

DNPM actions on the implementation of law 12.334/2010: from the ordinances and inspections to the SIGBM

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Eriberto Nascimento Leite¹
Luiz Paniago - Neves²
Tatiana Baqueiro - Milosevic³
David Barros Galo⁴

¹Agência Nacional de Mineração - Fiscalização
 Salvador - Bahia - Brasil
eriberto.leite@dnpm.gov.br, eribertodnpm@gmail.com

²Agência Nacional de Mineração - Fiscalização
 Brasília - Distrito Federal - Brasil
luizpaniago7@yahoo.com.br

³Universidade Federal da Bahia - DCTM
 (Departamento de Ciência e Tecnologia dos Materiais)
 Salvador - Bahia - Brasil
tatiana@camaraconsultoria.com.br

⁴Agência Nacional de Mineração - Fiscalização
 Salvador - Bahia - Brasil
david.galo@dnpm.gov.br

Abstract

As defined in PNSB - Law 12.334/2010 (Brasil, 2010), the DNPM, which manages the Brazilian mineral resources, is also responsible for overseeing the safety management of tailings dams in the country. The purpose of this article is to present the actions carried out in this context by the Department since the enactment of the Law in 2010, such as: elaboration of infra-legal regulatory instruments, training of civil servants, inspection actions throughout the country, seminars and lectures at mining companies and the organized civil society in general, among others, with the primary purpose of monitoring the implementation of the law instruments by mining companies, such as PSB and PAEBM, in order to avoid / mitigate accidents related to these structures.

Keywords: dam safety; regulation; surveillance.

1. Introduction

It is a fact that dams are of great importance for the development of any society (water storage for a range of uses, regularization of water flow, energy generation, retention of mineral and/or industrial waste). However, these structures can raise the exposure of communities, local infrastructure and the environment to risk levels considered relevant, which is the reason why it is indispensable to establish public policies that regulate the sector.

The legal history on Dam Safety in many countries goes back to decades ago; in Portugal, for instance, the pertinent legislation dates from 1990, while in Brazil, despite the growing concern from the population on the subject and the need for a greater participation of the State as a mediator of the multiple interests involved, our law was created only in 2010.

In relation to mining companies

specifically, it is known that many large, medium and small sized organizations already had the essence of the Dam Safety theme inserted in their routine. However, adaptations have been made necessary with the creation of the aforementioned law. Other companies that did not customarily apply those concepts in their activities had to adequate themselves following the current legislation (both in relation to the law and to its consequent regulations).

Brazil's legal insertion on the Dam Safety theme occurred with the promulgation of Law n° 12.334 of September 20, 2010 (Brasil, 2010), when many supervisory agencies were involved to execute it, such as the National Waters Agency (ANA), the National Electrical Energy Agency (ANEEL), the Brazilian Institute of Environmental and Natural Renewable Resources (IBAMA) and its decentralized

organizations and the National Department of Mineral Production (DNPM). These supervisory agencies, in accordance with their obligations as specified in the referred law, had to elaborate Resolutions and Ordinances with the objective of regulating some of their articles.

What can be noticed, when examining the Brazilian water resources legal-institutional framework from before the promulgation of Law n° 12.334/2010 (Brasil, 2010), is that there was no direct indication of responsibilities, at the national level, for monitoring the safety of dams, but only environmental agencies that often dealt isolatedly with accidents, and a disarticulation of public power when dealing with all the problematics involved. At the state level, however, some initiatives and important advancements should be highlighted, such as the work that is being

done by COGERH in the state of Ceará and by FEAM in Minas Gerais.

Chronologically, the history of Dam Safety in Brazil follows the framework presented below:

a) 2003: Bill n° 1.181/2003;

b) 2003: a Working Group is created within the Technical Chamber of Project Analysis (CTAP) of the National Council of Water Resources (GT SB CTAP/ CNRH) to discuss the subject;

c) 2004: at the end of their assignment, the Working Group submitted a substitute draft, which was discussed and approved by the Technical Chamber of Legal and Institutional Affairs (CTIL) and later by the CNRH plenary, originating the Bill PLC-168/2009;

d) 2010: Law n° 12.334/2010 (Brasil, 2010) is published, which established the National Policy on Dam Safety (PNSB), serving as an important landmark in the

management of dam safety in the country.

