been operating in the region, it has learned how to adapt to the different phases and cycles of the international ore market. In the recent commodity boom, from 2003 to 2013, there was a six-fold increase in the global ore imports, also causing a steep rise in the price of iron ore ton, which ranged from 32 to 196 US dollars, from 2000 to 2011. In this cycle, Brazil ranked second in the iron ore exports worldwide, and mining accounted for 5% of Brazil’s GDP, while iron ore accounted for 92.6% of all ore exports countrywide (WANDERLEY et. al., 2016, p. 30). Samarco, in turn, took a leading role in this process, becoming the world’s second largest transoceanic iron ore exporting company (REIS et. al, 2006, p. 157) and the 10th largest ore exporter in the country.

Samarco also learned to adapt to the post-commodity boom, characterized by a drop in demand, followed by a decline in the iron ore prices. This drop, partly generated by oversupply in a post-2008 crisis scenario, intensified in 2014 due to the expansion of the low-cost iron ore production. In this scenario, the countries that were successful in offering iron ore at a low cost, such as Australia and Brazil, have taken competitive advantage in this new commodity market cycle (WORLD BANK, 2014, p. 8).

“The change in the economic macro-scenario of mining, from a commodity boom to a post-boom phase, induced leading companies to invest in the creation and expansion of economies of scale” (WANDERLEY et. al., 2016, p. 31). In 2014, Samarco completed the Fourth Pellet Plant Project (P4P), which consisted in adopting a few measures to expand the company’s production during the recession of the iron ore price cycles. The formula adopted by the P4P was a 37% increase in production capacity, expanding it from 22.2 million to 30 million tons of iron ore per year, which allowed it to gain economies of scale and competitive advantage against the declining iron ore prices.

10 The average income of workers in the city was BRL 1,245.89, while the Brazilian average was BRL 1,327.91.
11 Samarco held 20% of seaborne iron ore market. FOURTH Pellet Plant Project in Ubu increases production by 30.5 million tons/year. Minérios e Minerais. Year XXXVIII, No. 358, 2014.
12 Not surprisingly, Australia is the country in which the BHP Billiton group, an indirect controlling company of Samarco, is headquartered.
14 The same.
Although investments in P4P have increased Samarco’s absolute debt, since 2011, the company has posted profitability gains of more than BRL 2.5 billion annually. In short, despite the drop in the international iron ore prices, Samarco has successfully maintained its high profitability by adopting productivity-increase practices.

Questions:

1. Mariana has high GDP per capita, high royalty-generated income and tax revenues and high government employment rates. However, the average income of Mariana’s workers is low compared to the national average. Moreover, Mariana does not provide wastewater treatment to its population. Think about the possible causes and correlations among these phenomena.

2. Davies and Martin (2009) developed a study that makes a correlation between mining dam accidents and commodity trading cycles. According to the authors, there is an increase in failures of tailings dams during recession that affected the iron ore price cycles. How may the hypothesis raised by Davies and Martin be associated with the burst of the Fundão dam and Samarco behavior during the megacycle?

Subdistrict of Bento Rodrigues

Santarém and Fundão tailings dams were installed in the district of Santa Rita Durão, which lies in the town of Mariana. In1698, the Subdistrict of Bento Rodrigues was founded in this region. This subdistrict was an important mining hub at that time, and was part of the Royal Road route in the seventeenth and eighteenth centuries. The subdistrict’s name reflects its historical importance: Bento de Godoy Rodrigues was a prominent Bandeirante (17th-century Portuguese settlers in Brazil and fortune hunters), one of the pioneers to move from the state of São Paulo to Minas Gerais in search of natural resources in that region.

Because of its historical relevance, Bento Rodrigues has accumulated a remarkable cultural and architectural heritage: the subdistrict used to house centennial churches with important sacred works and monuments of cultural relevance. In 1945, those works were recognized by the Institute of Historical and Artistic Heritage (IPHAN) as a Brazilian cultural heritage, which widened the tourist calling of the subdistrict.
The village had approximately 600 inhabitants, totaling 236 families. The economic activity of Bento Rodrigues gravitated around the retail trade of fresh produce, food and drinks. There was also a small rubber nipple pepper jelly factory and a specialized business consulting firm (Task Force Group, 2016, p. 34-35).

When Samarco settled in Santa Rita Durão, in 1977, Bento Rodrigues had been existing for 279 years. José das Graças, an old Bento Rodrigues’ resident, feels the arrival of Samarco in the region as if “Samarco had outdone Bento; it was not Bento that outdid Samarco.”¹⁵

The Fundão and Santarém tailings dam were built at a distance of 15 kilometers from the subdistrict of Bento Rodrigues. Bento Rodrigues’ residents were not heard prior to the construction of these dams and they report having been informed by the company of neither the potential risks of failure of the dams nor of the safety procedures and emergency plans that would be adopted by Samarco in the event of a disaster.

The disaster destroyed the entire infrastructure of the subdistrict, in such a way that all its inhabitants had to be removed from its territory and relocated temporarily to Mariana’s downtown. The territory where Bento Rodrigues was once located is now referred to as “o velho Bento” (The Old Bento), as a reminder that its population will never be able to live there again.

¹⁵ Testimony of José das Graças at the public hearing held at the municipality of Mariana, on April 19, 2016.
Question:

Fundão and Santarém tailings dams were built without Samarco and the environmental authorities properly analyzing the subdistrict of Bento Rodrigues for potential destruction in the event of a collapse. Point out possible causes for this phenomenon and correlate this event with other cases of environmental injustice of which you are aware.

_Fundão Tailings Dam_

Moments after the Fundão dam collapsed, a number of news were broadcast on the national and international media. These news include those that drew attention to the validity and compliance of the environmental permits granted for the operation of the Fundão dam.
Dams like that are used to contain the waste generated from iron ore processing and to store wastewater and water from the drainage areas.

The Germano complex featured, at the time of the disaster, three dams of that kind: Germano, with a capacity of 116 million cubic meters; Santarém, 7 million cubic meters; Fundão, 55 million cubic meters. However, these three dams had not been built simultaneously. The tailings dams, unlike the traditional ones such as those for rainfall control, electric power generation or water storage, are not statically designed. Not only can the construction of a dam be increased over time by means of lifts or wall raises, but the number of dams in an iron ore mine can be increased as mining activities get more intense.

The Fundão dam was the last one to be installed in mid-2007, a period that coincided with the boom in the commodity prices. Two facts have driven its installation: the start of operations of a new iron ore concentrating plant and the expected shutdown of the Germano Dam for 2009 (BRANDT MEIO AMBIENTE, 2005).

The dam project has undergone several changes from the date of its submission to obtain the provisional permit, in November 2005, to the date the latest permits were obtained before the collapse, in 2015.

The Brazilian project licensing system is three-phased. As a rule, a project that has the potential to degrade the environment will be allowed to start out only after three permits are obtained: the Provisional Permit, which approves the project site and design, ensure environmental feasibility and establish the requirements and the basic conditions to be met in the next implementation stages; the Installation Permit, which authorizes the construction of the project according to the specifications set out in the approved plans, programs and designs, including provisions that address measures to minimize the environmental impacts assessed at the Provisional Permit phase; and the Operating Permit, which authorizes the startup of the project according to the environmental compensation requirements, and other requirements, once the previous licensing conditions are met.

In November 2005, Samarco filed a petition for an ad referendum decision on the Provisional Permit for the Fundão Dam. An ad referendum decision is the one made by

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16 This system is currently governed by Decree No. 99.274/90, complemented by CONAMA Resolution no. 237/97.
the federal government agency having jurisdiction to make a final decision, on an urgent basis and with waiver of decision (ad referendum) from a technical or decision-making agency. In the state of Minas Gerais, the Conselho de Política Ambiental (COPAM - Environmental Policy Council) must decide, with the support of its technical chambers, on the environmental licensing process for medium and large-sized activities or companies (MINAS GERAIS, 2016). Permits granted by operation of ad referendum decisions are, therefore, neither granted under the COPAM’s resolution nor considered by its technical chambers.

For the Provisional Permit of the dam to be obtained, Samarco requested the authorization of the environmental agency to build, in the Fundão valley, a dam for the storage of sandy tailings and slimes produced by the iron ore processing plants (BRANDT MEIO AMBIENTE, op. cit.).

In the mining process, fine-grained tailings are called “slime”, while the coarse-grained ones are known as granular tailings and have a sandy aspect. These tailings may not only be stored in dams, but also be used to backfill underground mines and mined-out underground stopes, and also be stacked using the dry stacking method and as paste tailings.

The tailings dam – the solution adopted by Samarco – is the method of choice of mining companies, particularly if the tailings are used as construction material for the dam itself. These tailings are, as a rule, transported by water and stored using the hydraulic backfill technique. The tailings dam is the method of choice because of its lower cost compared to other containment methods (ESPOSITO, 2000). In the state of Minas Gerais alone, there are 220 tailings dams of this kind (TCU - Brazilian Federal Accounting Court, 2016).

The tailings dams also vary as to their construction methods. In order to dilute the costs over time, dams are built up gradually through successive crest raisings. A starter dyke is first built and the dam undergoes a series of crest raisings (i.e., the dam height is gradually increased) over its useful life and may even be built using a compact material produced from the waste itself.

