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PATENTING INVENTIONS RELATED TO NATIONAL SECURITY: INDIAN PATENT OFFICE AS THE GATE KEEPER

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ABSTRACT

India has entered into civil nuclear cooperation deal with many countries thereby opening the door for collaboration between the industries in the nuclear energy/atomic energy field as well as facilitating investment in this defence sector. This involves many defence related contracts relating to technology transfer as well as R&D between different countries with India. In this context the IP protection in relating to atomic energy/national security becomes highly crucial. Technology transfer to private players in a weak IPR protection regime is also a concern for the foreign companies. Different countries follow different ways to protect such inventions relating to national security as TRIPS agreement has given flexibility to exclude some nature of inventions from patent protection especially based on public interest or national security. India has adopted to exclude such inventions from the purview of subject matter list in Patents Act of 1970. Under the Atomic Energy Act, patents for inventions solely related to atomic weapons are barred. Other atomic-related inventions may be granted patents after review by the Department of Atomic Energy (DAE). In the Indian the Central Government's position on atomic-energy inventions is final and non-appealable. There have been instances of pharmaceutical companies filing patents on drugs which help in imaging techniques which have been rejected because of the presence of a radioactive isotope. In India, the Patent Office (IPO) does not make any distinction of atomic energy or nuclear energy related patent application based on its use. But nowadays it can be seen that similar applications have been filed in various jurisdictions. This paper further examines the IP strategy adopted in other jurisdictions and

analyzes whether India should revisit its patent provisions in light of foreign companies investing or forming joint ventures in nuclear power projects.

Keywords: Patents - Atomic Energy - Nuclear Energy - Indian Patent Act – National Security

1. INTRODUCTION

India kept away from nuclear deals for 34 years till 2009, which largely hampered its development of civil nuclear energy. Now India has opted outside nuclear non-proliferation treaty due to its weapon programme. Recently, India has entered into civil nuclear cooperation agreement between different countries like US, Australia, France, Canada.¹ India is exploiting its reserves of thorium for nuclear fuel as we lack indigenous uranium.² So Industrial collaboration for developing civil nuclear energy with foreign countries raises intellectual property Challenges. Patenting inventions either process or products have evolved so as to protect anything under the sun made by the man.³ But each country has reserved for their own protection either as National security or otherwise, some inventions from the purview of patents. Inventions related to atomic energy as well as inventions which may pose threat to national security may be excluded from patenting. The change in the socio-political matters of a country can be said to be a pre-determine for taking a policy decisions in such sensitive matters. Whether grant of patent is so crucial for such matters when two countries collaborate for Nuclear energy/ atomic energy based projects it has to be examined in the context of policies adopted by such countries in the said matter. Indian patent law has undergone a lot a changes after independence. The study made by Justice Ayyangar committee and Tek Chand committee recommended to keep atomic energy related inventions out of the category of patents. The attempt of this paper is to examine how Indian patent office has defined the scope of national security and atomic energy related inventions. The paper also looks into the patenting trends of Indian patent office and possible categories of security threat by other means and the impact of such patents on economy. The paper also compares the patent laws on National security related inventions and suggests a way forward.

EXCLUSION OF ATOMIC ENERGY RELATED INVENTION UNDER SECTION 4 OF INDIAN PATENT ACT

¹ Pulkit Mohan and Pallav Agarwal, "India's Civil Nuclear Agreements: A New Dimension in India's Global Diplomacy", *ORF Issue Brief No. 320*, October 2019, Observer Research Foundation.

² Indias prospects as a nuclear power, 2019 <https://www.drishtiias.com/to-the-points/paper3/india-s-prospects-as-a-nuclear-power>

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Based on 1959 Report on revision of the Patent Law submitted by Justice Ayyangar committee after examining the jurisdictions like US , Australia, and UK about patenting atomic energy related inventions submitted before the parliament suggesting incorporation of section 4 of the present Patent Act. The thorough study of pros and cons of granting patents on such invention tilted in favour of national security. It is a common sense that rather than giving monopoly rights for such atomic energy related inventions, in the wake of war/threat to national security to keep it away from patents, also making such knowledge available to public through disclosure of nuclear energy related inventions may result in dangerous consequences. Due consideration is given to both the Controller as well as the Central Government , the reason being giving a list of atomic energy related radio atomic substance will not suffice as the technology is ever evolving, so it requires experts in that field to decide such an invention falls under atomic energy or not. Under section 4 of the Patents Act of 1970, it excluded inventions falling under the category of atomic energy based on Atomic Energy Act 1962.⁴ This means central government can notify and can expand/ narrow the ambit of the term atomic energy. Section 20 of the Atomic Energy Act has given the different use in different sectors and purposes of atomic energy as not patentable,⁵ which shows that there is no need to make any distinction between atomic energy based weapons or for other civil purposes. This means atomic energy related inventions thus have been under the control of government itself and no to privatise this sector by allowing patents for the same is based on concerns of safety too. The way in which such security of nation was ensured is not merely by incorporating section 4 but also section 35, 39 and 65, emphasising Indian applicants that without prior permission of controller if they apply patents outside India including PCT applications it will be treated as violating secrecy directions and such applications will be treated either as abandoned or if patent has granted then controller can revoke such patents.⁶ All such related matters are finally decided by the Controller of patents either to prohibit publication of such patent application or communicates the same to such persons in the directions.⁷ At the same time section 35 also mandates controller to give notice to central government of such directions given by controller and such patent applications so that it can verify the same, in case the central governments finds that patent application not relevant/not falls under the category which is for defence purpose, such directions given by the controller should be revoked and notify the same to patent applicant.

