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From lobbyists to backstage diplomats:how insurers in the field of third party liability shaped nuclear diplomacy

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ABSTRACT

Third party liability insurance in the event of nuclear accidents emerged as a pressing issue in the 1950s, triggered to a great extent by the activities of international organizations and major nuclear accidents. By the mid-1960s a tight international network of negotiators comprising insurers, lawyers, scientists, engineers, businessmen, and government officials made its appearance along with nuclear insurance pools. Experts, functionaries, diplomats and politicians with often diverging views and expertise were involved in negotiations over the newly emerging legal and regulatory problems related to radiation protection and third party liability in the event of severe accidents. This paper argues that insurers transformed their identities from lobbyists to backstage nuclear diplomats, making their role explicitly political and profoundly diplomatic in an emerging international nuclear order. Within this novel multilayered context of negotiations the nuclear insurance pools developed a unique form of nuclear diplomacy, altering both terms of 'nuclear' and 'diplomacy'.

KEYWORDS

Third party nuclear liability; nuclear insurance pools; IAEA; nuclear diplomacy

'When CERA was born, you were one of the pillars of the assembly which finally fixed the wording of a resolution, which may become famous within the world of insurance, saying that the European insurers are studying the risk with a view to granting cover against nuclear perils'.[1] With these words, William Belser, the president of the Committee for the Study of Atomic Risks (Comité d' Études du Risque Atomique – CERA), acknowledged the contributions of Archibald George Mount Batten, the man who turned insurers into backstage nuclear diplomats in the early 1960s. Batten was an expert in third party liability insurance and the author of a standard reference book on this topic published almost a quarter of a century before this nuclear case even arose. In 1959, he served as assistant general manager of one of the most powerful British insurers – Alliance Company – and was also the chairman of the London Insurance Institute. That year, along with several of his esteemed colleagues, all chairmen of the European nuclear insurance pools and representatives of the Committee of European Insurers (CEA), Batten attended one of their most significant conferences in the glamorous premises of the London Savoy Hotel. With much fanfare, at the dinner party given at the end of the first day on 13 October, participants acknowledged Batten's services to the European insurers who were involved in the underwriting of nuclear risks.[2]

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What was most significant in Batten's career was his memorandum on insurance per nuclear installation, and not by incident, an approach which made its way to the draft convention of the International Atomic Energy Agency (IAEA) 'propounded as the normal one'.[3] The Working Group on Atomic Risks of the Committee of European Insurers had repeatedly lobbied the Organization for European Economic Cooperation (OEEC) with a proposal for a double limitation on levels of liability: limits of coverage assumed by insurers and their reinsurers had to be set per incident and per installation. All remaining liability should be transferred to the state. In August 1959 the European insurers noted that their proposals were not accepted by the OEEC. But there was a glimpse of hope coming from the IAEA. The experts of this organisation had incorporated the proposed compromise solution in the draft. It was Batten's memorandum that brought about this result.

The London Conference of nuclear insurance pools was taking place less than a year before the OEEC Paris Convention on Nuclear Third Party Liability in the Field of Nuclear Energy was to be signed, and preparations were running at full speed. It was crucial for the European insurers, who wanted to create favourable conditions for their business, not only to coordinate their actions, but also to achieve coordination with their American counterparts who had a role in the IAEA. Actions in the IAEA were of decisive importance for the developments in all other multilateral process underway in the western European context, and this meant also an indirect American influence on developments. Coordination beyond the European borders was important also for another reason. The European nuclear industry depended on the American, and this was made apparent from the early cooperation between the US, Canada, the UK, and soon with France and the Federal Republic of Germany. Mediators between these actors were key in the negotiating process.

In a memo addressed to the IAEA in 1959, the CEA made clear that insurers insisted on granting the high cover demanded once per installation, given that a single installation could cause more than one accident. Seeking to be on the safe side, insurers wanted to keep their options open regarding whether or not to renew the coverage following an accident. This was against the interests of the operators, who sought to retain the insurability of their prospective business even after the occurrence of probable accidents with severe radiation effects. Insurability of the operators was also in the interests of governments, without which the governments would have to share a higher percentage of the burden of indemnification of victims. This is why the governments preferred insurance coverage by incident, which would mitigate the risk of downgraded insurability of operators. While governments insisted on having nuclear installations insured per nuclear incident, insurers struggled for coverage of operators in a preferably stable legal environment.[4] Even though the OEEC and the operators of the reactors favored indemnification per incident, Batten was able to sway the outcomes of these debates. He basically personified the efforts of the whole community of insurers a) to influence the international agreements and legislation on radiation protection standards, and b) to define the terms of insurance of nuclear risks. Batten had definitely functioned as a successful facilitator working through ideas for an acceptable compromise between governments and insurers. In this process insurance specialists had a pivotal role to play in what came to be understood as nuclear diplomacy: the multilateral, intergovernmental, and international practice of influencing foreign affairs through policy, legal, and

scientific networks. Since nuclear risks could not be insured only on a national basis – radiation does not respect national borders – intergovernmental cooperation with the prospect of harmonizing legislation was of paramount importance. And insurers took up the challenge by altering their professional identity.

This paper traces the insurers' transformation from lobbyists to backstage nuclear diplomats, following them from US Congressional hearings of the mid-1950s on Atomic Power Development and Private Enterprise to nuclear insurance pools meetings, to international organizations. It traces also the emergence of the interplay between scientific and legal ideas that created a special kind of rhetoric of risk perception that was aiming to drive political decision makers into the creation of institutional, legal, and regulatory frameworks that would be favourable to the insurability of nuclear risks. Without terms of insurability of nuclear risks acceptable to all stakeholders, investment in the nuclear industry could neither be easily expanded, nor further enhanced by governments already exposed to the risks of nuclear accidents since the construction of the first nuclear power plants (NPPs) in the mid-1950s. Defining the terms of insurability by national legislation, imposed according to international legislation enshrined in multilaterally agreed conventions, was the main objective of insurers functioning as inconspicuous diplomatic mediators among governments, and as opinion makers in the context of multilateral institutions.