Samarco adopted the crest raising method (vertical growth) upstream the dam. Besides this method, there are two other tailings dam raising methods by means of hydraulic fill: downstream and centerline raising. Upstream raising is the oldest, most straightforward
and cost-effective dam construction method. Its first step is the construction of a starter dyke. After this step, the tailings are hydraulically stored in the ponds. The coarser particles of the material, which make up the slime, are precipitated on the bottom of the pond, thereby strengthening its structure. Conversely, the less coarse particles build up on the walls of the starter dyke and are used to filter water. As the tailings are deposited on the dam, their solid fraction is decanted and the excess water is drained. This solid fraction will serve as foundation for future raising dikes, which are built using the material from the tailings itself. The process is repeated until the maximum height planned is met.

The Environmental Impact Assessment (“EIA”) and the Environmental Impact Report (“EIR”) submitted by Samarco to the environmental agency to obtain the Provisional Environmental Permit for the Fundão Dam, described the installation of three dykes: a starter dyke for stacking sandy tailings and two dykes upstream to contain slime. The starter dyke was planned to be 850 meters high at the most. The slime containment dykes were planned to be 920 meters high at the most (BRANDT MEIO AMBIENTE, 2005).

In the upstream method, granular tailings are likely to present a high liquefaction potential. Instead of filtering, the sandy fraction can eventually retain water, becoming

Figure – Upstream crest raising method.

Decantation pond
Contained tailings
Foundation
Raisings
Starter dyke

The downstream crest raising method is used just to reduce these liquefaction hazards. After the starter dyke is built, subsequent raisings are built downstream until the maximum height of the project is reached. In this construction process, each crest raising is structurally independent of the waste disposal, thereby increasing the stability of their structure. The entire crest raising of the dam may be built from the
soft and saturated, thereby contributing to disruptions of embankments. The upstream raising method is also vulnerable to earthquakes. Chile, for example, which is highly susceptible to earthquakes, adopts the dry-stacking method.

Experts estimate that at least one large-scale collapse of tailings dams occurs worldwide each year. This figure is ten times higher than the disruption of traditional dams, considered much safer (DAVIES et al, 2000). In Brazil, there were 24 ruptures of dams from 1981 to 2015. In the state of Minas Gerais, seven dam ruptures occurred from 1986 to 2015 (ANA, 2016, p. 21; Oliveira, 2015).

The application for a Provisional Permit for the Fundão dam assumed that the project was expected to operate by 2022. The project also considered optimizing the dam using a second waste disposal area, the Brumado valley, which could give longer life to the dam and be extended by 2028 for slime disposal (BRANDT MEIO AMBIENTE, 2005).

The Provisional Permit, whose petition for an ad referendum decision had been filed in November 2005, was issued in April 2007. This permit established six conditions to be met in two years by Samarco, so that the Installation Permit could be granted. Such conditions are nothing but requirements that must be met by the project owners for the permit to be granted and maintained (renewed). From among the conditions imposed on Samarco at this licensing stage, was the submission of a dam operation guide, a design containing calculations to ensure its stability and a detailed engineering design (SEMAD, PA 15/1984/054/2006, 2006).

One month after the Provisional Permit was issued, in May 2007, Samarco filed, with the state environmental agency, a petition for an ad referendum decision, seeking to obtain the Installation Permit. The Installation Permit was granted in the following month, in June 2007, by referendum of the COPAM Mining Chamber.

Despite the short period of three months from the issuance of the Provisional Permit and the grant of the Installation Permit, the State Environmental Foundation (Feam), an

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same starter dyke material, and the internal drainage systems may also be installed during the raising, thereby allowing better control of the water table. This method has a much higher implementation cost than that of the previously described method, as it requires a large volume of backfill materials. Conversely, the centrefit method adopts an intermediate solution between upstream and downstream methods. It has greater stability than the upstream method, but requires a smaller volume of backfill materials compared to the downstream method. Its tailings disposal system is similar to that of the upstream method, with tailings being released from the crest of the starter dyke. However, the symmetry axis of the dam must remain constant.

18 According to Davies et al (2002), the probability of a disaster involving a traditional dam is 1 of 10,000.
agency under the Semad, issued technical opinion attesting Samarco’s compliance with the six previously established conditions. However, according to environmental prosecutor Carlos Eduardo Ferreira Pinto, who carefully examined the documentation of the licensing proceedings, the Fundão Dam detailed engineering design has never been submitted.

Although Samarco submitted some scattered studies, which could neither be named nor identified as a detailed engineering design, the environmental agency granted the permit. The environmental agency had no access to basic technical data such as dam height, volume to be stored, etc., i.e., the whole process was a licensed blank check. This project has not been found so far and when the company is requested to submit it, it never finds it.\(^\text{19}\)

When it granted the Installation Permit, the agency established three conditions. One was the submission of an Emergency Response Plan setting out a community emergency communication system (SEMAD, PA 15/1984/061/2007, 2007). The plan submitted by Samarco failed to include an emergency communication system containing, for instance, the use of alarms and sirens.

In April 2008, Samarco applied for a Permit to operate the Fundão Dam. However, as early as in the next month, the company filed a petition for a Provisional Operating Permit backed by State Decree No. 44844/08. This permit allows the start of activities before the Operating Permit is issued. For the Operating Permit to be granted, the project owners must provide evidence that they met the conditions established in the Installation Permit. The Provisional Operating Permit allows the project owners to start activities even before meeting the conditions established in the Installation Permit. The conditions pending compliance at the time the Provisional Operating Permit was granted included a technical safety audit of the dam, which should have been conducted. Therefore, Samarco started up the Fundão dam activities without previously auditing its safety system. The Operating Permit was issued in September 2008 and was valid for four years.

Provisional, Installation and Operating Permits were all granted within one year and four months. According to environmental prosecutor Carlos Eduardo Ferreira Pinto, one of the members of the Task Force of the State of Minas Gerais in charge of assessing the causes and damages caused by the disaster, the permits were granted in an extremely short timeframe without proper technical analysis. He claims that the Fundão Tailings Dam obtained the permits in record time. Provisional, Installation and Operating Permits were all granted by ad referendum decision of the environmental agency. The provisional

\(^{19}\) Testimony at a lecture given to students from FGV Direito Rio, on April 26, 2016.
permit was granted under ad referendum decision on March 22, 2007. In September 2008, one year and four months later, the dam was already in operation. This is a record time for a project that usually takes three years to be licensed.\(^{20}\)

Six monitoring-related conditions were established in this Operating Permit, which should have been fulfilled by Samarco after the permit was issued. The conditions included an annual audit of the Fundão Tailings Dam, development of an operating guide for the containment system and implementing the water resource quality monitoring program. This license also established conditions for deforestation actions to be taken by Samarco. (SEMAD, PA 15/1984/66/2008, 2008, p. 479).

There is no evidence of compliance with the monitoring activities laid down in the conditions of the Operating Permit.

In May 2013, when Samarco applied for the renewal of the Operating Permit, the only documentation provided was the one concerning the compliance with the deforestation-related conditions. About this event, prosecutor Carlos Eduardo Ferreira Pinto reports: \(^{21}\)

The company received an Operating Permit that included six monitoring-related conditions. That is, a permit was granted to operate the dam conditional on specific monitoring requirements. When the permit is to be granted, the environmental agency must check whether the company has complied with such conditions so that the permit can be renewed. However, when the permit was to be renewed Samarco only submitted a compliance report on the deforestation conditions. It failed to submit any document regarding its compliance with monitoring. And the agency accepted it! The agency revalidated and approved the permit without examining the company’s document of compliance with monitoring.

In discussions in the COPAM concerning the renewal of Samarco’s permit, another issue came up. The Public Prosecutor’s Office of the State of Minas Gerais, which has a seat in the COPAM, presented technical studies that indicated an overlapping between the Fundão dam and a sterile waste pile of Vale S/A. The Public Prosecutor’s Office opinion emphasized that the overlap of both structures has the potential to destabilize the Fundão Dam, as the water from the sterile waste pile was hitting the dam. The agency recommended that studies of these impacts be performed before the permit renewal, and emphasized the need to meet three conditions that had been established in the original Operating Permit, but were not fulfilled by Samarco. One of the conditions concerned the submission of a hazard or accident contingency plan, particularly in relation to Bento

\(^{20}\) Testimony at a lecture given to students from FGV Direito Rio, on April 26, 2016.

\(^{21}\) The same.
Rodrigues community, and the other one was the submission of a dam failure analysis (SEMAD, PA 015/1984/100/2013).

The Operating Permit was revalidated in October 2013, valid for six years, without prior compliance with the studies and the conditions required by the Public Prosecutor’s Office of the State of Minas Gerais.

In June 2015, Samarco obtained, by an ad referendum decision of the COPAM, both the Provisional Permit and Installation Permit to raise the Fundão dam, the maximum height of which would increase from 920 to 940 meters, with subsequent unification with Germano dam. The latter was also undergoing a crest raising, which would allow for both dams combined to increase the capacity of the ponds to 255 million m³.

