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Review Article

# Navigating the Legal Landscape of Nuclear Technology Patents in India

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***ABSTRACT:*** ***Patents are the statutory recognition of a new invention in "all fields of technology," as stipulated in the TRIPS Agreement and confirmed by the contracting states. Nevertheless, the Indian Patents Act, 1970 excludes granting patents for atomic energy-related inventions, as endorsed by the Atomic Energy Act of 1962, despite the Indian Patents Act's provision for securing such patents while maintaining the requirement of public safety. India is establishing multinational agreements with companies to utilize nuclear energy and technology to satisfy the energy requirements of the power sector. Authorities are required to implement technology transfer agreements, which include a clause that ensures the protection of the technology. The lack of statutory protection in the form of patents for nuclear technology, including safety equipment, can be interpreted as a significant impediment to using and controlling atomic energy for power generation. This is because India will not acknowledge the exclusivity of its inventions through patents, and companies will be hesitant to facilitate power generation through this method.***

***Furthermore, patenting safety and security apparatus is challenging due to the blanket prohibition of granting such patents. The paper will elucidate the emerging trends following the Civil Liability for Nuclear Damage Act 2010. The legislation establishes that Indian operators are primarily responsible for any nuclear accident while also allowing for the possibility of recourse to suppliers. India submitted its instrument of ratification of the Convention on Supplementary Compensation for Nuclear Damage (CSC) to the International Atomic Energy Agency (IAEA) in February 2016. The USPTO has been issuing patents in this field since 1955. The paper will conclude by asserting that India should reevaluate the patenting of nuclear technology, or at the very least, the patenting of safety equipment associated with nuclear technology, to prevent the recurrence of one of the world's most catastrophic industrial calamities.***

***The first section of this paper will reiterate the trends in sec 4 applications, legal alternatives, judicial stances over the issue, and the modes to facilitate the patenting of nuclear and atomic technologies without compromising public safety requirements. Part II discusses the rationale for the expansive use of advanced nuclear technologies in India through the multifaced scope. Given the progressive trajectory of India's Nuclear regime, Limited Liability under the Civil Liability for Nuclear Damage Act 2010 and outright refutation of Patent applications under Sec 4 have been explored in Part III of the current paper. Part IV establishes the foundation for the Safer Nuclear Regime through patenting nuclear technology, followed by the Conclusion.***

***KEYWORDS:*** ***Intellectual Property Rights (IPR), Digital Piracy, Copyright Infringement, Digital Media, Legal Framework, Cyber Law, India.***

## INTRODUCTION

Patent protection is restricted to practical innovations. To transform discoveries into patented inventions, inventors must transcend mere conceptual innovation. It is a responsibility to contribute to the existing body of knowledge by creating something new, whether a new service or product, a superior version of an existing one, or a unique method of achieving the same outcome.[1] An invention is considered "patentable" if it meets all three criteria before a patent application may be considered. The TRIPS Agreement 1995 transformed international intellectual property law in an unprecedented manner; it subsequently became the international Constitution of the field. All nations must comply with the minimum standards established by the agreement concerning safeguarding intellectual property to be a part of the World trade Organization (WTO).[2]

Nevertheless, all countries must ensure that their domestic legislation adheres to the TRIPS standards[3]or face sanctions imposed by the WTO and TRIPs agreement. As stipulated in the TRIPS Agreement and other international agreements, a particular set of inventions are not eligible for patent protection.[4] The *Indian Patent Act* of 1970 has been amended to meet the global standards.[5] The Supreme Court of India has reiterated the patentability requirements[6] and has elaborated the scope of patentability in the Indian legal framework. [7] The Indian Patent Act does not define the term "*patent*." Instead, it has only provided for inventions that are not patentable as under Chapter III of the Act. Regardless of satisfying the novelty, utility, and non-obviousness test, if it falls within any criteria under Sections 3 and 4, any invention is not patentable.[8]

The inventions relating to atomic energy mean the invention applicable for or relating to the production,control, use, or disposal of nuclear energy or prospecting, mining, extraction, production, physicaland chemical treatment, fabrication, enrichment, canning, or use of any prescribed substance or radioactive substance or ensuring of any prescribed substance or radioactive substance. It has been apprehended as a threat to national security as the information will be published and made public; therefore, anyone can use the information and use it against national security. The potential for reprocessing spent fuel and the development of deep geological repositories are critical strategies for long-term sustainability.[9]

The following table and graphical representation highlight the trends concerning patent claims for inventions related to atomic energy. As section 4 expressly excludes claims related to atomic energy from patent protection, this hurdle is a big concern for radioactive materials technologies. The Indian Patent Office (IPO) opposes or rejects the case upfront. Such compounds are nevertheless subjected to questions about their patentability, even when used