Among the reasons that led to the joining of efforts for the drafting and approval of Law n° 12.334/2010 (Brasil, 2010), one of the most important is the recognition of an elevated risk of problems of organizational nature, responsible for the widespread state of concern for the Brazilian dams, many of them with latent project, construction and operational vulnerabilities.

In the context of the mining industry, the “mineral boom” that occurred in the years of 2006/2007 caused substantial changes in the existing scenario: the rise of commodity prices increased the production scale of existing mines and encouraged the opening of new enterprises. As a consequence, the already existing tailings dams had to be expanded and also new structures had to be built. In a similar way, industrial enterprises followed the

same tendency.

The enactment of Law 12.334/2010 (Brasil, 2010) on September 21, generated a series of new demands for the responsible agencies, especially for the DNPM, which on September 3, 2012 and on December 11, 2013, regulated all the legal provisions attributed to it, and has since then carried out a series of measures aimed at its proper implementation, an approach which is the purpose of this study.

By making a comparison between the state of the management of registration and safety of dams inspected by the DNPM, as it was before and how it is after the publication of the aforementioned legal provisions and the actions of the Department, it can be verified whether the creation/promulgation of the law and its regulations with the objective of increasing the safety of the dams has indeed reached its goal.

2. Methodology

The information herein presented was gathered from members of the Supervisory Board at the Department Headquarters in Brasilia that were involved in the entire process, as well as from agents of each respec-

tive decentralized regional units – 25 superintendencies and 6 offices in the country, which work with the supervision of mining activities.

In general, four groups of actions can be highlighted during this

period, which will be individually detailed as follows: development of the regulation, training of government employees, supervisory actions and communication with the organized civil society.

Regulation

Regarding the first group of actions, in the years of 2010 and 2011, DNPM participated in meetings convened by the CTIL (Technical Chamber of Legal and Institutional Affairs) of the CNRH (National Council of Water Resources) in order to regulate, in consensus with the various supervisory agencies and civil society entities, articles 7° and 20° of Law n° 12.334/2010 (Brasil, 2010), concerning the classification of dams and guidelines for the implementation of the National Policy on Dam Safety (PNSB).

From that work came the publica-

tion of Ordinance N° 416/2012 (Brasil, 2012), which together with Ordinance N° 526/2013 (Brasil, 2013) allowed the formalization and legal support to the field work of agents under the administrative point of view – DNPM was a pioneer in such regulations, being the first supervisory agency to completely regulate Law 12.334/2010 (Brasil, 2010). In May 2017, after public consultation for changes due to the practical results experienced during the previous three years of inspections, as well as the need for updates, the Department published Ordinance 70.389/2017

(Brasil, 2017), unifying its regulation and incorporating important changes.

Together with such alteration, in partnership with a hired IT company, the Mining Dams Management System – SIGBM – was developed, which provides the registration of the existing structures in the country in real time, assists in the planning of inspection campaigns and modernizes the agent’s work, ultimately contributing to a more effective management of the safety of our dams, following the principles of administrative governance.

Training

Concerning the second group, which deals with the training of government employees, an initial observation that has to be made is that these initiatives were intensified and began to have a broader practical meaning since the publication of the instruments previously discussed; that is, September 2012 and December 2013 – despite the fact that the law dates from 2010.

Besides that, the lack of entrance and availability of specific agents in the

staff for such a demand, as well as the recurrent budget limitations imposed on the agencies in the recent years, have also brought difficulties to the process.

Despite all that was reported, the Department has committed itself to the attempt of training its agents and several actions have been carried out, of which we highlight:

Federal University of Ouro Preto 2012 – UFOP: Course given by professor Waldyr Lopes de Oliveira Filho,

PhD, held between July 23 to 27, 2012 (unlike the others, this action occurred before the DNPM regulations through Ordinance n° 416/2012 (Brasil, 2012) and 526/2013 (Brasil, 2013)), with a total of 40 hours, training 11 DNPM technicians of the DF, GO, MT, BA, MG, PA and SP regional units.

Dam Safety Course (Extension) – ANA-PTI-Itaipú agreement: In 2012 the National Waters Agency (ANA) and the Itaipu Technology Park Foun-

dation (PTI-Itaipu) organized a course named “Dam Safety (Extension)”. DNPM had two spots on the course made available by ANA (agency that manages the SNISB – National System of Information on Dam Safety) which were filled by a servant from Brasilia (headquarters) and by another from Minas Gerais.