According to prosecutor Carlos Eduardo Ferreira Pinto, “This [the Fundão dam licensing process] was a patchwork quilt, full of inconsistencies, omissions and serious mistakes that reveal a lack of public policy aimed at protecting the society.”

Shortly after the disaster, the iron ore mine operations have been shut down by decision of the Departamento Nacional de Produção Mineral (Brazilian National Department of Mineral Production - DPNM). In parallel, the Minas Gerais State Department for the Environment and Sustainable Development (SEMAD) embargoed all Samarco activities in Mariana.

On May 2, 2016, the governor of the state of Minas Gerais issued a decree suspending indefinitely the licensing of new tailings dams that adopt the upstream raising method.

In May 2015, a few months following the disaster, the Public Prosecutor’s Office of the State of Minas Gerais filed a civil lawsuit for the enforcement of collective rights with the 2nd Treasury Court, seeking to cancel all environmental permits granted to the Germano-Alegria iron ore complex. In June 2016, after completion of the Environmental Impact Assessment, Samarco filed a petition for a Provisional Permit for a new tailings storage project. In the Environmental Impact Assessment submitted by the company, tailings would be stored in mined out stopes – in this case, the stope of the Alegria do Sul mine – with capacity to store 22.3 million cubic meters of mining waste, which would

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24 The applications for the licensing of dams still pending when the decree was published were not cancelled.
allow it to resume 60% of its production capacity. This stope would not have any physical connection to the Germano and Fundão dam systems. Faced with Samarco’s efforts to resume its activities, the Public Prosecutor’s Office sought legal means to preclude this action in progress. On August 19, 2016, a substitute judge of the 12th Court of the Treasury suspended in limine all Germano iron ore mine permits.

In a press release, the SEMAD, shortly after this court decision, said it will meet the State Prosecutor’s Office requirements as to reviewing, in an integrated manner, the licensing process of all the activities conducted by Samarco, not only the licensing of dams. One of the most vociferous criticisms of the Prosecution regarding the licensing of Samarco’s projects is that those were carried out in a fragmented fashion. The permits of Germano, Santarém and Fundão dams were granted individually, as well as the permits of the mines, processing plants, iron ore pipelines, etc. According to the Public Prosecutor’s Office of the State of Minas Gerais, individually granted environmental permits can cause the projects’ environmental impacts to be underassessed, as inadequate geographic clippings are used to assess the impacts of the project on the physical, biotic and socioeconomic environment. Moreover, fragmentation causes cumulative and synergistic impacts from projects operating in parallel to be disregarded. Finally, fragmented licensing may result in less comprehensive environmental impact assessment studies, and in less stringent conditions being imposed on the project owners for granting environmental permits.

On December 5, 2016, the new Attorney-General of the Public Prosecutor’s Office of the State of Minas Gerais, Antonio Sérgio Nonet, took office. One of the first actions taken by the newly sworn-in Attorney-General was to remove prosecutor Carlos Eduardo Ferreira Pinto from the command of the Environmental Department of the Public Prosecutor’s Office of the State of Minas Gerais.

Leaflets handed out to former residents of the subdistrict of Bento Rodrigues stated that the removal of the Prosecutors from the case had to do with the alleged desire of the governor of the state of Minas Gerais to see Samarco operating again.

26 AUGUSTO, Leonardo. Prosecutors responsible for investigating Mariana’s tragedy are removed from the case. O Estado de São Paulo. 12/06/2016. Available at:
Questions:

1. The tailings containment dams that adopt the upstream raising method are the most common in Brazil and abroad. Why is this tailings storage method so popular and what are its inherent risks?

2. Identify the major flaws, errors and omissions in the government’s and Samarco’s behaviors regarding the Fundão dam licensing process.

Table 1 – Timeline of Fundão Dam environmental licensing procedure

<table>
<thead>
<tr>
<th>Year</th>
<th>Major procedural steps</th>
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<tbody>
<tr>
<td>Apr/2007</td>
<td>Provisional Permit for the Fundão Dam, valid for two years, was granted.</td>
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<tr>
<td>June/2007</td>
<td>Installation Permit for the Fundão Dam, valid for two years, was granted.</td>
</tr>
<tr>
<td>Apr/2008</td>
<td>Application for Operating Permit for Fundão Tailings Dam (PA 15/1984/066/2008).</td>
</tr>
<tr>
<td>May/2008</td>
<td>A Report on Compliance with Installation Permit Conditions was filed with the SUPRAM Forest Zone.</td>
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<tr>
<td>May/2008</td>
<td>Application for Provisional Operating Permit (APF) for the dam.</td>
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<tr>
<td>May/2008</td>
<td>Provisional Operating Permit (APF) for the dam was granted.</td>
</tr>
<tr>
<td>August/2008</td>
<td>Technical inspection was performed by FEAM in the Dam area for the purpose of granting the Operating Permit.</td>
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<tr>
<td>Sept/2008</td>
<td>The granting of the Dam Operating Permit was passed at the 45th meeting of the Forest Zone URC (Regional Collective Units), valid for four years.</td>
</tr>
<tr>
<td>March/2012</td>
<td>One-year extension of the Operating Permit was granted.</td>
</tr>
<tr>
<td>Nov/2012</td>
<td>Application for Provisional Permit and Installation Permit for Optimization of the Fundão Dam (PA 0015/1984/093/2012).</td>
</tr>
<tr>
<td>May/2013</td>
<td>Application for renewal of the Fundão Dam Operating Permit and submission of the Dam’s Environmental Performance Report (PA 00015/1984/005/2012).</td>
</tr>
<tr>
<td>Sept/2013</td>
<td>Application for Provisional Permit and Installation Permit for the Raising of the Fundão and Germano Dams (PA 015/1984/100/2013).</td>
</tr>
<tr>
<td>Oct/2013</td>
<td>Revalidation of the Dam Operating Permit was voted at the 69th meeting of the URC (Regional Collective Units) of Rio das Velhas.</td>
</tr>
<tr>
<td>Dec/2013</td>
<td>Provisional Permit and Installation Permit for Optimization of the Fundão Dam were granted.</td>
</tr>
<tr>
<td>Jun/2015</td>
<td>Provisional Permit and Installation Permit for the Raising of the Fundão and Germano Dams were granted.</td>
</tr>
</tbody>
</table>

Source: MPMG (2016); SIAM-MG (2016).
In 2010, the Brazilian Congress approved Law No. 12334, which established the National Policy on Dam Safety (PNSB). This law gave jurisdiction to the Department of Mineral Production (DPNM), a federal agency to monitor the safety of the dams. Before the enactment of this law, the DPNM used to have general jurisdiction over inspection of iron ore mining activities. Although it had authority to inspect the dam, the instruments and procedures for enforcing such inspection were not clearly established. The agency, before the PNSB was established, took an essentially passive position as to the risk of mining projects, intervening only after the occurrence of accidents. With the advent of PNSB, the DPNM was equipped with instruments to control, monitor, follow up and inspect these projects.

The project owners were also assigned, by the law governing the PNSB, a number of obligations to ensure the safety of the dam. The entrepreneur, considered by law as legally responsible for the dam safety, is now required to plan it, maintain an emergency action...
plan and regularly inspecting the dam structures. The DPNM’s duty is to assess the plans and reports produced by the project owners and monitor their compliance.

The submission of documents such as dam safety guides, periodic monitoring reports, emergency action plans, dam stability condition certificate, etc., which used to be required in an unsystematic and irregular fashion in the course of environmental licensing procedures, became mandatory and periodic, under penalty of notice of violation issued to the project owner. Regarding the submission of the documents required by the law governing the PNSB, Samarco filed with the DPNM, on October 8, 2012, its Dam Safety Plan, required by Law No. 12334/2010 and DPNM Decree No. 416/2012. At the time of the accident, the company had a safety plan in place and used to perform regular, routine inspections.

By operation of Law No. 12334/2010, Samarco also had to submit to the DPNM an Emergency Action Plan (EAP) in the case of an accident. The EAP submitted by Samarco contained a flowchart and reporting procedures, but it did not contain the form of communication with neither the dam safety staff nor the Self-Rescue Zone, required by DPNM Ordinance No 526/2013. Moreover, the EAP failed to inform any quick and effective disclosure and warning strategies to the potentially affected Self-Rescue Zone population. The DPNM, however, did neither conduct any inspection at Samarco premises, after the company submitted its EAP, nor did it request any of its non-conformities with the law to be sorted.

Samarco also submitted, on August 7, 2013, a risk chart of the Fundão Dam, which identifies attention, warning and emergency situations with respect to the readings of the instruments of the dams. The risk chart was found to mention some instruments that indicated attention, warning, and emergency situations, which have signaled internal drainage problems since 2012.