[1] 'Patentability Criteria in India: A Critical Analysis of Case Laws by Pramit Chandra Rout, Subhankar Behera, Ananya Swain: SSRN' accessed 13 June 2024

[2] 'Frow, John --- "Intellectual Property Rights and the Public Domain in the New World Order" [2006] INJlLawTech 5; (2006) Two Indian Journal of Law and Technology 106'

[3] Art 27.3 Retrieved from https://www.wto.org/english/docs_e/legal_e/27-trips_04c_e.htm on 5th march, 2024

[4] 'Article 53 – Exceptions to Patentability'

[5] 'India Code: Section Details' accessed 13 June 2024; 'Ministry of Law and Justice (Legislative Department)'

[6] 'Biswanath Prasad Radhey Shyam vs Hindustan Metal Industries on 13 December, 1978'

[7] Novartis A.G. v. Union of India & Others (2013 SC para 91)

[8] 'India Code: Section Details' https://www.indiacode.nic.in/show-data?abv=CEN&statehandle=123456789/1362&actid=AC_CEN_11_61_00002_197039_1517807321764&sectionId=15871&sectionno=3&orderno=3&orgactid=AC_CEN_11_61_00002_197039_1517807321764 accessed 13 June 2024

[9] Bagley et al., 'PATENT LAW'

in small quantities or as catalysts. [10] As seen from the data exhibited below, the office of the Controller of Patent Designs, trademarks, and Geographical Indications referred to four times more applications in 2021-22 than in 2019. However, a partial reduction was noted in 2023.[11]

| years | Sec 4 Applications Referred | Inventions Related to Atomic Energy | Allowed to Proceed in normal course of action |
|---|---|---|---|
| 2019-2020 | 178 | 1 | 1 |
| 2020-2021 | 245 | 2 | 21 |
| 2021-2022 | 846 | 10 | 88 |
| 2022-2023 | 721 | 30 | 445 |

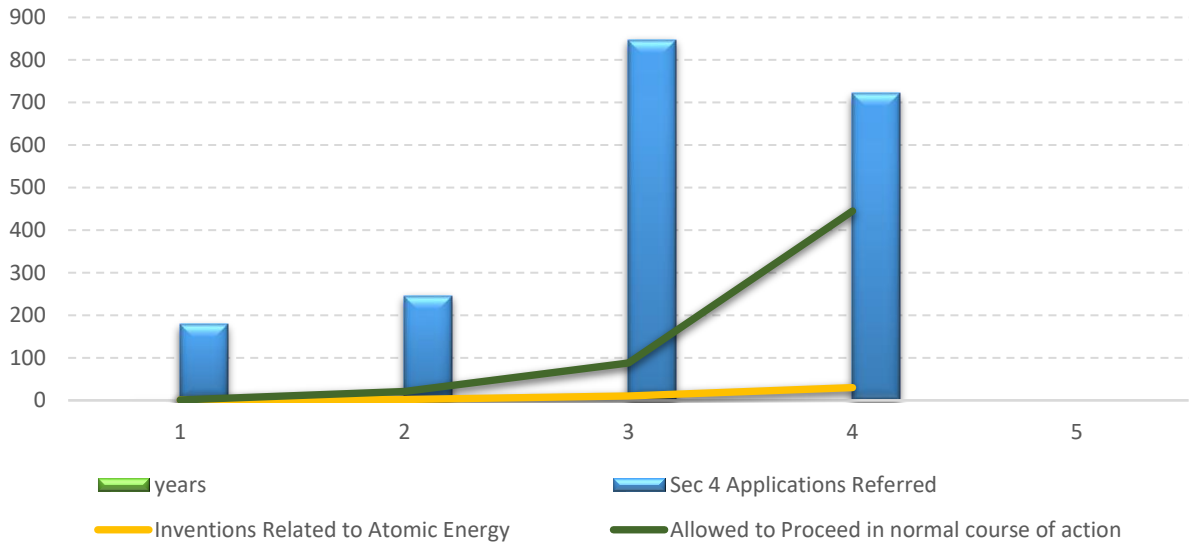


**Figure 1: Shows the trends of Sec 4 Applications in the duration 2019-2023.**

The Atomic Energy Act of 1962 encompasses the Prescribed Substances, Prescribed Equipment, and Technology.[12] The categorization of the various elements is based on their nature and the percentage of each component present in metal, alloys, compounds, manufactures, waste, or scrap. Furthermore, an invention cannot be considered patentable under section 4 of The Patents Act 1970 unless it involves a nuclear material, which can be defined as a prescribed substance or radioactive substance, and the quantity of this material must be higher than the safe limit. This problem typically occurs when the Indian Patent Office and the Department of Atomic Energy have raised multiple objections under section 4 to a patent application for medical use or to research and development (R&D) involving radioactive substances.[13] In one instance, the Controller's office submitted the Petitioner's application to the Atomic Energy Department. The application was rejected under the directives of the Department of Atomic Energy. Under section 20(1) of the Atomic Energy Act 1962 (hereinafter referred to as AE Act), the aforementioned is legal and appropriate. Nevertheless, the High Court stated that the explanation provided by the individual is indicative of their thoughts. The order is unsustainable due to its lack of justification. Upon reviewing the impugned order, it is evident that the application has been rejected solely based on the

