

INSURANCE AS A MANAGEMENT TOOL FOR CONTAMINATED SITES: CUBAN AND BRAZILIAN EXPERIENCES

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ABSTRACT

In this article we aimed at verifying which types of insurance are permitted for environmental management and whether they are effective instruments for the management of contaminated sites. This is a relevant and current issue as the number of contaminated sites in Brazil grows. In the state of São Paulo alone, more than 6,000 sites with environmental liabilities were identified between 2002 and 2019. To achieve this goal we conducted an exploratory research to identify what exists in foreign and in Brazilian legislations and doctrines, especially that from Cuba regarding the environmental insurance theme. The choice of the Cuban experience is justified as it allows a relevant counterpoint to the Brazilian experience: there is a small Cuban insurance market, under state control;

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and a promising insurance market in Brazil, based on the capitalist economic system. Relevant points of the research are: the procedures for the identification and management of a contaminated site; the aspects for the identification and valuation of risks and damages; and the difference between environmental insurance and guarantee insurance. We highlight as contributions of this study the challenge for identification of several scenarios of environmental risks as well as the care to be taken by the insurer and the insured in the execution of the insurance contract.

Keywords: contaminated sites; damage; insurance; risk; valuation.

*SEGURO COMO INSTRUMENTO DE GESTÃO DE ÁREAS
CONTAMINADAS: EXPERIÊNCIAS CUBANA E BRASILEIRA*

RESUMO

O objetivo deste artigo é verificar as modalidades de seguro previstas para a gestão ambiental e investigar se tais modalidades são instrumentos eficazes para o gerenciamento de áreas contaminadas. A temática se torna relevante e atual à medida que cresce o número de áreas contaminadas no Brasil, sendo que, somente no Estado de São Paulo, foram identificadas mais de 6.000 áreas com passivo ambiental entre os anos de 2002 e 2019. Para tanto, o trabalho foi realizado a partir de uma pesquisa exploratória com o intuito de identificar o que existe nas legislações e doutrinas brasileira e estrangeira, especialmente a cubana, referente ao tema de seguro ambiental. A escolha da experiência cubana se justifica por permitir um contraponto relevante com a experiência brasileira: tem-se um tímido mercado securitário cubano, sob controle estatal; e um promissor mercado de seguros no Brasil, lastreado no sistema econômico capitalista. Destacam-se como pontos relevantes da pesquisa: os procedimentos para identificação e gestão de uma área contaminada; os aspectos para a identificação e valoração dos riscos e danos; e a diferença entre o seguro ambiental e o seguro garantia. Como contribuição deste estudo apontam-se os desafios para a identificação de diversos cenários de riscos ambientais, e os cuidados na celebração do contrato de seguros por parte da seguradora e do contratante.

Palavras-chave: áreas contaminadas; dano; risco; seguro; valoração.

INTRODUCTION

The human being, throughout evolution, has been amplifying the risks to which he is submitted, both voluntarily and involuntarily. However, the sharing of common risks provides greater security when an unwanted event occurs. Accordingly, we can understand why the insurance market is of extreme relevance as a risk management instrument used for a long time, and emerged as a protection and prevention strategy. There are records of the use of this practice since 23 B.C., during the crossing of cameleers in the Babylonian desert.

Data from the National Confederation of General Insurance, Private Pensions and Life, Supplementary Health and Capitalization (CNSeg), indicate that despite the economic situation, in 2019, from January to September, the insurance market grew 12.3% reaching R\$ 21.805 billion Brazilian reais. Also, in the document prepared by CNseg, “Proposals of the Brazilian Insurance Sector,” for the period 2019 and 2022, there is a record that there will be growth in the segment of products for engineering risks, transportation, major risks and civil liability. In the last five years the sector increased 92.3%, with the collection of R\$ 9.9 billion Brazilian reais in 2017 alone (CNSEG, 2019). Of the several types of insurance on the market the so-called environmental insurance is already a reality in several countries. However, the insurance offered for this segment in Brazil is usually General Civil Liability.

In this work we aim at verifying the insurance modalities foreseen for the environmental management and investigate if the environmental insurance is effective in the management of impacts to the environment, especially in the management of contaminated sites, considering that the São Paulo state Law No. 13,577/2009 brings a prevision for this instrument (SÃO PAULO, 2009).

Thus, we propose an exploratory research to identify what exists in Brazilian and foreign legislations and doctrines, especially the Cuban one, related to the subject of environmental insurance. We believe the comparative study of Cuban and Brazilian legal and regulatory perspectives permit revealing the relevant counterpoints between the timid Cuban insurance market, under state control, inserted in the socialist political-economic system and the promising Brazilian insurance market, which finds favorable conditions in the capitalist economic system, rewarding free initiative and free competition.

The article intends to contribute to reflections and discussions on relevant points of legal and technical nature, among which: procedures developed for the identification and management of contaminated sites; aspects to be considered for the identification and valuation of risks and damages; and the difference between environmental insurance and guarantee insurance. At the end, we offer challenges for the identification of several scenarios of environmental risks and the consequent care in the celebration of the insurance contract. From the methodological point of view, the research was developed with the aid of exegetical, analytical, bibliographic and documentary methods.

1 PROTECTION OF THE ENVIRONMENT, THE PRINCIPLES OF THE POLLUTER-PAYER, IN INTEGRUM REPARATION AND THE LOGIC OF ENVIRONMENTAL INSURANCE

The initial concern, when approaching environmental insurance, which is a relevant economic tool, and was more recently inserted among the instruments of the National Environmental Policy, according to Article. 9, item XIII, of Law No. 6,938/1981 (BRASIL, 1981), is that it is not only seen as the promotion of an attractive and promising insurance market that advances as environmental protection gains importance and evidence. Indeed, as Brandalise and Silveira Leite (2019, p. 109) point out, “the environmental insurance market consists of moral conditions of appeal to environmental protection.” Such protection, “by becoming a social value, allows financial coverage on environmental injury and practices of prevention and remediation of damage to be products that can be sold in the market” (BRANDALISE; LEITE, 2019, p. 109). And they recognize that the advance of this market is linked to the following factors: the “evolution of environmental legal liability,” a “resacralization of nature by society and the market” and a movement of the State, “allowing the social liability of risk and environmental damage to be transferred to the insurance market” (BRANDALISE; LEITE, 2019, p. 109).

Precisely because it allows the transfer of this responsibility, there is a concern about the risks of disfigurement and loss of effectiveness and educational function of the principles of the polluter-payer and the repair *in integrum* of environmental damage by the polluter. Law No. 6,938/1981 establishes, as one of the objectives of the National Environmental Policy, the imposition on the polluter and the predator of the obligation to recover

and/or compensate for the damage caused (Article 4, VII), and the Rio Declaration (1992) lists among its principles: National authorities should strive to promote the internalization of the costs of environmental protection and the use of economic instruments, taking into account the concept that in principle the polluter should assume the cost of pollution, in view of the public interest, without distorting international trade and investment (Princípio, 16).