The Mariana disaster, however, has highlighted some widespread failures in the institutional design and implementation of the PNSB, which go beyond the limits of its case. The Brazilian Federal Accounting Court (TCU) (2016), during a tailings dam safety Operational Audit, identified poor criteria for planning the dam surveys carried out by the DPNM. Given the agency’s lack of structure and limited resources, the TCU found that the DPNM prioritizes the on-site inspection of dams that have a highly critical risk. The rules governing the National Policy on Dam Safety (PNSB) establish two dam
classification criteria - critical risk and associated potential damage. The critical risk category can be understood as the probability of failure. The critical risk considers aspects of the dam itself such as structure, project conservation condition and compliance with the safety plan to determine whether there is a high, medium or low risk of accidents. But the associated potential damage evaluates the potential for loss of life and economic, social and environmental impacts in the event of rupture, leak or malfunction of the dam structure. The Mining Activity Supervisory Board (Difis), responsible for preparing the DPNM survey rules, established that the survey should prioritize highly critical risk projects. Difis does not take into consideration other important aspects to choose structures to be inspected, such as dam stability certificate and the associated potential damage rating. Dams such as those of Samarco, rated as low critical risk and high associated potential damage, would not be among the inspection priorities. Before the disaster occurred, the DPNM inspected the Fundão dam only once, in 2012, even before the implementation of the PNSB.

The TCU audit findings also pointed to a number of implementation gaps in the National Policy on Dam Safety, which compromise the inspection activity. Of the 220 dams registered in the State of Minas Gerais, about 65% (144) had not even once been inspected from 2012 to 2015. In addition, of the 48 inspections carried out by the Superintendence, in 2015, 71% (34) of them were held in the dams owned by Samarco after the accident. TCU also found that the DPNM does not have appropriate technology to help checking the accuracy of data reported by the project owners upon the registration of the dams, such as geocoding software, satellite imaging services etc. The agency also does not have enough staff to analyze in a timely manner the documents regularly submitted by project owners, such as dam safety certificate and safety inspection report. Moreover, the DPNM did not develop any methodology to process the information provided in these documents so that they can be used in the planning of surveys. In this regard, the TCU found that when the DPNM examines the dam stability certificates, it only checks whether the stability was attested by the document, failing to analyze any recommendations made by the engineer in charge. In September 2015, the year of the accident, Samarco filed a dam stability certificate. This document stated that the dam “was in adequate safety conditions, provided that the recommendations contained in the action plan be met.” Therefore, although the Certificate attested the stability of the structure, it established some conditions for such stability. Questioned by TCU on the issue, the DPNM claimed that
the stability assurance of the structure is assessed by considering the information contained in the first paragraph of the document, which attests, directly and explicitly, the dam safety. “Thus, any recommendations stated in that certificate, given to the project owner, are only examined and monitored by the DPNM when on-site inspections are carried out.” (TCU: 2016, p. 53). Anyway, according to the TCU, the recommendations that were part of the stability certificate, regarding services and maintenance and monitoring routine, did not indicate critical situations that required the adoption of urgent and immediate actions by the project owner.

Regarding the DPNM’s surveys, they fall mostly in a conformity assessment as to the requirements of law, focusing on checking documents at the expense of a visual analysis of the dam’s technical conditions. According to the TCU, this is because the DPNM’s technicians do not have the technical expertise required to evaluate and make, for instance, technical judgments on instrument readings and geotechnical calculation results.

The TCU audit findings did not recommend that the DPNM officials be held individually accountable for the disaster. The TCU audit team “was not able to establish a direct cause-and-effect relationship between the government agency’s acts (or omission) and the collapse of the structure, especially because Samarco performed regular safety inspections and delivered stability certificates attesting to the safety of the structure.” (TCU, 2006, p. 56). This is because, for the TCU, the entire dam safety monitoring system is ineffective. “The safety inspections held by the DPNM on the tailings dam fails to meet the objectives of the PNSB as it does not monitor and follow up, on a regular basis, the actions taken by the project owners and, at the end of the day, it is unable to ensure compliance with safety standards aimed at reducing the possibility of accidents and their consequences.” (TCU: 2016, p. 38).

The Fundão dam accident has caused changes to the regulatory framework of the National Policy on Dam Safety. One of the innovations was the DPNM being assigned jurisdiction, by decree No. 416/2012, to issue an embargo order to any project owners failing to submit the dam Stability Certificate and Emergency Action Plan in the time limits prescribed by law. In Minas Gerais alone, 36 embargo orders have been issued for dams (12% of all existing dams) since the Mariana disaster, in the first quarter 2015. Moreover, in response to the accident, the DPNM commissioned a private company (Geoestável Consultoria e Projetos) to reassess the risk analysis criteria currently used in the risk rating of mining dams.
After the disaster, the DPNM made successive visits to Samarco’s facilities, which resulted in nineteen notices of violation, seven of which are due to non-conformities related to the collapsed dam. Moreover, more than twenty requirements were established for the Germano Complex project structures to mitigate the damage caused by the disaster, such as a detailed engineering design of emergency works or performance of special inspections on the remaining structures.

Question:

What were the major flaws of the National Policy on Dam Safety identified by the TCU? Analyze and distinguish the design flaws of this policy from its implementation flaws.

_Dam rupture and slime run-out_

On the day that the dam collapsed, more than 600 people were working in the Germano mining complex. At about 3.45 p.m., Samarco employees witnessed a movement of the dam and tailings stored in it, with lifting dust. They reported having seen the dam dyke moving on its plateau and carrying vehicles that were on it at the same time it collapsed. Some described a crack or burst sound at the time of the rupture and that they felt somewhat dizzy seconds before it, but said that until that moment they had not noticed any abnormal vibration in the dam area. Some workers who witnessed the collapse, while seeking higher ground to protect themselves, issued an alert via radio and verbally, allowing others to escape the tragedy. Nevertheless, twelve workers got trapped or drowned by the sea of mud and one worker died of sudden illness. The body of one of Samarco’s employees was never found (BRAZILIAN DEPARTMENT OF LABOUR AND SOCIAL SECURITY, 2016, p. 11-12).

Tailings formed a sea of mud that swept through the valley downstream the dam and rose through the Santarém dam. Despite having suffered damage, the latter did not collapse. It contained the mud for long enough to allow the community of Bento Rodrigues, located 2.5 km from the Santarém dam, to evacuate. Samarco had no sirens or other means of communication to alert Bento Rodrigues’ residents. Residents warned each other that a flood of mud was approaching and moved out on their own to a place in the subdistrict they deemed to be safe. This escape movement, however, failed to prevent the death of five residents, including two children and three elderly.
Bento Rodrigues was nearly buried by the flood of water, mud and debris produced by the dam collapse. According to information from the Military Fire Department of Minas Gerais, tailings deposits reached more than 10 meters of height in some parts of the village. Bento Rodrigues is situated on unpaved back roads, which are the only available means of land travel to the other districts and to the city center. Because of its precarious access location, the flooding made Bento Rodrigues completely inaccessible by road. The only option for transport into or out of the subdistrict was via helicopter, which made the firefighters’ rescue operations much more difficult.

Other localities of Mariana were also affected by the mud, especially Paracatu de Baixo, who had part of their houses buried.

After reaching Bento Rodrigues, the wave of mud ran 55 km along the River Gualaxo do Norte before reaching its mouth, in Rio do Carmo, along which it traveled 22 km down to the Rio Doce river. In this part of the mud run-out, it caused the most destructive effect, as it exceeded the capacity of the rivers’ channels, then reaching the cities of Mariana Barra Longa, Rio Doce and Santa Cruz do Escalvado. In this part of the run-out, the flood of mud hit an area of about 1,500 hectares (IBAMA, 2016), causing destruction of buildings, bridges, roads and other urban facilities. In this stretch, the wave of waste also produced strong erosion in the narrow river banks.
In the city of Rio Doce, the mud was retained by the Candonga Hydroelectric Power Plant dam, and after overtopping this barrier, it resumed its voyage down the channel of the Rio Doce river. About 30% of the tailings spilled with the rupture of the Fundão dam were retained by the Candonga Hydroelectric Power Plant\textsuperscript{27}, whose power generation was halted. Then the wave of tailings reached the Baguari Hydroelectric Power Plant,\textsuperscript{28} whose operations were also halted. In the stretch between Candonga and Baguari, the waste sedimentation changed the morphology of the channel of the Rio Doce river. After this stretch, the wave of tailings continued its travel, with less concentration of sediments but at a higher speed. However, although the grains of the tailings that ran down the river were thinner, they considerably increased water turbidity. As in this stretch lie several cities that capture raw water directly from the Rio Doce river, the water supply to 12 cities, including Governador Valadares (MG) and Colatina (ES), had to be stopped for a few days, affecting about 424,000 people.(ANA, 2016a). The Krenak indigenous community, who lived on the left bank of the Rio Doce river, in a reserve of about four hectares, had to be removed from the region due to the contamination caused by the waste spill. In this region, two other hydroelectric power plants – Aimorés\textsuperscript{29} and Mascarenhas\textsuperscript{30} – were also hit. Although a significant part of the wave of waste has been contained by the ponds of these hydroelectric power plants, this containment was not enough to prevent the mud from reaching the Atlantic Ocean.

The flood reached the mouth of the Rio Doce river on November 11, 2015, without flooding the larger cities bordering the river. The crest of turbid water, in turn, reached the mouth 16 days after the dam rupture, on November 21. In the ocean, the orange-colored stain reached an area of about seven square kilometers.

The mud traveled 660 km and reached 39 cities - 35 in Minas Gerais and 4 in Espírito Santo (IBAMA, 2015; Task Force Group, 2016).