[10] The Patent Office Journal 01/05/2015 page no.32574 '8129/DELNP/2013' accessed 13 June 2024
[11] https://www.ipindia.gov.in/writereaddata/Portal/IPOAnnualReport/1_114_1_ANNUAL_REPORT_202223_English.pdf
[12] 'India Code: Section Details'
[13] 'Patentability of Inventions Involving Usage of Radioactive Substances?'

directives issued by the Department of Atomic Energy. Consequently, the application is rejected. It is beyond question that the Authority has the Authority to deny a patent application if it encompasses the circumstances and/or inventions outlined in Section 20(1) of the year 1962. Nevertheless, the rationale outlined in the decree supports this assertion. The Controller's office was directed to evaluate the Petitioner's application for a patent on its own merits under the law and make a fresh decision as soon as possible.[14]

Subsequently, the IPO declared in an order dated December 7, 2017, that "the Act does not provide for the resending of the application to review the directions issued by the Department of Atomic Energy." The review petition was rejected under the Authority Department of Atomic Energy directive and Section 4 of the Patents Act, which states that a 1970 patent cannot be granted for the invention in the extant patent application.[15]

In another case, Merck submitted a national phase patent application (PCT) in 2009, which claimed priority from a European Patent application. In 2014, the European Patent application was subsequently approved.[16]The invention pertained to assisting with imaging techniques, and these medications can be employed as tracers in diagnosing and treating abnormal biochemical processes in the body, including cancer and other inflammatory disorders.[17] The Controller forwarded the patent application to the Department of Atomic Energy (DAE) for its patentability assessment, as the invention used a radioactive isotope (18F). Nevertheless, Merck was allowed to be heard, even after the orders were received from DAE. The Controller denied the patent application after a thorough investigation, citing that the application pertained to atomic energy and was rejected by the Department of Atomic Energy (DAE), India.[18]

In this context, it is essential to consider the CGPDTM office order no. CG/F/4/27/2006/225, dated March 30, 2006, states, "if the prescribed materials are used for reactors, or have nuclear-related dual-use, then such materials may be prohibited." Therefore, it is imperative from the above discussion that if the invention does not involve nuclear reactions, it is not subject to the prohibition.[19] Furthermore, it is evident from the data shown in Fig. 1, the office of the Controller, that the number of applications getting referred to the Department of Atomic Energy has substantially increased.[20] However, it is pertinent to mention herein that the government may avoid the publication of such patent applications, as the mechanism has already been provided in the Act.[9] Moreover,if things do not appear to work under the section, the patent relating to atomic energy may also be revoked as provided for under the Act. The inventions related to atomic energy may be considered for patents, and the restrictions imposed by section 35 can be used. In this manner, both the rights of the inventor and national security[21]can be balanced. Further, IndianResidents applying for patents relevant to defense

[14] Ceres Intellectual Property Company Limited. Petitioner v/s The Controller of Patents, Trade Marks and Designs & 2 ors. Para 4

[15] 'Examining Patentability of Inventions That May Relate to Atomic Energy: A Notable Decision from the Bombay High Court - Lexology' https://www.lexology.com/library/detail.aspx?g=33383658-bd52-4ef6-bb2c-a4fd00fd4833 accessed 14 June 2024

[16] (EP 2146944 B1)

[17] 'EP2146944B1 - A Method for the Preparation of 18f-Labelled Folates - Google Patents'

[18] Sribindu Chivukula, 'Merck's (Atomic Energy) Patent – Fizzles!! – SpicyIP'

[19] 'Patentability of Inventions Involving Usage of Radioactive Substances?'