Nuclear insurance pools

From the mid-1950s and until the mid-1960s there was an expansion of a tight international and highly interdisciplinary network of negotiators comprising insurers, lawyers, scientists, engineers, businessmen, and government officials. Experts, functionaries, diplomats and politicians with often diverging views and expertise were involved in deliberations on novel solutions for coping with the newly emerging legal and regulatory problems related to radiation protection and to third party liability in the event of severe accidents. In 1957, the establishment of the IAEA, the only United Nations body with specific statutory responsibilities for radiation protection and safety in all sectors, was the first serious international attempt to regulate nuclear energy while highly promoting it at the same time.[5] Late in the same year two major nuclear accidents occurred in Kyshtym, Russia and Windscale, England. Despite efforts to cover up the incidents to the wider public, most politicians and insurers, who were particularly attentive readers of reports in the press, had been well aware of the threats such occurrences could pose.[6] This awareness of risks emerged a short time after the first decisions for the construction of NPPs were made in the UK and in the US (in some cases while construction was in progress), and few years ahead of their operation and connection to grids.[7] It became obvious that those who were involved in the development of the nuclear industry would have to navigate in uncharted technological, financial, and legal waters. They had consequently to counterbalance these uncertainties not only with improved technologies and financial risk management, but also with new legal and regulatory frameworks; perhaps also by introducing new directions of judicial understanding. Thus, the insurance coverage of third party liability for nuclear operators became a critical facet of multilateral negotiations triggered by the growing interest in the commercial exploitation of atomic energy for peaceful uses and the widened understanding of radiation as a new risk.

The insurance industry at this time took proactive practical measures by assembling underwriting capacities. Since 1956 insurance companies had been establishing nuclear insurance pools. These were organisations of a significant number of insurers in a given national insurance market for the purpose of the distribution of nuclear risks. Insurance and reinsurance companies participated in proportion to their financial potential and their readiness for exposure to these new risk configurations. Although initially organised at the national level, the nuclear insurance pools were soon interconnected beyond borders with mutual insurance or international reinsurance policies. This international coordination of insurance activities made necessary a unified space of compatible legal standards beyond national borders.

As one may expect, the managers of these insurance pools showed a vivid interest in matters of both national and international nuclear legislation. The purpose of nuclear law is to put in place special legal norms required by the special nature of risks implied by the adoption of nuclear technologies. Regulating the conduct of entities engaged in the handling of fissionable materials, or in activities involving ionizing radiation or exposure to natural sources of radiation, was a critical issue in this respect. Additionally, a risk-benefit approach emerged as a central feature of all dimensions of nuclear legislation. As the assumption was that the possibility of high-impact operational failure could not be excluded, risk-benefit considerations and liability approaches became of central importance.[8] Thus, nuclear law emerged partly for the purpose of disentanglement from restrictions set by government agencies, which were inhibiting incentives for investment in nuclear industry. Conforming this drive for liberalisation was the appearance of new risks, and consequently of the awareness that coping with these made necessary adequate proactive measures.

Technological change made once more apparent the necessity of legal change, not on a national level but internationally.[9] Regulation of emerging technologies by law was not a historical novelty of 1950s.[10] In the case of radiation risks, however, there was a unique connection between operational, financial, and liability considerations. The scale was considerably different from previous internationalizing project. No industry up to this point in time was explicitly built on proactive legislation for encountering problems of public risk perception as an indispensable condition for its development. Although liability regimes emerged in the nineteenth century with the 'economization of contracts' and the expansion of strategic technological systems that were influencing the well-being of the public, third party liability as connected to probable harm that could be inflicted on wider populations by industrial activities had never before arisen to such an extent.[11] In this respect, the nuclear industry posed a novel concern for third party liability insurers. Even in the case of the perception of risk of accidents in the chemical industry, often associated with the experiences of the poisonous gases used in the First World War, concerns remained distinctly moderate.[12] It was especially the need to insure prospective investment in NPPs that veered third party liability to the center of insurers' attention and turned it into a pressing issue.

Electricity production with atomic energy was expected to become a rapidly developing high investment industry in the context of the promotion of the peaceful uses of nuclear technologies.[13] The anticipated benefits could not, however, sweeten the fears of the public. For years, most people could not disassociate the probability of nuclear power plant accidents from the devastating effects of nuclear bombs.[14]

In this cultural context of persistent fear among the public regarding nuclearity, the policy problems that had to be resolved were as unprecedented as the new kind of risk that radiation posed to insurers.[15] The key question was, how could the compensation of victims of radiation in the surroundings of nuclear installations, in the event of a major accident with far reaching nuclear fallout, be adequately provided? For the insurers the problem was to find ways to cope in such situations with the expected excessive claims. No single insurer could take on the burden of indemnifying large populations of potential victims affected by radiation. Of course neither nuclear facility operators, nor the potential victims of accidents could be deprived of insurance coverage. The nuclear industry would under these circumstances be declared as unfeasible; not only in economic but also in political terms. No government could openly accept avoidance of liability in case of nuclear accidents. The state was expected to assume responsibility and share the burden of compensating for damages to health, and losses to life and material, with private industry.[16] It was obvious that insurers would be strongly interested in finding a viable solution; and they were under pressure to do so from both governments and industrialists. It was thus natural that in the years following the establishment of the first nuclear insurance pools, their meetings and conferences having as their main topic the possibility of influencing nuclear legislation multiplied at a fast pace. And the agendas set frequently made apparent a sense of urgency. As was recorded in the proceedings of a meeting of the Working Group on Atomic Risks of the CEA in August 1959, insurers were anxious to adapt their business plans as quickly as possible to newly passed legislation.[17]