\textsuperscript{27} The Candonga Hydroelectric Power Plant, power capacity of 140MW, belongs to a consortium formed by Aliança Energia (50%) and Vale (50%) (ANA, 2016b).

\textsuperscript{28} The Baguari Hydroelectric Power Plant, with power capacity of 140 MW, belongs to a consortium formed by Neonegria (51%), Cemig (34%) and Furnas (ANA, 2016b).

\textsuperscript{29} The Aimorés Hydroelectric Power Plant, with power capacity of 330 MW, belongs to Aliança Energia.

\textsuperscript{30} The Mascarenhas Hydroelectric Power Plant Aimorés, with power capacity of 198 MW, belongs to EDP.
Disaster Impacts

Days after the rupture of the Fundão dam, the Mariana citizens began to demand the return of Samarco’s operations. Posters, leaflets and shirts reading “Mariana quer a volta da Samarco” (Mariana wants Samarco back), “Somos todos Samarco” (We all are Samarco) and “Justiça sim, Desemprego Não” (Yes to Justice, No to Unemployment) came to be seen throughout the city. Mariana’s mayor Duarte Junior came to announce to the press that Mariana would shut its doors without mining. According to the mayor, “[M]ining...
accounts for 80% of our revenue. Saying that there can be no mining anymore is the same as affirming that basic services must be stopped and that four thousand people will lose their jobs.” The mayor added: “(I) have to confess that that our city did not work towards economic diversification.”

nonprofit organizations mobilized to conduct studies that assessed the impacts caused by the disaster. Some of them acted individually, but in a coordinated manner (e.g.: IBAMA, ANA and Department of Environment), other independently (e.g.: External Commission of the Chamber of Deputies). Some of them favored a joint action (as in the case of the Task Force composed of government agencies of the State of Minas Gerais and cities affected by the disaster). Given the short time between the occurrence of the disaster and these studies, the impact assessments carried out a few months after the disaster did not intend to be conclusive, but rather give guidance to compensatory actions and actions for the damage caused by the dam collapse. Although these studies do not necessarily converge with each with respect to the characterization and extent of the damage caused by the disaster, some impacts\(^{32}\) have proved recurrent in all of them.

The major impacts on the environment were:

- Quality degradation of water in the affected rivers\(^ {33} \);
- Soil quality degradation\(^ {34} \);
- Destruction of natural vegetation and permanent preservation areas in the stretches in which are the sources of the rivers\(^ {35} \);
- Siltation of water bodies\(^ {36} \);
- Morphological changes of the affected water bodies;
- Killing of fish and other aquatic organisms\(^ {37} \);
- Disturbance to the balance of aquatic ecosystems.

The disaster caused the following economic impacts:

- Disruption of mining production;

\(^ {32} \) The characterization of the impacts mentioned herein was based on (Task Force Group, 2016; ANA, 2016a; IBAMA, 2015).

\(^ {33} \) Raw water from rivers showed turbidity and physical and chemical characteristics differing substantially from the historical average and noncompliant with the consumption standards.

\(^ {34} \) There were changes in soil porosity, hindering water infiltration and plant growth, as well as in its fertility level.

\(^ {35} \) Along 77 km of water bodies, 1,469 hectares of vegetation were destroyed, including permanent preservation areas, which according to the new Forest Code, are marginal strips of waterways. The protected areas and preservation areas that were permanently affected include Parque Estadual do Rio Doce; Parque Estadual Sete Salões; Floresta Nacional Goytacazes; and Corredor da Biodiversidade Sete Salões-Aimoré (IBAMA, 2015).

\(^ {36} \) The disaster led to a continuous process of entrainment and deposition of sediments in waterways that causes riverbeds to lose their capacity to carry suspended particulate matter toward its mouth.

\(^ {37} \) The mud caused the death of more than 11 tons of fish (Task Force Report, p.6) and caused several species of aquatic organisms to become endangered of extinction.
• Loss of tax revenue\textsuperscript{38};
• Increased costs in providing emergency public services\textsuperscript{39};
• Losses to the power generation of hydroelectric power plants;
• Damage to merchants affected by the sea of mud;
• Damage to public and private infrastructure;\textsuperscript{40}
• Losses to industry and other economic activities that depend on the water quality of the affected water bodies;
• Harm to fishing activities in the entire length of the river and transition to the marine environment;\textsuperscript{41}
• Harm to the agricultural activity;
• Damage to rural property;\textsuperscript{42}
• Harm to tourism, especially in the area of the estuary of the Rio Doce river\textsuperscript{43};
• Harm to farming\textsuperscript{44};
• Unemployment caused by the shutdown of Samarco's operations.\textsuperscript{45}

Although there is no data to precisely quantify the economic damage, it is estimated that in the micro-regional scale only, including the cities of Mariana, Barra Longa and Santa Cruz do Escalvado, damage to infrastructure and public and private economic losses amount to more than BRL 250 million (Task Force Report, 2016, p.36-37).

\textsuperscript{38} Cities without economic diversification were severely impacted. This is the case of Mariana, in which more than 80\% of revenue comes from mining activity, as well as Rio Doce, where is located the Candonga Hydroelectric Power Plant.
\textsuperscript{39} The city of Barra Longa, for example, had losses of almost BRL 2 million arising out of medical care to the victims, disinfestation of pests, urban cleaning, transportation of victims and public safety (Task Force Report, p.46).
\textsuperscript{40} In Mariana, infrastructure losses totaled over BRL 100 million. In addition to the loss of dwelling units in the districts of Bento Rodrigues and Paracatu de Baixo, basic health units, sports facilities, bridges, roads, streets, schools and headquarters of community associations were destroyed. In Barra Longa, the losses amount to BRL 10 million. (Task Force Report, p.49).
\textsuperscript{41} At least 1,249 fishermen were registered in the affected areas of Minas Gerais and Espírito Santo, riverine workers, farmers and traditional populations (POEMAS, 2015).
\textsuperscript{42} One hundred and ninety-five farms were hit in Mariana, Barra Longa, Rio Doce and Ponte Nova cities (Task Force Report, 2016, p. 37).
\textsuperscript{43} In the city of Rio Doce, there was a decrease in the revenue of hostels, restaurants, grocery stores and fishery product traders.
\textsuperscript{44} The disaster caused the loss of animals, machinery and equipment and crops, totaling a loss exceeding BRL 25 million (Task Force Report, 2016, p. 40).
\textsuperscript{45} One year after the disaster, the city of Mariana had an unemployment rate of 25\%, which is twice as much as the national average. The increase in unemployment was caused chiefly by the suspension of Samarco contracts with subcontractors.
Other cities of greater economic significance had significant losses in the industry and service sectors. The city of Belo Oriente, for example, had losses in the order of BRL 200 million on account of the temporary shutdown of Cenibra Papel e Celulose due to the impossibility to capture water. The service sector had losses of BRL 40 million, followed by the livestock sector, which had losses of little more than BRL 20 million (Task Force Report, 2016, p.36-37).

With regard to private damage, it is observed that several of the affected communities depend on family-based rural production for their livelihood. With the destruction of crops and pastures, the population was left with no alternative livelihood and no prospect of resuming their own self-support means of living in the short term. This happened with the population of Bento Rodrigues. Given the complete infrastructural destruction of the subdistrict, all its residents who performed trade, industry and service activities lost their sources of economic livelihood.

The tragedy also caused human and social harm, including:

- Loss of lives;\(^{46}\)
- Injured people;
- Psychologically affected people;
- homeless and shelterless people;
- Interruption of health, epidemiological, sanitary, environmental and occupational health surveillance services;
- Interruption of public safety services;
- Interruption of educational services;
- Loss of historical and cultural heritage;\(^{47}\)
- Loss of cultural reference;
- Impact in the form of social reproduction of the Krenak indigenous community.

\(^{46}\) The collapse of the Fundão dam was the disaster registered in the State of Minas Gerais that caused the greatest number of victims. 18 people died and one is missing. Before November 5, 2015, the rupture of Fernandino Mine, in Itabirito, claimed seven victims, in 1986; the disruption of the dam operated by Mineração Rio Verde, in Nova Lima, had hit five victims, in 2001, while the collapse of the dam of Mineradora Herculano, in Itabirito, caused 3 deaths, in 2014. (ANA, 2016, p. 21).

\(^{47}\) Three churches were directly affected by the disaster: Capela de São Bento, in Bento Rodrigues, entirely destroyed; Capela de Nossa Senhora das Mercês, also in Bento Rodrigues, was not hit because it was located in the uppermost part of the subdistrict; and Capela de Santo Antônio, in Paracatu de Baixo, was hit by the mud, but not destroyed (Task Force Report, 2016, p. 67).

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Question:

The collapse of the Fundão dam intensified conflicts between groups that were affected by the disaster in different ways. Point out the main differences in the identifying features of these groups (e.g.: livelihoods, forms of interpersonal relationships, cultural traits, etc.) and especially how they were affected by the disaster.

*People affected by the Collapse of the Dam*

The Mariana disaster impacted the lives of many communities. The most harshly impacted people were those living in the subdistricts of Bento Rodrigues, Paracatu de Baixo and Barra Longa, the infrastructure of which was destroyed by the disaster. Those who used the Rio Doce river as a means of livelihood, such as fishermen, farmers, indigenous communities, etc., were also affected. The disaster directly hit these groups because it took away their means of economic and social reproduction.

