On Environmental Quality Standards and Finding of Liability for Environmental Pollution Torts

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Abstract: Though bearing technical and legal attributes, environmental quality standards are neither rules nor regulatory documents. With the binding force coming from the legal norms where they are cited, environmental quality standards are designed and implemented as a yardstick for measuring environmental quality. They also play a role in the functions of goal setting, merit appraisals, inspiration, supervision and accountability in conjunction with the legal norms and administrative plans where they are cited. Characteristically, environmental quality standards adopt sort management in concept, take holistic values and methodologies, establish phased goals and accept the resulting policy choices. These standards are not applicable to determine tort liability caused by environmental pollution from the perspective of legal norms but provide limited evidence for finding the same in the view of factual analysis by delivering scientific support to prove negative effects on the environment. Hence, environmental quality standards do contribute to finding torts, thus making the production of evidence less difficult. Also, they can be used to prove the relevance between torts and damage.

Keywords: environmental quality standards, environmental pollution liability, facts, norms

1. Problems

Environmental quality standards are restrictive provisions regarding harmful substances and factors in the environment and include technical requirements that must remain consistent in the context of environmental protection. Established on factors like assessment of environmental risks, the standards are

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designed to ensure public health and maintain a sound ecological circle.[①] But should they be used to find tort liability caused by environmental pollution? No consensus has been reached on this question. Advocates who answered "no" considered environmental quality standards no more than indexes that authorities try to meet, rather than criteria for liability fixation (Shi, 2016; Wang, 2008) or legal norms that directly provide for specific rights and obligations for citizens (Naohiko, 1999), which therefore justifies that compulsory environmental quality standards cannot be used as a defense to negate environmental pollution liability (Tan, 2017). Those who answered "yes" believed that environmental pollution shall be established on the grounds of environmental quality standards, i.e. pollution shall be found if environmental quality standards are not met (Jin, 2016; *Environmental Science Dictionary*, 2008; Cai, 1995; Jin & Wang, 2003). This group is further divided into arguments of sufficient and necessary conditions. The sufficient conditions argument made a relatively stronger confirmation, holding that polluters must face civil liabilities as long as their emissions to the environment exceed the standards (Wang, 1997), while the necessary conditions group held that failing to meet environmental quality standards is a necessary condition for establishing environmental pollution liability, i.e. no excess of the standards as a result of polluting acts means no pollution and therefore no necessity to analyze the causal relationship. Even though the factual causal relationship can be confirmed, environmental quality standards should be acknowledged as the defense of compliance under Tort Law on the premise of its legal formulation and reasonable provisions. Environmental quality standards set reasonable boundaries for finding equivalence of the causal relationship in environmental pollution, and thus also set the boundary for finding the extent to which victims' rights should be protected under Tort Law of the People's Republic of China (Wang, 1997). To find the causal relationships in liability for environmental pollution tort, environmental quality standards set thresholds and boundaries which respectively exclude the condition (factual causation) and equivalence (causation in law).

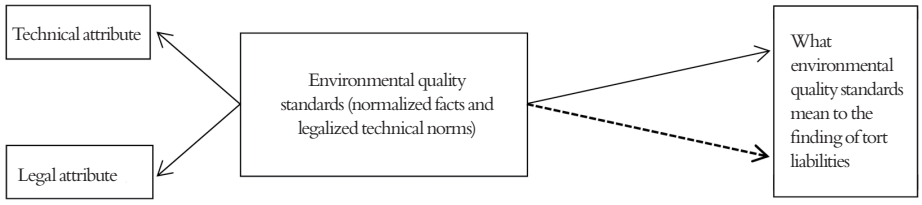
Even the courts are not unified in applying the standards to adjudicate legal disputes over the liability for environmental pollution tort. For example, in *XXX Company Ltd. v Feng* over environmental pollution tort, where both noise and air quality met the standards in the course of construction, the trial court negated a necessary linkage between the satisfaction of air and noise quality standards and environmental damage because it considered the standards merely the basis for the executive authorities to administer the environment, and therefore ordered the polluter to assume liability.[②] However, in *Jiande Cement Co., Ltd. v Jiang* over noise pollution, the trial court made the judgment in favor of the polluter because the noise generated had not exceed the environmental quality standard.[③]