The role of intergovernmental and international organizations, such as the Organization for European Economic Cooperation (OEEC, founded in 1948) and the IAEA, were catalytic for reaching agreements on the harmonization of legislation on the ground of internationally acceptable standards. Through these, the multilateral negotiations and subsequent conventions, the ratification of which would create the conditions of introduction and harmonization of national nuclear legislation, were put on track. While the very meaning of insurance operations in this field was deeply altered, nuclear insurers' professional identities, especially for those working for the nuclear pools, were equally being transformed. Instead of lobbying governments towards becoming receptive to their views, insurers became involved in intergovernmental and international negotiations for the shaping of the legal standards that would in turn shape multilateral third party nuclear liability insurance regimes. This made their role explicitly political and profoundly diplomatic. From actuaries and lobbyists, they very rapidly became backstage nuclear diplomats. Within this multilayered context of negotiations the nuclear insurance pools developed a unique form of nuclear diplomacy altering both terms of 'nuclear science' and 'diplomacy'.[18]

Controversies over international nuclear legislation

The drive towards exploitation of atomic energy that gained momentum gradually after World War Two,[19] and the commercialisation of the nuclear industry encouraged by the Eisenhower policies for peaceful uses of atomic energy,[20] brought about a new awareness of the need for financial, legal, and political risk management. The first pieces of legislation in the US instituted the demilitarisation of this source of energy. Almost

a year after the congressional hearings on Atomic Energy and the Private Enterprise in the US, and a few months after Eisenhower's UN 'Atoms for Peace' speech, the 1954 Atomic Energy Act removed the government monopoly on nuclear plants and created a licensing system for private operators. Liberalisation and the lifting of restrictions had to come first.

The passing of this Act created worrying insurance problems as the responsibility for third party liability shifted from government agencies to private enterprises, making questionable the insurability of new ventures. Insurance issues were not and could not be beyond the horizon of authorities dealing with atomic energy. The US Atomic Energy Commission had already in 1954 established contacts with insurers for policies regarding minor accidents, but without entering the treacherous territory of third party liability for major and high impact accidents.[21] In spite of attempts to downplay risks by declaring these as undoubtedly insurable,[22] and thus avoiding negative attitudes among the public and investors, the anxiety either manifest or concealed urged those concerned into action.[23] The US tackled the new challenges with international conferences and agreements that had to be implemented by governments but also orchestrated their monitoring by international organisations. It was at this time that the latter – especially the IAEA – started to play a major role in regulating the twofold and conflicting expectations national governments had for atomic energy: to facilitate investment in the nuclear industry, and to protect workers in installations and the public from radiation exposure.[24]

Industrialists and governments had no alternative but to rely for these desired outcomes on the expertise of insurers, and insurance lawyers. In particular, politicians and government officials did not sufficiently understand the legal and financial intricacies until the pools began lobbying first the US federal administration and later the governments of the European industrial nations.[25] But it was clear that the pools could not mastermind solutions without the partnership of the state. For, the problem was not solely the lack of insurance statistics that might allow a credible mathematical assessment of risks. The lack of an institutional framework regulating this new field of activity was equally disturbing.[26] Finding ways to share the excessive costs of third party nuclear liability claims between the state and the private insurance industry arose as a pivotal issue in this context. It also evoked fears of indirect nationalisation of the insurance industry in one of that industry's promising new branches.[27]

The question of alleged indirect nationalisation among insurers was at the same time technically, legally, and politically more complicated than one might think. Insurers of the pools wanted to have state guarantees because without these the business of the pools would be deprived of credibility. Hence, they wanted these guarantees within specified risk exposure limits that had under the circumstances to be defined without truly sound foundations in mathematical insurance techniques.[28] At the same time, insurers wanted to prevent expansion of state responsibility that would cause a shift of motives, blur responsibilities, and thus cause moral hazard for the insurers. The propensity of nuclear operators to pour premiums for third party liability into the private insurers would wane. And this was regarded by many as a first step towards the nationalisation of the whole atomic energy industry.[29]

Sterling Cole, the director of the IAEA, and most of his advisers were rather inclined to opt for a compromise, which would fit this approach of sharing liability but without an

ex-ante relief of the state from fixed obligations. Cole continued to be interested in this question even after his retirement from the IAEA and the European insurers kept in their memory his role for a fair settlement. 'I was very pleased to receive your letter of August 31, commenting on my memorandum on liability and State intervention in the atomic field' wrote William Belser to Cole in 1962. ' . . . the United States is fortunate in having men of such rigor and conviction to oppose the tendencies I described [. . .] Limitation of the operator's liability to an insurable amount, with direct State liability towards the victims above that amount seems imperative to safeguard private industry'.[30]

The stakes for the insurers were high, but the task of shaping the views of politicians in matters of the legal ramifications of insurance operations and thus influencing domestic policies and international negotiations was not an easy one. Yet without sensible international nuclear legislation there could be no nuclear industry.[31] The harmonisation of legislatures was a crucial issue that required the mobilisation of actuaries and lawyers who would stage interpretations of liability regimes.[32] In this there was a growing convergence between insurance managers and government officials, as well officials of international organizations. Until 1955 the conditions of insurability of nuclear risks remained unclear. In 1956 activities towards spotting viable solutions accelerated. The US Atomic Industrial Forum showed a vivid interest in the initiatives of European insurers and insurance lawyers. Western European insurers were collecting the views of politicians and civil servants who could get involved in the drafting of documents for international organisations such as the OEEC, EURATOM, and the IAEA. The OEEC was moving ahead at a fast pace, as a consequence of pressures from governments interested in promoting the nuclear industry. The officials of this organisation were preparing in the summer of 1956 a study to cover the problems connected with public health, including the protection against the effects of radiation in mining as well as in the use of radioactive substances.