In Brazil, the evolution of the polluter's responsibility for the repair of environmental damage is in the sense of increasing scope, seeking to ensure the effectiveness of the fundamental right to the environment ecologically inscribed in the caput of Article 225 of the 1988 Constitution. According to the principle of *in integrum* reparation of environmental damage, the polluter must be held civilly liable for the full reparation of the property and moral damage (off-balance sheet) caused not only to the environment (diffuse environmental damage) but also to third parties (collective and individual environmental damage), pursuant to Article 14, § 1, *in fine* of Law No. 6,938 (BRASIL, 1981) and Article 1 of Law No. 7,347 (BRASIL, 1985). Regarding diffuse environmental damage, the Superior Court of Justice's case law consolidates the extent of the responsibility for the full compensation of such diffuse damage, as can be seen from the excerpt from the following menu (Resp No. 1.180.078/MG):

[...]

4. Environmental reparation should be performed as completely as possible, so that condemnation to restore the damaged site does not exclude the duty to compensate, especially for the damage that remains between its occurrence and full restoration of the affected environment (= interim or intermediate damage), as well as for collective moral damage and residual damage (= environmental degradation that persists despite all restoration efforts).

[...] (BRASIL, 2010b)

As we will see, the provision of limited coverage, due to several factors, makes it difficult for environmental insurance to be considered a skillful instrument to ensure the effectiveness of the composition of damages that affect diffuse rights, as advocated by Polido (2016). The increase of environmental protection by all is pressing. The data from the reports published on the limits of the planetary boundaries and the resilience of natural ecosystems are alarming (WWF, 2020; LOVEJOY; NOBRE, 2018).

2 ENVIRONMENTAL INSURANCE IN THE LIGHT OF FOREIGN LEGISLATION: THE CUBAN EXPERIENCE

In foreign doctrine and legislation there is no unanimous criterion around the concept of insurance contract. Surely this type of contract has a heterogeneous content, given the various classifications, so that it is impossible to reduce such an institute to a concept valid for all types of insurance. In Cuban legislation and doctrine the insurance contract has traditionally been conceptualized as a legal relationship for which one of the parties is made answerable, through a certain price, for the fortuitous damage that may occur in certain goods that belong to other people (SERRANO, 2015). However, a rational definition would conceive the insurance contract as that by virtue of which one of the parties (the insurer) undertakes, against a retribution or payment (premium) it receives from another person (insured), to pay a certain amount of money, in the event of a risk, represented by the death or injury of a person, or damage to things, or the occurrence of an uncertain fact.

Following the same line, Article 448 of the Cuban Civil Code prescribes that

By the insurance contract the insurance broker is obliged to pay an indemnity or to perform some other benefit up to the total of the sum or insured value, when some of the events foreseen in the contract occur; and the insured party is obliged to pay a premium calculated in accordance with the established tariffs⁴ (Our translation).

The historical view of insurance in Cuba over the last five decades has considered the insurer as a specialized institution authorized to offer its contracts, in view of the insurance fund and the possible events that can cause damage to the insured (fires, accidents, robberies, civil liability, among others), which generate the destruction or deterioration of property or interests financially contemplated, according to the insurance conditions.

In 1959, with the triumph of the Cuban Revolution, there were 52 institutions in the country in the field of social security, such as the so-called “savings banks,” “funds,” “retirement funds” or “insurance,” classified by the National Economic Council as: “state retirement and pensions,”

4 Código Civil de la República de Cuba, Ley 59, de 16 de julio de 1987, vigente desde el 12 de abril de 1988, MINJUS. 1988. [Por el contrato de seguro la entidad aseguradora se obliga a pagar una indemnización o a efectuar alguna otra prestación hasta el total de la suma o valor asegurado, al ocurrir algunos de los acontecimientos previstos en el mismo; y el asegurado a pagar una prima calculada de conformidad con las tarifas establecidas].

“professional insurance” and “worker insurance.” But with the changes in the country’s political and economic life since the 1960s, social security has gained a new meaning as a result of the nationalization of industries, the elimination of private property, and free enterprise and competition. In the same year, the “Social Security Bank of Cuba” was created as the only autonomous body in charge of government and social security execution, to which the 20 retirement funds of the sector were incorporated. From that moment on, the functions of its boards of directors were terminated and the assets of these institutions were transferred to BANSDESCU. The objective was to guarantee the unity of the administration and then extend the regime to workers without protection.

Law 851 of 1960 decreed the nationalization of almost 50 US insurance companies based in Cuba, declaring them to be awarded to the Cuban state and the Social Security Bank of Cuba was designated for their administration. In the same year, the Insurance Control Office was created to manage all the business developed by the insurance entities (ANTÚNEZ SÁNCHEZ, 2014).

Certainly, in Cuba, the only bodies authorized to offer the services are: the National Insurance Company (ESEN) and the Cuban International Insurance Company (ESICUBA), which, on behalf of the Cuban State, attend to everything related to insurance and their respective tasks. However, due to its complexity and importance, the insurance contract requires the issuance of the policy and the written form, according to Article 450 of the Cuban Civil Code. The insurance policy must contain the names of the parties, the insured interest, the insured value, the risks or events, the premium with an expression of the date and place of payment, the start and end dates of the contract and other stipulations.

ESICUBA, since its creation, has offered coverage for all risks related to the country’s foreign economy, aviation, merchant and fishing vessels, foreign trade cargo, Cuban properties abroad (embassies, consulates, etc.) and others of a similar nature. However, as the state became the owner of the means of production, it took on ever greater risks at its expense (on account of the state budget), without the intervention of the financial insurance mechanism; and only those goods that were linked to non-Cuban third parties continued to need insurance protection.

It was during the 1980s that foreign interests began to resurface and ESICUBA’s reinsurance activity reached a certain level in the international market. In order to speed up its international operations, adopting a

more commercial work style and clearly dissociating its obligations from those of the state, ESICUBA was transformed into a commercial company with the corporate name Seguros Internacionais de Cuba, S.A. from 1987 onwards. It maintained the initials ESICUBA as a commercial name (ANTÚNEZ SÁNCHEZ, 2014).

After the fall of the socialist government, and especially of the former USSR, a new period of social and economic crisis began on the island. Cuba, now without a secure market, was practically forced to develop the tourism sector, long forgotten. The so-called special period meant, and still means, the period socially marked by the denial of guarantees, especially of food, aggravated, above all, by the economic embargo imposed for several decades by the United States.