⁴ Section 4 of the Patent Act, 1970,

⁵ Section 20(1) of the Atomic Energy, Act.

⁶ Section 34, Patent Act 1970

⁷ Section 35.

This is to make sure that controller is not making such decisions without a second thought. The central government is having suo moto power to notify Controller of patents such patent applications which it deems prejudicial to the national security of India. Since the matters related to defence or national security of a country is of vital importance any secrecy orders of controller or orders of central government on such matters are non-appealable for any court of law,⁸ This to ensure certainty of decisions of central government and to respect that decision pertaining to national security orders of central government or controller's secrecy orders are made non appealable. Any violation of secrecy directions are punishable offence of two years of imprisonment or fine or both.⁹

In case a foreign applicant, if applies for patent in India and such application is already been published in such country, then secrecy directions would be revoked.¹⁰ This is because if the same application even if related to defence purpose but already published in other countries inference would be the invention would not be something prejudicial to national security. Since it is already published in other countries anyone can access it if not kept confidential or it is under the secrecy direction of their country. The section 36 also takes care of interest of applicant by reconsidering the secrecy directions including from Indian applicant by submission of a request to the controller of patents which will be decided by the central government. The central government can make use of such invention during the continuance of secrecy directions and in case if the patent applicant suffers any difficulty due to the secrecy directions considering novelty and utility of such inventions solatium will be provided to applicant by the central government.¹¹ Also, on patent grant of such inventions no need to pay renewal fee during the period of pendency of secrecy directions. These steps taken by the central government is beneficial for the patent applicant as the government pays royalties for the use of such inventions even during the pendency of secrecy directions. The controller is given the power to extend any deadline relating to patent application which expired during the pendency of secrecy directions so that patent applicant update any requirements under the patent Act. However, central government retains the right to revoke any granted patents when it is satiated that it is prejudicial to security of India by giving an opportunity to be heard to the patent applicant as well as interested third parties.¹²

⁸ Section 41, Patent Act 1970

⁹ Section 118, Patent Act 1970

¹⁰ Section 36 of Patent Act 1970

¹¹ Section 37 of Patent Act 1970

¹² Section 65, Patent Act 1970

The Patent amendment in 1999 also imposed responsibility upon the Central Government not to disclose any information relating to patent application filed/granted prejudicial to security of India and also to revoke such patents if already it is granted.¹³ The provision is a non obstante clause empowering the Central Government to notify in the official gazette revocation of such patents inventions which the government feels prejudicial to security of India. This provision is commendable, as after amending the patent Act to become TRIPS compliant, such powers to revoke any patent detrimental to national security is quintessential.

Defining the Scope of “Security of India” or “National Security” under Patent Act

The Indian patent Act has used different terminologies to bar patents one is atomic energy related inventions under section 4 another under chapter vii inventions which are for defence purpose, under section 159A inventions detrimental to national security could be revoked by central government. In the light of these terminologies there is a need to examine the definition of each term.

The Atomic energy Act 1962 defines the terms like atomic energy, prescribed materials, radioactive substances. Under the said Act it had categorically mentioned patents will not be granted to substances used in different stages of production and disposal of atomic energy or such prescribed substances¹⁴ or radioactive substances. It has also defined the prescribed substances which include different minerals which are used for production of atomic energy and other compounds and derivatives related to it ¹⁵ In the definition of radioactive substance also it says about radiation limits in access emitted by any substance.¹⁶ Atomic energy definition says energy released from atomic nuclei by fusion or fission.