Transport of radioactive or fissionable materials was also a central topic. The proposals had to be submitted as soon as possible to the Council of Ministers for the adoption of common standards to serve as a basis for national legislation and regulatory frameworks. The modalities of sharing responsibilities between the state and private enterprise have also been at the epicentre of this process.[33] But other issues have been crucial for the insurers, as well. One of the priorities was the exclusion of nuclear risks from conventional insurance policies. Another was finding ways of differentiating and segmentating nuclear risks which were, from an insurance point of view, more appropriately handled separately. The lack of sufficient knowledge on radiation health effects, as well as on the consequences of the spread of radioactive fallout, was also a source of great concern. The same applied in the case of legal channelling of risks that rendered one entity, the main contractor or the operator, legally liable for an event (even in cases where the responsibility for misconduct lies with subcontractors or cooperating agents). Legal channelling was an issue of negotiation among the nuclear pools. It was settled relatively early and was subsequently incorporated in most national legislations and further into the international conventions; for the first time in the OEEC 1960 Paris convention.[34]

Channelling the exposures of nuclear installations, to both conventional and nuclear risks, was relatively simple from the point of view of insurers and lawyers. All liability had to be concentrated on the operating company, which was also made responsible for the engineering standards of the construction project. Contractors and their subcontractors

were thus relieved of liability after delivery of their products and services. This eliminated unmanageable complexity for the insurers and made litigation realistic. But as Belser was stressing in his memorandum to the New York Industrial Forum, '[...] differences [between national legal systems] have been minimized by adopting the principles of channelling liability to the operator of a nuclear installation under an umbrella (omnibus) policy. We consider this solution universally applicable, [...] even in countries where legal channelling exists, e.g. Sweden and Switzerland. Legal channelling cannot be 100% effective so long as the surrounding countries have not introduced it'.[35] This need for harmonisation of legislation rendered effective diplomacy indispensable to insurers.

The first major result of the awareness of the need for legal innovations, at this stage at the national level, was the passing of the Price-Anderson Act of 1957 in the US that introduced a shared responsibility between nuclear operators and the state, and thus corrected discouraging deficiencies in the field of insurance resulting from the 1954 Atomic Energy Act. This change was of decisive importance for similar initiatives especially in Europe. It paved the way for the emergence of multilateral processes that led to international agreements. The 1957 'Price-Anderson Industries Indemnity Act' was passed four months after the Euratom Treaty was signed. As the latter treaty dictates, 'Member States shall take all necessary measures to facilitate the conclusion of insurance contracts covering atomic risks'. But although the need for insurance measures was explicitly mentioned, there was no reference to large-scale third party liability, as in the case of the American piece of legislation of the same year.[36] Both the Euratom Treaty and the Price-Anderson Act functioned as the background against which the OEEC Paris Convention (1960), the Brussels Supplementary Convention (1963),[37] and the Vienna Convention (1963) were drafted. National legislation in all these fields followed soon after the initial US developments.

The first to follow the trend, which paved the way to the international conventions, were the Japanese who had already passed in 1955 the Atomic Energy Basic Law. In Europe the first laws with wider institutional impact were the German 'Atomgesetz' and the Swiss Atomic Energy Act, both passed in 1959. In this same year Australian legislation on radioactive substances was passed.[38] Not all of these new laws made direct provisions for insurance regimes. But none of their articles were irrelevant for handling insurance risks. These legal developments had been put on track in Europe for the most part within the OEEC. On 10 June 1955 the OEEC Working Party on Nuclear Energy was established. On 18 July 1956 the OEEC Council of Ministers responded to the working parties' proposals with a series of actions, including the establishment of a Steering Committee for Nuclear Energy (SCNE). But it was the 1960 Paris Convention that finally laid down the legal principles regardingthe liability of operators of nuclear installations.[39]

As we have seen, the European Association of Insurers (CEA), and its Centre for Research (CERA), and the coordination of the nuclear insurance pools since their establishment in 1956, had played behind the scenes a crucial role in the preparation and drafting of these legal documents, which created a new framework of international third party liability law. Bruno Latour asserts that law is provincial, stubbornly local and in this context an unstable product of a ceaseless movement of documents.[40] Yet, the functionaries of the nuclear insurance pools and of their member companies wanted to achieve the contrary.

The insurance law specialists of these organisations were driven by attitudes prevailing in internationalised commercial law and sought a high degree of transnational standardisation of procedures. They succeeded in skilfully managing international relations, both at the level of painstaking coordination among the various national headquarters of insurance and reinsurance companies, as well as between the official representatives of countries. But their main efforts were concentrated on shaping multilateral processes and the day-to-day influence on the internal working of the international organisations specialising in nuclear issues. They managed to foster a decisive role for themselves that was of catalytic importance for the internal life of OEEC and the IAEA committees in charge of dealing with insurance issues.[41] At a time when international organizations, such as the IAEA, were striving to establish their diplomatic status on a global level,[42] insurers fashioned themselves as pivotal diplomatic actors in the new international order that emerged.

The involvement of insurers (and reinsurers), and of their insurance lawyers, first in the deliberations for the Price-Anderson Act and then in the drafting of these international Conventions, created new roles for the representatives of the nuclear insurance pools. They became involved first in nuclear insurance politics and then in intergovernmental negotiations for the shaping of third party nuclear liability insurance regimes. And this made the managers of the nuclear insurance pools key figures in the controversies unfolding over international nuclear legislation. Nonetheless, the disputes they were taking part in were inextricably embedded in the politics of scientific and technological knowledge.

Insurance lawyers and the rhetoric of science

Because of the character of nuclear legislation, it must be no surprise that all pieces of nuclear legislation included a preamble in which the required concepts of nuclear physics and nuclear engineering were defined. Estimating the probability of accidents and the extent of damage is in certain senses primarily a matter of science and engineering. Equally important was the formulation of practical measures against probable operational failures, also on the basis of the relevant scientific and technological insights. Moreover, the required knowledge had to be made translatable into the language of the lawyers at the same time that the legal arguments, from which nuclear legislation could be produced, had to be adjusted to pragmatics embedded in the conceptual frameworks of nuclear physics, nuclear engineering, and nuclear medicine. The legal arguments had also to be adjusted according to the financial insights and the jargon of the insurers. Scientists and engineers had to understand how their expertise could fuel legal arguments and engage themselves in diplomatic negotiations.

Scientific arguments were needed in the first place in order to ensure that nuclear accidents were of low probability. Otherwise the industry would have been declared uninsurable because of anticipated frequency of accidents for which there was consensus about their devastating effects. But there was also a need for an additional set of scientific and technological arguments through which the effectiveness of potential capabilities for coping with the supposedly unlikely event of high-impact incidents could be convincingly demonstrated. Drawing scenarios of the various implications of high-impact incidents was also crucial for specifying levels of insurability and their financial backing.