Thus, the 1990s were marked by a lack of investment, which was the reason why the development of the activity on one's own began: a set of economic activities, specifically services and the sale of handmade products, food and family activities. In this sense, from 1996 onwards, and in a period marked by the following seven years, the company "Seguro do Turismo, La Isla S.A." operated and was dedicated to general insurance and associated with the tourism sector. This company was liquidated in 2003 and ESICUBA took over the pending obligations. Likewise, the company "Reaseguradora de la Habana, S.A.," which was in charge of placing the risks covered by Cuban insurance companies on the foreign market operated for some years, and eventually ESICUBA also took on the task of continuing it. The Cuban-English mixed capital company "Heat Lambet de Cuba, S.A." operated for several years as an insurance broker. In 1996 "Asistencia al Turista S.A." was created, which also operates as an assistance company (ANTÚNEZ SÁNCHEZ, 2014). Foreign companies began operating in the country, especially in the tourism and mining sectors. As a result, the state began to issue regulations aimed at protecting natural resources, including the Agrarian Reform Law, the Environment Law, the Mining Law and the Forestry Law.

In this process of institutionalization, environmental protection gained an important space, mainly in the constitutional and environmental plan. Thus it evidenced the execution of actions to protect nature in the face of environmental protection and recognition of the close relationship between sustainable economic and social development. There is a discourse on new economic model erected with the approval of the Guidelines in the 6th Congress of the Communist Party of Cuba; a new environmental law

must be rethought within Cuban domestic law. Certainly there is a legislative debt related to environmental insurance as Cuban legislation does not explicitly establish it. However, the possibility of its institution was left open by the indication of the “others” option. We could say that due to the heterogeneity and the many years of state management, the Cuban industrial sector does not meet the international standards related to the cleaner production market, causing aggression to the environment. Add to this the growing exploitation carried out by small and individual entrepreneurs who do not respect good practices with the environment (ANTÚNEZ SÁNCHEZ, 2014).

The environmental policy, within the Cuban legal system, is a little studied topic, which has motivated us to develop a brief historical analysis of the insurance activity in the country. The basis of this study was the constitutional norms, the commercial activity related to the insurance policy and the foreign investment policy, as well as the analysis of other legal norms that contextualize insurance policies in Cuban domestic law by the public administration.

3 ENVIRONMENTAL INSURANCE AS A MANAGEMENT TOOL IN BRAZILIAN LAW

We proceed to approach the environmental insurance as a management tool in Brazilian law, dealing first with the main insurance concepts of its basic principles; the evolution of this tool in Brazil and its modalities; and the relevant distinction between environmental insurance and guarantee insurance.

3.1 Insurance: concepts, principles, history and modalities

The insurance contract is an instrument that can be optional or mandatory, aimed at risk management by protecting and/or preventing one’s own or others’ assets. It is a bilateral and onerous contract, regulated by the Brazilian Civil Code, Law No. 10,406, in articles 757 to 802 (BRASIL, 2002).

According to the Civil Code, by this contract “the insurer undertakes, upon payment of the premium, to guarantee the legitimate interest of the insured, relative to the person or thing, against certain risks” (Article 757). By the logic exposed, the insured compensates the insurer for the payment of the premium and thus is entitled to the provision of guarantee of interest

in relation to the risks that were specified in the contract. The insurance represents a joint effort of many, at random, in favor of a few members of the group, “to overcome the individual consequences of future damage” (CALVERT, 2015). The essential element, built on a fundamental principle, is mutualism, defined as the “association between among of a group in which their contributions are used to propose and guarantee benefits to their participants” (INSTITUTO BRASILEIRO DE ATUÁRIA, 2014). Solidarity and good faith of the participants are the two other essential principles linked to mutualism. For solidarity to be effective, the total premiums to be paid by the insured must be sufficient for the payment of the total losses experienced individually. And it is through the estimation of the value of the premiums, using calculations of probabilities, or actuarial, that the principle of good faith appears.

The credibility of the insured party’s word, when declaring their personal conditions in contracting and/or adhesion, and of the insurer, when promising protection, is an essential pillar for the insurance activity, considering that the parties share the price of the protection to their assets, rents, life or health, in view of the unpredictability of the risk (INSTITUTO BRASILEIRO DE ATUÁRIA, 2014, Annex, p. 3).

Objective good faith is a fundamental principle to be observed in the conclusion and execution of contracts (Civil Code, Article 422) and imposes duties on the contracting parties (MIRAGEM; CARLINI, 2014). They must act in accordance with the parameters of honesty and loyalty, in search of balance in consumer relations, the content of Article 4, III of the Consumer Defense Code (RIZZATTO NUNES, 2007). In Brazil, the insurance contract emerged with the opening of ports to international trade in 1808 (19th century), which was aimed at protecting the maritime transport of goods. The activity was regulated by Portuguese legislation and only after the promulgation of the Brazilian Commercial Code, Law No. 556, of 1850, maritime insurance started to be studied and regulated in the country (NORBIM; NORBIM, 2014).

In the same century, from the appearance of new products offered in the insurance area, Decree No. 4270, of 1940, regulated the operation of insurance companies. By means of an annexed regulation, the aforementioned decree created the General Superintendence of Insurance with jurisdiction throughout the national territory, which was replaced in 1906 by an Inspectorate of Insurance (NORBIM; NORBIM, 2014).

The insurance contract has gained prominence in the Brazilian Civil Code, mainly due to the essential principles established. According to

Norbim and Norbim (2014), they guaranteed the development of the insurance institution in the country. In the wake of the nationalization of insurance by the Constitution granted in 1937, it was established the obligation to contract insurance for traders, owners of industries and utilities. In addition, the competence to legislate and supervise the insurance area was established as exclusive to the Union. According to the Regulation of Article 185, of Decree No. 5,901/1940 (BRASIL, 1940), the insurance covered disasters occurring by fire, lightning and the consequences caused by them.

In the same period, by Decree Law No. 1,186/1939 (BRASIL, 1939), the Institute of Reinsurance of Brazil (IRB) was created, with the purpose of obliging the insurers to reinsure the liabilities that were above their capacity. The measure aimed at avoiding the remittance abroad of reinsurance premiums that were celebrated with foreign companies. Reinsurance is a strategy used when the contract is high risk and the insurer shares the premium, and the risk, with another insurer, which, to do so, must have the competence to pay part of the claim if necessary.

It was only in 1966, with Decree-Law No. 73 (BRASIL, 1966), that Brazil began to have the National Insurance System (SNS). The decree was an important milestone, because in addition to creating the SNS, it regulated all insurance and reinsurance operations in the country, with the designation of control to the federal government. The government should then ensure the economic and financial hygiene of the insurer and, consequently, the protection of the insured, consumer of the safe product (NORBIM; NORBIM, 2014). In this regulatory regime of public law was created the National Council of Private Insurance (CNSP) with competence to set the guidelines for private insurance and the Superintendence of Private Insurance (SUSEP), which is the autarchy with competence to supervise the insurance activity, executing the policy outlined by CNSP, responsible for monitoring the activities of insurance companies (MIRAGEM; CARLINI, 2014).