Two reasons have been blamed for disputes over theories and inconsistent ruling practices. First, the Chinese legal profession has not given enough attention to, nor conducted sufficiently deep studies into environmental quality standards. Second, China has experienced big changes in formulating and implementing environmental quality standards over the last three decades, behind which we saw failures of MEPArating facts from norms and disregard for technical and legal attributes of environmental quality

① See Environmental Information Terminology (HJ/T416–2007) (published by the State Environmental Protection Administration, now renamed Ministry of Ecology and Environment of the People's Republic of China, on December 29, 2007, implemented on February 1, 2008), Beijing: China Environmental Science Press (2007), p. 19. The Environmental Protection Law (April, 2014) replaced "human health" with "the public health" under Article 1, supplemented by Article 2 (1) of the Standardization Law of the People's Republic of China (November 4, 2017).
② Civil Judgment No. (2012) Tanzhongminyizhongzi 222 by Xiangtan Intermediate People's Court of Hunan Province.
③ Civil Judgment No. (2010) Zhehangminzhongzi 3015 by Hangzhou Intermediate People's Court of Zhejiang Province.

standards. With respect to the legal attributes (norms), studies should be made proceeding from the coverage of application and validity ranking to determine whether environmental quality standards can be applied as legal norms in finding environmental pollution liability. As to the technical attributes (facts), efforts should be made on probative force proceeding from authenticity, relevance and validity, to decide whether environmental quality standards can be applied as scientific literature and factual institutions to evidence the elements of the liability. Also, both negation and confirmation groups shall clearly express their positions based on facts or norms for effective academic exchanges, otherwise any ambiguous confirmation or negation would, to some extent, deliver biased and unsatisfactory results. In real legal disputes, litigants who raise claims or defenses and the trial courts who resolve disputes while avoiding vocational risks have been making demands for environmental quality standards. The negation group absolutely says no to the application of environmental quality standards in finding environmental pollution liability. It sounds reasonable but not fully convincing. The confirmation argument seems attractive because it tries best to apply environmental quality standards in response to social demand but has been misused since it is not self-consistent and fails to MEPArate facts from norms.

To give well-structured explanations and make the theory concise and self-consistent, this paper first clarifies that environmental quality standards bear the technical attribute (facts) and then analyzes the legal attribute (norms), followed by discussions over the evolution from environmental baselines (scientific facts) to environmental quality standards (standard and legalized technical norms) and characteristics defined in this course. Finally, this paper discusses what environmental quality standards mean to the finding of environmental pollution liability.[①] The structure is indicated as follows.



2. Legal attribute

Environmental quality standards, also called "quantitative law,"[②] have technical attributes if examined based on facts. If analyzed from the perspective of norms, they also have legal attributes, which can be rolled out in form and substance to reveal who, acting in what capacity and following what procedure, transforms

① Environmental pollution liability in this paper is limited to physical injury and property damage that environmental pollution causes to civil subjects. Other completely different problems such as damage to the ecological environment and public rights and interests in the environment are excluded. Also, this paper introduces the Ambient Air Quality Standards (GB3095–2012) and the Environmental Quality Standards for Surface Water (GB3838–2002) as representative samples for analysis andgives consideration to both the Environmental Quality Standard for Noise (GB3096–2008) and others. This paper is so rolled out because the two samples are the best representatives after considering enforceability, enforcement authority, coverage of application and applications of currently–in–force 16 environmental quality standards issued by China's environmental protection department. Plus, the majority of other legal literature focuses on the aforesaid three standards, such as reference No. 5, Chen W..

② Lu. Zh. M. & Yang Sh. M. Control Environment and Healthy Risks–Drawing Lessons from the U.S. Environmental Standards, Chinese Journal of Environmental Management, 2017, Vol. 7.

scientific and technical consensus into legal requirements and publishes the documents in what way, as well as the validity and function of the documents in the environmental law system.

2.1 Analysis in form

2.1.1 Analysis made based on authorization

Since the enactment of the 1979 Environmental Protection Law of the People's Republic of China (For Trial Implementation) ("1979 Environmental Protection Law"), the competent department of environmental protection administration under the State Council has been vested the power of formulating national environmental quality standards by the enabling clause under the legislation on environmental protection made by the National People's Congress. This has been true before and after the implementation of the Standardization Law of the People's Republic of China ("Standardization Law") on January 1, 2018. Article 26 of the 1979 Environmental Protection Law authorized the then State Administration of Environmental Protection to set standards in conjunction with relevant departments, and to approve and release national environmental quality standards. This directly gave birth to the Environment Standard of Aircraft Noise around Airports (GB9660-88) and the Standard of Vibration in Urban Area Environments (GB10070-88). The 1989 Environmental Protection Law deleted "The environmental protection administrative department of the State Council shall develop the national environmental quality standards." which gave birth to the other 14 currently effective national quality standards. The provision was then maintained under Article 15 (1) of the 2014 Environmental Protection Law, but no new national standards have been made since then.

