

French Compensation System for Victims of Nuclear Tests: The Battle over the Presumption of Causality¹

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1. Introduction

The issue of victims of nuclear tests in France came to light relatively late, in the 2000s, and disputes over the system for certifying victims are still ongoing. In particular, the “presumption of causality” has been a major point of contention. This article will examine the evolution of the compensation system for victims of French nuclear tests, focusing on the controversy over this principle.

2. French Nuclear Tests

France conducted a total of 210 nuclear tests in the Algerian Sahara Desert and French Polynesia during the 36 years from 13 February 1960 to 27 January 1996 (Table 1). The total nuclear yield is estimated at some 14.4 Mt (megaton in TNT equivalent, equivalent to about 960 Hiroshima-type atomic bombs).

The French Ministry of Defense (now the French Ministry of the Armed Forces) states that throughout the period of French nuclear tests, a total of 147,500 military personnel and civilians (personnel of the Atomic Energy Commission (*Commissariat à l'énergie atomique* (CEA)) and private sector employees) were dispatched from metropolitan France to the nuclear test sites (Table 2).

¹ This is a revised and enlarged version of the original Japanese article, Mashimo 2020 (translated by the author; proofread by Yuichi Yokoyama and Annelise Giseburt). This version is based on information as of July 2021.

Table 1. French Nuclear Tests

	Test Site	Atmospheric	Underground	<i>Subtotal</i>	<i>Total</i>
Algeria (Sahara)	Reggane	4 (1960-61)	-	4 (1960-61)	17 (1960-66)
	In Ekker	-	13 (1961-66)	13 (1961-66)	
<i>Subtotal</i>		4 (1960-61)	13 (1961-66)		
French Polynesia (South Pacific)	Moruroa	41 (1966-74)	137 (1976-95)	178 (1966-95)	193 (1966-96)
	Fangataufa	5 (1966-70)	10 (1975-96)	15 (1966-96)	
<i>Subtotal</i>		46 (1966-74)	147 (1975-96)		
<i>Total</i>		50 (1960-74)	160 (1961-96)		210 (1960-96)

Unit: Number of tests (Year)

Table 2: Number of people involved in the French nuclear test (source in [])

Category	Number (persons)	
	[Ministry of Defense]	[Bataille 2001]
Number of people involved in the French nuclear test		
Ministry of Defense personnel (military personnel + civilian + external company) assigned to Sahara	20,000	24,000
Ministry of Defense military personnel assigned	100,000	57,750
Ministry of Defense civilian personnel assigned to CEP	8,000	
External company staff assigned to CEP	12,000	
CEA staff assigned to Sahara / CEP	7,500	
Subtotal	147,500	81,750
Those who may have been exposed	70,000	
Local population who may have been exposed to radiation in Sahara	0	
Polynesian population who may have been exposed to radiation	2,000	
	600	
Number of other involved people		
Residents around Leggane [Ministry of Defense]	40,000	
Residents within 100km outside the Leggane [Ministry of	500	
Nomadic people [Ministry of Defense]	?	
Algerian workers [Ministry of Defense]	?	
Polynesian workers [victims association]	thousands ~	
	15,000	
All local workers and residents [Senate 2013]	80,000	
Subtotal	120,000	
Total	230,000	

This figure does not include Algerian and French Polynesian local populations and workers who were hired on a temporary basis to carry out civil engineering and miscellaneous tasks.

The French Ministry of Defense estimated that 40,500 people were settled in and around the city of Reggane, Algeria, which lies about 10 km from the four atmospheric tests conducted in 1960-61. There were also an unknown number of locally hired workers on site for the tests, as well as nomads and traders passing through the area around Reggane and In Ekker, the underground test site used in 1961–66. In 1967, an unknown number of Algerian military personnel took over the management of the abandoned test sites of Reggane and In Ekker after the withdrawal of French troops following the Evian Accords.

The Bataille Report, the first comprehensive parliamentary report on the health and environmental impacts of French nuclear tests published five years after the last test in 1996, stated that there were about 24,000 people on the sites of Reggane and In Ekker (Bataille and Revol 2001).

Bataille and Revol 2001 also stated that a total of 57,750 people were involved in nuclear tests of the Pacific Experimentation Center (*Centre d'expérimentation du Pacifique* (CEP)), the organization which carried out nuclear tests in Polynesia. It says, "In 1990, for example, there were 1,500 military personnel, 600 civilian personnel from metropolitan France (CEA and companies) and 1,000 civilian personnel recruited locally at all CEP sites" (Bataille and Revol 2001). In contrast, a representative of an association of Polynesian former nuclear test site workers cited the figures of "several thousands to 15,000" as a total number of locally hired workers for the tests, adding that the exact number could not be known.²

In 2013, a Senate report (Bouchoux and Lenoir 2013) stated that there were roughly 80,000 total local workers and residents near the test sites in the Sahara and French Polynesia throughout the French nuclear test period of 1960–1996, based on hearings by the authors of the report.