Currently, the insurance market in Brazil offers different products and continues to grow, accumulating assets in the order of R\$ 1.2 trillion Brazilian reais. It represented, in 2017, 6.5% of the gross domestic product (GDP), with collection, in that year, of R\$ 428.9 billion Brazilian reais. Of this total, R\$ 9.9 billion Brazilian reais were collected in the segment of engineering, transportation, major risks and civil liability (CNSEG, 2019).

The precautionary principle has been pointed out as indispensable in

relation to the establishment of preventive measures to protect the environment and sustainable development. Therefore, it is necessary for the insurance market to develop valuation strategies for the environmental risks that can be identified.

3.2 Relevance of risk and scenario identification and Brazilian reality

Risk is the main element to be considered when concluding an insurance contract. The term risk, widely used since the 1990s, has been presented with different definitions, such as the following. It can be understood as the effect of uncertainty on the achievement of certain objectives (STATE OF VICTORIA, 2015). For ISO 31000 – Risk Management standard, risk is the effect of uncertainty on the objectives, that is, a deviation from what is expected (ABNT, 2009). In turn, NBR 16209 – Risk assessment to human health for management of contaminated sites – relates the risk to health and ecological risk, which relates to the possibility of adverse effects to organisms present in ecosystems (ABNT, 2013a). And CNSP (2013), in Resolution n. 283, defines legal risk as the possibility of losses resulting from fines, penalties or indemnities resulting from the actions of supervisory and control agencies, as well as losses resulting from unfavorable decisions in judicial or administrative proceedings (CNSP, 2013).

We understand that it is more appropriate to the purpose of this work, the definition of ABNT 16209 Standard, which establishes criteria for risk assessment and guides the identification of different exposure scenarios from a contaminated site and the established conceptual model. However, the definitions of risk lead to two other important elements for the conclusion of the insurance contract: the need to be a future event and the uncertainty of its occurrence.

There are situations in which the risk is known, therefore, it is easier for the insurance company to evaluate a possible coverage to be offered as well as the value of the premium. But, when the risk is unknown, some characteristics can be evaluated, such as the nature of the risk, the probability of occurrence, the population exposed, and the magnitude of its consequences, among others. Such characteristics make it possible to predict and, consequently, avoid a future event (POLIDO, 2015). In this context, many commercial or industrial activities are considered potential polluters, due to the very nature of the activity and, consequently, may present a risk of environmental impacts. Under these conditions, insurance contracts are

still little used and the insurance market tries to adapt, often based on large events. Thus, among the biggest doubts that have raised discussions, are the tools for calculating the risk and the viability of coverage.

The common insurances assume a statistical study based on observations, that is, they consider events already occurred with a mathematical modeling by actuarial science. For pure ecological damage, according to the Conceptual Model of the ecosystem(s) affected, the assessment should be conducted on a case-by-case basis, considering the possible impacts. Conceptual Model is a concept that has its definition established in the E 1689-95 standard (ASTM, 2014) and also in the Brazilian NBR 16210 Standard (ABNT 2013b), both specific for the management of contaminated sites. However, the concept can be used broadly, seeking to represent the physical environment and also the description of the species of flora and fauna present in a given ecosystem. There is not yet, in the set of Brazilian standards, a specific procedure for ecological risk assessment. When projecting the occurrence of environmental impacts and damages, it becomes necessary to point out all the environmental matrices that can suffer impacts or degradations, the sources of such impacts, the real and hypothetical risks associated in the Conceptual Model and the valuation of the environmental services of the whole affected site. The projection must consider proposals for intervention for the restoration, recovery or remediation of the affected site.

Environmental matrices such as soil, air, surface water, groundwater are the affected media and the sources concern the origin of the impact for such matrices. For example, a fuel storage tank, when leaking, brings the product into the soil matrix, causing contamination. In these conditions, the work of the insurer is great, since it needs to identify all the risks and, mainly, which of them would make the coverage of the policy impossible or limited. Therefore, a statistical evaluation would be essential for the identification and quantification of risks, since it allows one to know how and under what conditions an event can occur.

In environmental insurance and especially for contaminated sites, this practice is not known by the insurance companies that offer the product “safe for environmental risks.” Such assessment would be feasible if mutualism were identified, i.e., operations with risks in common in different companies that would make possible its sharing.

3.3 Liability Insurance and its inadequacy to cover environmental risks arising from sudden and gradual pollution

One type of insurance that has been offered to companies, as a possibility of coverage, for consequences of impacts to the environment, is the Civil Liability insurance. In this modality, coverages are established with values that can, in principle, be requested by the contractor him/herself, or by the insurance company, after a careful evaluation of the risk scenarios.

In Brazil, most companies, according to Polido (2019), take out a General Liability Insurance (RCG), which is a classic policy, from a sudden accidental pollution event. The RCG brings to the insured a false expectation of protection. Still according to the author, most policies of this type of insurance cover only tangible goods, without coverage for pure ecological damages; that is, the natural resources, which may be affected, are not taken into consideration.

The National Policy for Solid Waste, Law No. 12,305/2010, in Article 40, in the procedure for environmental licensing of enterprises that operate with hazardous waste, requires that Civil Liability insurance be taken out (BRASIL, 2010). There is no description of the type of coverage and therefore it can be assumed that Civil Liability insurance would be accepted, with coverage for accidents during transportation and payment of containment expenses, without necessarily offering coverage for environmental liabilities arising from the accident.

However, the insurance for environmental risks, denomination established by Polido (2005), would not fit into any of the existing definitions and, for this reason, the Civil Liability policy is not an adequate instrument for this. According to the author, Civil Liability policies were already offered for cases of sudden pollution (for example, a fuel leak due to the abrupt rupture of a fuel tank), which is characterized by having a clear initial date and by foreseeing the identification of the event/claim within 72 hours after its beginning since the 1960s.

Gradual pollution can either derive from a sudden pollution event or, for example, after the rupture of a chemical storage tank, with the compromise of the soil and consequently of the groundwater, or emerge slowly and almost imperceptibly, due to the lack of an adequate management system for the operation. A chemical storage tank, for example, may present small leaks over time that may contribute to the impact on environmental matrices such as soil and groundwater.

According to Polido (2005), if this type of pollution were preexisting, could also be guaranteed by insurance, as long as it had a retroactive date of coverage in the policy, but this condition can give rise to conflicts, since it is difficult to establish the effective date of contamination in many situations. The models for risk coverage, adopted in Brazil, according to the author, in the case of gradual pollution, follow the French and Italian models, whose coverage is limited, being almost certain the need for reinsurance in the face of high risk. For all the complexity it is understood that the contracting of insurance for the modality of gradual pollution presupposes the detailed verification of pre-existing conditions. Expertise in the area of interest and its surroundings would be necessary.