Big changes have occurred in formulating local environmental quality standards. The 1979 Environmental Protection Law (Article 27) provided that the environmental protection institutions at or above the county level have the power to formulate local environmental quality standards. Such power, however, was revoked by the 1989 legislation, which under Article 9 (2) set that "the people's government of provinces, autonomous regions and municipalities directly under the Central Government may establish their local standards for environmental quality for items not specified in the national environmental quality standards and shall report them to the competent department of environmental protection administration under the State Council." The revised 2014 Environmental Protection Law vests the power of formulation in the people's governments of provinces by formulating under Article 15 (2), saying that "for matters included in the national environmental quality standards, they may develop local environmental quality standards higher than the national standards." These are blank enabling clauses because no factors have been considered in vesting the power of formulating national quality standards. Even the provisions on drawing up local environmental quality standards are limited merely to coverage (i.e. items not defined in national environmental quality standards) and minimum level (with respect to the items defined in national environmental quality standards, local standards should be set stricter). This type of authorization assigns the authority under organizational norms (Song, 2008), but constitutes no substantial restraints on framers and therefore leaves much leeway for them to exercise their discretion.

2.1.2 Analysis made by formulating procedures

With the power vested by laws, the competent department of environmental protection administration under the State Council has established relevant regulations and normative documents including the Measures for the Administration of Environmental Standards. In accordance with these regulations and normative documents, national environmental quality standards and trade standards must be formulated or

modified following the steps of setting up, drafting, soliciting opinions, review, examination and approval, numbering, issuance and publishing. With respect to local environmental quality standards, the formulation and modification must be drafted by the competent department of environmental protection administration under the people's governments of provinces, submitted to the Ministry of Environmental Protection ("MEPA," now the Ministry of Ecology and Environment) for comments, and reported to the people's governments of provinces for approval and to MEPA for filing. As required by the Legislation Law of the People's Republic of China ("Legislation Law") and the Provisions on the Procedures for the Formulation of Regulations, regulations shall be established following the steps of setting up, drafting, review, decision-making and release, while the Measures on Examining Legality of Normative Documents of MEPA ("MEPA's Measures on Legality") provided that the draft of normative documents must be submitted to MEPA's Department of Policies and Regulations after being signed and approved by the first person in charge. All these indicate that environmental quality standards differ from regulations and normative documents in procedures of formulation.

2.1.3 Analysis made by document numbering

The Chinese government has enforced strict rules to number official documents. Environmental quality standards in the strict numbering system shall be numbered by code, sequence number and year, as well as different letters to demonstrate whether they are national, local, industrial and voluntary in nature. According to MEPA's Measures on Legality, starting from January 1, 2016, any documents that are not numbered with "Guohuangui" (national environmental regulations in English) are not normative documents. Before that date MEPA had attached various file numbers to its normative documents, which were quite different from those given to environmental quality standards.

Based on the above explanations, framers of environmental quality standards have the power to draw up normative documents which have a binding force equal to or below regulations. But if examined in terms of formulating procedures and numbering rules, these standards are neither regulations nor lower ranking normative documents.

2.2 Analysis in substance

2.2.1 Enforceability of environmental quality standards

Under the Standardization Law of the People's Republic of China, standards established by the government are either mandatory or voluntary. However, neither is self-enforceable, and their binding force comes from laws and norms where they are cited (Shi, 2016). Article 28 (2) of the Environmental Protection Law of the People's Republic of China, which fixes "local people's government in the key regions and valley areas failing to meet the national environmental quality standards shall work out plans for correction and take measures to meet such national standards within a prescribed time period," is a good example to indicate that it is the article, not the standard itself, that imposes the binding force on the local people's government.

2.2.2 Functions of environmental quality standards

Environmental quality standards are designed and implemented as a yardstick for measuring environmental quality. They also play functions of goal setting, merit appraisals and inspiration, as well as supervision and accountability in combination with legal norms and administrative plans where they are cited.