Servants from ANA, DNPM, ANEEL and IBAMA, among other state supervisory agencies joined the course with the duration of 320 hours, split between 3 online and on-site modules. Its objective was to train the civil servants in view of the new National Policy on Dam Safety and the consequent inspection, implementation and management of the SNISB.

In 2013, another class was initiated and DNPM again inscribed two of its civil servants, one from Maranhão and another from Minas Gerais. The course program and structure were similar.

Specialization Course on Dam Safety – Technical and Legal Aspects - UFBA: In 2014, the Federal University of Bahia (UFBA) launched the specialization course in Dam Safety, in which it addressed technical and legal aspects on the theme. DNPM enrolled the professionals that had participated on the ANA/PTI course and added another servant, this one from the Bahia regional unit, with a total of 5 civil servants. The course objective was to train professionals apt to perform project analysis activities, constructive procedures, operation procedures, maintenance and evaluation of Dam Safety. The course had 360 hours divided between presentational lessons (4 modules) and distance learning.

Assessment of Tailings Dam Safety Course - IETEC: In 2014, IETEC (Institute of Technological

Supervision actions

Since the implementation of the PNSB in September, 2010 and mainly after the publication of its regulatory instruments, DNPM considered the execution of dam inspections as an important task of the Supervisory Board, being also highlighted as one of the relevant items established in the Institutional Goals.

However, given the complexity of the situation found in many enterprises, since there was no previous record of recurrent actions of inspection on min-

ing dams, associated with staff and budgetary limitations in the Department itself, until the end of 2015, the inspections, though considered a priority and in accordance with the legal obligation, couldn't cover the entire universe of structures that belong to the PNSB, especially in the states with the highest number of registered structures.

Other Courses promoted by the National Waters Agency – ANA: Two civil servants from the DNPM headquarters in Brasilia participated in some trainings and events organized by the ANA staff and by the World Bank, which was hired by ANA to give support on the implementation of the SNISB, among which we can mention:

1. Workshops on dam safety;
2. Brazil – Portugal Exchange – legislation on dam safety;
3. Seminar – five years of implementation of the Dam Safety Law.

Besides that, in November, 2016, DNPM participated with 4 civil servants (Minas Gerais, Bahia, Goiás e Brasília) in the 40 hour course offered by ANA on the use of the Guide on Orientation and Forms of the Emergency Action Plans (PAE) of Dams: Entrepreneur Manual – Volume IV, carried out in the ANA building in Brasília/DF. The course was aimed at public agencies and dam entrepreneurs, as they are the ones legally responsible for the supervision and safety of the structures and for the elaboration of the PAE when demanded, and it was based on the Entrepreneur Manual – Orientation and Forms Guide of the Emergency Action Plans, in which the content and typical organization of a PAE is presented.

DNPM Superintendence in Minas Gerais 2016 - UFOP: In this action taken by the DNPM, 36 public agents were trained, 22 of them perform regular inspections for the DNPM in dams throughout the country and 14 from the Mineral Resources Research Company (CPRM) – public company

with specialists trained to act in natural disasters, which in December, signed a Technical Cooperation Agreement with the Department with the intention of participating in activities related to the management of the safety of dams and emergency actions.

This course was taught by the dam specialist, UFOP professor Waldyr Lopes Oliveira Filho, who had already participated in a similar event in 2012, with a program similar to the previous one but with the addition of instrumentation topics and auscultation of structures and dam risk analysis. Special highlight to the participation of the General and Supervisory Directors of the DNPM and the President of CPRM, who interacted directly with the civil servants during a workshop of the field activities performed by the agency since the law was validated.

National Waters Agency in Brasília 2017 - UFOP: With the intention of raising the number of trained staff for the inspections on a national level, the Department held the same course again in September, 2017, with the same workload and contents, this time with 16 of its own agents, 6 from CPRM from the states of the northern region of Brazil and 3 from the National Waters Agency. The practical part occurred in the Morro do Ouro Mine, which belongs to the mining company Kinross, in the city of Paracatu – Minas Gerais, in one of the largest structures currently in operation in the country.

Technical Meeting of Inspection Agents – DIFIS: In April 2018, the Department's Supervisory Board organized a meeting in the city of Salvador with 20 SIGBM system management agents for a workshop, to discuss the current status of its use and good supervision practices, coordinated by its own collaborators.