In Bento Rodrigues, Paracatu de Baixo and Barra Longa, hundreds of residents lost their homes: 236 families in Bento Rodrigues, 108 in Paracatu de Baixo and 8 in Gesteira, in the city of Barra Longa, were made homeless.

With the displacement of these people from their territories, the community and neighborhood relations that structured the daily life of these communities were destroyed. Since November, 2015, former residents of Bento Rodrigues, Paracatu de Baixo and Barra Longa came to live in the city of Mariana, in detached houses. Initially, these residents were accommodated in hotels, and later in houses rented by Samarco. These emergency measures have been prolonged over time while a definitive solution by way of award of damages to those affected is not found.

Everybody lived closed together. We lived next door to each other. Now we are all living in detached houses here. Our house belonged to my parents. There was a part where my sister lived. She had a restaurant in the square. Her house was the next. My friends. Everybody lived closed together. Everybody lives separate from everybody else here. Living in separated hotels. We stayed two months in a hotel, in a room. Then we went to the houses, and things got a little better, you know. Because staying two months in a hotel is too bad... Everybody knew one another. And the seniors, one got depressed, another has already died. My brother got mentally disturbed. He used to raise a lot of pets: little birds, dogs, cats... that were left behind, because he had no time enough to open the cages and set them free. And our houses lay on the most affected place. There were two mango trees. It lay beside the church.
and is fenced off now. There were two mango trees and our house used to be there, beside the church. Her restaurant still has a piece of the restroom and you can see two wood stoves that are still there. There used to be three wood stoves, but two were left in there (Maria, former resident of Bento Rodrigues. Mariana, April 2016).

The same feeling of loss and displacement was experienced by those who used the Rio Doce river as a means of subsistence. The Krenak indigenous communities claim that the environmental disaster caused the "death of the Rio Doce river" (watu é kwen). The approximately 400 Krenak indigenous people, who used the Rio Doce river as a means of subsistence and input for the agricultural activity, were forced to stop because of the water contamination by waste. A fence between the community and the river had to be installed by the Company to prevent the cattle belonging to the Krenaks from approaching the contaminated river. Since then, the population has been unable to fish, feed their cattle, swim in the river, call the rain... This separation, however, brought more cultural and identity loss than economic loss to the Krenaks. The Rio Doce river, referred to by the natives as *watu* (great river, great father), was their locus of choice for rituals and traditions, like baptisms of children and fishing and hunting rites.

Douglas Krenak, the community leader, claims that “the Rio Doce river is more than just water for our people; it goes beyond water supply. It is a sacred entity for the Krenaks. (...) Some people do not get it. It is not enough to bring water trucks or distribute mineral water to our community. There are people suffering, especially the elderly, who now cannot pass on our traditions. We are in search of a way to preserve our culture.

Some of those affected by the collapse of the Fundão dam were not even recognized as such. To define which people should be entitled to emergency damages, in the form of payment of a monthly cash grant and, specifically for the homeless, a housing grant, Samarco considered as affected only those who have suffered physical and economic displacement directly due to a disaster.

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50 It was agreed that each affected family would be entitled to a house rented by the company and a minimum monthly cash payable to the householder, plus 20% for each dependent and a *cesta básica* (Brazilian government basket of food staples).
According to the Movimento dos Atingidos por Barragens (Movement of People Affected by Dams), an organization active in defending the rights of the people affected by the disaster in Mariana, the recognition policy adopted by Samarco is restrictive.

In Mariana, only those considered affected individuals by the Civil Defense are registered, rather than all those affected by the tragedy as a whole. How will we be able to map those affected individuals who had their entire life affected, both in terms of income and river, water, after the crime? Representative of MAB (MINAS GERAIS STATE LEGISLATURE. Extraordinary Commission for Dams - Final Report - 2016).

The solution adopted by Samarco has excluded many affected individuals from the emergency compensatory programs. As in the case of Francisco, who works and lives, during the week, in the city of Mariana, but was the owner of a house in Bento Rodrigues, where he used to spend all the weekends. The company refused to help Francisco, claiming that he already had a home in Mariana, and therefore, he did not fit in the “affected individual” category. Francisco questioned in return: “when I was paying the property tax, I was considered a resident of Bento Rodrigues, why, now that I lost everything, am I no longer a resident?” (ALCÂNTARA, 2016, p. 177).

To determine whether the plaintiffs who claim for emergency compensatory damages fell into the “affected individual” category, Samarco held meetings, interviews and attempted to negotiate a settlement with the plaintiffs. In the specific case of the homeless, plaintiffs should provide evidence that they used to reside, on a permanent basis, in the impacted territory in order to be entitled to the claimed compensation.

As for people who did not lose their homes, but depended on the Rio Doce river to survive, such as fishermen and farmers, their difficulties are even bigger. Hundreds of fishermen had to stop fishing and claim to have never received any financial assistance from Samarco. These fishermen had once to seek other means of subsistence during the period in which fishing was prohibited in Rio Doce river, and some of them never resumed this activity, as the trade of fish from the Rio Doce river was harmed.  

In addition to dismantling the social relations of those affected by the disaster and all the difficulties they have faced in their attempt to have their rights satisfied, the former

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residents of the cities affected by the Fundão dam break still face prejudice due to their condition as an “affected individual”. Children from the districts devastated by the Fundão Dam, who came to live and study in Mariana, are called “pé de lama” (muddy feet, in Portuguese) at school. Mariana’s Human Rights Prosecutor William Meneghin initiated inquiry to investigate the creation of a petition calling for Bento Rodrigues’ students to be removed from the school to which they were sent.\textsuperscript{52}

The parents of these children are seen as “freeloaders” by part of the Mariana’s population who is dependent on mining and advocates the immediate resumption of the operations by Samarco.\textsuperscript{53} This prejudice against those affected by the disaster stems partly from the fact that those affected are living in the city “at the expense” of Samarco, while a significant part of the residents economically agonizes over the interruption of the company’s operations. “One year after the day they had to run for their lives, leaving behind all of their property, the residents of the subdistrict of Bento Rodrigues, in Mariana, State of Minas Gerais, are now discriminated as if they were the cause of the tragedy that struck the city.”\textsuperscript{54}

Questions:

1. Analyze the major difficulties faced by the people affected by the Marina disaster, which make them be known as “affected individuals.”

2. What are the positive and negative implications of recognizing an individual as affected by an environmental disaster?

\textit{The Responsible for the Disaster}


\textsuperscript{53} The same.

\textsuperscript{54} FERNANDES, Márcio; RIBEIRO, Bruno, \textit{op. cit.}
In December 2015, several agencies from the Brazilian federal government and the State of Minas Gerais\textsuperscript{55} filed a civil lawsuit for the enforcement of collective rights\textsuperscript{56} against Samarco and its parent companies, Vale S/A (Vale) and BHP (Billinton). The 12 plaintiffs of this civil lawsuit, which is currently being processed jointly with another civil lawsuit filed by the \textit{Associação de Defesa de Interesses Coletivos} (Public Interest Advocacy Association),\textsuperscript{57} demanded the payment, by Samarco and its parent companies, of the amount of BRL 20.2 billion, to be disbursed over a period of 10 years, in order to defray the costs of compensatory measures. The plaintiffs also filed for a provisional remedy against Samarco for the adoption of a series of emergency actions in order to prevent the damage caused by the disaster from aggravating, under penalty of a daily fine of BRL 100,000.00 (one hundred thousand BRL) for each unfulfilled obligation. The plaintiffs also demanded the creation of a provision of Samarco's capital in order to compensate the damage caused by the disaster.\textsuperscript{58}

The plaintiffs also demanded that both parent companies, Vale S/A (“Vale”) and BHP Billiton (“BHP”), were held liable, on the grounds that the companies would be deemed, by the Brazilian environmental laws and regulations, “indirect polluters” and, therefore, jointly liable for the environmental damage.\textsuperscript{59} The plaintiffs also sought to pierce the corporate veil of Samarco in order to hold its shareholders liable, in the event that any obstacles occur to compensation for damage caused by the disaster.\textsuperscript{60} The plaintiffs also demanded that Vale be also deemed a direct polluter as a result of the company having

\textsuperscript{55} There are twelve plaintiffs: Federal Government, State of Minas Gerais, \textit{Instituto Mineiro de Gestão das Águas} (Water Management Institute of the State of Minas Gerais), State of Espírito Santo, \textit{Fundação Estadual de Meio Ambiente} (State Foundation for the Environment), \textit{Agência Nacional de Águas} (Brazilian Water Agency), \textit{Instituto Estadual de Florestas} (State Forestry Institute), \textit{Instituto Chico Mendes de Conservação da Biodiversidade} (Chico Mendes Institute for Biodiversity Conservation), \textit{Departamento Nacional de Produção Mineral} (Brazilian Department of Mineral Production), \textit{Instituto Estadual de Meio Ambiente e Recursos Hídricos} (State Institute for the Environment and Water Resources), Ibama (Brazilian Institute of Environment and Renewable Natural Resources) and \textit{Agência Estadual de Recursos Hídricos} (State Water Resources Agency).