From combined readings of all these definitions its can be infer that only if the substances used emits radiation more than prescribed limits by central government it falls under section 4 of patent Act becomes a non-patentable invention. At the same time prescribed substances used for atomic energy related application where radioactive substances are used need not be decided based on emission of radiation, in such situation it can be decided by controller or central government’s DAE. It seems to be there vest a discretion on the controller of patents to decide which inventions relating to atomic energy falls under section 4 or not. Also, definition

¹³ Section 157A.

¹⁴ Section 2 (1) of Atomic Energy Act, 1962 (33 of 1962s).

¹⁵ Prescribed substance” is defined in section 2(1)

¹⁶ Section 2(1)(g) of Atomic energy Act 1962

has not mentioned anything about if such substances are having dual characteristic as well as whether focus to be given to its ultimate use or merely on limits of emission of radiation as prescribed by central government or not. This means the ultimate authority to decide is controller or as directed by central governments where such orders become non appealable. It is the DAE which notifies and issues the standard guidelines on updating of prescribed substances and equipment and technology under Atomic energy Act 1962, Based on the nature of metal or alloys or compounds, the DAE decides the percentage of radiation emission and its limits of emission. The law also sets limits on radiation emissions depending on how the elements are categorized. These limits vary based on the nature of the element and the percentage present in different forms - such as pure metals, alloys, compounds, manufactured products, or even waste and scrap materials. The recent gazette notification by the atomic energy department in 2016 and 2019 notification appended defines the prescribed limits of radiation emission.¹⁷ The office order of CGPDTM in 2006 reflects these sought of orders.¹⁸ Medicinal and R&D inventions using radioactive substances face frequent Section 4 objections in India. These objections are raised by both the Indian Patent Office and the DAE, since radioactive materials are tightly regulated for safety and national security reasons.

But Indian patent office seems to be not incorporating these guidelines of DAE while examining the patent application under section 4. The normal practise of patent office is referring the applications to DAE which has used terms like atomic energy or radioactive substances. So the inventions related to usage of radioactive substances for non-reactive purposes and within the permissible limits for such usages are mostly referred to central government by the controller of patents. This became a concern in case of the civilian nuclear business for patenting nuclear/atomic energy based inventions which are per se non atomic energy/nuclear energy based inventions and such deals with multinational companies of foreign countries will pose challenge to intellectual property protection.¹⁹

The definition of “security of India” is given under the explanation part of section 159A. The definition is trying to cover any activity relating to fissionable materials, traffic in arms. Here the definition has broadly covered fissionable materials, source of such materials, arms, and implements of war and such goods and materials directly or indirectly used for military

¹⁷ <https://dae.gov.in/node/733>

¹⁸ Office order no. CG/F/4/27/2006/225 dated March 30, 2006 of CGPDTM the purview of section 4.

¹⁹ Vijay pal Dalmia, Vaish Associates, Advocates, 2014, [tps://www.mondaq.com/india/patent/302560/indian-patent-act-nuclear-technology](https://www.mondaq.com/india/patent/302560/indian-patent-act-nuclear-technology)

establishment or anything taken at the time of war as well as during emergency in international relations. It has not tried to distinguish between materials like fissionable one either it is used for civilian purpose or purely for its usage in war or other emergency in international relations. But after India signing WTO product and process patents are allowed under the category of inventions, where medicines, drug, food chemicals were kept away from product patent in the Patent Act 1970. So drafting the definition of security of India is very crucial. Many of the substances like drug, chemicals and medicines are having dual character which can act as a chemical weapon in a warfare.²⁰ There are instances during the world war II different countries used DDT, parathion, Dieldrin etc as a chemical weapon.²¹ Similar is the case of biological substances like microorganisms which can be used as bioweapon in warfare. So there is a need to connect these dual characteristic substances to be included under the definition of National security so that central government can revoke such patents having dual characteristics. This can also be included as one of the grounds for patent revocation. Indian patent Act will be well aligned with the TRIPS requirement as Art 73 of TRIPS allows security exceptions. However, one can give a broader interpretation to the term "emergency in international relations" to include health emergencies like COVID19 pandemic²² including HIV AIDS.²³

But in Russia- Ukraine case though many members supported this view of broader interpretation including health emergencies like HIV AIDS or pandemics as emergency in international relations, however WTO panel gave a narrower interpretation: In the same case panel has considered "*general instability engulfing or surrounding a state*" as an emergency within the scope of the term. similarly in those lines pandemic can be considered as a potential threat to the stability of the state and the general trend over these years is of going beyond the traditional concept of military context and includes any kind of instability of the state emanating from various factors such as environment, health, food, economic etc under the purview of threat to national security²⁴