The French authorities thus estimates that some 230,000 people may have been affected by French nuclear tests. These people are generally grouped into three parties: metropolitan French, Algerians and French Polynesians.

3. Radiation Doses Published by French Authorities

The French Ministry of Defense estimated that 70,000 of the 147,500 personnel from metropolitan France, who were subject to dose control using film badges, were potentially exposed to ionizing radiation, and that no local residents in Algeria nor 2,000 local residents in French Polynesia were exposed (Table 2). Figures on radiation exposure from various official sources, which are limited and fragmentary, are summarized in Tables 3 and 4.

As is mentioned in the first section of this article, in 2001, the French National Assembly published a first unitary report (Bataille and Revol 2001) on the health and

² Statement of Roland Oldham, representative of *Moruroa e tatou* (French Polynesian ex-workers of French nuclear test) at *Commission d'enquête sur les conséquences des essais nucléaires* (Commission of Inquiry into the Consequences of Nuclear Tests). See *Commission d'enquête sur les conséquences des essais nucléaires 2005* and *Commission de Recherche et d'Information Indépendantes sur la Radioactivité 2006*.

environmental impact of the French nuclear tests based on data supplied by the Ministry of Defense.

Regarding atmospheric tests in Algeria, the report stated, “Of nearly 8,000 external dosimetry results, 97% are less than 5 mSv and the six highest values are between 50 and 100 mSv” (Bataille and Revol 2001). The doses received by the pilots of the airplanes in charge of taking samples in the radioactive cloud “did not exceed 100 mSv” (Bataille and Revol 2001). It also said, “Anthropogammametric measurements to control internal contamination were carried out after the ‘Gerboise’ tests [the four atmospheric tests near Reggane] on approximately 195 people (125 civilians and 70 nomads). They gave negative results (absence of contamination). Overall, the exposure of local populations attributable to French air tests was low and always lower than the ICRP [the International Commission on Radiological Protection] recommendations for civilian populations” (Bataille and Revol 2001).

The report also stated, “Four of the 13 underground tests were not fully contained or contained: Béryl, Améthyste, Ruby and Jade. The first two tests led to expulsion of radioactive lava from the underground test site tunnels. In the other two cases, the releases limited to gaseous or volatile radioelements did not cause significant exposure in terms of the health of personnel and populations” (Bataille and Revol 2001; see Table 3).

As for the external dose from the French nuclear tests in French Polynesia, the Bataille Report said, “Of the 52,750 people affected across all sites during atmospheric testing, 93.5% received zero dose; only 3,425 (6.5%) received measurable doses. Seven people received doses that exceeded the ‘annual worker standard’ of 50 mSv. Four of them were the pilots of airplanes which flew through the radioactive cloud following the tests, with doses of 180 mSv, 120 mSv, 60 mSv and 51 mSv, which places them in the category of concentrated exceptional exposure, the first being slightly above the limit” (Bataille and Revol 2001). “Most of the other category A [directly involved in the tests] personnel received doses below the ‘public’ standard (i.e., 5 mSv): only 55 people reached the value of 15 mSv. The least exposed group was made up of locally recruited Polynesians. Thus, for a population of 4,701, there were 4,461 who received zero doses (95%) and 240 (5%) who received doses between 0.20 and 5 mSv, none of whom reached this threshold” (Bataille and Revol 2001).

As for the underground tests in French Polynesia, the report estimated that “5,000 people were monitored for dosimetry: none reached the category A worker limit and there were only 16 cases that reached the dose of 5 to 25 mSv. [...] These were the personnel involved in the erection of buildings, post-drilling and decontamination of all the drilling equipment” (Bataille and Revol 2001).