\textsuperscript{56} Civil lawsuit for the Enforcement of Collective Rights No. 0069758-61.2015.4.01.3400, filed before the 3rd Federal Court of the Federal District and sent to the 12th Federal Court of the State of Minas Gerais due to lack of jurisdiction.

\textsuperscript{57} Civil lawsuit for the Enforcement of Collective Rights No. 0060017-58.2015.4.01.3800, filed in November 2015, before the 12th Federal Court of the State of Minas Gerais, in the amount of BRL 10 billion.

\textsuperscript{58} To ensure the effectiveness of this provision, the plaintiffs demanded the creation of an annual provision of either 20% of Samarco’s turnover or 50% of the company’s net profit, whichever was higher.

\textsuperscript{59} According to the Law governing the Brazilian National Environmental Policy (Law No. 6,938 / 81), “polluter”, in Art. 3, IV, means “the natural person or private or state-owned legal person, which is held, directly or indirectly, liable for any activity that causes environmental degradation.”

\textsuperscript{60} The grounds for the piercing of the corporate veil is supported by Art. 4 of Law 9,605/98, which provides for criminal and administrative liability for environmental damage.
entered into a contract with Samarco Mineração S/A, which allowed the former to dump liquid waste (slime) from the Alegria iron ore complex into the Fundão dam.

On December 18, 2015, the 12th Federal Court judge rendered a decision by the trial court, determining a number of provisional remedies, among which the suspension of permits and concessions granted to Samarco’s mining activity, as well as the deposit in court of the amount of BRL 2 billion to cover future action for damages. The lawsuit is still pending, but its suspension is possible by virtue of a settlement between the parties to the case, still pending approval.\(^{61}\)

Later, in May 2016, the Federal Prosecutor's Office of the State of Minas Gerais filed a civil lawsuit for the enforcement of collective rights against 21 defendants, including Samarco, Vale and BHP, as well as government entities such as Federal Government, State of Minas Gerais, State of Espírito Santo and environmental agencies. The amount in dispute of the civil lawsuit is BRL 155 billion and it has forty pages dedicated to applications for preliminary injunctions and injunctions on the merits of the case. The applications also include the suspension of the payment of dividends to Samarco's shareholders and suspension of government funding to the companies. Prosecutors also requested the accountability of the Federal Government, the State of Minas Gerais, several agencies of the direct and indirect administration of the federal government and the state of Minas Gerais and Espírito Santo for damages caused by the disaster. The amount in dispute was calculated by the plaintiffs on the basis of the amount that the oil company BP has disbursed so far, after the oil spill in the Gulf of Mexico, occurred in 2010. The plaintiffs understood that the dimension of Mexico disaster was similar to that of Mariana. After verifying the request, the judge dropped the State of Espírito Santo as a defendant, as well as of various federal and state authorities, on the grounds that there is no “minimum causal link between the act or omission of that state and the damage, there being no justification to include this vast list of state-owned legal entities, which will only cause delay and turmoil to the outcome of the action, which already has more than 11,000 pages.”\(^{62}\) At a conciliation hearing, held in September 2016, Samarco

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\(^{61}\) The settlement, which would suspend this lawsuit, was initially approved by the General Coordination of the Regional Federal Court of the 1st Region, but it was suspended by an injunction from the Superior Court of Justice on the grounds that the court having jurisdiction over the settlement approval would be the 12th Federal Court, where the lawsuit was originally filed.

\(^{62}\) RODRIGUES, Léo. Hearing to be held in September for Federal Prosecutor's BRL 155 billion lawsuit against Samarco. Agência Brasil. 12/07/2016. Available at:
committed itself to carry out surveys to assess the damage. The parties also agreed to hold 11 hearings in open court, in locations along the Rio Doce river.

In addition to these actions, Samarco, Vale and BHP still face other civil, administrative and criminal proceedings at the municipal, state and federal levels.

In the administrative sphere, Samarco has been fined by a number of environmental agencies, totaling over 500 million BRL.63 These fines, which have been imposed by the government environmental agencies, aim to punish Samarco for the environmental degradation actions caused by the disaster.

More than one year after the disaster, Samarco has not yet paid any of these fines, which are being disputed in the context of administrative proceedings brought by the federal agency. Samarco has appealed against these proceedings on the grounds that its conduct was neither willful nor faulty, which, in its opinion, is a sine qua non condition for the imposition of fines. The company also claims that the activities performed when the Fundão dam collapsed were widely supported by environmental permits granted by the state fine-imposing authorities.

After the closure of these procedures, which could extend for years, the company may also seek the judiciary to attempt to annul the sanctions. In addition, any amounts paid by Samarco due to the fines imposed at the administrative level will be earmarked for the public treasury, in lieu of compensation for damage caused by the company.

At the criminal level, the Public Prosecutor’s Office of the State of Minas Gerais and the Federal Prosecutor’s Office, after civil and federal police investigations had been completed, brought several charges against Samarco, Vale, BHP and their employees.

In one of them64, the Federal Prosecutor’s Office filed an information against the officials of Samarco’s executive board, board of directors’ members appointed by Vale and BHP, 


63 The Brazilian Institute of Environment and Renewable Natural Resources (Ibama) has already imposed 7 fines, totaling 292 million reais; The State Institute for the Environment and Water Resources (IEMA), in Espirito Santo, imposed 3 fines, 2 in the amount of BRL 450,000 and 1 daily fine of BRL 50,000. The Minas Gerais State Department for the Environment and Sustainable Development (Semad) imposed 18 fines, totaling over BRL 68.6 million, for the loss and environmental damage caused and failure to comply with established requests and deadlines. The Environmental Policy Council of the State of Minas Gerais (Copam) has imposed a fine of BRL 112 million for the damage caused by the rupture of the Fundão Dam.

64 The information was filed on October 21, 2016.
as well as against Vale and BHP representatives in the company, on charges of having committed not only environmental crimes, but also second degree aggravated murder. For the third party plaintiffs, the third-party defendants participated in operational committees, internal committees and dam committees in which they learned about the Fundão dam problems and its burst risks. In these decision-making bodies, circulated, for example, internal documents of the mining company containing a forecast in case of collapse of the dam, indicating the possibility of about 20 deaths and shutdown of the company’s activities for two years. According to the third party plaintiffs, Samarco, even aware of the risks, would have prioritized the economic results at the expense of safety practices. “Greed for profit resulted in tragedy,” concluded the prosecutors who brought the charges.

Samarco, Vale and BHP Billiton, in turn, were accused of having committed 12 environmental crimes, including pollution, flood, landslide, crimes against fauna and flora, crimes against urban planning and against the cultural heritage. The penalties imposed to the companies include fines, temporary embargo orders, ineligibility for the government and community service, such as the funding of programs of agencies and environmental organizations and performance of works at degraded areas. The company VogBR and one of its engineers were accused of issuing misleading report on the dam stability.

Questions:

1. Assume that VALE and BHP are jointly liable for the damage caused by Samarco, whether on the grounds of the indirect polluter concept provided for in the Brazilian law, or the piercing the corporate veil theory. Should all shareholders of Samarco’s parent companies be held jointly liable?

2. Conversely, could Samarco’s, VALE’s and BHP’s non-controlling shareholders file a suit against these companies by the drop in Samarco’s share price after the occurrence of the disaster?

3. Review the appropriateness of the lower court decision on dropping the environmental licensing agencies as defendants in the civil lawsuit for the enforcement of collective rights filed by federal prosecutors in the amount of BRL 155 billion, on the grounds that
the causal link between administrative decisions and the damage caused by the disaster would be too attenuated.

4. Samarco has appealed the decisions on the administrative fines imposed by the Brazilian environmental authorities on the grounds that these are only attributable to those who act in a willful or faulty manner. Is this argument correct?

*Indemnification and Compensation for Damage*

In March 2016, several government entities negotiated a settlement with Samarco, Vale and BHP in order to establish short, medium and long-term measures to indemnify, compensate and remedy the environmental and socio-economic damage caused by the disaster. The settlement, which was formalized in the form of a TAC (Consent Decree), aiming to put an end to the BRL 20.2-bn civil lawsuit for the enforcement of collective rights that was pending before the 12th Federal Court, established 14 socio-economic programs and 11 environmental programs to be implemented over 15 years by the parties to the settlement.

The TAC was executed on March 2, 2016 and approved on May 05 by the Federal Court.\(^{65}\) Three months elapsed from the date of filing of the civil lawsuit for the enforcement of collective rights (November 30, 2015) to the execution of the TAC (March 2, 2016). This was the length of time that the negotiations on the terms provided for in TAC lasted. Given that this time period would not be enough to accurately characterize the actual scale of the environmental and socio-economic damage caused by the disaster, the parties to the settlement have chosen to draft a TAC with general and indefinite clauses.