November, 2015, which revealed to the entire country the importance of greater control by the government agencies responsible for the supervision of dam safety management – which, as established in Law N° 12.334/2010 (Brasil, 2010) itself, is the responsibility of each entrepreneur – specific demands came from the federal government to DNPM in order to intensify those actions. This initially resulted in the temporary and extraordinary hiring of skilled labor to support the agents of

the Department, aimed at diagnosing the situation of existing structures in the state of Minas Gerais – which has the highest number of registered structures on the PNSB, culminating in a project that with the participation of agents from Minas Gerais and other DNPM units in the beginning of 2016, inspected the totality of dams registered in the PNSB in the state.

In addition to that, the other Superintendencies were asked to prioritize the dam inspections in each state with members of the Department’s own staff, in many cases with the participation of agents from other units, as occurred in Minas Gerais, to obtain a similar result. It is important to notice that in some units of the Federation, these actions were carried

out jointly with other control units, as was the case in Bahia, where the inspections of the main dams were from then on accompanied also by agents of the state environment agency – INEMA.

In these actions, the agents were instructed to verify the implementation of the Safety Plans of each dam, such as the documentation situation, available technical staff, regular inspections and special ones when applicable, declaration of stability, examination of the declared register in the Annual Mining Report and its classification, and finally the in loco condition of its structural safety.

The results of that endeavor during the year of 2016 were 472 inspections

of 329 structures in the entire country, some of which were even closed due to the identified condition. Some of the inspections also happened more than once in the same place to verify the application of the previously requested corrective and preventive measures.

In 2017, there were made 307 inspections in 187 different structures, prioritizing the return to the dams considered important, according to a ranking created internally with the data collected from the 2016 campaign; the examination of some units declared as not being part of the PNSB; and finally intelligence actions with image and sorting systems in the enterprises where unregistered dams could be identified (Figure 1).

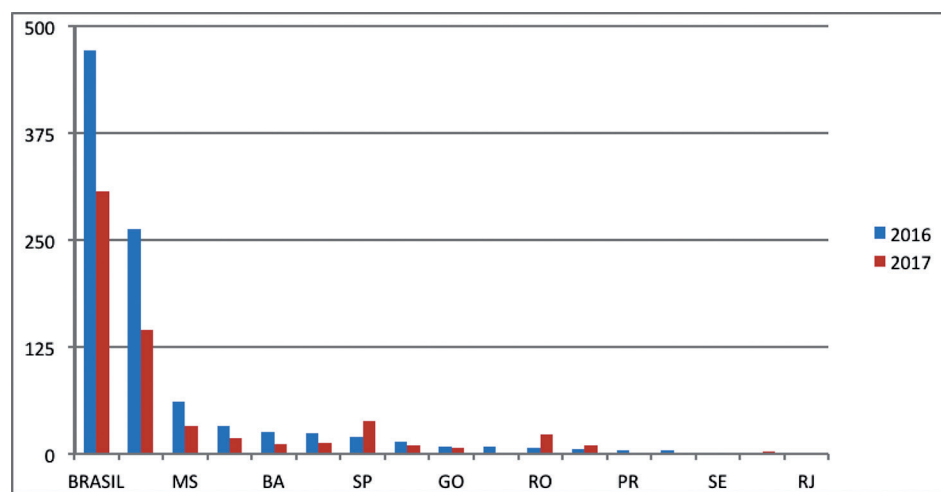


Figure 1
Inspections in Brazilian waste dams 2016 – 2017.

Communication with the civil society

From an institutional point of view, from 2011 until now, DNPM has participated as an integral member of SGTSIC (Technical Sub-group of Security of Critical Infrastructures of Dams) of the Presidency of the Republic. The aforementioned sub-group is inserted in the Chamber of External Relations and National Defense, of the Government Council, being articulated by the Office of Institutional Security of the Presidency of the Republic. The objectives of this study are the surveying of dams that are critical in the country, the identification of their vulnerabilities, the assessment of risks that may compromise the continuity of the services provided, and the proposition of protection and safety measures in the public and private sectors.

With an essentially preventive content, the task is to find early solutions to situations that can happen in dams aiding in managerial decision-making, complemented by the adoption of opportune measures and corrective actions.