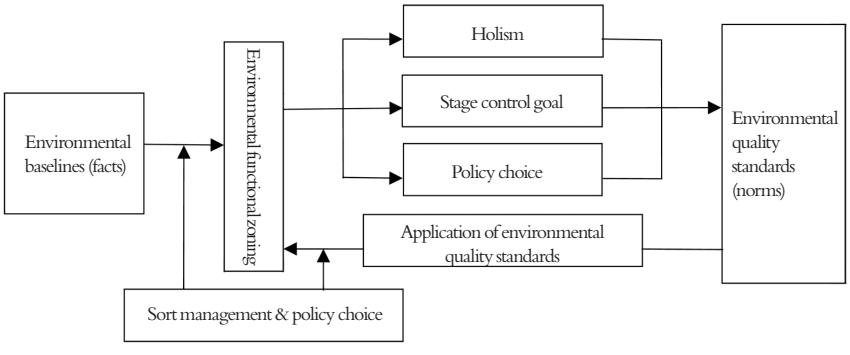
Constitution of the People's Republic of China ("Constitution") provides that "The state protects and improves the environment in which people live and the ecological environment. It prevents and controls pollution and other public hazards." under Article 26, and that the obligation shall be fulfilled by the people's

governments at all levels and their functional departments. For this purpose, the Central Government must set goals for the local people's governments to ensure the fulfillment of the national target. For example, the Environmental Protection Law establishes multiple-target appraisal systems under Article 6 (2), Article 26, and Article 28, etc. In addition to self-appraisal and examination conducted by the governments at higher levels, the people's governments shall also accept the supervision of the people, the people's congress at the same level and political parties. All these must be done against objective criteria, of which environmental quality standards become the first choice because they are indicated in quantitative values. Practically, important appraisals have usually been done based on environmental quality standards. So, holding the local people's governments accountable for the environmental quality substantially reflects their accountability for the rate at which environmental quality standards are met. It therefore explains why the local governments lead the efforts to stand against raising environmental quality standards.

Accordingly, environmental quality monitoring conducted based on environmental quality standards has been implemented to supervise governance practices. China is now going through vertical management reform in monitoring supervision and law enforcement at environmental protection institutions below the provincial level. The effort aims to MEPArate monitoring of pollution emissions from that of environmental quality, partly because of the demand for moving the authority for monitoring to the people's governments of provinces.

3. Characteristics of environmental quality standards

Environmental quality standards and environmental baselines relate to each other but also share differences in nature. Environmental baselines consist of pure scientific data that reflect the relationships between the effect expressed by a single discipline and the pollutant volume, while environmental quality standards are selected indexes and their limits are based on the assembly of benchmarks and weighing of various factors such as the environmental quality at present, pollutant load, social, economic and technical capacities for environmental improvement, categories of regional functions and values of environmental resources, etc (Ye & Zhang, 2013). Environmental baselines are scientific facts, which are singular propositions described in words after observations, experiments and measurements, etc (Zhu, 2012). Though they could be wrong and explainable, scientific facts offer the best accessible facts for drawing up and implementing norms because they take objects as factual bases (Cao, 2003) and stand on the shoulders of existing scientific knowledge. If reviewed from the relationship between facts and norms, the process by which environmental quality standards are formulated based on environmental baselines is the one by which scientific facts are transformed into legal norms. Scientific facts provide facts



and important bases for environmental quality standards and become a legal attribute by expressing the standards in scientific language. Further, environmental quality standards are facts conforming to norms and legalized specifications, rather than pure legal norms, thanks to the technical attributes they fundamentally retain. In China, the transformation of environmental baselines into environmental quality standards has been affected mainly by sort management, holism, stage control and policy choice, which therefore give some characteristics (indicated and explained as follows) to environmental quality standards.