In certain situations the environmental liability precedes the current occupation, the identification of the impact may occur many years later. There is also the possibility of environmental commitment by practices previously adopted by the company, which are not always easily identified, requiring extensive research. For the request of this modality, it would be important and necessary that the company prove the inexistence of impact in the place from the activities it conducts.

4 ENVIRONMENTAL INSURANCE AND MANAGEMENT OF CONTAMINATED SITES IN THE STATE OF SÃO PAULO: CHALLENGES TO ITS PROPER IMPLEMENTATION

Environmental liabilities came to light in the mid-1970s. The identification of damage can occur many years after the deactivation of an industry or other activity with polluting potential, as has occurred in several countries on the American and European continents, where environmental liabilities were discovered many years after the land was reused. Contaminated sites, according to Sanchez (2001), pose a risk to human health, since substances present in the soil, groundwater, or even in vapors from them can, over time and through exposure, cause damage to human health. Even so, until 2001, there was still no inventory of contaminated sites in Brazil (SANCHEZ, 2001).

4.1 Regulatory standards

The State of São Paulo began, in the 1990s, to identify potential sites with activities that had the potential to cause contamination. As a

consequence, the Contaminated Sites Management Manual was published, the first Brazilian document to establish all steps for the identification and management of contaminated sites (CETESB, 1999). Following this, through the possibility of reusing sites on contaminated land, a Guide to Assess the Potential for Contamination in Real Estate was published (CETESB, 2003). As the number of confirmed cases of contamination increased each year, a procedure for the management of contaminated sites was established by a Board Decision, No. 103 (CETESB, 2007) of the São Paulo environmental agency. This document presented, in an annex, definitions and a flow chart, pointing out all the steps for the identification and management of contaminated sites (CETESB, 2007).

According to the proposed procedure, every potential activity is a “Potential Site” which, after the stage called “Preliminary Assessment” may or may not become a “Suspected Site.” The Preliminary Evaluation stage foresees the gathering of historical information about the occupation of the site and its surroundings, as well as the search for information related to the physical environment that are auxiliary in the projection of the contaminants’ behavior. From the Preliminary Evaluation, the Conceptual Model is elaborated, which constitutes a graphic representation, accompanied by a written report of the situation. If the site is suspect, the next stage, “Confirmatory Investigation,” which foresees the collection of soil samples, installation of monitoring wells and taking of underground water samples, is mandatory.

The results are compared with the reference values established by the environmental agency and, if the result of the chemical analysis indicates that the substance(s) of interest exceeds the intervention value, the site becomes a “Contaminated Site under Investigation” and the next stage of management, which constitutes a “Detailed Investigation,” must be initiated. It aims to identify how far the contamination present in the groundwater has advanced, and often extends far outside the area of the enterprise.

4.2 Liability risk assessment

After the detailing, with the proper delimitation of the plumes of contaminants, it is up to the “Human Health Risk Assessment” stage to verify the scenarios of real and hypothetical risks. Real are the existing scenarios such as, for example, the capture and ingestion of groundwater with quality alteration, in the radius of influence of the contamination; hypothetical

are possible scenarios, which may occur in the future, such as, for example, the inhalation of volatile chemical substances, present in the soil and/or groundwater, above the maximum acceptable concentrations in a closed environment that may be built in the place reached by the contamination.

In this evaluation stage it is essential to consider the receptor in the site, the concentration of the substances that were confirmed above the intervention value and the route of exposure. There are mathematical models used for this, which elaborated and made available by the environmental agency of São Paulo in a spreadsheet that contains toxicological information of different chemical substances, and that allows the calculation of risk in different exposure scenarios. If the risk is confirmed, the site is effectively described as “Site Contaminated with Confirmed Risk,” demanding that an Intervention Plan be proposed. Such plan must be elaborated by a technical responsible and has the objective to abate the contaminants until the maximum allowable concentration (CMA), that is, below the concentration for which there is no risk. The CMAs are different for each of the scenarios that are established for the Conceptual Model of the site. In addition, from this plan are chosen the intervention measures, which can be used alone or in combinations. The Intervention Plan should be forwarded to the environmental agency, a factor that does not prevent its implementation. Thus, based on these procedures and through the real need for soil quality protection, the State of São Paulo published, in 2009, Law No. 13.577 (SÃO PAULO, 2009).

In the same year, the National Council for the Environment (CONAMA) published Resolution No. 420, which established the need for Brazilian states to create their own reference values for their soils (BRASIL, 2009). In this scenario of changing soil quality, the possibility of damage to health and the need for interventions, insurance is now pointed out as a risk management tool.

4.3 Environmental insurance (environmental risk insurance for future and uncertain events) and the guarantee insurance (for contamination that requires remediation): distinctive aspects

There are situations in which the impact on the environment has already occurred, so it is not a question of future and uncertain risk, but the need for recovery or remediation of a site. Thus, the most adequate management instrument to fulfill such obligation is the insurance guarantee, according

to Poveda (2012). as the name suggests, the insurance in this condition aims at ensuring that the remediation of a contaminated site meets what was established as a goal, eliminating the risk that had been identified and quantified. Decree No. 59.263 (SÃO PAULO, 2013), which regulated Law No. 13,577 (SÃO PAULO, 2009) brings, in Article 41, the requirement to submit an Intervention Plan when the site is classified as a contaminated site with confirmed risk. Prior approval from the environmental agency will only be required for an Intervention Plan in two specific situations:

Article 43 – The implementation of the Intervention Plan will not require prior approval from CETESB, except in the following situations:

- I – in the sites classified as Critical Contaminated Sites (critical CA)
- II – in contaminated sites in Process of Reuse.

Therefore, if it is not a critical site that requires special management by the state, or a site in the process of being reused, in which its use is changed, it does not seem feasible for the insurer to wait for the approval of the Intervention Plan by the environmental agency before signing the insurance contract. It is understood that the insurance company itself should have its own team of experts, with knowledge in the subject, to verify the effective fulfillment of the “obligation to do,” i.e., the fulfillment of the goals and deadlines proposed in the remediation project. Considering the preventive aspect, it would be up to the hiring of environmental insurance, which would in fact be an insurance contract for future and uncertain pollution, as Poveda (2012) teaches.