²⁰ John Rice, It's a Bug's Life: Chemical Weapons, Agricultural Revolution, and the War on Insect 2017 https://www.pugetsound.edu/sites/default/files/file/rice-john_0.pdf see Gay, Hannah. 2012. "Before and After Silent Spring: From Chemical Pesticides to Biological Control and Integrated Pest Management---Britain, 1945-1980." *Ambix: Journal of the Society for the History of Alchemy and Chemistry* 59 (2): 88-108. p91

²¹ K.L. Mehra Patent ACT and National security 2009 <https://www.iatp.org/news/patent-act-and-national-security>

²² Tushar Kohli, India: section 157A in the context of COVID 19

²³ Resource Book on TRIPs and Development, UNCTAD, CUP,2004

²⁴ Shirin Syed, Should India Invoke Section 157A of Patents Act in the Context of Covid-19?, *Spicy IP*,2020. <https://spicyip.com/2020/07/covid-19-india-should-invoke-section-157a.html>

The patent war between Huawei and Verizon has also raised serious national security related issues with cybersecurity vulnerabilities as well as military and cyber warfare that may pose by the patent holders of 5G technologies by US government. So far Chinese inventors obtained 12,600 U.S. patents in 2018 and Huawei alone holds more than 56,000 patents worldwide.²⁵ In short, Huawei dominates 5G patents, and U.S. regulators stopped Broadcom's Qualcomm takeover to protect national security.²⁶ Also china's patents on AI and related application is a matter of concern on national security for US administration.²⁷ It is in this context US Patent Office Director David Kappos, who stated that "a policy disincentivizing innovation and investment in these technologies could pose a national security threat."²⁸ Thus United States has gone to the extent of widening the scope of national security to threat posed by foreign patents²⁹

Not only in patent Act, but also in other Intellectual property related legislations like designs Act, semiconductors and Integrated circuit topography Act, Plant variety and farmers rights protection Act and competition Act provisions are incorporated relating to national security.³⁰ In designs Act it gives powers to controller either for cancellation of such design which is prejudicial to national security and not to disclose the information in the application in such cases.³¹ In case of semiconductors and integrated circuit lay out designs Act 2000, gives power to the registrar for cancellation of such lay out designs as well as non-disclosure of designs if it is prejudicial to national security.³² Similarly in plant variety's Act similar power for cancellation of registered variety or non-disclosure of such information is given to Registrar or Plant variety Authority³³ In Information Technology Act also there is similar provision where central government is having the power to issue directions in the light of national

²⁵ <https://www.bloomberg.com/news/articles/2019-01-08/china-increases-u-s-patent-holdings-while-ibm-keeps-top-spot>

²⁶ <https://btlaw.com/insights/alerts/2018/foreign-investment-in-the-us-president-blocks-broadcom-qualcomm-under-cfius-citing-national>

²⁷ James Morrison, Intellectual Property & National Security, 6 U. Cin. Intell. Prop. & Computer L.J. (2021) <https://scholarship.law.uc.edu/cgi/viewcontent.cgi?article=1038&context=ipclj>

²⁸ <https://www.judiciary.senate.gov/imo/media/doc/Kappos%20Testimony.pdf>

Qualcomm's extensive litigation campaign and resulting settlement with Apple reportedly caused [Intel's recent exit](#) from 5G chip development. The United States lost a key 5G player, no doubt benefitting Huawei and China

²⁹ Charles Duan, Do Patents protect National Security, 2019, <https://www.lawfareblog.com/do-patents-protect-national-security>

³⁰ V.K. Gupta, DESIDOC Bulletin of Information Technology, Vol. 27, No. 4, July 2007, pp. 5-14 2007, DESIDO

³¹ Section 46 Designs Act 2000

³² Section 68 of Semiconductors and Layout design of Integrated circuit

³³ Section 78, Plant variety and farmers rights protection Act

security to prevent incitement of commission of offence. Authorities can order interception or decryption of computer communications for security or investigation, but only with written justification.³⁴ Also under competition Act it empowers central government to exempt application of Act in the interest of security of India³⁵ In all these legislations controller/registrar is given such power or to act according to the direction of central government in the interest of national security. Intellectual property regime offers a number of mechanisms which may effectively legitimate interference with intellectual property for national security ends.³⁶

ANALYSING PATENT APPLICATIONS RELATED TO ATOMIC ENERGY

The patent office examines the applications based on specific category of inventions it belongs to.³⁷ Also a formality check will be done whether it falls under section 4 or not. But in practice this may not happen i.e., objection may not be raised in before first examination report is prepared. But in some cases objection based on section 4 is raised in FER submitted. In some cases after the submission of first examination report, this results in further delay in decisions from the controller of patents relating to outcome. The mention of radioactive substance, atomic energy its makes these types of applications to consider under section 4, there is no consideration of quantity of atomic energy been used and the purpose for which it is used. Specially patent applications for radio imaging techniques for medical treatment and research and development purpose are rejected based on section 4. In some cases very rarely the submission made by applicant is considered followed by amendment/ modifications and alteration of the claims and patent has been granted. More often applications relating to atomic energy are rejected based on section 4 and it is subjected to secrecy directions before referring it to atomic energy department. Till the central government decides the matter the patent application will be put on hold.