3.1 Idea-sort management

Sort management, also called differentiated management, is done according to the divergence of objects (Xie, 2005). This idea has been prevailing in China's environmental management practices, including the design and application of environmental quality standards. In detail, both design and application of the standards require environmental functional zoning, which means properly zoning the region into different parts by functions according to social and economic development, environmental structure, environmental state and functions.② As these parts often require a different environmental quality due to different functions, environmental quality standards must reflect regional variations (Jin & Wang, 2000, pp. 82-83) and different limits as a result. For example, the Ambient Air Quality Standards set two functional areas, one is natural reserves, scenic spots and other areas that require special conservation, and the other is residential areas, business complexes, transports and residences, industrial and rural areas. For these two types, the standard accordingly sets different concentration limits with respect to sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, airborne particulate matters with a mass median diameter less than 10 μm (PM10) and a mass median diameter less than 2.5 μm (PM 2.5), as well as the total suspended particulate, nitrogen oxides, lead, benzo(α) pyrene. Regarding implementation, functional zoning is also the first step that needs to be taken, followed by finding limits that should be applied. Functional zoning in the setting of standards is a kind of initial classification of the environment, while in application it is a further finding of the specific type of environment.

China also has a few environmental quality standards that set limits for special functions or special regions, rather than for functional areas. Behind this practice are the areas of special nature and small coverage not included in the general environmental functional zoning. Examples include the Water Quality Standard for Fisheries (GB11607-89), which applies to spawning grounds, feeding grounds, over wintering grounds, migration pathways, aqua-cultural areas, as well as marine and freshwater fishery waters. Another example is the Standards for Irrigation Water Quality (GB5084-92) for surface water, underground water, urban sewage after treatment, as well as industrial sewage that is similar to urban sewage in quality as the source of irrigation water for farmland. The two standards reflect the idea of sort management as they are applied to two types of functional zones.

3.2 Values and methodology-holism

"Holism," a term with multiple meanings that covers various interrelated dimensions such as holism of methodology and that of values. It has been demonstrated by China's domestic environmental laws, both in methodology and values (Deng, 2014; Ke, 2014).

Environmental quality standards reflect the holism of values mainly in functions because they are set to protect the public and the ecological environment rather than individuals or parts of the ecological

① Environmental Information Terminology (HJ/T416–2007).

environment. The 2014 Environmental Protection Law adopts "public health" in place of "human health" under Article 1, as the word "public" clearly shows holism. As explained before, environmental quality standards set limits for functional areas based on the leading function, thus giving response to the demand for protecting public health and ecological environments. But since the response is not made to answer the special demands of different individuals and no sufficient consideration is given to non-leading functions, no one can be sure that every individual's demand can be satisfied by meeting environmental quality standards.

Environmental quality standards also reveal holism of methodology in methods of formulations. Taking the social public and environmental elements as the object and scientific knowledge such as epidemiology as the basis, the formulation methods are used to consider the route through which objects are exposed to pollutants and the exposure-dose relationships on the whole, select conservation levels and find pollution indexes and their control limits. Conservation levels are about probability that, i.e. to what extent and what percentage of the objects will sustain negative impacts. The question that needs no consideration in the formulation process is who on earth will be affected. Though some sensitive groups are taken into account, consideration is given to the whole group, rather than specific individuals.

The 16 currently-in-force environmental quality standards also share differences in reflecting holism. Generally, the more objects to be protected, fewer zoning grades are needed, which means greater reflections of holism. For example, the Ambient Air Quality Standards, the Environmental Quality Standards for Surface Water and the Environmental Quality Standard for Noise have greater reflections of holism, while the Environmental Quality Evaluation Standard for Farmland of Greenhouse Vegetables Production (HJ333-2006) and the Farmland Environmental Quality Evaluation Standards for Edible Agricultural Products (HJ332-2006) have less.

3.3 Basis-stage control

China has made its environmental quality standards based on stage control goals. This can be seen in the difference between threshold limits and stage control standards and their selections.

Threshold limits and stage control standards are different in whether they consider economic and technological conditions and accessibility of the standards. Threshold limits have no such consideration. They set the standards below the level at which safety threshold of pollutant concentration is controllable or the risk is acceptable merely on the current scientific knowledge and achievements of baseline studies. Negative impacts caused by pollutants below the threshold are generally negligible, and the risks caused by non-threshold pollutants to public health and the environment are controllable and acceptable (Nevers, 2005; Meng, Zhang & Zheng, 2006). The U.S. National Ambient Air Quality Standards is a representative example (Zhang et al., 2011). It sets PM2.5 at 12μg/m^3, the standard annual average of the first grade, 15μg/m^3, the second, and 35μg/m^3, the average of both grades in 24 hours.① According to the latest study, this setting is sufficient to protect sensitive populations like children and the elderly from sustaining physical damage including premature death, hospitalization, increment of emergency treatment and chronic respiratory diseases derived from prolonged or short-term exposures.②