Table 3: Official Evaluations of Radiation Exposure from French Nuclear Tests (source in [], p.=person(s))

Sahara	
Personel from Metropolitan France	
Atmospheric [Bataille 2001]	5 mSv> : 97% of nearly 8,000 records 50-100 mSv : 6 p.
Underground [Bataille 2001]	Béryl (May 1, 1962) 50 mSv< : 100 p. 200 mSv< : 15 p. 600 mSv : 9 p. 2.5 mSv> : maybe 240 p. Améthyste (March 20, 1963) = 10 mSv : 13 p. 1 mSv> : 280 p. Rubis (October 20, 1963) 0.2 mSv> : 500 p. = 0.01 mSv : (NA) Jade (May 30, 1965) 1 mSv> : (NA)
[DlCoD 2007]	600 mSv< : 9 p. 200 mSv< : 15 p. 50 mSv< : 100 p. 10 mSv< : 13 p. 1 mSv< : 280 p.
[Bouchoux 2013]	5 mSv< : 581 p. 50 mSv< : 102 p.
Local workers	(NA)
Local population	(NA)
Atmospheric [Bataille 2001]	No internal contamination detected : 195 p. (125 civils and 70 nomadics)
French Polynesia	
Personel from Metropolitan France	
Atmospheric [Bataille 2001]	3,425 (6.5%) measurable doses out of 52,750, among which 180 mSv : 1 p. 120 mSv : 1 p. 60 mSv : 1 p. 51 mSv : 1 p. 15 mSv< : 55 p.
[Bouchoux 2013]	0.2 mSv< : 12,000 p. 5 mSv< : 345 p.
Underground [Bataille]	5-25 mSv : 16 p.
Local workers	
Atmospheric [Bataille 2001]	0.20-5 mSv : 240 p. (5%) in 4,701
Local population	
Atmospheric [IAEA/DSND 2006]	(see Table 4)

Concerning the internal dose, the report said, during the atmospheric tests in Polynesia, “there were six cases of significant internal contamination, none of which resulted in the workers’ normative limit being exceeded” (Bataille and Revol 2001, 108). As for the underground tests, “only one case of significant internal contamination was noted: a doubling of the norm” (108).

In 2004, an anti-nuclear and pro-independence politician, Oscar Temaru, was elected President of French Polynesia. His Polynesian government conducted its own investigation on the health and environmental consequences of the French nuclear tests, which showed that the atmospheric tests had caused radioactive fallout on the inhabited archipelagos of French Polynesia, with Tahiti (some 1,200 kilometers north-west of the test sites, where 70% of the French Polynesian population lives) affected with radioactivity levels six to seven times higher than normal.

In 2006, the French Ministry of Defense published a report that claimed to be “a considerable work which has been carried out with great rigor in order to offer to its reader the most accurate vision possible of the radiological situation in Polynesia as it has been observed since the first test” (Ministry of Defense 2006, 6). Based on dose reconstruction studies carried out in 2005 and 2006, the report revealed for the first time that some of the 46 atmospheric tests in Polynesia had significant fallouts on inhabited islands and atolls (Table 4, upper figures in plain).

**Table 4. Differences in Effective Dose Estimations
Between CEA and the Authors of the TOXIC Study**

Nuclear Test	Location	Child		Adult	
		Min (mSv)	Max (mSv)	Min (mSv)	Max (mSv)
Aldébaran (1966)	Gambiers	3.2	9.4	3.1	6.6
		<i>4.4</i>	<i>24.6</i>	<i>3.4</i>	<i>17.3</i>
Rigel (1966)	Tureia	0.11	0.23	0.06	0.15
	Gambiers	<i>0.1</i>	<i>3.9</i>	<i>0.1</i>	<i>1.3</i>
Arcturus (1968)	Gambiers	0.4	0.71	0.13	0.23
		<i>0.4</i>	<i>8</i>	<i>0.1</i>	<i>2.2</i>
Encelade (1971)	Tureia	0.9	4	0.8	3.2
		<i>0.9</i>	<i>8.6</i>	<i>0.8</i>	<i>6.5</i>
Phoebe (1971)	Gambiers	1.5	3.5	1.3	1.9
		<i>1.8</i>	<i>11.5</i>	<i>1.5</i>	<i>8.4</i>
Centaure (1974)	Pirae, Tahiti	0.5	7.9	0.2	2.6
		<i>0.5</i>	<i>12.4</i>	<i>0.2</i>	<i>4.1</i>
Centaure (1974)	Pirae, Tahiti	1.2		0.5	
		<i>2.02</i>		<i>0.93</i>	
	Hitiaa, Tahiti	5.3		2.6	
		<i>5.98</i>		<i>3.28</i>	
Taravao, Teahupoo, Tahiti	4.5		3.6		
	<i>10.46</i>		<i>9.4</i>		

In plain: estimations of the CEA (2006) / In *italic*: reassessment of the authors of the TOXIC Study (2021)