In the management system for contaminated sites established by the State of São Paulo, State Decree No. 59.263 (SÃO PAULO, 2013) provides for the contracting of environmental insurance in Article 4, XXXII: “Environmental insurance: an insurance contract containing coverage to ensure the execution of an Intervention Plan approved in its entirety and within the established deadlines, in the amount of at least 125% of the estimated cost. At the same time that it provides for the contracting of environmental insurance, this decree, in its Article 45 establishes the need to present one of the guarantees provided for in Article 4 of Law No. 13,577 (SÃO PAULO, 2009): item IX – bank guarantees and item X – environmental insurance. It is then understood to be the product “insurance guarantee” that will offer the guarantee of the execution of the Intervention Plan.

Given the doctrine’s definitions, it is possible to infer that environmental insurance, or insurance for environmental risks, as Polido (2005)

has called it, is a preventive instrument and presupposes that all environmental aspects of the activity and the site have been considered on the possible risk scenarios. Based on the risk, the costs of repair, recovery or remediation can be valued more closely to reality and these can help in the calculation of the premium and the amount of indemnity in the event of a claim. The precautionary principle is applied to the species in the face of scientific uncertainties, and the possibility of more detailed coverage to be offered in the contract to be signed is real.

CONCLUSION

We conclude from this study that insurance is an old tool used for sharing risks provisioned in legal systems, governed by the principles of mutualism, solidarity and good faith. There is a great diversity of insurances offered in the market; however, we highlight the contrast between the two realities analyzed: the strength of the promising Brazilian insurance market and the incipient Cuban market, which operates under state control. In relation to environmental insurance we identified that there is a “legislative debt,” since there is no explicit provision in Cuban legislation, as is so in Brazil, in which it figures among the economic instruments provided for in the National Policy on the Environment, the National Policy on Solid Waste and is required by the legislation of the state of São Paulo, regarding contaminated sites, the central object of this research.

We also conclude that there is an evident contrast between the Cuban reality, very distant from the Brazilian one in relation to the subject we examined in this article, which is due to the known differences between the socialist socio-economic and juridical regime in Cuba and the capitalist economic system in Brazil. In the former, there is no private property, so that the insurance and productive system is absolutely state-controlled, unlike Brazil where free enterprise and free competition prevail (Article 170 of the Constitution). Therefore, companies in Cuba are either state owned or, in some cases present mixed ownership (companies constituted of state and foreign capital), so that responsibility and socio-environmental control fall to the state. As a consequence, citizens are unable to participate in private initiative, being left out of this type of insurance and, consequently, out of responsibility.

On the one hand, the strength of the Brazilian insurance market points to the need for new regulations in the face of globalization and market

integration processes. On the other hand, the nationalization of the Cuban economy denotes an inertia in the regulations in the face of environmental protection. In the Brazilian reality, environmental risk insurance is considered an important aid in the management of impacts that may cause environmental damage. However, such a sector may present variations that hinder the creation of a group of mutualists. Thus, activities such as gas stations in locations presenting different configurations and installations may require different assessments, especially when there is an intention of coverage for gradual pollution, a modality not easily identified and mapped.

When contracting environmental insurance, a product focused on the preventive aspect, the declaration of the insured part is not enough to elaborate the proposal, as the inspection of the insurance company is also essential for the identification of different environmental aspects and associated risks. This would bring real advantages for the company, since it could identify necessary improvements for the prevention of risks, i.e., through expertise, the insurers can verify the absence or presence of an environmental management system, the existing failures and the need for improvements helping the actuarial scientist in modeling the risks and indicating situations of very high risk for the insurer.

We should also consider that the insurer would bear an additional cost of hiring experts and, as the insurance proposal is not a guarantee of the conclusion of the contract, the survey would be a service provision independent of its validation, because it constitutes an audit whose costs are separated from the insurance's. In a scenario of total ignorance of the risks, it is common for premium values to be high or for coverage to be limited in policies.

Finally, the guarantee insurance has a clearly different objective from environmental insurance or environmental risk insurance. It aims to ensure that the necessary interventions to equate the liability are carried out. As we examined, in Brazil the environmental insurance is indicated in the state Law No. 13,577 (SÃO PAULO, 2009), which provides for soil quality and management of contaminated sites in the state of São Paulo. The environmental insurance, provided for in this law, together with the provisions of Decree No. 59,263 (SÃO PAULO, 2013), consists, of an insurance guarantee, as it aims to ensure the implementation of the intervention plan. In both modalities, environmental insurance or guarantee insurance, the insurers depend on the evaluation of experts. In the guarantee modality, specific knowledge in the management of contaminated sites is necessary to

verify the relevance of the project presented and monitor its performance.

Although the intervention plan is submitted to the environmental agency for approval, it is possible to start its implementation in order to later adapt it to the complementary requirements that may be formulated by the agency. Thus, the conclusion of the insurance contract depends on the technical assessment of the insurer, based on the information offered by the candidate to conclude the contract and subsequent confirmation of the situation in detailed surveys at the site to be insured. Due to the difficulty in valuing resources and environmental impacts, the insurance market tends to offer products with limited coverage that cannot necessarily meet all the costs associated with the effective equation of environmental liabilities.

It was not possible for us to locate, in this exploratory survey, the premises adopted by the insurance companies that support the calculation of claims in environmental insurance policies in Brazil. The companies that need or wish to contract the environmental insurance with the objective of prevention, in face of the possibility of payment of a high premium, without the certainty that the amount received is sufficient in case of a claim can seek alternatives that guarantee the repair of future impacts.

As a final remark, it is worth recalling the concern expressed, right from the beginning, with the advance of the insurance market in terms of environmental protection: the risks of disfigurement and loss of effectiveness and pedagogical function of the principles of the polluter-payer and the repair *in integrum* of environmental damage by the polluter. Such risks derive from the logic of the insurance system, due to the transfer of social responsibility for risk and environmental damage to the insurance market. To the extent that the supply of products occurs with limited coverage, insufficient to meet all the costs of full repair, the polluter must remain jointly responsible for the proper equation of environmental liabilities, if the case requires it.

The environmental insurance must induce the dissemination and consolidation of the culture of sustainability, valuing the incorporation of sustainable production and consumption patterns. Thus, it will contribute to the growing elimination of predatory economic exploitation models that are harmful to the environment and to healthy quality of life.

REFERENCES

ABNT – ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS. *NBR ISO 31000: Gestão de Riscos – Princípios e diretrizes*. Rio de Janeiro: ABNT, 2009.

ABNT – ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS. *NBR 16209: Avaliação de risco a saúde humana para fins de gerenciamento de áreas contaminadas*. Rio de Janeiro: ABNT, 2013a.

ABNT – ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS. *NBR 16210: Modelo conceitual no gerenciamento de áreas contaminadas – Procedimento*. Rio de Janeiro: ABNT, 2013b.

ANTÚNEZ SÁNCHEZ, A. F. La póliza ambiental y el desarrollo sostenible en Cuba. *GestioPolis*, 20 jun. 2014. Available from: <https://www.gestiopolis.com/la-poliza-ambiental-y-el-desarrollo-sostenible-en-cuba/>. Access on: Sept. 15, 2020.