With stage control standards, framers consider both the necessity of protecting public health and the ecological environment and factors such as social and technical conditions that affect the satisfaction of the

① See NAAQS Table, at https://www.epa.gov/criteria-air-pollutants/naaqs-table(Last visited on April 13, 2017)
② See Environmental Protection Agency, National Ambient Air Quality Standards for Particulate Matter (Final Rule), 78Federal Register 3086 (2013).

environmental quality standards and set environmental quality standards according to the environmental quality being pursued at present. The practice is scientific because it is established on environmental baselines and makes standards more practical by spelling out specific targets to be met at present (Zhang et al., 2011). Such ideas therefore have been adopted in designing environmental quality standards by many countries and international organizations including the European Union and the World Health Organization.

China is a member of this group. For example, the Method on the Management of Environmental Standards sets under Article 10 that "the uniformity of environmental efficacy, economic returns and social benefits shall be promoted on the basis of the principles, policies, laws, rules and related regulations, and for the purpose of protecting people's health and improving the quality of environment." So, economic and technical conditions, pollution at present and accessibility of standards are all factors that should be considered in formulating environmental quality standards. However, in the absence of environmental baselines, China has practiced by drawing on the experience of developed countries. For example, under its Ambient Air Quality Standards, China applies the lowest PM2.5 limits under the WHO's Air Quality Guidelines to functional area II. The enactment classifies nature reserves and scenic spots that have a low population density into functional area I, and highly populated and economically developed regions functional area II, and sets stricter limits for functional area I than that for functional area II. If only the necessity of protecting objects had been considered, the PM2.5 limits for functional area II should have been tougher than those of functional area I because compared to an ecological environment the human body is more prone to be affected by PM2.5.[①] However, such stricter standards would be unreachable if functional area II has sustained more severe pollution than functional area I. It indicates that China has been selecting environmental quality standards according to its present conditions. In addition, MEPA acknowledged that the standard was provisional, and asked for revisions from time to time according to social and economic development and the requirements for environmental protection.[②]

3.4 Result-policy choice

Ultimately environmental quality standards are the result of policy choices, not pure scientific conclusions. Stage control standards are this type of results, after considering factors such as public health, ecological environments, and social and economic development. Even threshold limits reflect the policy choices. For example, the United States Environmental Protection Agency has jettisoned the constraints posed by factors like social and technical conditions in setting ambient air quality standards and relied more on achievements of scientific research in setting values. But the department still has problems in policy choice when collecting relevant evidence and selecting margins of safety (Lu & Yang, 2017). The Agency has basically introduced the scientific research achievements from the US and Canada, but given less consideration to those of other countries,[③] partly because Canada borders the United States and the two are equivalent in economic development and environmental protections, which therefore provides comparable data. Also, the Agency has considered the nature of the impact on health and the affected populations to select the margin of safety[①]

① Behind this is PM2.5 limits set by the U.S. Federal Ambient Air Quality Standards, which also sets standard I to protect public health (annual average 12μg/m^3), stricter than standard II for public wellbeing including the environment (15μg/m^3). See NAAQS Table, at https://www.epa.gov/criteria-air-pollutants/naaqs-table(Last visited on April 13, 2017)

② Notice on Implementing the Ambient Air Quality Standards (GB3095-2012), file No.: Huanfa [2012] 11, State of Environmental Protection Administration, website: http://www. zhb.gov.cn/gkml/hbb/bwj/201203/t20120302_224147.htm, last visit: Oct. 24, 2017.

③ See Environmental Protection Agency, 2013 pp. 3268 – 3276.

to resolve problems caused by scientific uncertainty and incomplete information. Such practices have been confirmed by the U.S. courts in multiple judicial precedents.②

Environmental functional zoning, an effort made for applying environmental quality standards, also demonstrates policy choice. As the areas of different environmental functions correspond to different limits of environmental quality standards, the zoning process is the one by which limits of environmental quality standards are selected for application, thus imposing the impact of policy choice on the process.

4. Role of the environmental quality standards in finding environmental pollution liability

Environmental pollution liability is a special tort liability established through the general mechanism and developed in response to environmental pollution in today's world. It is also an important part of China's ecological civilization system. According to Article 65 of the Tort Law of the People's Republic of China ("Tort Law"), "where any harm is caused by environmental pollution, the polluter shall assume tort liability." Generally, it is believed that environmental pollution liability is a no-fault liability that includes elements of torts, damages and the causal relationships (Lu, 2016, p. 203). In this part the paper analyzes norms and facts to reveal what environmental quality standards mean to finding each of these elements.