Source : *The TOXIC Study* cited in Brotherson 2021

4. Victims' Demands for Acknowledgement and Compensation

The impact of French nuclear tests on health did not come to light for a long time, because the French government maintained that French nuclear tests had no health or environmental consequences, and because the test participants feared that they might be charged for divulging national security secrets if they spoke out. However, the 1986 Chernobyl nuclear power plant accident triggered a growing awareness of the health effects of ionizing radiation, the spread of domestic and international opposition to the resumption of French nuclear testing in 1995-96 and its subsequent end, as well as the publication of “Moruroa and us,” a report of a sociological inquiry conducted by a team made up of the Polynesian NGO Hiti Tau, the Evangelical Church of French Polynesia and led by Dutch sociologists (de Vries and Seur 1997), led test participants in France and French Polynesia to break their silence. In 2001, associations of French nuclear test victims were successively formed in France and French Polynesia. They began to speak out about the suffering brought by health damages and reveal their experiences and documents that contradicted the explanation given by the French authorities. Representatives of associations from Algeria, French Polynesia and metropolitan France met together for the first time at the 57th Congress against nuclear weapons held in Hiroshima and Nagasaki in August 2002.³

The victims sought compensation from the French Government—military veterans in the form of disabled veteran pension, and civilians in the form of occupational disease compensation benefits. Hundreds of lawsuits were filed, of which several judgements overturned the French authorities' rejections, acknowledging reverse burden of proof and presumption of causality.

At the same time, the victims' associations sought to enact legislation to institutionalize compensation for victims of French nuclear tests. They called for the establishment of a comprehensive compensation system consisting mainly of (1) the French government's acknowledgement of the existence of, and its responsibility for, the damage the French nuclear tests inflicted, (2) the presumption of causality: those who meet basic eligibility criteria (place, time, and type of disease) are automatically exempted from the burden of proof of a causal link between radiation exposure and the development of their illness (see below), and (3) establishment of a follow-up investigation committee.

In 2002, *Les Verts* (the French Green Party) and the Socialist Party proposed the first bill based on this principle, followed by almost all other opposition parties, with both left-leaning and conservative parties presenting their own (13 bills in total). A bill co-drafted

³ “Les essais nucléaires français en accusation à Hiroshima [French nuclear tests in accusation at Hiroshima],” *Le Monde*, August 16, 2002.

by a bipartisan parliamentary coalition was scheduled for debate in the National Assembly in 2008.

5. Law on Compensation for Victims of French Nuclear Tests (the Morin Law)

Under the growing pressure, the French government finally enacted the “Law No. 2010-2 of January 5, 2010 on the Recognition and Compensation of Victims of French Nuclear Tests” (commonly called the “Morin Law (*Loi Morin*)”) consisting of the following principles (at the time of enactment):

(1) In the title of the law, the words of “recognition of victims” were included, but no mention of the responsibility of the State was made.

(2) Full reparation for harm can be obtained by any person (military, civilian and residents of the surrounding area) suffering from radiation-induced diseases listed in decree (18 cancers) that resulted from exposure to ionizing radiation due to French nuclear testing, or by their rightful claimant (Article 1),

(3) if the person resided or stayed in the areas of test centers in Algeria or in the atolls of Mururoa and Fangataufa during the test period, or in the designated exposed areas of French Polynesia during the designated test period (Article 2).

(4) A compensation committee is headed by a judge of the Council of State (*Conseil d'État*) or a judge of the Court of Cassation (*Cour de cassation*) and composed of medical experts jointly appointed by the Minister of Defense and the Minister of Health (Article 4-I).

(5) This committee examines whether the conditions for compensation are met. If they are, the applicant benefits from a presumption of causality unless, in view of the nature of the illness and the conditions of their exposure, the risk attributable to the nuclear tests can be considered negligible (Article 4-II).

(6) The Minister of Defense decides whether or not to grant compensation based on the results of the review submitted by the compensation committee (Article 4-III).

(7) Compensation will be in the form of a lump-sum payment. However, duplication with other programs is not allowed (Article 5). Litigation over the same compensation will be withdrawn (Article 6).

(8) An advisory commission to monitor the consequences of nuclear testing (*Commission consultative de suivi des conséquences des essais nucléaires* (CCSCEN)) is established for monitoring the application of the law and is consulted on possible changes to the list of radiation-induced diseases (Article 7).

As a source of funds for compensation, “Reparation for the health consequences of French nuclear tests” was newly added as a subdivision of the “Acknowledgement and reparation for the former combatant (*ancien combattant*)” program budget⁴, with an annual budget of 10 million euros.