[20] (n.12)

[21] Section 35. Secrecy directions relating to inventions relevant for defense purposes. (n.d.). Retrieved June 13, 2024, from https://www.indiacode.nic.in/show-data?abv=CEN&statehandle=123456789/1362&actid=AC_CEN_11_61_00002_197039_1517807321764&sectionId=15905&sectionno=35&orderno=37&orgactid=AC_CEN_11_61_00002_197039_1517807321764

purposes or atomic energy have been prohibited outside India without prior permission. Any act contravening the secrecydirections or provisions of the Act shall lead to the application for a patent under this Act deemed to have been abandoned, and the patent granted, if any, shall be liable to be revoked.[22] Moreover, the Central Government is empowered under the Act not to disclose any information prejudicial to the interest of the security of India.[23]

*The Rationale*

The present energy supply and consumption patterns are not sustainable from a social, environmental, or economic perspective. By 2050, carbon dioxide (C02) emissions from energy sources will have more than doubled, and rising oil demand will worsen supply security worries. An energy revolution is necessary to alter our present trajectory, and low-carbon energy technology will play a pivotal part in this. To achieve our targets for greenhouse gas emissions, it is necessary to widely deploy nuclear power and other related technologies. Participation is essential from all major economies and nations.[24] Additionally, the nation must collaborate with pertinent industries to incorporate nuclear programs into its national energy and environmental strategy.[25] When the nuclear supply industry is mainly in the private sector, it is imperative to have robust policy support.[26] Harmonizing nuclear regulatory practices worldwide and international cooperation in non-proliferation efforts necessitate the development of legal and regulatory frameworks. Additionally, successful nuclear programs require the participation of civil society in capacity-building and policy-making.[27] There is a dilemma in intellectual property law due to the exponential increase of new technologies, which are drastically different from earlier technology.[28]

Relative Specialization Index (RSI)13[29] of the top 10 patenting countries for nuclear power technologies shows that France is the most specialized country for atomic power. India is among the top 10 countries in 9th place.[30]

Discussing United States Legislative development in pertinent areas is imperative at this juxtaposition. The crucial legislative acts regarding the supervision of nuclear energy in the United States include the Atomic Energy Act of 1954, which was enacted to establish the Atomic Energy Commission (AEC) to supervise nuclear operations, including those related to

[22] Reference can be made to Section 102 of the Patents Act provides for *"Acquisition of inventions and patents by the Central Government" for a "public purpose". Under this section an invention which is the subject of an application for a patent or a patent, both, could be acquired from the applicant / patentee for a public purpose. For such acquisition, the Central Government shall pay to the applicant / patentee (as the case may be) such compensation as may be agreed between the Central Government and such person*. Section 157A "The explanation appended to the Section defines "security of India" *to include any action necessary for the security of India which relates to, inter alia, fissionable materials or the materials from which they are derived*"

[23] ibid

[24] Cameron and Taylor, 'The 2050 Roadmap for Nuclear: Making A Global Difference'

[25] Eisenberg, 'Patents and the Progress of Science: Exclusive Rights and Experimental Use'

[26] Somaya, Williamson, and Zhang, 'Innovation at and across Multiple Levels of Analysis'

[27] Cameron and Taylor, 'The 2050 Roadmap for Nuclear: Making A Global Difference'

[28] Pamela Samuelson, 'Innovation and Competition: Conflicts over Intellectual Property Rights in New Technologies', vol 12 (Winter 1987) https://www.jstor.org/stable/688813

[29] Dag W Aksnes, Thed N van Leeuwen and Gunnar Sivertsen, 'The Effect of Booming Countries on Changes in the Relative Specialization Index (RSI) on Country Level' (2014) 101 Scientometrics 1391. "The IPO uses the Relative Specialization Index (RSI) to compare two countries' published patenting activity within the same technology area. RSI is a measure of a country's share of patent families in a particular field of technology as a fraction of that country's share of patent families in all fields of technology"

[30] UK Intellectual Property Office, Advanced Nuclear Power: A Worldwide Overview of Patenting Related to the UK's Ten Point Plan for a Green Industrial Revolution

both military and civilian sectors.[31] The Energy Reorganization Act of 1974 established the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission (NRC) as separate entities to handle military and civilian nuclear activities, respectively. ERDA was responsible for managing weapons-related functions, while the NRC was tasked with overseeing civilian applications of atomic energy. In 2000, the National Nuclear Security Administration was created to segregate specific military responsibilities from the Department of Energy.[32] US patent application no. US56890444, submitted in 1944, pertaining to the Chicago Pile-1 artificial nuclear reactor, the first self-sustaining nuclear reaction created by humans. It was kept highly confidential for over ten years and published in 1955 in the United States.[33] The initial patent analysis emphasizes the significance of safety and regulation in developing nuclear energy, namely in managing reactivity, cooling fuel, and confining radioactive materials. The patent application FR 7408375 A, filed in 1974, represents an early instance of ECCS technology. This technique ensures a secondary provision of cooling fluid in pump malfunction. This mechanism effectively mitigates the risk of excessive overheating resulting from residual power and guarantees cooling in all situations.[34]