4.1 Analysis from norms

By analyzing from the perspective of norms, this paper examines whether environmental quality standards can be applied as institutions and rules to find the elements of environmental pollution liability.

4.1.1 Environmental quality standards and torts

Will the satisfaction of environmental quality standards affect and be used as a defense against the constitution of torts? Some scholars said yes to this question, arguing that environmental quality standards are the basis on which torts should be established, or torts should be established if environmental quality exceeds the standard because of emissions. If the environmental quality reaches the standard in the presence of emission, the polluter may use the fact as a defense and claim compliance. Of these scholars, some believed that while finding whether the environmental quality exceeds the standard, a relevant strict criteria shall be applied no matter which functional area the physical injury has occurred in (such as surface water grade II), and that property damage should be found against applicable environmental quality standards (Chen, 2017).

But such an argument conflicts with the provisions of Article 65 of Tort Law, which adopts "environmental pollution," a phrase that refers to activities polluting the environment. Whether and to what extent the environment is polluted is the result of an act, which is different from the occurrence of an act, and the results should not be used to prove the occurrence of the act.

In addition, with respect to substance pollution like air and water pollution, torts should not be negated because environmental quality standards are met for the following four reasons. First, standard items are exhaustible. When selecting items of environmental quality standards, it is necessary to think about

① Id.,3097–3164.
② See Lead Industries Association v. EPA, 647 F. 2d 1130, 1154 (D. C. Cir 1980); American Petroleum Institute v. Costle, 665 F. 2d 1176, 1186 (D. C. Cir. 1981); American Farm Bureau Federation v. EPA, 559 F. 3d 512, 533 (D. C. Cir. 2009); Association of Battery Recyclers v. EPA, 604 F. 3d 613, 617 – 18 (D. C. Cir. 2010).

universality of pollution, maturity of monitoring technologies, and acceptability of monitoring costs. Based on this, only wide-spread and easy-to-be-monitored items are selected, while many indexes set under emission standards are excluded. For example, the emission standard of air pollutants lists 120 items to be controlled, while the Ambient Air Quality Standards merely sets 6 or 15 items plus the 4 "other items" indicated in the above Table 2 and 5 items in Appendix A. Plus, as PM10, PM2.5 and total suspended particulates are indexes under the emission standard of air pollutants,① 107 items are actually included in the air pollutant standard but not in the Ambient Air Quality Standards. The Environmental Quality Standards for Surface Water is another example. It includes neither all items listed by the emission standard of water pollutants nor other indexes like blackness and odor. Just because of this feature, environmental quality monitoring data cannot reflect environmental quality in every aspect and therefore cannot be used to find the pollution caused by pollutants not included in environmental quality standards. Second, standard limits are provisional. As explained above, environmental quality standards are set in stage, and pollution, even quite severe pollution, may happen even if the standards are met. Third, standards have been applied differently. As stated above, the functional zoning provides the premise for applying environmental quality standards, and areas of different environmental functions have different limits. For example, the water quality standard limits fecal coliform for the water environment from I to V to 200/liter, 2000/liter, 10,000/liter, 20,000/liter, and 40,000/liter, of which functional area V has a limit 200 times greater than functional area I and 20 times greater than functional area II. With respect to waters IV and V, severe pollution still exists after the standards are met. So practically, waters III and above are in good condition. Plus, it is found that even the waters that have the worst quality have been enabled to meet the standard by degrading their functional zoning and applying loosened limits. Fourth, pollution has been judged in the context of environmental functions. Before finding the damage that needs to be relieved, we are not able to find pollutants that may lead to the damage. As the old Chinese saying goes, "All things on earth mutually reinforce and neutralize each other," "one man's meal is another man's poison" and "if a water is too clean, no fish can live in it." Substances or pollutant concentrations that harm a human body may conform to the necessity of aquaculture or other uses. So, we cannot find whether the pollution occurs or whether torts that results in liability occur merely depending on the satisfaction of environmental quality standards. Even in the pollution cases that involve human health, it is not correct to apply relevant strict environmental quality standards to all functional areas, because some are designed not for residence or direct contact with a human body. Instead, these areas shall be governed by relevant relaxed standards.