ANTÚNEZ SÁNCHEZ, A. F.; LÓPEZ ESPINOSA, E.; VILTRES, C. B. La industria 4.0: dimensión ambiental en el entorno mercantil. *Direito & Paz*, Lorena, ano XIII, n. 42, p. 348-376, 2020.

ASTM – AMERICAN SOCIETY FOR TESTING AND MATERIALS. *ASTM E1689-95: standard guide for developing conceptual site models for contaminated sites*. West Conshohocken: ASTM, 2014.

BRANDALISE, A. P.; LEITE, E. S. A valorização do meio ambiente: da proteção aos seguros ambientais. *Política & Sociedade*, Florianópolis, v. 18, n. 43, p. 108-135, 2019.

BRASIL. *Decreto-lei n. 1.186, de 3 de abril de 1939*. Revogado pelo Decreto-Lei n. 9.735, de 1946, cria o Instituto de Resseguros do Brasil. Casal Civil, Brasília, Diário Oficial da União. Governo Federal. Available from: http://www.planalto.gov.br/ccivil_03/Decreto-Lei/1937-1946/Del1186.htm. Access on: Mar. 11, 2020.

BRASIL. *Lei n. 5.901 de 29 de junho de 1940*. Aprova o Regulamento para execução do artigo 185, do Decreto-lei n. 2063, de 7 de março de 1940. Brasília, Diário Oficial da União, Governo Federal. Available from: <https://www2.camara.leg.br/legin/fed/decret/1940-1949/decreto-5901-29-junho-1940-323381-publicacaooriginal-1-pe.html>. Access on: Apr. 14, 2020.

BRASIL. *Decreto-lei n. 73, de 21 de novembro de 1966*, que dispõe sobre o Sistema Nacional de Seguros Privados, regula as operações de seguros e resseguros e dá outras providências. Casal Civil, Brasília, Diário Oficial da União, 1966, Governo Federal. Available from: http://www.planalto.gov.br/ccivil_03/Decreto-Lei/Del0073.htm. Access on: Mar. 11, 2020.

BRASIL. *Lei n. 6.938, de 31 de agosto de 1981*. Dispõe sobre a Política Nacional do Meio Ambiente, seus fins e mecanismos de formulação e aplicação, e dá outras providências. Brasília. Diário Oficial da União, Governo Federal. Available from: http://www.planalto.gov.br/ccivil_03/Leis/L6938.htm. Available from: Sept. 24, 2020.

BRASIL. *Lei n. 7.347, de 24 de julho de 1985*. Disciplina a ação civil pública de responsabilidade por danos causados ao meio-ambiente, ao consumidor, a bens e direitos de valor artístico, estético, histórico, turístico e paisagístico (VETADO) e dá outras providências. Brasília. Diário Oficial da União, Governo Federal. Available from: http://www.planalto.gov.br/ccivil_03/leis/l7347compilada.htm. Access on: Sept. 24, 2020.

BRASIL. *Lei n. 8.078 de 11 de setembro de 1990*. Dispõe sobre a proteção do consumidor e dá outras providências. Brasília, Diário Oficial da União. Governo Federal. Available from: http://www.planalto.gov.br/ccivil_03/leis/l8078compilado.htm Access on: Sept. 30, 2020.

BRASIL. *Lei n. 8.884, de 11 de junho de 1994*. Transforma o Conselho Administrativo de Defesa Econômica (CADE) em Autarquia, dispõe sobre a prevenção e a repressão às infrações contra a ordem econômica e dá outras providências. Brasília. Diário Oficial da União, Governo Federal. Available from: http://www.planalto.gov.br/ccivil_03/leis/l8884.htm Access on: Sept. 24, 2020.

BRASIL. *Lei n. 10.406 de 10 de janeiro de 2002*. Instituiu o Código Civil. Brasília, Diário Oficial da União. Governo Federal. Available from: http://www.planalto.gov.br/ccivil_03/leis/2002/l10406.htm. Access on: Mar. 11, 2020.

BRASIL. Ministério do Meio Ambiente. Conselho Nacional do Meio Ambiente. *Resolução n. 420, de 28 de dezembro de 2009*. Dispõe sobre critérios e valores orientadores de qualidade do solo quanto à presença de substâncias químicas e estabelece diretrizes para o gerenciamento ambiental de áreas contaminadas por essas substâncias em decorrência de atividades

antrópicas. Brasília, Diário Oficial da União, Governo Federal. Available from: <https://cetesb.sp.gov.br/areas-contaminadas/wp-content/uploads/sites/17/2017/09/resolucao-conama-420-2009-gerenciamento-de-acs.pdf>. Access on: Apr. 8, 2020.

BRASIL. *Lei n. 12.305 de 2 de agosto de 2010*. Institui a Política Nacional de Resíduos Sólidos, altera a Lei n. 9605, de 12 de fevereiro de 1998, e dá outras providências. Brasília, Diário Oficial da União, Governo Federal. Available from: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12305.htm. Access on: Mar. 11, 2020.

BRASIL. STJ, *REspn. 1.180.078/MG*, julgado em 01/12/2010, relator Ministro Herman Benjamin, Segunda Turma, DJe de 28/02/2012. Available from: <https://www.jusbrasil.com.br/busca?q=REsp+n.+1.180.078%2FMG>. Access on: Apr. 30, 2020.

CALVERT, E. Contratos de seguro, mutualismo, solidariedade e boa-fé: análise de decisões judiciais. *Cadernos Jurídicos*, São Paulo, ano 16, n. 39, p. 171-189, jan./mar. 2015. Available from em: <http://www.tjsp.jus.br/download/EPM/Publicacoes/CadernosJuridicos/37de%2010.pdf?d=636688261614679211>. Access on: Apr. 30, 2020.

CAMACHO RODRÍGUEZ, T. El seguro en Cuba, antecedentes, desarrollo y perspectivas. *Revista Cubana de Derecho*, La Habana, año XVII, n. 33, p. 23-49, 2010.

CÁNOVAS GONZÁLES, D. Nuevas normas sobre responsabilidad civil por daños derivados del manejo de productos y desechos químicos. *Revista de Derecho Ambiental*, Buenos Aires, v. 2015, n. 42, abr./jun. 2015.

CETESB – COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO. *Manual de gerenciamento de áreas contaminadas*. São Paulo: CETESB, 1999.

CETESB – COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO. *Guia para avaliação do potencial de contaminação em imóveis*. São Paulo: CETESB, 2003.