It was obvious that the profiling of thinkable disasters in all their dimensions (health, life, material damage, financial ruin of insurers and reinsurers, etc.) required combining nuclear physics and engineering with knowledge on legal matters and insurance techniques. This was of critical importance for specifying third party liability insurance, especially when long-term consequences of accidents were expected to become a matter of legal dispute over indemnification.

Among the many issues the handling of which depended on legislation, and which required combined legal and scientific expertise, was the distinction between nuclear and conventional risks.[43] This was a rather tricky exercise that required interdisciplinary knowledge and thus cooperation among experts from various fields. Similarly, problems were posed the legal channelling of risks. A third issue had to do with medical causation. The fundamental hazards and their effects on human organisms and property resulting from radiation were, as already mentioned, not sufficiently explored in the 1950s.[44] Further, the cumulative effects of radiation, resulting in long-term injuries with diverse characteristics, the cause of which is often almost impossible to trace back to identifiable incidents or health issues, implied puzzling legal issues.[45] Estimating risk exposures and contamination effects also required answering questions concerning the geographical range of the consequences of accidents. It was for the courts of justice to decide on the causal connections. Judges could not under the circumstances rely on general rules. They had to decide on the acceptability of conclusions presented by medical experts who could only base their learned opinions on circumstantial evidence in each individual case.[46] Verdicts also depended on scientific expertise, in that matter stemming from health physics, which was also a relatively new discipline. The relevance of such expertise for insurers was also implied by the prohibition against applying the legally allowed nuclear exclusion clauses of policies on property and casualty insurance to health insurance.

For this kind of issue, actuaries of insurance and reinsurance companies and insurance lawyers wanted to have educated answers on the basis of which they could influence both national and international legislation. When in the 1970s a considerable number of NPPs for electricity production came into operation, the issue of differentiating and bundling risks became even more acute.[47] In 1959 the nuclear power plant industry, the activities of which would imply a rather complex risk configuration, was in its infancy. The risks that had to be insured in the first decade of peaceful uses of atomic energy were related more to research reactors and the transport of radioactive substances than to electricity production.[48] This, however, did not mean that the nuclear insurance pools were not steadfastly preparing for the major projects of large NPPs. As they obviously anticipated, it was in this industrial activity that the main commercial and investment interests lay. Planning for the appropriate insurance policies presupposed scientific and engineering knowledge for separating conventional from radiation risks and for defining terms of legal channelling. Also inspection problems were expected to become increasingly demanding as the technically highly complex installations had to be thoroughly screened by scientists and engineers who would be skilled enough to map out the often labyrinthine interconnections between the various parts of these technological systems. It is indicative that mechanical engineers and later nuclear scientists were increasingly hired by (re)insurance companies.[49]

For lawmakers who were used in thinking in terms of traditional risks it was often difficult to adapt to these new requirements. It was the insurers, and especially the

insurance lawyers engaged by the nuclear insurance pools, who undertook the task of framing the understandings of lawmakers and officials of national governments and multilateral organisations, such as the OEEC and the IAEA. All these actors played crucial roles in the shaping of both national legislation and international law in matters of third party nuclear liability, but also in all other aspects of catastrophe insurance. Insurers had to cultivate an art of persuasion, which exploited the authority of nuclear science in order to shape both risk perception and the acceptance of scenarios of risk mitigation, striving throughout to inspire trust in existing or prospective engineering capacities.

Lawyers are par excellence the masters of making, or even of twisting arguments. And in this case the insurance lawyers had to invent the suitable rhetoric in order to disseminate specific versions of scientific ideas in networks of decision makers, and especially among those who were responsible for the formulation and passing of nuclear legislation; both national and international. If they wanted to be successful as lobbyists and opinion makers who could further influence multilateral processes, they had to influence first the understanding of nuclear science and engineering among politicians, career diplomats, and upper-echelon administrators. The nuclear insurance pools that were involved in this were not only trying to set up financial standards. They were also interested in having put in place radiation protection standards, and thus they linked the insurability of nuclear risks to technical and behavioural safety standards. In this respect they developed science and engineering expertise as the basis of their risk assessment. Because no risks that they were expecting to handle could be detached from legal risks, they were also creating bridges between legal, insurance, physics, medical, and engineering perspectives.[50] For this purpose, they obsessively collected information. For example, insurers circulated elaborate questionnaires among experts who were authorities in the field of radiation injuries. The need to use rhetorical means to persuade lawmakers by combining legal, financial, and scientific arguments drove them into territories of sophisticated knowledge management. The insurers established special committees to collect and assess information from various fields, all required in their view to support legislative and insurance decision-making.[51]

It was thus utterly natural that they made use of scientific findings, that they talked nuclear science in their way, and for this purpose collected scientific papers and documents. In the files of the CERA that have survived in the Swiss Re Corporate History Archives, various outlines of nuclear physics can be found attached to insurance documents. Nuclear physics and engineering had also been a central topic of addresses in the meetings of insurers soon after the passing of the first pieces of legislation on the peaceful uses of atomic energy. For instance, almost exactly three years before the 1959 London conference of the nuclear insurance pools in the Savoy Hotel, on the other side of the Atlantic, on 4 October 1956, at the Luncheon of the Graduates Committee of the Insurance Institute of Montreal, the distinguished reinsurer Max De Salis delivered a talk on ‘Atomic Energy and Insurance’. He put emphasis on principles of atomic physics, which were essential for understanding the problems he was intending to examine.[52]

Striving for this kind of knowledge was also apparent in the hearings in the Joint Congressional Committees in the US, but as well in European parliamentary committees

convening in the 1950s and early 1960s. Parliamentary committees followed the US example and conducted hearings on nuclear risks where insurers were frequent guests in tandem with nuclear scientists in order to present their views.[53] Informal contacts and meetings between government officials and experts from the insurance industry were impressively frequent.[54] The CERA correspondence and the papers archived witness a vivid exchange between a considerable number of natural scientists and physicians with legal experts from various faculties of law of both American and European Universities.[55] Insurers visited laboratories, hospitals, and law faculties. Scientists, medical experts, and many professors of law frequented insurance and reinsurance companies in search for interlocutors with whom they could explore new dimensions of nuclear risks.[56] But most importantly it was the politicians, the government officials, and especially the professional diplomats who were seeking advice from insurers and the insurance lawyers who mediated between the worlds of legal and scientific professions. They also mediated between business and politics. This mediation saw great early success: insurers didn't have to struggle for access to the boardrooms of the political decision makers. They very soon belonged to common social networks where in spite of controversies they could make their voice heard.