Despite the lack of a previous diagnosis to provide reliable information that could allow detailed formulation of the indemnification, remedial and compensation measures to be adopted, the TAC established limits for the allocation of resources to certain categories of actions. In addition to establishing the socioeconomic indemnification programs would have priority over the other programs,\(^{66}\) the TAC established an annual fixed amount for

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\(^{65}\) The Coordinator-General of the Regional Federal Court of the 1st Region approved the TAC. The Federal Prosecutor's Office, in a subsequent lawsuit aimed at challenging the settlement, argued that this agency did not have jurisdiction to issue such a decision, as this should be exercised by the original court, notably by the 12th Federal Court.

\(^{66}\) See Clause 6, item IV of the TAC, which "provides that Socioeconomic programs reparatory nature in preference to other programs. The socioeconomic programs set out in the TAC include: (i) program for
expenditure on compensatory measures. If we follow the reasoning of the TAC it will not be possible to allocate resources in excess of BRL 240 million per year for compensatory claims, even if these may be necessary.\(^{67}\) In addition, the disbursement schedule mentioned above established limits of contributions for the first 6 years of the TAC duration, regardless of the actual amount needed for indemnification of the damage caused by the disaster. The fact that the settlement limits Samarco’s liability, without actual knowledge of the real and potential damage caused by the disaster is, in the view of the MPF (Federal Prosecutor's Office)\(^{68}\), one of the major deficiencies of the TAC.

According to the MPF, the settlement “gives priority to the protection of the companies’ assets at the expense of the protection of the affected populations and the environment” (G1 MG, March 3, 2016).

From a legal point of view, this settlement is unbelievable. It limits MPF participation, making negotiation with inalienable rights and treating affected individuals in a segregated manner... this is unbelievable. The settlement was very interesting for the companies. So much so that at a meeting with the companies, we were talking about the settlement... one of the lawyers said: “well, sir, we submitted our proposal. They agreed and we signed it.” This means that the Federal Government and the States did so more for the sake of resumption of operation by Samarco.\(^{69}\)

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\(^{67}\) See Clause 232, which provides for the allocation of 240 million reais annually for compensatory measures for 15 years. The only exception to this rule is the allocation of resources for the sewage collection and treatment and solid disposal waste program, for which the TAC provided for the allocation of 500 million reais, to be disbursed in the first three years of the settlement, as set out in Clause 170.


\(^{69}\) Testimony or prosecutor Carlos Eduardo Ferreira Pinto, at a lecture given to students from FGV Direito Rio, on April 26, 2016.
The latter provided for the creation of a Foundation governed by private law, established and maintained by Samarco, Vale and BHP, which shall be responsible for selecting and implementing the socioeconomic and environmental programs under the TAC. Although the TAC provides for the government to mandatorily be part of the Foundation’s tax and advisory boards, and the actions of the Foundation be validated by an Interfederative Committee appointed by the Government, which is responsible for defining priorities in the implementation of the projects and monitoring their implementation, the settlement granted broad autonomy to the Foundation. If the government or the affected population disagrees with the actions and proposals submitted by the Foundation, the TAC provides that the former will have to resort to the judiciary. The TAC does not provide, therefore, for mechanisms for direct implementation of the projects by the government with the resources paid by Samarco, as these will have been transferred to the assets of the private non-profit entity.

The TAC expressly provides, in the clause 235, sole paragraph, that the projects and programs can be performed directly by Samarco, without the intermediation of the Foundation. In this case, the TAC provides that expenses incurred by the company shall be deducted from the amounts to be contributed to the Foundation. The TAC has no similar clause that allows the government to be reimbursed later, by the Foundation, of expenses incurred in the direct performance of projects.

The parties to the Brazilian TAC were those who filed one of the civil lawsuits for the enforcement of collective rights before the 12th Federal Court in the State of Minas Gerais. Other important eligible government bodies, such as the State and Federal Public Prosecutor’s Office, and cities affected by the disaster, did not execute this settlement. Failure to represent the affected cities in the settlement was highlighted, by the appellate judge of the Court of Justice of the State of Minas Gerais, in the proceedings of an interlocutory appeal:

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70 This Foundation, Fundação Renova, has been duly established.
71 Clause 244 provides that the interfederative Committee shall be composed of two representatives of the Department of Environment; 2 representatives of the federal government; 2 representatives of the State of Minas Gerais; 2 representatives of the State of Espírito Santo; 2 representatives of the cities of the State of Minas Gerais that were affected; 1 representative of the cities of the State of Espírito Santo that were affected by the dam rupture and 1 representative of Rio Doce Water Basins.
72 The absence of dispute resolution mechanisms provided for in the TAC is also a flaw that weakens the government’s position in the settlement.
73 Interlocutory Appeal No. 1.0000.16.031023-1/001.
it is sufficient to see that the cities described in item V, not represented in the settlement, are: Mariana, Barra Longa, Rio Doce, Santa Cruz do Escalvado, Sem-Preixe, Rio Casca, São Pedro dos Ferros, São Domingos do Prata, São José do Goiabal, Raul Soares, Dionísio, Côrrego Novo, Pinto D’água, Mariléia, Bom Jesus do Galho, Timóteo, Caratinga, Ipatinga, Santana do Parnaíso, Ibapa, Belo Oriente, Bugre, Iapu, Naque, Periquito, Sobralia, Fernandes Tourinho, Alpercata, Governador Valadares, Tumiritinga, Galiléia, Conselheiro Pena, Resplendor, Itueta, Aimorés, Baixo Guandu, Colatina, Marilândia and Linhares.

The rights of the most impacted but not represented individuals (Cities and population) in the settlement have been determined by third parties that appear to be not allowed to do so.

Accordingly, there is no evidence that a member of the Public Prosecutor’s Office of the State of Minas Gerais has been included to negotiate the settlement in question, which indicates the lack of proper discussion of the agreed outcome to the dispute, precisely among those individuals who are the closest and, therefore, most sensitive to the effects of the tragedy.

The decision on the settlement approval, however, was suspended on a preliminary basis by the STJ (Superior Court of Justice), which upheld complaint of the Public Prosecutor's Office, on the grounds that the Federal Regional Court of the 1st Region has no jurisdiction over the settlement approval. Moreover, the STJ decision also examined substantive issues such as the legitimacy of settlement that was formulated without the key interested parties being heard. In her decision, the Judge highlights that the Public Prosecutor’s Office of the State of Minas Gerais did not participate in the settlement in question, which indicates the lack of proper discussion on the agreed outcome to the dispute,” (Complaint Nº 31.935 - MG 2016/0167729-7, p 7. The chief judge also emphasizes that the most affected parties (population and cities) are not party to settlement either:

Given the extent of the damage caused by the disaster occurred in Mariana/MG, it is strictly recommended that a broader debate be held on the agreed settlement of the dispute, by means of public hearings held with the participation of citizens, civil society, the scientific community and representatives of local interests, such as the municipal authorities (the same).

Despite disagreeing with the TAC, both the Public Prosecutor’s Office of the State of Minas Gerais and the Federal Prosecutor's Office have already executed settlements with Samarco:

• On November 16, 2015, the MPF and the Public Prosecutor’s Office of the State of Minas Gerais executed a Preliminary Commitment Agreement with Samarco, which established and environmental guarantee in the amount of BRL 1 billion to fund emergency preventive, mitigation, remedial or compensatory (environmental or socio-environmental) measures arising out of the collapse of the Fundão dam;

• Also on November 16, 2015, the Public Prosecutor’s Office of the State of Espírito Santo, the Federal Public Prosecutor’s Office and the Labor Prosecutor’s Office executed a Preliminary Socio-Environmental Commitment Agreement with Samarco, with the main objective to adopt a series of emergency measures, among which the one that ensures water supply to the Cities of Baixo Guandu, Colatina, Linhares and Marilândia.

• In June 2016, a TAC (Consent Decree) was entered into by and between Samarco mining company and the Public Prosecutor’s Office of the State of Minas Gerais, AGE (Office of the General Counsel for the State Government) and the Candonga consortium, for cleaning the Risoleta Neves Hydroelectric Power Plant, aka Candonga, the structure of which received 10 million cubic meters of tailings from the Fundão dam (G1 MG, June 15, 2016).

On August 18, 2016, the 5th Panel of the Federal Regional Court of the 1st Region confirmed a preliminary decision from the STJ (Superior Court of Justice) and annulled the TAC approval.

Although the settlement approval has been annulled by the Judiciary and new civil lawsuits for the enforcement of collective rights have been filed, with the objective of increasing the liability of the company in relation to that provided in the lawsuit that gave rise to the TAC, the settlement remains valid between the parties and the programs and projects provided therein, especially the urgent ones, are being implemented by Samarco.

Question:

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75 It is noteworthy, in this regard, the civil lawsuits for the enforcement of collective rights filed by Federal Prosecutors. This lawsuit substantially differs from the previous ones, as it established a preliminary amount in dispute, to be confirmed by supervening technical studies, much higher than that of the lawsuit that generated the TAC analyzed herein (BRL 155 billion). This lawsuit also included the Federal Government and the States in the case as defendants, on the grounds that the federal units, through their environmental agencies, were negligent in their activities of licensing, allocation and monitoring mining projects.
Please review the settlement agreed upon with Samarco with regard to: a) adoption of general and indeterminate clauses; b) annual limits for the transfer of resources and limits for the allocation of compensatory measures; c) independence and autonomy of the Foundation governed by private law to manage the terms of the settlement.
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