CETESB – COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO. *Decisão de Diretoria n. 103/2007/C/E*. São Paulo: CETESB, 2007. Available from: <https://cetesb.sp.gov.br/areas-contaminadas/wp-content/uploads/sites/17/2015/07/DD-103-07-C-E-Procedimento-para-Gerencia>

mento-de-%C3%81reas-Contaminadas.pdf. Access on: Apr. 8, 2020.

CNSEG – CONFEDERAÇÃO NACIONAL DAS EMPRESAS DE SEGUROS GERAIS, PREVIDÊNCIA PRIVADA E VIDA, SAÚDE SUPLEMENTAR E CAPITALIZAÇÃO. *Conjuntura CNseg*, Rio de Janeiro, ano 2, n. 7, maio 2019. Available from: http://cnseg.org.br/data/files/10/83/32/F6/F66EA61069CEB5A63A8AA8A8/Conjuntura_CNSeg_07_completo.pdf. Access on: Apr. 8, 2020.

CNSEG – CONFEDERAÇÃO NACIONAL DAS EMPRESAS DE SEGUROS GERAIS, PREVIDÊNCIA PRIVADA E VIDA, SAÚDE SUPLEMENTAR E CAPITALIZAÇÃO. *Propostas do Setor Segurador Brasileiro 2019|2022*, p. 60. Available from: <http://cnseg.org.br/publicacoes/propostas-do-setor-segurador-brasileiro-2019-2022.html>. Access on: Apr. 8, 2020.

CNSP – CONSELHO NACIONAL DE SEGUROS PRIVADOS. *Resolução n. 283/2013*. Dispõe sobre os critérios de estabelecimento do capital de risco baseado no risco operacional das sociedades seguradoras, entidades abertas de previdência complementar, sociedades de capitalização e resseguradores locais. Publicado em 30 de janeiro de 2013. Available from: <http://www2.susep.gov.br/bibliotecaweb/docOriginal.aspx?tipo=1&codigo=30628>. Access on: Mar. 11, 2020.

COLECTIVO DE AUTORES. *El Seguro como categoría económica en el estado socialista*. La Habana: Editora Universitaria, 1998.

CUBA. *Ley n. 59, de 16 de julio de 1987*, Código Civil de la República de Cuba, vigente desde el 12 de abril de 1988, MINJUS, 1988.

CUBA. *Decreto-Ley n. 177*, Sobre el Ordenamiento del Seguro y sus Entidades, de 2 días de septiembre de 1997.

CUBA. *Decreto-Ley n. 263*, Contrato de Seguro. 2003.

DICCIONARIO DE SEGUROS. Madrid: Mapfre, 2002.

HERNANDEZ AGUILAR; O. ANDINO RUIBAL, A. R. Fundamentos jurídicos constitucionales de la gestión ambiental en Cuba: propuestas para su perfeccionamiento desde una perspectiva integral. *Observatorio Medio-ambiental*, v. 16, 2013.

IBA – INSTITUTO BRASILEIRO DE ATUÁRIA. *Resolução IBA n. 02/2014*. Dispõe sobre a criação do Pronunciamento Atuarial CPA 001 –

Princípios Atuariais. Available from: http://www.atuarios.org.br/docs_old/Arq635475931482992040.pdf. Access on: Oct. 26, 2020.

LOVEJOY, T.; NOBRE, C. Amazon tipping point. *Science Advances*, New York, v. 4, n. 2, 2018.

MIRAGEM, B.; CARLINI, A. (orgs.). *Direito dos seguros: fundamentos de Direito Civil, Direito Empresarial e Direito do Consumidor*. São Paulo: Revista dos Tribunais, 2014.

NORBIM, L. D.; NORBIM, F. D. *Manual prático de seguros no Direito brasileiro*. Rio de Janeiro: Freitas Bastos, 2014.

POLIDO, W. A. apólice de RCG é suficiente para a garantia dos riscos ambientais? *Revista APTS Notícias*, São Paulo, v. 31, n. 134, p. 11-14, 2019.

POLIDO, W. A. Contrato de seguro: a efetividade do seguro ambiental na composição de danos que afetam direitos difusos. *Revista TRF1*, Brasília, DF, v. 28, n. 11/12, p. 52-71, 2016.

POLIDO, W. A. *Programa de seguros de riscos ambientais no Brasil: estágio de desenvolvimento atual*. 3. ed. Rio de Janeiro: Escola Nacional de Seguros, 2015.

POLIDO, W. A. *Seguros para riscos ambientais*. São Paulo: Revista dos Tribunais, 2005.

POVEDA, E. P. R. *Seguro garantia como instrumento de gestão para a mitigação de danos ambientais na mineração*. Tese (Doutorado em Geociências) – Universidade Estadual de Campinas, Campinas, 2012.

REY SANTOS, O. *¿Qué derecho ambiental necesitamos?* Notas para una teoría del derecho ambiental. I Congreso política, Derecho y Justicia Ambiental. Convención Internacional sobre Desarrollo y Medio Ambiente. Cuba, 2013.

RIZZATTO NUNES, L. A. *Comentários ao Código de Defesa do Consumidor*. 6. ed. São Paulo: Saraiva, 2011.

SANCHEZ, L. E. *Desengenharia: o passivo ambiental na desativação de empreendimentos industriais*. São Paulo: Edusp, 2001.

SÃO PAULO (Estado). *Lei n. 13.577, de 8 de julho de 2009*. Dispõe sobre diretrizes e procedimentos para a proteção da qualidade do solo e gerenciamento de áreas contaminadas, e dá outras providências correlatas.

Assembleia Legislativa do Estado de São Paulo, São Paulo, 2009. Available from: <https://www.al.sp.gov.br/repositorio/legislacao/lei/2009/lei-13577-08.07.2009.html>. Access on: Mar. 11, 2020.

SÃO PAULO (Estado). *Decreto n. 59.263, de 5 de junho de 2013*. Regulamenta a Lei n. 13.577, de 8 de julho de 2009, que dispõe sobre diretrizes e procedimentos para a proteção da qualidade do solo e gerenciamento de áreas contaminadas, e dá providências correlatas. Assembleia Legislativa do Estado de São Paulo, São Paulo, 2013. Available from: <https://www.al.sp.gov.br/repositorio/legislacao/decreto/2013/decreto-59263-05.06.2013.html>. Access on: Mar. 11, 2020.

SERRANO, P. J. *Direito dos contratos: doutrina geral*. Rio de Janeiro: Jurismestre, 2015.

STATE OF VICTORIA. *Victorian government risk management framework practice guide*, 2015, p. 51. Available from: https://www.vmia.vic.gov.au/~/_/media/internet/content-documents/risk/risk-tools/risk-management-guide/vmia-practice-guide-may-2015.pdf. Access on: Mar. 11, 2020.

WWF. *Living Planet Report 2020 – Bending the curve of biodiversity loss*. Switzerland, 2020.

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