The critical infrastructures considered are the installations, services, goods and systems, whose interruption or destruction, in whole or in part, will have serious impacts on the social, environmental, economic, political and international aspects or on the safety of the State and society, needing special protection measures. Also participating in this forum are ANEEL, ANA, CODEVASF, DNOCS, IBAMA, MI, Civil Defense and IME.

In order to objectively mention some actions, in 2014, DNPM, headed by the Supervisory Board, organized jointly with the IBRAM and with the SINDIEXTRA, the Seminar on Safety of Mining Dams which took place at the Federation of Industries of the State of Minas Gerais (FIEMG). The target audience was the Technical Managers of the mining dams and the legal representatives of the respective companies. The Federal Legislation that governs the theme (Law n° 12.334/2010 (Brasil, 2010)), the CNRH resolutions (n° 143 and 144/2012 (Brasil,

2012)) as well as DNPM Ordinances n° 416/2012 (Brasil, 2012) and 526/2013 (Brasil, 2013) were presented to this specialised audience. Similarly, in the following year, the same seminar was held in Santa Catarina, in the city of Criciúma, with the same focus and target audience.

As to what concerns the organized civil society, from the moment the Brazilian population realized the importance of the issue in guaranteeing the safety conditions of mining operations, of its employees and of the environment around and beyond it, many demands arrived at the Department requesting various clarifications, such as the safety situation of existing dams in each state, report filing services, concepts of Critical Risk, Potential Damage and Structure Classification, lifespan of structures, possibility of using new technologies and alternative practices for the deposition of mining waste, among others.

Through its Ombudsman Office (*Ouvidoria*) in the Department Head-

quarters in Brasília, most requests have been received and sent to the Superintendencies for answers, some of them through mail and official letters and in other cases in person, with the participation of

DNPM’s representatives in public hearings that have been happening in institutions such as Public Ministries, Engineering Councils, Universities and Schools, Environmental Agencies, Legislative As-

semblies, among others, which ended up depending on DNPM to present all the work that is being done and the difficulties met to make the necessary supervision management of these structures.

3. Results and discussions

One of the ways to measure the impact of the actions headed by DNPM since 2010 with the promulgation of Law N° 12.334 (Brasil, 2010) until now, is to analyze the official data available on the registered structures and its characteristics, through the information declared by the register holders and the updates made after the inspections.

This way, from the first diagnosis of the dams managed by DNPM until the recent data from April 2018, it is possible to verify a significant raise in the number of dams registered. In 2010 there were 243 dams compared to the current number of 789, representing an increase of 546 structures, or 225%. Using as base year the year in which the DNPM Ordinance n°

416/2012 (Brasil, 2012) came into effect, and already with two years since Law n° 12.334/2010 (Brasil, 2010) became effective, it is possible to verify an increase of 33% in the registrations from 2012 to 2018 (from 594 to 789 registered dams), which points out that the increase was significant but not as dramatic as the one that occurred from 2010 to 2012 (Figure 2).

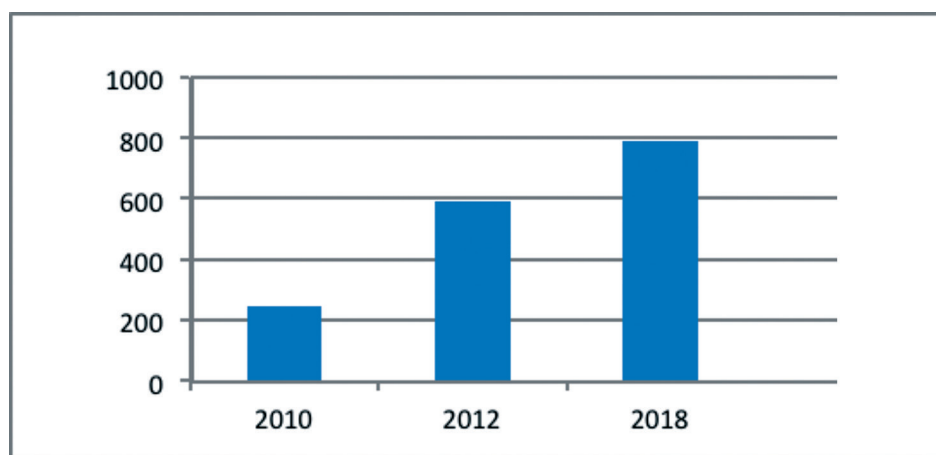


Figure 2

Total of registered Brazilians waste dams.