For patent applications involving pharmaceutical compositions that use elements restricted under Section 4 (atomic energy-related substances), especially when the invention is a diagnostic method or kit, the application cannot simply be amended by removing the restricted

³⁴ Section 79 of Information Technology Act, 2000

³⁵ Section 54 of competition Act 2002

³⁶ Iljadica, M. and Scott, P. F. (2017) Intellectual property and national security. *Journal of Intellectual Property Law and Practice*, 12(1), pp. 49- 61.

³⁷ Manual of Patent Office Practice and Procedure Version 3.0, 2019

elements. This is because the radioactive substance itself is the core feature of the diagnostic invention.³⁸ The Calcutta High Court in *Raytheon Company Vs The Controller of Patents & Ams*³⁹ held that controller is having discretion to refer any applications if feels which may fall under section 4. The decision taken by the central government in this matter will be decisive and non-appealable be either good or bad be the decision may be and controller is directed to communicate the same to patent applicant. This act of controller cannot be said to be arbitrary. The criteria that is used to demine the inventions fall under section 4 or not depends on factors like what is the purpose of the invention, what is the source of materials used for the atomic energy related invention like medical use diagnosis, research and development and possibility of dual use and whether it is prejudicial to national security or not.⁴⁰

Patent application	Invention	Decision	Year
8129/DELNP/2013	Catalyste composition ULTRAFILTRATION CONCENTRATION OF ALLOTYPE SELECTED ANTIBODIES FOR SMALL VOLUME ADMINISTRATION	Reply to FER not filed	Abandoned 2016
4361/MUM/2015	HYDROCARBON SOLUBLE METAL COMPOSITION AND A METHOD OF MAKING IT THEREOF	Application amended after FER	2019 granted
1824/MUMNP/2011	NANOPOROUS FILMS AND METHOD FOR MANUFACTURING THE SAME	Granted	2015
4222/KOLNP/2008		refused	2016

³⁸ Preeti Sharma and Indrani Adikari, patentability of inventions relating to radio active subatances, 2020<https://www.lexorbis.com/patentability-of-inventions-involving-usage-of-radioactive-substances/>
#acceptLicense

³⁹ AIR 1974 Cal 336

⁴⁰ Archana Shankar, A Brewing Storm In India's Patent Arena: Section 4: (Inventions Related To Atomic Energy) <https://www.expertguides.com/articles/a-brewing-storm-in-indias-patent-arena-section-4-inventions-related-to-atomic-energy/arzxizoo>

	APPARATUS FOR SPECTROSCOPICALLY ANALYSING A GAS		
4202/DELNP/2007	"STABILISED 99M TC COMPOSITIONS"	refused	2016 Due to use of a 'radioactive element' was deliberately found not to be mentioned
No. 2047/KOLNP/2009	CARBORANYLPORPHYRINS AND USES THEREOF use of	Granted	2016 Claim for MRI
2996/KOLNP/2009	LABELED FOLATES 18F-LABELLED FOLATES	Refused	2016
4001/DELNP/2008	PRECURSOR COMPOUND OF RADIOACTIVE HALOGEN LABELLED ORGANIC COMPOUND"	Granted 18F-fluorine as a radioactive tracer which has a short half-life (i.e., 110 minutes) and was claimed to be used for medical purposes only.	2016
2026/MUMNP/2007	LOW EMISSIVITY COATING WITH LOW SOLAR HEAT GAIN COEFFICIENT, ENHANCED CHEMICAL AND MECHANICAL PROPERTIES AND METHOD	Granted 2016 usage of elements involving Zirconium and Titanium was	Granted 2016

	OF MAKING THE SAME	objected	
3155/KOLNP/2009	novel folate conjugates and corresponding metal-chelate complexes and pharmaceutical compositions thereof	Falls under section 4	Refused
IN297192	SUBSTITUTED TIN NIOBIUM OXIDE PIGMENTS	GRANTED	2018
IN281044	Niobium dioxides	GRANTED	2017
IN253462	"NIOBIUM-DOPED VANADIUM/PHOSPHORUS MIXED OXIDE CATALYST"	Granted	2012