6. Dysfunction of the Morin Law and Its Revision in 2013

The Morin Law, however, turned out to be completely dysfunctional, with 11 certifications among 840 applications (rejection rate of 98.7%) over the three and a half years after its enforcement. The representatives of Association of Veterans of Nuclear Tests (*Association des Vétérans des Essais Nucléaires* (AVEN)) affirmed that “they only file files that fall strictly within the criteria set by the law, but that they also have more than 1200 other files that they refuse to file because they are certainly inadmissible” (National Assembly 2014, 23). A representative of the National Association of Veteran Victims Nuclear Test (*Association Nationale Vétérans Victimes Essais Nucléaires* (ANVVEN)) confirmed that “he discourages his members from feeding what he calls the ‘guillotine’ of CIVEN. Faced with the almost certain risk of rejection, he considers it unnecessary for victims or their widows to take long and painful steps” (23).

In view of the obvious dysfunction of the Morin Law, several amendments were made to the compensation system in 2012-2013:

(1) The list of diseases was expanded to include spinal dysplasia, non-Hodgkin’s lymphoma, and myeloma, bringing the total to 21 cancers, and breast cancer was made applicable also to men.

(2) All geographical restrictions were lifted to cover the whole of French Polynesia (Article 2), because declassified military documents revealed that there had been fallouts all over the Polynesian islands and atolls.

(3) The compensation committee was separated for the Ministry of Defense to become an independent administrative institution (*autorité administrative indépendante* (AAI)) entitled Compensation Committee for Victims of Nuclear Tests (*Comité d’indemnisation des victimes des essais nucléaires* (CIVEN)), with one of the eight member experts recommended by victims’ associations (Article 4-I and II).

⁴ In France, the former combatants (*anciens combattants*) are different from the veterans (*vétérans*) in that the former combatants’ contribution to the country is more highly acknowledged, and that they are entitled to larger military pension benefits. The Senators who presented the bill for the reform mentioned, “The veterans of nuclear testing did not fight, but they contributed to a security and deterrence tool that benefits the national community. They deserve the title of recognition of the Nation, in accordance with the title of the bill” (Senate 2009).

However, even after these amendments, the number of certifications for compensation remained small. By the end of 2017, the total number of certifications was 31 as against 1,245 total applications received (rejection rate of 97.5%), with an increase of only 20 certifications among 405 applications during the three years following the revision (CIVEN 2021). This suggested that the amendments to the Morin Law had failed to address the law's problems. Then what was the real cause of the dysfunction?

7. Presumption of Causality

One of the biggest points of contention in compensation for health effects of environmental pollution in general is the proof of causality. In the case of the French nuclear tests in particular, (1) there is a great deal of scientific uncertainty about the conditional relationship between radiation exposure as the cause (especially low-dose exposure of 10 mSv or less) and health effects as the result, (2) the French Ministry of Defense holds the information on the French nuclear tests and does not disclose it sufficiently, and (3) the time between the exposure and the manifestation of the health effects is generally long, and the victims tend to lose necessary proofs, often unaware of the effects of radiation.

For this reason, from the drafting stage of the Morin Law, victims have strongly demanded that the law be based on the “presumption of causality”⁵ to reduce the burden of proof.

The main model maintained by the victims was the Radiation Exposure Compensation for Veterans Act (REVCA) enacted in the U.S. in 1988, now integrated into the Radiation Exposure Compensation Act (RECA). RECA is based on a “conclusive and irrefutable presumption” that automatically allows “presumptive eligibility” recognizing a causal relationship between radiation exposure and cancer, if it is proven that an applicant (1) was in a designated area, (2) in a designated period of time, and (3) has a designated cancer. The amount of compensation is fixed at the same amount for each category of victims, regardless of the degree of damage suffered by each individual victim.

From the drafting stage, the French nuclear test victims' associations negotiated with the Ministry of Defense so that the future Morin Law would be based on the same principle

⁵ Article 1354 of the French Civil Code defines three kinds of presumption: “The presumption that the law attaches to certain acts or facts, holding them to be certain, exempts the person in whose favor it exists from having to prove it. It is said to be simple, when the law reserves contrary proof, and can then be refuted by any means of proof; it is said to be mixed, when the law limits the means by which it can be refuted or the object on which it can be refuted; it is said to be irrefutable when it cannot be refuted” (Code civil [C. civ.] [Civil Code] art. 1354 (Fr)).

as RECA, which they claimed had already been introduced in France in such systems as the asbestos compensation, the hepatitis C compensation, and the certification for occupational injury (especially for radiation workers). The draft bill presented by the Ministry in November 2008 introduced the principle of reversed burden of proof, stating that victims would not be required to prove a causal relationship between radiation exposure and illness, but the State would bear the burden of disproving it. However, it also stated that those eligible for compensation must have been exposed to 50 mSv or more as assessed by the Ministry of Defense. This indicates that the Ministry of Defense in fact wanted from the beginning to introduce a certification system based on the radiation dose threshold, not the presumption of causality as demanded by the victims. The then Minister of Defense Hervé Morin stated that under this system, “hundreds of people” would be eligible for compensation⁶.