The mining dams inserted in the PNSB in 2010 could not be compared with the ones from 2012 and 2018 because the registration in the Department back then did not have the necessary information to know if the structure was or not in accordance to the current policy. The variation between the data from 2012 to 2018 is of 57 structures, which represents an increase of 16%.

Similarly, for comparison among the items of Critical Risk, it was only possible to execute them with the data base from

2012 and 2018. The analysis with the information from 2010 was not possible because the CNRH Resolution n° 143/2012 (Brasil, 2012), which defined the criteria and items for dam classification, was only published in September 2012. However the data bases from 2012 and 2018 were analyzed, and it has been verified that from the 362 mining dams inserted in the PNSB in the 2012 registration, 36 were of high Critical Risk, representing 9.94% of the total, and from the 419 existing dams in 2018, only 7 had high Critical Risk, or

1.67% of the total, meaning that there was a representative absolute reduction of 8.27%. For low Critical Risk, there was an increase of 4.6% (85.4% to 90%), while for medium Critical Risk there was a fluctuation of 3.65% (4.7% to 8.35 %). Such data show that there was a migration from high Critical Risk to medium and low, according to what the previous numbers demonstrate, which proves the efficacy of the implemented actions and mainly of the supervisory actions executed in the whole country (Figure 3).

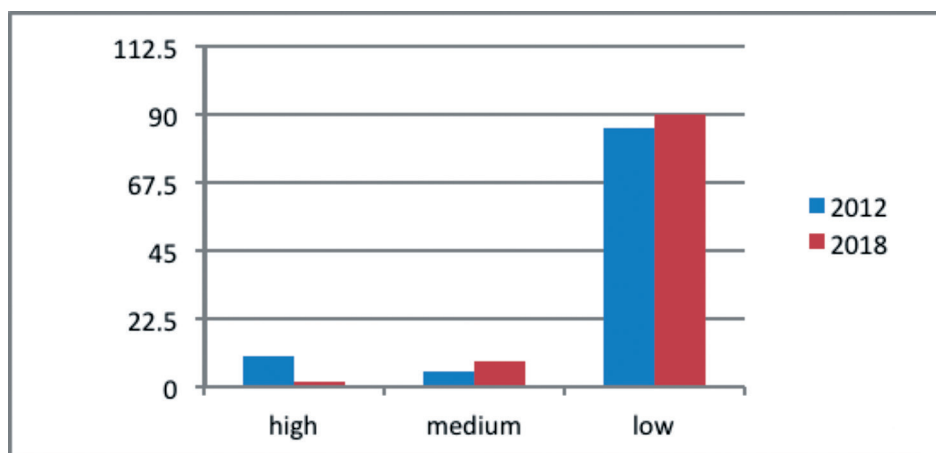


Figure 3

Percentual of waste dams critical risk.

4. Conclusion

It is apparent from the data analyzed and results presented that, notoriously, the promulgation of Law n° 12.334/2010 (Brasil, 2010), the publication of the CNRH Resolutions and the DNPM regulatory Ordinances, associated with the actions made possible by them in the Department, provided a qualitative and quantitative increase in the supervision and mining dam safety management, as well as permitted the Department a higher visibility of its importance to society.

Two years after the promulgation of the law, the registrations in the DNPM increased 145%, and after the DNPM Ordinances came into effect, there was a 33% raise in that amount. The number of structures registered in DNPM grew

enormously, showing that there were many dams that were not being managed by the Department.

However, the most important item that was achieved with the actions was the percentual decrease of the Critical Risk of the mining dams, with a 8.27% reduction in the mining dams classified as high Critical Risk, which in a general sense have migrated to medium and low risk degrees; it is hoped that with permanent agent training, intensification of the inspection programs and with an improvement in the available systems (mainly after the implementation of SIGBM), these results become increasingly more significant.

The regulation of an issue of such magnitude and importance, both for the

entrepreneurs as for the supervisory agencies, and specially for civil society, was essential in this process. The legal devices coming into effect brought to the surface the need for parameters and monitoring of the safety management of dams. With this standardization of procedures, the safety of dams was increased and it is a tendency that continues to increase, in a way that ensures harmony between the entities involved in a sustainable environment. In the end, it is the Brazilian society that benefits the most because by doing all of this, the continuity of the industrial activity is guaranteed with generation of well-being, jobs and income, at the same time that the risk to human life and the eventual environmental impacts are minimized.

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