Source: INPASS IP INDIA, INDIAN PATENT ADVANCED SEARCH SYSTEM

Between 2013–2017, India issued the highest number of secrecy orders (43) under Section 4 of the Patents Act. The Kolkata Patent Office was the most active, issuing about 70% of these orders in the last five years. Of the 43 applications, 39 (90%) were referred to the DAE (DAE), while 4 (10%) were not. The DAE rejected 41.8% of the referred cases, saying they fell under Section 20(1) of the Atomic Energy Act, which restricts patents related to atomic energy.⁴¹

PATENTING NUCLEAR ENERGY RELATED INVENTIONS IN UNITED STATES, UK, FRANCE, RUSSIA & CHINA

United States initially granted patents for atomic energy/nuclear emerging related inventions even it is for making weapons for warfare.⁴² The first patent in this category was filed for atomic pile in 1944 for method by which self-sustaining controlled nuclear chain reaction and patent was granted in 1955.⁴³ But commissioner of patents used to withhold such patents which prevent successful prosecution of the war. But later this provision was amended that only

⁴¹ Archana Shankar, A Brewing Storm In India's Patent Arena: Section 4: (Inventions Related To Atomic Energy) <https://www.expertguides.com/articles/a-brewing-storm-in-indias-patent-arena-section-4-inventions-related-to-atomic-energy/arzxizoo>

⁴² Wellerstein A. Patenting the bomb: nuclear weapons, intellectual property, and technological control. *Isis*. 2008 Mar;99(1):57-87. doi: 10.1086/587556. PMID: 18505023.

⁴³ <https://www.ne.anl.gov/About/hn/news960518.shtml> Argonnes Nuclear science and Technology Legacy

during war time patents to withhold relating to defence. Over 11,200 patent applications were classified as confidential information during Second World War and imposed secrecy directions to patent holders like radar radio system and other electronic devices. Consequently, such patent applications were under secrecy orders.⁴⁴

After Second World War by introducing Atomic energy Act, 1954 and Invention secrecy Act, 1951, Nuclear Regulatory Legislation Patents were barred if it is useful or in the utilisation of nuclear or atomic energy in atomic weapon. The Act applied only if the invention is made/created in United States.⁴⁵ Also, in Patent 1952 Act, provision which states in case of inventions with secrecy orders will be dealt by defence agency not by commissioner of patents. If in case any patent is granted commissioner is having power to revoke and pay compensation.⁴⁶ The inventor can send a report to the commission by providing the detailed description of the invention, in such cases commission can provide secrecy directions.⁴⁷ The commission will forward such application which he suspects as atomic/nuclear weapon related invention for the inspection to the Atomic Energy Commission, the Secretary of Defence, and the chief officer of any other department or agency of the Government that the President designates as a defence agency of the United States.⁴⁸ In the United States, the Under Secretary of Commerce for Intellectual Property (who is also the Director of the USPTO) must inform the Commission about all patent applications. These applications are then kept confidential by the Commission.

In US term for secrecy is for one year⁴⁹ which may extend many years, till this period patent cannot be granted.⁵⁰ If there is a reasonable delay occurred for granting patents due to secrecy orders, a patent term adjustment is awarded in these circumstances.⁵¹ No one can file foreign patent during this period, but can seek consent to file application abroad by obtaining a permit or secrecy order modification.⁵² It is two tier system in US to obtain compensation for the loss

⁴⁴ Sanjana, An overview on Invention secrecy Act 1951, 2021 <https://www.mondaq.com/india/patent/1119888/an-overview-on-the-invention-secrecy-act-of-1951>

⁴⁵ 37 C.F.R. § 5.11(e) (2015)

⁴⁶ <https://www.law.cornell.edu/uscode/text/42/2181> Legal Information Institute, Cornell law school

⁴⁷ 35 U.S.C.A. § 181 (West 2000)

⁴⁸ 35 U.S.C.A. § 181 (West 2000)

⁴⁹ 35 U.S.C.A. § 181 (West 2000); MPEP § 120 [VII][100-30] (9th ed. Rev. Jan. 2018).

⁵⁰ See, e.g., *McDonnell Douglas Corp. v. United States*, No. 278-77, 1980 WL 20809 (Ct. Cl. Jan. 25, 1980) (10 years under secrecy order)

⁵¹ 35 U.S.C.A. § 154(a)(2) (2015). 78 Id. § 154(b)(1)(C).