The victims strongly opposed this bill, denouncing it saying that the Ministry of Defense was selling them a bill of goods and made every attempt to bring the text into line with what they wanted. In the bill submitted to the National Assembly, the introduction of the threshold dose was replaced with a clause “[The compensation committee, an advisory body to the Minister of National Defense] shall examine [...] whether, taking into account the nature of the disease and the conditions of exposure of the person concerned, *the causal link between the disease from which they are suffering and the nuclear tests can be considered as existing*” (Article 4-V-(3); emphasis added). After various motions at the National Assembly in May 2009, this clause of the bill was amended to read, “[The compensation committee] examines whether the conditions [place, time, and disease] for compensation are met. When they are, the person concerned benefits from a presumption of causality *unless, in view of the nature of the illness and the conditions of its exposure, the risk attributable to the nuclear tests can be considered negligible*” (Article 4-II; emphasis added). In a Senate debate, Defense Minister H. Morin said, “We wanted to introduce the notion of simple presumption, and not that of irrefutable presumption, which would be contrary to the idea of examining files on a case-by-case basis” (Senate 2009, 8601).

⁶ “Morin veut faciliter l’indemnisation des victimes des essais nucléaires [Morin wants to Facilitate Compensation for Victims of Nuclear Tests],” *Liberation*, May 28, 2009.

8. NIOSH-IREP Software

The Morin Law went into effect in January 2010. The law stipulates that the method for determining the “negligible risk” shall be determined by the Decree of the Council of State (Article 4-IV). The decree went into effect in June of the same year. The compensation committee established by the decree decided to adopt NIOSH-IREP as the method for determining the “negligible risk.”

NIOSH stands for the U.S. National Institute for Occupational Safety and Health, a division of the Centers for Disease Control and Prevention (CDC). It developed a science-based software, NIOSH-IREP (Interactive RadioEpidemiological Program), which is used “to determine the probability a cancer was caused by a person’s radiation dose from nuclear weapons production work,”⁷ under the Energy Employees Occupational Illness Compensation Act (EEOICPA). The guideline is based on spread sheets developed by the U.S. National Institutes of Health (NIH) resulting from epidemiological studies of atomic bomb survivors in Hiroshima and Nagasaki. By entering personal data such as sex, age at the time of exposure, external and internal radiation doses, circumstances of exposure, date of cancer diagnosis, etc., it calculates the probability of radiation exposure causing cancer.

A CIVEN’s report affirmed, “CIVEN considers in principle ‘negligible’ (in the sense that the [Morin] law gives to this term) the risk corresponding to a probability of causality of less than 1%” (CIVEN 2016, 5). The president of CIVEN testified in a Senate hearing, “This method has so far resulted in few cases with a probability rate of more than 1%” (Senate 2015).

9. Removal of the “Negligible Risk” Clause

The “negligible risk” clause, the primary cause of the dysfunction of the Morin Law, took an unexpected turn in February 2017. At the beginning of 2017, the left-wing Hollande administration, whose job approval rating remained so low that it seemed unlikely for them to win the presidential election in April-May of that year, was fast-tracking the enactment of the “Substantive Equality of Overseas Prefectures (*égalité réelle outre-mer* (EROM))” bill, aiming to reduce the inequality between metropolitan France and its overseas territories. As a remedy for the malfunctioning Morin Law, the bill included a decree

⁷ “NIOSH-IREP Software,” Centers for Disease Control and Prevention, accessed December 31, 2021. <https://www.cdc.gov/niosh/ocas/nioshirep.html>.

amendment that lowered CIVEN’s threshold for the probability of causation from 1% to 0.3%.

The bill was first adopted on first reading in the National Assembly with a large majority on October 11, 2016. The text was then approved by the Senate on January 19, 2017, and then brought to the Parliament/Senate joint committee (*commission mixte paritaire* (CMP)), following a rule in case of a single reading due to the adoption of the accelerated procedure. Member deputies and senators of the committee decided to reconsider the “negligible risk” clause in the Morin Law in response to growing calls against it, and, after a fierce debate, the committee unanimously voted for deleting it late on February 6, 2017. This text (Article 113 of the EROM Law) was validated by the Assembly two days later, but with a condition to set up a commission responsible for proposing “measures to reserve compensation for persons whose illness is caused by nuclear testing” by formulating “recommendations for the attention of the Government.” The EROM bill was also passed by the Senate on February 14, and entered into force on February 28 of that year.