Insurers, especially the ones involved in nuclear insurance pools, exploited these connections to disseminate views, with their art of persuasion resting on the interdisciplinary knowledge they were persistently accumulating. But despite their pivotal role in shaping mindscapes, and thus associating risk perception with solution finding, they were only rarely allowed to appear on the front stage. If they could stay in the room where negotiations took place, they were given in the best case the role of observers. Yet, from this position, as backstage nuclear diplomats, they could nonetheless be highly influential by connecting risk perception with risk rhetoric as part of their strategies and tactics of negotiations. They did so with the aim of shaping international liability regimes, as was the case with the 1960 Paris and the 1963 Vienna Conventions on Third Party Nuclear Liability.

Nuclear diplomacy

Seen from the parts of insurance and reinsurance companies along with the nuclear insurance pools, nuclear diplomacy entailed a change in the very nature of both nuclear science and diplomacy. In the case of nuclear energy, technological, scientific, and legal issues were strongly entangled, characterizing insurance practices and enforcing radical changes in the identity of insurers from lobbyists to backstage nuclear diplomats. In addition, the exploitation of science-related insurance rhetoric, aiming to influence international nuclear legislation, conceived science not as an instance of universal rationality but as a set of mental representations that could be shifted, reconfigured, and adapted to the requirements of power games.

The power of the insurance pools depended on their ability to drive political and administrative actors who had critical roles for shaping international nuclear legislation towards attitudes consistent with their views on the insurability of radiation risks. As there was a consensus across the board on the need for tackling these insurability problems, any differences between insurers and their audiences were to a great extent the result of varying risk perceptions and thus of diverging views on the role and content

of legislation as a catalytic factor for the institutional alignment of risk management practices. In this context the insurers and reinsurers were the only ones who could transpose views on science and technology to make them fit into interdisciplinary perspectives, which could in this way be made instrumental for legislative practices and insurance operations.

Among the insurers, and especially among reinsurers, one could find highly skilled managers with long experience in international commercial negotiations. Interlinking scientific, engineering, and legal arguments was always part of the insurance business. International insurers and reinsurers were also champions in coping with nation-scale risks, either by adapting their operations to shifting legal environments or by trying to influence these. The travel reports of reinsurance managers deposited in the Swiss Re Corporate History Archives offer evidence of the multifaceted activity of reinsurers in this field. And in the leaflets on nuclear insurance one can find explicit reference to the need of the insurance and reinsurance companies to seek continuous influence on the insurance side of nuclear legislation. In this respect, they were the right people for policy formulation and policy implementation through diplomacy at the multilateral level. Of course, as they were representatives of economic interests they had not the legitimacy to take over roles of the representatives of political and administrative authorities, and thus they could not go beyond backstage nuclear diplomacy. In this sense, the managers and advisers of the nuclear insurance pools were neither in the conventional business of those who were informing foreign policy objectives with conventional scientific advice, nor were they idealists caring for safety standards and welfare conditions. This kind of nuclear liability diplomacy was aiming at the introduction of international legal frameworks favourable to prospective investment in industrial projects. The direct dependence on economic interests of enterprises and governments differentiates this backstage networking from the so called 'Track-II' diplomacy which is embedded in the context of civil society.[57]

Theirs was a new way of social, political, and administrative shaping of nuclear science which was instrumental in establishing international investment and insurance regimes. The legitimacy of the final regulatory decisions that resulted from negotiations depended upon the insurers' ability to reconstruct plausible scientific rationales for serving the proposed action of multilateral rule making.[58] The processes of deconstructing and reconstructing knowledge for this purpose was realised by reconfiguring the terms of disputes in the diverse social networks of well-connected insurers, scientists, politicians, administrators, officials of international organisations and diplomats. Yet, in the end, the complexity of interactions could be rendered workable by following technical standards of sound insurance operations. Financial hedging made complex implications for the adoption of nuclear technologies seem manageable. The conceptual platform that insurers formed through their rhetoric prioritizing issues at the boundary of science and policy was a catalytic factor for transforming scenarios of insurance operations into policies that could be adopted by lawmakers and diplomats.[59]

Risk analysis was an integral part of designing and influencing criteria and choices of legally embedded financial technologies, which corresponded in a normative fashion to the understanding of problems of radiation protection and third party nuclear liability issues. Through such understanding, these imagined probable future scenarios of human, material, and financial disaster could be projected backwards onto present configurations

of instruments of precaution.[60] This process was not about substantially comprehending the science and technology details of the mechanisms that might lead to negative occurrences. Indeterminacy was counterbalanced with estimates of costs, rarely for repairing damage, and more often for financially sweetening a situation that might have been perceived as dramatic both by the immediate victims and the wider public; the latter with far-reaching political consequences. Here again the risk of exposure to critical scrutiny was counterbalanced with rhetoric that could transform perceived objects of nuclear risks into objects of technological and financial certainty.

Critical to our perspective is the understanding that the diplomatic practices of the nuclear insurance pools were indeed novel. Paradoxically, it was these practices that responded to and simultaneously shaped the equally novel regulatory system of international organizations that dealt with nuclear energy. Until that time, the main diplomatic efforts undertaken on a multilateral level were concentrated in making artefacts and devices compatible through the adoption of common measures and standards, and thus in facilitating trade across different jurisdictions.[61] The control of military technologies, as in the case of treaties against the use of poisonous gases in combat, was also an existing line of multilateral understanding. The emergent international cooperation for coping with major and high impact industrial risks and their terms of insurability was not only novel, but also paved the way for all later styles of international negotiations on third party liability.