Patents have been utilized to safeguard advancements that aid in the management of nuclear waste, such as the patent titled "Disposal of radioactive cations," submitted by William Ginell in 1951. Early US patents document several endeavors to use the potential of nuclear fusion, including the 'Astron,' an innovative apparatus developed throughout the 1960s and 70s.[35] It is imperative to mention that the US has granted patents related to nuclear technology ranging from Multi-layered radio-isotope for enhanced photoelectron avalanche process, Method for preventing corrosion of spent nuclear fuel canisters by using electrolytic corrosion protection, and Power generation devices.[36]

The Indian Patents Act of 1970 expressly excludes the grant of patents to inventions relating to atomic energy.[37] The inventions in the field of nuclear power, therefore, are non-patentable under the Indian Patent law.[38] Moreover, the rejections are made without clearly emancipating the scope of 'dual use' and procedural incapacity to reconsider the decision of the Department of Atomic Energy.[39] This provision resulted from an interim report submitted by the Ayyangar Committee (1957-59). One possible reason for incorporating such a provision in the Act is the strategic importance of atomic energy and inventions in this field. The other rationale behind this act could be national security.[40]

India's debate on patent denial under section 4 is irrelevant due to the outdated nature of the law. This could be substantiated in the cases of Patent Cooperation treaty applications, through

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[31] Avner Cohen and Brandon Mok, 'James Martin Center for Nonproliferation Studies (CNS) Nuclear Governance and Legislation in Four Nuclear-Armed Democracies: A Comparative Study' (2017)
[32] Cohen and Mok
[33] Nick Tyrie, 'Powering Tomorrow #4: Nothing New under the Sun - a History of Nuclear Innovations - Intellectual Property Law - Reddie & Grose'
[34] Nick Tyrie
[35] Nick Tyrie
[36] 'Nuclear Energy Type Patents and Patent Applications (Class 136/202) - Justia Patents Search'
[37] 'India Code: Section Details' https://www.indiacode.nic.in/show-data?abv=CEN&statehandle=123456789/1362&actid=AC_CEN_11_61_00002_197039_1517807321764&sectionId=15872&sectionno=4&orderno=4&orgactid=AC_CEN_11_61_00002_197039_1517807321764 accessed 13 June 2024
[38] Sribindu Chivukula, 'Merck's (Atomic Energy) Patent – Fizzles!! – SpicyIP'
[39] Ceres Intellectual Property Company Limited ... Petitioner v/s. The Controller of Patents, Trade Marks and Designs & Two ors. (n 21)
[40] Prashant Reddy, '1,2,3,4: The 123 Indo-U.S. Civil Nuclear Deal and Section 4 of the Patent Act – SpicyIP'

which inventions could be made available to the public through publishing and granting of patents in other jurisdictions, which can be implemented in India without affecting national security.[41] Considering these developments, it is noteworthy that the Department of Atomic Energy has filed around 270 patents in different jurisdictions, including the USA, France, China, and the European Union.[42] In the present scenario, it is the need of the hour to revise this provision in the rapidly developing nuclear alternatives to nonrenewable energy resources.[43]

## INDIA'S NUCLEAR REGIME AND SAFETY CONCERNS

After signing the U.S. – India Nuclear 123 Agreement, India no longer remains an "untouchable" in the nuclear world commerce group. India is expecting to usher in billions of dollars' worth of civilian nuclear technology.[44] India is prioritizing clean hydrogen production and has set a target of generating 5 million metric tons per year by 2030 through the implementation of the National Green Hydrogen Mission. This strategy sets the goal of achieving energy independence by 2047 and reaching Net Zero by 2070. It has successfully attracted investments totaling over USD 1.08 trillion.[45]

India is inviting international corporations to form joint ventures to scale up nuclear-driven hydrogen projects, conduct research, and transfer technology. The government is soliciting $26 billion in private investment for its nuclear energy sector.[46] Green hydrogen production utilizing nuclear power is pioneered by the Department of Atomic Energy (DAE) by converting two experimental reactors into pilot plants. Some of the leading companies in the field are developing nuclear reactor technologies specifically for hydrogen production. These include the small modular reactor (SMR) by NuScale Power, the innovative traveling wave reactor (TWR) by TerraPower, the high-temperature gas-cooled reactor (HTGR) by X-energy, the HTR-PM reactor by China National Nuclear Corp., the KHNP reactor by Korea Hydro & Nuclear Power, and the fast neutron reactor technology developed by Russia. Generation IV nuclear reactors are designed to produce electricity while minimizing emissions and high-temperature heat, which makes nuclear energy a viable alternative for producing low-carbon hydrogen on a big scale.[47]