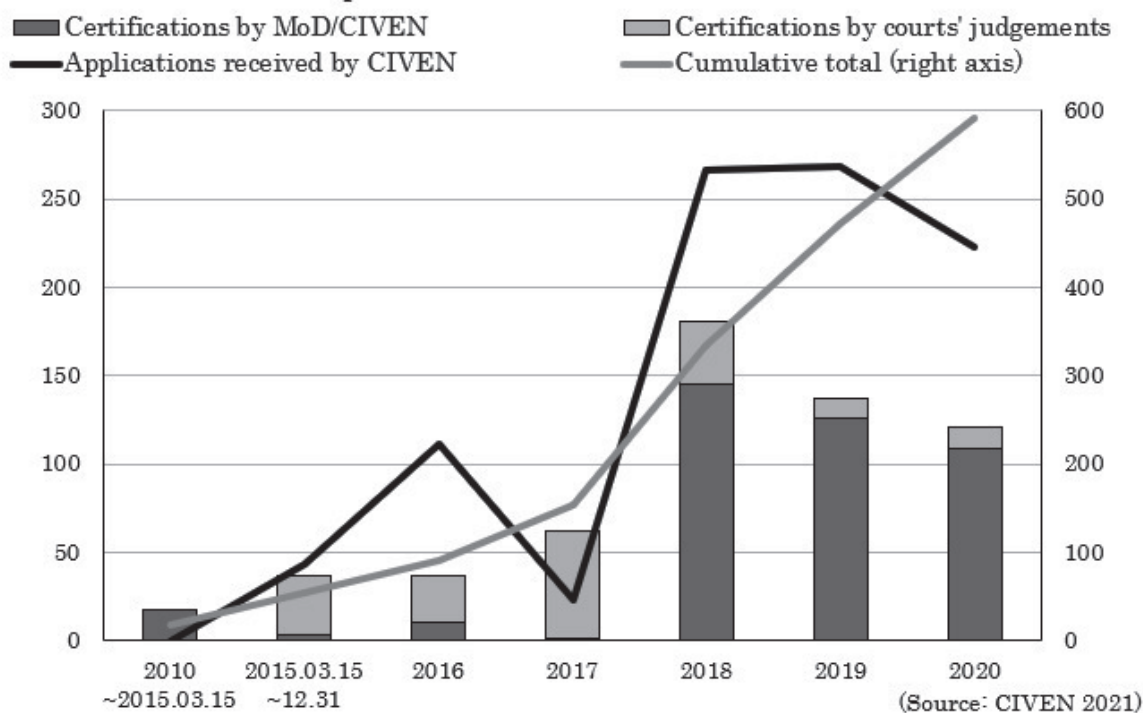
10. Reintroduction of Threshold: 1 mSv/year

With this amendment, the “irrefutable presumption” seemed to be established, as compensation would be granted if the three conditions of location, timing, and disease were met, thus nullifying the *raison d’être* of CIVEN. The newspaper *Le Monde* referred to a “historic breakthrough for the compensation of victims of nuclear testing in French Polynesia.”⁸ Applications for compensation increased rapidly immediately after the amendment (Figure 1).

However, on July 2 of the same year, the Council of State, the French supreme administrative court, issued an opinion on a disputed case after the amendment, stating, “This presumption [stipulated by Article 113 of the EROM Law] can only be reversed if the administration establishes that the pathology of the person concerned results exclusively from a cause unrelated to the exposure to ionizing radiation due to the nuclear tests, in particular because they have not been exposed to any such radiation” (Conseil d’État 2017). Although this opinion makes it more difficult for CIVEN to disallow certification, it indicates that the new presumption should not be considered as the “irrefutable

⁸ “Le Parlement vote à l’unanimité la loi pour l’égalité réelle des outre-mer [Parliament Unanimously Votes on the Law for Substantive Equality for Overseas France],” *Le Monde*, February 15, 2017.

**Figure 1. Applications and Certifications:
Compensation for French Nuclear Test Victims**



presumption,” but as “simple presumption” as defined by Article 1354 of the French Civil Code, with which the law reserves contrary proof, and can then be rebutted by any means of proof.