Notes

1. The manuscript of the speech was found in the Swiss Re Corporate History Archives (SRCA File 10.103.253). William Belser's files and correspondence, deposited in the Corporate Archives of the Swiss Reinsurance Company (SRCA), are an invaluable source of information on the informal diplomatic activities of the nuclear insurance pools, and especially for the special kind of science diplomacy they were pursuing.
2. Batten, *Third Party Liability*.
3. Belser's manuscript of the speech, Swiss Re Corporate History Archives (SRCA File 10.103.253).
4. Kalderén to Belser, 27 April 1959, SRCA 10.158628.01.
5. Creager and Rentetzi, "'Dual Use' and the Conundrum of Control."
6. On the widespread anxieties of the British public due to the Winscale incident, and on the reports in the press and perceptions among closed circles of politicians, see Penney et al., "Report on the accident at Windscale No. 1 Pile on 10 October 1957." Also: Baten, "A Significant Moment in the Development of Nuclear Liability and Compensation." On publications on Kyshtym which might have been noticed by politicians, officials and entrepreneurs interested in the development of the nuclear industry, see Soran and Stillman, "An Analysis of the Alleged Kyshtym Disaster."
7. According to the IAEA statistics of units still in operation in 2005, during the period 1954–1963, in which the Committee for the Study of Atomic Risks (CERA) was active and functioned as the node of the networks of insurers nuclear diplomacy, in the Western World only eleven NPPs have been constructed, of which only seven reached the stage of their first criticality and connection to grids. All, with no exception, were in the UK (4) and the US (7). Two NPPs were during this period in operation in the USSR. In comparison, according to the same statistics, between 1963 and 1973 the construction of 153 new NPPs had started in 19 countries. Data: IAEA, *Nuclear Power Reactors in the World*, 2006. According to Char and Csik in their 1987 article on 'Nuclear power development,' between 1953 and 1963 the construction of 74 NPPs had started and 36 reached the stage of being

connected to grids. The corresponding figures for the period 1964 and 1973 are 218 and 110. Apparently investment in NPPs was regarded as considerably safer after the international legal frameworks on third party liability insurance were in place. This was a significant factor in addition to progress in engineering.

8. For details on the architecture of nuclear legislation: Stoiber et al., *Handbook of Nuclear Law*.
9. On this issue see: Mandel, "Legal Evolution in Response to Technological Change," 225–6.
10. Rayfuse, "Public International Law and the Regulation of Emerging Technologies."
11. Kleeberg, "From Strict Liability to Workers Compensation"; and Horwitz, *The Transformation of American Law*.
12. Feldenkirchen,"Big Business in Interwar Germany"; and Hoffman, "Institutional Evolution and Change."
13. 'Hearings before the Joint Committee on Atomic Energy, Congress of the United States, Eighty-Third Congress, First Session: on Atomic Power Development and Private Enterprise.' United States Government Printing Office: 1953.
14. The stance adopted against these fears by many of the politicians who participated in this series of hearings that continued until 1957 was poignantly expressed by Senator John W. Bricker, a long time member of the Congressional Joint Committee of Atomic Energy: *'Ever since 1947 [. . .] we heard of nothing but destruction and bombs, war, and terror. It was with a great new hope that we were able, in 1953 and 1954, to begin to give our attention to the peaceful uses of atomic energy.'* United States of America Congressional Record, Proceedings and Debates of the 85th Congress, First Session, Volume 103, Part 7, Washington DC: United States Government Printing Office, 1957, 9473.
15. CERA Information Bulletin No 13, 1967, 31–52; this quotation on 33–34. For similar attitudes: Bähr and Kopper,*Munich Re: Die Geschichte der Münchener Rück 1880–1980*. For the disputes on the insurability of nuclear risks, see also: Daston, "What is an Insurable Risk?"; Gugerli, "Cooperation and Competition," 189–90; Lange, "The Insurance Industry Enters the Atomic Era."
16. The state's share of responsibility for probable negative effects of private investment as heralded by the 1957 Price-Anderson Act still remains politically controversial. See: Testimony of Ralph Nader Before the Committee on the Budget, US House of Representatives 30 June 1999.
17. CPRA meeting of CEA 18.8.1959 (SRCA File 10.158 622.01).
18. The frequent exchange of information and the attempts to coordinate efforts have already been thoroughly discussed by Daston, "What is an Insurable Risk?" and Gugerli, "Cooperation and Competition," but without focusing on aspects of multilateral nuclear diplomacy.
19. According to the Congressional Record of 1953, General Electric and Westinghouse had together about four thousand subcontractors involved in the R&D and production of nuclear installation and processing of fissionable materials.
20. Rentetzi, "Determining Nuclear Fingerprints," 43–4. On opposition and delays: Del Sesto, "The Commercialization of Civilian Nuclear Power and the Evolution of Opposition," 305–6.
21. "Seventeenth Semi-annual Report of the Atomic Energy Commission," 45, 85. In Europe the foundation of CERN in 1954 posed insurance issues characteristic for this period that had to be dealt with in the framework of labour law.
22. Daston, "What is an Insurable Risk?"; Gugerli, "Cooperation and Competition"; and Bähr and Kopper, *Munich Re: Die Geschichte der Münchener Rück 1880–1980*.
23. On downplaying risks, see also 1953 congressional hearings on Atomic Energy and Private Enterprise.
24. On the dual, conflicting roles of the IAEA in regulating atomic energy see Creager and Rentetzi, "'Dual Use' and the Conundrum of Control."
25. Report by Belser to CEA (SRCA 10.158 628.01).