⁵² Id at 5.4

suffered by the patent applicant if the patent is withheld by secrecy direction or used by government, undue delay in granting due to secrecy direction, one is from administrative agency followed by court review after the patent application is deemed allowable or file directly in court after patent is issued. The time period to seek compensation is within six years after issuance. One can claim two types of damages one due to secrecy orders and other due to government use.⁵³ So to get compensation for withholding the application based on secrecy direction is a cumbersome process.⁵⁴ Though in US atomic energy used for making atomic weapons are barred from patents, still, based on section 22 of patent Act discretion is upon the federal agencies to decide matter, but the difference here is the orders are not non appealable unlike in India and compensation for the withholding patent application based on secrecy direction. There was a move to expand secrecy orders to economically significant patents but concern has been expressed by ABA and IPOA such impact on domestic industry and research and development relating to nuclear/atomic energy related sector.⁵⁵ The patents relating to nuclear energy is only 1%.⁵⁶

In the U.K., under Section 22 of the Patent Act 1977, the Secretary of State must send patent applications involving atomic inventions to the relevant authorities. These authorities then decide whether publishing the patent could harm national security or the public interest.⁵⁷ There are more inventions kept under secrecy directions in UK when compared to US. Atomic energy Act 1946, allows government to use any patented invention. Inventions with dual nature with potential to act as a threat to national security like bioweapons are also withheld by imposing secrecy directions like airborne crop duster.⁵⁸ These decisions are non-appealable.⁵⁹

In Russia inventions relating to national security are categorised in to three tier secrecy. In Russia, if an invention is classified as secret, its registration and patenting are handled by the federal executive intellectual property authority or another authorized body. Once the patent is granted, the responsible authority must notify the federal executive authority on intellectual

⁵³ Id s.5.5

⁵⁴ Locke, Scott (2019) "The Invention Secrecy Act: The USPTO as a Gatekeeper of National Security," IP Theory: Vol. 8 : Iss. 1 , Article 4.

⁵⁵ Daniel P. Gross, The Consequences of Invention Secrecy: Evidence from the USPTO Patent Secrecy Program in World War II Harvard Business School, working paper, 2019

⁵⁶ https://www.brookings.edu/wp-content/uploads/2018/02/final_cleantech.pdf

⁵⁷ Ibid.

⁵⁸ Paul marks, UK keeps three times as many patents as secret than US, 2010, <https://www.newscientist.com/article/dn18691-uk-keeps-three-times-as-many-patents-secret-as-the-us/#ixzz7JoUwS3IP>

⁵⁹ PA 1977, s 97(1)(c). The decisions in question are those made under PA 1977, s 22(1) and (2).

property about the registration.⁶⁰

In Russia, details about applications and patents for secret inventions are not made public in the official patent register. Any disclosure of such information is strictly controlled and must follow the country's law on state secrets.⁶¹

In European countries it is based on European Patent conventions they are governed, there is no express bar on patenting nuclear weapons related inventions, it is up to the European member countries to decide and incorporate in their national patent laws.

In Bulgaria, patents involving state secrets are treated as "secret inventions" under special classified-information laws.⁶²

In Bulgaria, the law says a state secret is any information (listed in Schedule 1) that, if accessed without authorization, could harm the country's national security, defence, foreign policy, or constitutional order. Schedule 1 provides a detailed list of items that may qualify as secret inventions.⁶³ Under Bulgarian Patent Law, the Council of Ministers decides who can use or manage a secret patent.⁶⁴ In France inventions relating to nuclear energy are non-patentable under their Intellectual property code⁶⁵

In China Substances obtained by means of nuclear transformation are not patentable.⁶⁶ If a patent application relates to an invention that affects national security or other vital state interests, and secrecy is required, then the case will be handled according to the relevant provisions of the State.⁶⁷ In China, if an invention is created there, the applicant must first get security clearance from the patent office before filing for a patent abroad. If this rule is ignored, the Chinese Patent Office (SIPO) can refuse to grant a patent for the same invention in China.⁶⁸

⁶⁰ Article 1402., Russian federation intellectual property code

⁶¹ Article 1402. Civil code of Russian Federation, https://www.jpo.go.jp/e/system/laws/gaikoku/document/index/russia-e_minpou_no4.pdf

⁶² Committee on development of IP https://www.wipo.int/edocs/mdocs/mdocs/en/cdip_15/cdip_15_6_corr-main1.docx 2017 In Bulgaria Article 24 of the Patent Law of Bulgaria explains that "secret inventions are inventions which contain classified information representing a state secret within the meaning of Article 25 of the Law on Protection of Classified Information"

⁶³ Schedule No 1 to Article 25 includes a long list of "Categories of Information Classified as a State Secret" (more than 64 items grouped in three categories: I. Information Relating to the Country's Defense; II. Information Relating to The Country's Foreign Policy and Domestic Security and III. Information Relating to the Country's Economic Security).

⁶⁴ See Article 24 (8) of the Law on Patents and Utility Model Registration No. 27/2 of 1993 as last amended on 20/07/2007 of Bulgaria.