On May 14, 2018, while there were still no sessions of the advisory committee stipulated by Article 113 of the EROM Law, CIVEN decided on its own to adopt as a “provisional” threshold for certification the annual additional effective dose standard of ionizing radiation for the general public (1 mSv/year) set by the Public Health Code (CIVEN 2018). What it relied on were the above opinion of the Council of State and the provision of Article 1 of the Morin Law, which stipulates compensation for “a radiation-induced disease resulting from exposure to ionizing radiation from French nuclear tests.” On December 20, 2018, the advisory committee (*Tetuanui committee*) retroactively approved this provisional threshold and recommended to the Government to retain the modality of reversal of the presumption of causality that CIVEN had already implemented. The committee also specified that it intends the dose limit of 1 mSv/year to apply as soon as CIVEN began implementing it at the beginning of 2018. Laws⁹ followed to retroactively confirm CIVEN’s 1 mSv/year threshold.

⁹ *Loi 2017-256 du 28 février 2017 de programmation relative à l'égalité réelle outre-mer et portant autres dispositions en matière sociale et économique*. [Law 2017-256 of February 28, 2017 on Programming Related to Substantive Equality Overseas and on Other Social and Economic Provisions]. *Journal Officiel de la République Française* [J.O.] [Official Gazette of France], March 1, 2017; and *Loi 2020-734 du 17 juin 2020 relative à diverses dispositions liées à la crise sanitaire, à d'autres mesures urgentes ainsi qu'au retrait du Royaume-Uni de l'Union européenne*. [Law 2020-

11. What Kind of Presumption of Causality?

Since 2018, the number of applications and certifications by CIVEN has increased dramatically (Figure 1). As CIVEN (2019, 5) stated, “CIVEN’s adoption of this new methodology to applications has resulted in a dramatic increase in the acceptance rate of applications, from less than 10% after litigation to over 50%. For example, for applicants residing in French Polynesia alone, while only 11 applications were accepted from 2010 to 2017, 80 were granted from January 1, 2018 to March 30, 2019.” This can be seen as an amendment to the dysfunction of the Morin Law, but even with the new method, nearly half of the applications are still rejected on the ground that the applicants’ dose do not reach 1 mSv/year.

CIVEN admits: “In the absence of the data on personal dose, ambient dose, when available, is used as a reference. For local populations, in the absence of the data on personal dose, either local ambient dose or reconstituted dose during atmospheric experiments is sought. [...] The committee considers that the measurement of doses made by the testing authorities are accurate.” The ambient and reconstituted doses CIVEN relies on for its evaluations are tables of reconstructed effective dose and thyroid dose estimates produced by the CEA’s Military Applications Division (*Direction des applications militaires du Commissariat à l’énergie atomique* (CEA/DAM)) in 2006 (CIVEN 2021).

This foundation of CIVEN’s estimation of 1 mSv is recently under direct criticism. According to a research paper by non-governmental experts who reviewed the CEA/DAM reconstructions in light of hundreds of French military documents declassified in 2013 and made new reconstructions using atmospheric transport simulation models, “maximum doses to the public for key atmospheric tests may have been underestimated by factors of 2 to 10 and estimates that the total population exposed above the compensation threshold of 1 mSv/yr could be greater than ~110,000” (Philippe, Schoenberger, and Ahmed 2021, 1 ; See Table 4: figures in italics in the lower lines of the table). In the “Discussion” of the research paper, its authors give a recommendation as follows: “In this context of a low dose compensation threshold coupled with high uncertainties in dose reconstructions, French policymakers should consider a pure presumption [irrefutable presumption] of causality applicable to all ~125,000 inhabitants present in French Polynesia at the time of the atmospheric tests (as it was briefly the case in 2017, in the immediate wake of the *Loi EROM* [EROM Law]). Per our above analyses, given that 110,000 individuals may have

734 of June 17, 2020, Related to Various Provisions Related to the Health Crisis, other Urgent Measures and the Withdrawal of the United Kingdom from the European Union]. *Journal Officiel de la République Française* [J.O.] [Official Gazette of France], June 18, 2020.

been exposed to 1 mSv or more of ionizing radiation in the Society Islands [an archipelago in French Polynesia, in which Tahiti is located] in 1974, this pure presumption of causality would not dramatically enlarge the pool of eligible individuals and would provide for more equitable compensation in the absence of comprehensive exposure data over all islands at all times.”

The on-going battle between simple presumption and irrefutable presumption has a key importance for the compensation for the French nuclear test victims. Its future evolution is all the more worth paying attention to, because, as long as it is impossible to prove perfect causality, introduction of some sort of presumption of causality is indispensable for any compensation and relief system for the victims of low-level ionizing radiation around the world.

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