India is striding high in the field of nuclear technology. The Department of Atomic Energy has underscored the notable achievements of Nuclear Power Corporation of India Limited (NPCIL), mentioning the 962-day continuous operation record held by KGS-1, the 765-day (more than two years) continuous operation of RAPS-5, the 777-day continuous operation of RAPS-3, the 852-day continuous operation of NAPS-2, and the 42-times continuous operation of Indian nuclear power reactors for more than a year.[48]

Moreover, in the year-end review 2023, the Department of Atomic Energy highlighted the Nuclear Power Program Accomplishments in radiation-based technology for agricultural and

[41] (n 17)
[42] 'Patents Filed by Department of Atomic Energy | Department of Atomic Energy | India' accessed 12 June 2024
[43] Sribindu Chivukula, 'Merck's (Atomic Energy) Patent – Fizzles!! – SpicyIP'
[44] Paul K. Kerr, *U. S. Nuclear Cooperation with India: Issues for Congress - Paul K. Kerr - Google Books*
[45] 'Nuclear Power: A Force Multiplier for Clean Hydrogen Generation in India — Nuclear Business Platform'
[46] 'India Seeking $26bn in Private Investment for Nuclear Sector - Power Technology'
[47] 'India to Build 18 Nuclear Reactors with 13.8GW of Capacity by 2032'
[48] 'Press Information Bureau, Year-End Review -2022: Department of Atomic Energy' accessed 14 June 2024

food preservation applications.[49] Therefore, given the international trajectory, India's promising position, and rapid progress in nuclear trade and nuclear technology, it is crucial to have a solid legal backdrop to balance progress and safety. The present section will explore India's legal preparedness and accountability principles for accommodating unforeseen incidents. India deposited its instrument of ratification of the Convention on Supplementary Compensationfor Nuclear Damage[50](CSC), a critical multilateral treaty relating to liability and compensation for damage caused by a nuclear incident.[51] It aims to increase the compensation available in the event of a nuclear incident through public funds made available by the Contracting Parties based on their installed nuclear capacity and UN assessment rate. It also aims at establishing treaty relations among States that belong to the Vienna Convention on Civil Liability for Nuclear Damage, the Paris Convention on Third Party Liability in the Field of Nuclear Energy, or neither of them, while leaving intact the 1988 Joint Protocol that establishes treaty relations among States that belong to the Vienna Convention or the Paris Convention.[52] India has enacted Civil Liability for Nuclear Damage Act 2010 (hereinafter referred to as CLNDA). It created a mechanism for compensating victims for damage caused by a nuclear accident, allocating liability, and specifying procedures for compensation. The liability of the operator is essentially capped at Rs. 15 billion (USD 238 million), and the overall liability of the central government to anyparticular nuclear incident is capped at an equivalent of 300 million Special Drawing Rights (an IMF basket of currencies) which is equal to approximately USD 397.1 million as of June 2024.[53]

Section 17 (b) of the CLNDA has so far stood in the way ofreactor transfers from abroad, and reportedly, hesitation on the part of the Indian supplier to the Indigenous nuclear program, deals with t h e Right of Recourse according to which

"*The operator of the nuclear installation, after paying the compensation for nuclear damage under section 6, shall have a right of recourse where the nuclear incident has resulted in consequence of an act of supplier or his employee, which includes the supply of equipment or material with patent or latent defects or sub-standard services.* "[54]

In the event of catastrophes, the CLNDA offers compensation to victims from the presumably generous financial resources of corporations that own and operate nuclear facilities. However, specific provisions, such as the fifteen-day waiting period for the Atomic Energy Regulatory Board to report an incident, raise concerns about the extent of our progress.[55]

The Civil Liability for Nuclear Damage Rules 2011 came into force on November 11, 2011. According to Rule no 24, which dealt with the Right of Recourse, the liability of the suppliers,

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[49] 'Year End Review of the Department of Atomic Energy-2023 | Department of Atomic Energy | India' accessed 14 June 2024

[50] The CSC was adopted on 12 September 1997, together with the Protocol to Amend the Vienna Convention onCivil Liability for Nuclear Damage, and entered into force on 15 April 2015

[51] General Distr Original, 'INFCIRC/657 - Convention on Supplementary Compensation for Nuclear Damage'. < https://www.iaea.org/sites/default/files/infcirc567.pdf> accessed 14 June 2024

[52] Aabha Dixit, "IAEA Office of Public Information and Communication India Joins the Convention on Supplementary Compensation for Nuclear Damage", Retrieved from https://www.iaea.org/newscenter/news/india-joins-convention-supplementary-compensation-nuclear-damage on 3rd Jan, 2024