⁶⁵ <https://www.wipo.int/edocs/lexdocs/laws/en/fr/fr467en.pdf>

⁶⁶ Article 25 of patent law of peoples republic of china

⁶⁷ Article 4 of patent law of peoples republic of china

⁶⁸ Philips, National security implications of international collaborations, 2015, <https://www.lexology.com/library/detail.aspx?g=be281a41-2117-4967-9e57-d6cd607659c2>

The comparative study shows security laws Security rules aren't uniform, they keep changing, and breaking them can mean losing rights or even criminal charges for the inventor or applicant.⁶⁹ Some countries have different statutes to protect including intellectual property statutes with varying scope of definition of nation security or atomic/nuclear energy related inventions by way of secrecy orders. The growing concerns are withholding intellectual property by secrecy directions may impede research and innovations in nation security/defence related/Atomic/nuclear energy related inventions and the lack of alternative mechanisms in incentivising such inventors. Though compensation provisions are there in some jurisdiction then also expenses involved for litigation as well as those receiving compensation are very less as proved from US situation. So far, none of the above said countries have taken any steps to narrow the definition of national security or increase the patent grants related nuclear/atomic energy related inventions.

NUCLEAR ENERGY DEALS OF INDIA AND STRATEGIC MANAGEMENT

India kept away from nuclear deals for 34 years till 2009, which largely hampered its development of civil nuclear energy. Now India has opted outside nuclear non-proliferation treaty due to its weapon programme and NSG . Recently, India has entered in to civil nuclear cooperation agreement between different countries like US, Australia, France, Canada.⁷⁰ India is exploiting its reserves of thorium for nuclear fuel as we lack indigenous uranium.⁷¹ So Industrial collaboration for developing civil nuclear energy with foreign countries raises intellectual property Challenges. The Indo- US nuclear deal opened the door for India to join global nuclear trade and partner with many countries, even though it's outside the Non Proliferation Treaty framework.⁷² The deal made India's civilian nuclear program internationally transparent, while keeping its military program independent.⁷³ India relies on its own PHWRs, is working with France (Jaitapur EPRs) and Russia (Kudankulam + SMRs), and is expanding with new reactors, breeder technology, and private sector entry to hit its 2047 nuclear power goals. There is a need to have a proper strategic movement of the nuclear energy related inventions, for that effective re-framing of existing intellectual property is one amongst them.

⁶⁹ Philips, National security implications of international collaborations, 2015, <https://www.lexology.com/library/detail.aspx?g=be281a41-2117-4967-9e57-d6cd607659c2>

⁷⁰ Ibid.

⁷¹ <https://www.drishtiiias.com/daily-updates/daily-news-analysis/indo-us-nuclear-deal>

⁷² Ibid.

⁷³ Indo-US nuclear deal 2021, <https://www.drishtiiias.com/daily-updates/daily-news-analysis/indo-us-nuclear-deal>

CONCLUSION

The comparative study of laws relating to control/regulation of nuclear /atomic energy as well as intellectual property laws it could be said that there is a need to stream line the procedure of assessment and a strict time frame for taking decisions without much delay.⁷⁴ In case of inventions with dual character/use it should be left with the central government to decide, at the same time decision should come out with specific time. There should be a specific department to handle such patent applications, so that before First examination report is issued patent applicant can come to know whether it is referred to central government or not. There should be provision to directly approach patent office and central government that application of inventions is of such use that central government can use for national security, whereby such application can be processed and collaborative research with such inventors can be concluded by the central government with confidentiality agreements. In case of government exploring further in such invention there should be collaborative research with such inventors with the central government with confidential agreement binding on the parties is one way of providing solution, thus facilitating further innovation in this sector.

Central government should explore the collaborative research with such domestic inventors in India so that they are being incentivised and future potential of such inventions can be further exploited. The government shouldn't walk away by giving compensation to such inventors but confidential project agreement should be executed with them so that research and investment in such sectors should be staggered only because of bar on granting patents in the light of national security. The lessons from US teaches the same, growing concern of IP theft as well as slow growth of technology in such sector. In the context of central government entering civil nuclear energy projects with foreign partners intellectual property can be granted and retained but with well-maintained secrecy directions of government, This is taking in to account of sensitivity of such inventions at the same time inventors efforts to be recognised by granting intellectual property protection. The central government should have a strategic plan in case of IP for inventions relating to nuclear/atomic energy for civil purpose when it is based on collaborative research with foreign partners.

⁷⁴ Preeti Sharma and Indrani Adikari, patentability of inventions relating to radio active substances, 2020 <https://www.lexorbis.com/patentability-of-inventions-involving-usage-of-radioactive-substances/>
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