26. Richard D McClure, A Review of Nuclear Energy Insurance (paper presented at the November Meeting of 1968 of the Casualty Actuarial Society, retrieved from www.casact.org/pubs/proceed/proceed68/68255.pdf).
27. Daston, "What is an Insurable Risk?" 242.
28. Belser, "Atomic Energy Insurance Law," 10.
29. Belser to Francis McCune, on 17 August 1962 (SRCA 10.158 628.01).
30. William Belser to Sterling Cole on 6 September 1962 (Cole was at this point in time already retired from the IAEA). On the issue of the role of the state in nuclear liability coverage, see also Belser's letter to Francis McCune, the President of the US Atomic Industrial Forum, (17 August 1962), (SRCA 10.158 628.01); Belser to Spencer (18 September 1957), (SRCA 10.158 628.01).
31. In the field of harmonisation the pools were extremely active. Minutes of CPRA meeting of CEA 18.8.1959 (SRCA File 10.158 622.01).
32. Daston, "What is an Insurable Risk?" 238.
33. Belser to Prof. E. Artom (President of CEA), 21 September 1956 (SRCA 10.158 628.01).
34. Dr. Jur. H. Salzmann's talk in the Fourth International Civil Defence Conference, Montreux, 7–17/10/1961 (Title of presentation: 'Insurance against Atomic Risks') (SRCA 10.173469.03).
35. Belser's letter on 22 May 1962 addressed 'to the Gentlemen, Atomic Industrial Forum, NY' (SRCA 10.158628.01).
36. Article 98 of the 1957 EURATOM Treaty.
37. Convention of 31 January 1963 Supplementary to the Paris Convention of 29 July 1960, as amended by the additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982 ('Brussels Supplementary Conventio').
38. Regulations Relating to Irradiating Apparatus and Radio-Active Substances, Victoria Government Gazette, 29 June 1959.
39. Reyners, "Developments in International Conventions on Nuclear Third Party Liability."
40. Latour, *The Making of Law*, vi and 277.
41. Proof for this is the frequent correspondence between CERA, nuclear insurance pools and two IAEA directors, Sterling Cole and Sigvard Eklund. Kalderén to Belser on exchange of ideas with Cole on a possible world organisation for the management of nuclear liability risks (2 December 1959); exchange of letters on participation in OEEC committees between Kalderén of Skandia Insurance Company and Belser; Kalderén to Belser, 27 April 1959 and Belser's reply on the same day; Belser to Cheneaux-de-Leyritz, 17 August 1961: '. . .. une note sur mon entretien avec Sterling Cole, Directeur General de IAEA, d'ouil a spontanément pris une attitude positive envers une demande éventuelle de la part soit du Comité Européen des Assurances, soit du CERA . . . '. Belser to Eklund: 17 March 1962, 11 October 1962, 28 January 1964 (All letters in file SRCA 10.158628.01).
42. On IAEA's attempts to establish its diplomatic status see Rentetzi, "'Nuclear Classrooms on Wheels' as Diplomatic Gifts"; and Rentetzi and Freris, "Attaching Diplomatic Significance to Laboratories."
43. Letter of Belser to J.L. Weinstein, Consultant, Nuclear Energy Secretariat, OEEC, Paris, on 5 February 1957(SRCA 10.158628.01).
44. Belser, "Atomic Energy Insurance Law," 3.
45. Belser to Spencer (SRCA 10.158 628.01).
46. Belser, "Atomic Energy Insurance Law," 6.
47. Until the early 1960s the nuclear risks came mostly from the transport of nuclear materials, the propulsion of vessels (warships and submarines as well as commercial vessels) with nuclear reactors, and from research reactors of various types. NPPst hat were meant to expand the nuclear marine propulsion technologies came later and posed the additional problems. It is historically interesting that the nuclear power plant industry came to full bloom after the 1963 Vienna Convention.
48. Max De Salis, "Atomic Energy and Insurance" talk, 1956, 7–8. Swiss Re Library, Filing Cabinet: Publ DL-0434.

49. Bähr and Kopper, *Munich Re: Die Geschichte der Münchener Rück 1880–1980*; C. J. Haugh, *Insurance of Nuclear Reactors*, Address at the Graduates Committee Luncheon, 4 October 1956, Swiss Re Library Filing Cabinet: Publ DL-0434, 24.
50. Report on the EURATOM Wiesbaden Meeting on 'The technical conception of insurance covering radioisotope risks in the various branches' by William Belser (Meeting on October 19–29, 1961) (SRCA 10.173 469.03).
51. Max De Salis talk, "Atomic Energy and Insurance," 3.
52. Ibid.
53. In 1957 insurance lawyers were invited as experts in the hearings of the Bundestag for the German nuclear law; Letter of Belser to Esser, 4 June1957 (SRCA 10.158 628.01).
54. German ministry officials, and also the Minister for Atomic Energy Siegfried Balke, were among those who had frequent contacts with the nuclear insurance pools and the CERA (SRCA 10.158 628.01).
55. For discussions on dosimetry from a legal and insurance point of view in a social network consisting of insurance lawyers, physicist and medical experts, see Belser's letter to Prof. H. Langendorff, Director of the Radiological Institute of the University of Freiburg on 23 January1957 (SRCA: 10.158 628.01). Also Belser to Gruse, 9 October 1957(SRCA 10.158 628.01).
56. Relevant correspondence and papers in SRCA Files 10.158 628.01, and 10.158 622.02;10.158 627.01.
57. The literature on Track-II diplomacy illustrates in a very clear manner this connection between informal networking and negotiations on the one hand, and civil society aspects on the other. See: Kraft and Sachse, *Science, (anti-) Communism and Diplomacy*; Downs, *Negotiating with the Russians on Nuclear Arms*; Evangelista, *Unarmed Forces*; Barth, *Catalysts of Change*. For the civil society aspect and informal international relations see also contributions in Chandler, *Constructing Global Civil Society*.
58. On the relation of politics to risk and legal discourses see Jasanoff, "Contested Boundaries in Policy-Relevant Science."
59. Brian Wynne discusses along this line links between environmental learning and precautionary action. Wynne, "Uncertainty and Environmental Learning."
60. For a similar approach see Esposito, *The Future of Futures*.
61. Wenzlhuemer, "The History of Standardisation in Europe"; and Ping, "A Brief History of Standards and Standardisation Organisations."

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