[53] 'India Code: Section Details' (Section 6. Limits of liability.) https://www.indiacode.nic.in/show-data?abv=CEN&statehandle=123456789/1362&actid=AC_CEN_38_63_00002_201038_1517807327224&sectionId=1373&sectionno=6&orderno=6&orgactid=AC_CEN_38_63_00002_201038_1517807327224 accessed 14 June 2024

[54] 'A Primer on the Indian Civil Liability for Nuclear Damage Act, 2010 | Manohar Parrikar Institute for Defence Studies and Analyses'

[55] Suhasini Rao-Kashyap, '26 Years since the Oleum Gas Leak Case – the MyLaw.Net Blog'

irrespective of total damage, was limited to the maximum liability of the operator, namely rupees one thousand five hundred (1500) crores (equivalent to US $ 250 million) under Sec. 6(2) of CLNDA, although this section does provide for enhancement of the maximum liability.[56]

Furthermore, it has been clarified by the Department of Atomic Energy that sec 46 is meant to ensure that other laws, if any, regarding the "operator" can still be applied. Essentially, no other statute addresses civil nuclear liability.[57] Sec 46 of the Act does not give victims the legal right to sue in foreign courts. Providing a domestic legal structure for victims of atomic devastation to seek compensation goes against the very spirit of the law. This reading is supported by the fact that the CLND Bill was adopted notwithstanding a particular amendment that would have introduced the Authority of foreign courts.[58]

## PAVING THE WAY FOR PATENTING NUCLEAR TECHNOLOGY FOR SAFER NUCLEAR REGIME

The fact that nuclear energy and nuclear weapons are currently treated as one entity under Indian law. The country's security concerns seem to be the driving force behind the decision to deny atomic weapon patents. It is contradictory and unreasonable, therefore, to end nuclear apartheid while also removing patents for inventions relevant to atomic energy from the ambit of patent law.[59] Even though the Indian legal regime provides for an adequate mechanism wherein the confidential and non-disclosure of any such information on producing and developing nuclear technology[60], the Indian system is not exploring the full potential of civil use of nuclear technology as they provide the blanket cover as to non-grant of patents to such type of inventions.

Moreover, Section 11 of the AE Act provides for "Compulsory acquisition of prescribed substances, minerals, and plants." Vide the said section, the Central Government may, *among other things*, compulsorily acquire, under the provisions of the said section, any prescribed equipment; any plant which is designed or adapted for the mining or processing of any minerals referred to in Clause (b) of Section 11(1) or substances obtained from there or for the production or use of any prescribed substance or a radioactive substance or the production, use or disposal of such articles as are or are likely to be required for or in connection with the production, use or disposal of atomic energy or for research into matters connected in addition to that. The section then stipulates the procedure to be followed during such compulsory acquisition, and Section 21 of the AE Act specifies the principles relating to payment of compensation for compulsory acquisition.

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[56] 'A Primer on the Indian Civil Liability for Nuclear Damage Act, 2010 | Manohar Parrikar Institute for Defense Studies and Analyses' (n 45)

[57] 'FAQs Version 2.0 on CLND Act, 2010 | Department of Atomic Energy | India' accessed 14 June 2024

[58] 'FAQs Version 2.0 on CLND Act 2010 | Department Of Atomic Energy | India'

[59] Section 2(1) (a) of the Atomic Energy Act, 1962 '*Atomic Energy means energy released from atomic nuclei as a result ofany process, including the fission and fusion process*'

[60] Section 3 (c) of the AE Act in relation to "General Powers of the Central Government" stipulates *inter alia* that subject to the provisions of the AE Act, the Central Government shall have the power "*to declare as "restricted information" any information not so far published or otherwise made public relating to… (iii) the theory, design, construction and operation of plants for the treatment and production of any of the prescribed substances and forthe separation of isotopes; (iv) the theory, design, construction, and operation of nuclear reactors…"* Section 18 (1)of the Atomic Energy Act thereof empowers the Central Government to make an order restricting the disclosure of information, Section 18(2) further stipulates that *"No person shall disclose or obtain or attempt to obtain anyinformation restricted under sub-section (1)*"

*Necessity To Grant Patents in India to Nuclear Safety Equipment*

Having justified in the above two sections that in India, there is a possibility of granting a patent to nuclear technologies, thereby keeping the security of the nation intact, the present section highlights that it's not appropriate to grant blanket cover of prohibitions on all patents on nuclear technology as in the current era post the CLNDA 2010, patents for the safety equipment are the need of the hour.[61]

In the United States, the Atomic Energy Act of 1946 provided that "No patent hereafter granted shall confer any rights concerning any invention or discovery to the extent that such invention or discovery is used in the conduct of research or development activities in the fields specified in [the Act]. Congress deleted this provision by outlawing the patenting of all atomic energy-related inventions in the Atomic Energy Act of 1954 (Public Law 703), which prohibits patents but requires payment of "just compensation" or "reasonable royalty fees." Prohibiting patent rights in atomic and nuclear inventions is based on national security interests.[62] The present statute leaves the remainder of the nuclear energy field open to patent application, subject only to limited control by the Commission to prevent a monopoly of fundamental patentsby those industries primarily involved in developing the atomic bomb.[63]

Moreover, patents have been granted by the USPTO and EPO for the safety of nuclear plants and reactors. In the absence of a patent grant for nuclear technology, even for the safety types of equipment, unlike the trends followed by USPTO and EPO[64], it's unlikely that many of the market players would be attracted to Indian markets for investment purposes. It is pertinent to mention herein that the compensation and liability of the supplier and operator have been fixed under the Act of 2010 vide sections 6 and 17.[65]

India's nuclear power expansion programme banks heavily on imported technologies, which havedeveloped at high cost and risk over a long period. Not unreasonably, therefore, the atomic technology developers would expect compensation for the transfer of their technologies. When the technology is transferred in any form (sale, JVs, localization, or complete ownership transfer), the technology provider will want to ensure its competitive advantage, as the technology developer is protected. If current trends in the nuclear industry are any indication, host countries worldwide are placing an increasing priority on both localization and technology transfer.[66] To take forward the civilian nuclear business and implement the Indo-U.S. Nuclear 123 Agreement in its true essence, the Act requires to be amended, allowing patents for inventions solely related to atomic energy[29] without any extended rights as to patents it. It may be asserted that somewhere safety and security are also compromised because inventions useful

[61] Sengupta and Ambast, 'Sci-Hub | A Dangerous Recourse? A Critical Relook at Section 17 of the Civil Liability for Nuclear Damage Act, 2010. International Journal of Nuclear Law, 3(4), 292 | 10.1504/Ijnucl.2012.048431'

[62] Cohen and Mok, 'James Martin Center for Nonproliferation Studies (CNS) Nuclear Governance and Legislation in Four Nuclear-Armed Democracies: A Comparative Study'

[63] Greg Morton and Brent Shumaker, 'Specializing in Instrumentation and Control System Test Equipment, Training and Services. Services Recent News Ams Receives U.S. Patent for Its Technology To Verify Proper Operation of Control and Shutdown Systems of Nuclear Power Plants Ams Receives U.S. Patent For Its Technology To Verify Proper Operation Of Control and Shutdown Systems Of Nuclear Power Plants Employee Spotlight: Elijah Connatser Employee Spotlight: Ryan O'Hagan AMS Hosts After Work with ETEC Employee Spotlight: Trevor Toll' (2021)

[64] OECD Nuclear Energy Agency. and Source OECD (Online service), 'Innovation in Nuclear Energy Technology.' 117 accessed 14 June 2024

[65] 'A Primer on the Indian Civil Liability for Nuclear Damage Act, 2010 | Manohar Parrikar Institute for Defence Studies and Analyses'

[66] Dalmia Vijay Pal, 'India - Patent - (Indian) Patent Act & Nuclear Technology'

for or relating to the production, control, use, or disposal of atomic energy or the prospecting, mining, extraction, production, physical and chemical treatment, fabrication, enrichment, canning or use of any prescribed substance or radioactive substance or the ensuring of safety in atomic energy operations cannot be patented in India and the absence of patent protection their inventors have to protect their rights through a confidentiality clause in the contract or a separate confidentiality agreement so that in case of breach, the supplier can have a right of compensation.

## CONCLUSION

Therefore, it can be safely appended that the absence of a grant of patents on nuclear technology allied safety equipment may threaten securing safety standards in nuclear plants. Without such protection, the companies shall rely on Government agreements for compensation. Moreover, it's a compromise and a lack of endeavor to procure state-of-the-art technology to generate a secure, safe, and protected nuclear regime in India. According to the MIT Technology law review, thorium is cleaner and more abundant in building a molten salt that could replace 1970-era technology in today's nuclear power plants, leaving zero carbon energy in the environment. As the production and use of nuclear energy for peaceful purposes developed in 1950, Significant attention has been understandably placed at the international and national levels fostering vital programmes to achieve safety, security, and safeguards at a high level, as evident from various patents being granted by USPTO and EPO for safety equipment. India should also wake up to the call for safety by removing the blanket cover and issuing guidelines exploring the scope of 'dual use' on the prohibition of patenting all types of inventions of nuclear technology as it will attract foreign investments and state-of-the-art technology in procuring the safety of nuclear technology.