Likewise, with respect to the pollution caused by energy like noise, torts shall not be found depending on whether environmental quality standards are met. The Law of the People's Republic of China on Prevention and Control of Pollution from Environmental Noise gives a definition to "noise pollution" under Article 2 (2), and the Law of the People's Republic of China on the Prevention and Control of Radioactive Pollution defines "radioactive pollution" under Article 62, both of which are administrative rules and apply the emission standards of pollutants, rather than environmental quality standards.

4.1.2 Environmental quality standards and damage

① PM2.5, PM 10 and total suspended particulates under environmental quality standards are particulates that are different merely in aerodynamic diameter. Altogether they are named particulates under emission standards.

The damage to be relieved by Tort Law shall be remediable, which sets the extent to which the damage occurs. Slight disadvantage is not remediable, because laws require civil subjects to tolerate it to exempt the actor from legal responsibilities for the purpose of social stability and better coordination. (Wang, 2011) This has been generally accepted by countries in the world.① Also, it has been acknowledged by customary international law, under which the environmental pollution liability between countries shall be established only if the harm caused thereby is significant.②

Tolerance limits shall be set according to the generally accepted practice at the place, i.e. the "community standard" or general recognition of an ordinary society (Zeng, 2001), because the costs of finding tolerance in individual cases is relatively high for both the trial court and the litigants. Comparatively speaking, introducing environmental quality standards to find tolerance seems credible and may reduce litigation costs and yield more consistent judgments. Even so, we still believe that environmental quality standards should not be used to judge reasonable tolerance, at least for following three reasons.

First, constraints imposed on the obligee exceed social common cognition. Take the Ambient Air Quality Standards for example. It defines rural areas as Functional Area II where the daily average limit of sulfur dioxide shall not be more than 150μg/m^3. But the limit cannot satisfy the demand of common crops such as wheat and barley in the growing seasons. These common crops are sensitive to sulfur dioxide under the Farmland Environmental Quality Evaluation Standards for Edible Agricultural Products, and so to ensure their growth the daily average limit of the substance shall not exceed 50μg/m^3 in the growing seasons or 150μg/m^3 in other seasons. Clearly, the value between 50-150μg/m^3, though it conforms to the limit set by the Ambient Air Quality Standards for Functional Area II, is not enough to satisfy the demand of such crops for growth. Also, if the standard limit was viewed as the threshold of reasonable tolerance, the farmlands where these common crops have been planted would be damaged or other crops would need to be grown there, which is unfair to the obligee. In addition, the two standards were formulated by MEPA, but the Ambient Air Quality Standards is mandatory while the other one provides for directive standards. Which should prevail if the environmental quality standards become the threshold of reasonable tolerance? The answer would be the compulsory one based on the binding force, which, however, would lead to the unfair result.

Second, governments may adjust environmental quality standards. In detail, governments may modify environmental quality standards and adjust environmental functional zoning to reduce or increase applicable limits, which, however, would be very bad for protecting civil rights and restricting infringements by governments.

Third, the practice reduces Tort Law to empty words. In today's world Tort Law is the law of remedies in nature, focusing on offering redress to poor victims rather than punishing infringers (Wang, 2011, pp. 286-287). This is true for environmental pollution liability, a tort strict liability, which is designed primarily for redressing the victim. Public law and tort liability constitute a net of justice to protect victims at different levels. For victims, Tort Law is an addition to other remedies when environmental quality exceeds the

① For example, the German Civil Code provides for that landowners must give proper tolerance to smog, smell of burning, odor and vibration trespassed from other's land, where "proper tolerance" is the requirement of severity of disadvantage. Shen B. X. Comparison of the Civil Liability of Water Pollution in China and Germany, Journal of CUPL, 2014, Vol. 2.

② International Liability for Injurious Consequences Arising out of Acts not Prohibited by International Law (Preventing Cross-border Damage caused by Dangerous Acts), the 10th Supplement to the 56th United Nations General Conference (A/56/10), Article 2 and its comments (paragraphs 4–7), p. 314.

standard, but also the only redress if environmental quality satisfies the standard. If we see the limits of environmental quality standards as the threshold of reasonable tolerance, there would be no way for Tort Law to play its unique role of redress.

Next, the paper discusses obligation of tolerance and its limits, which are closely related to equivalence or a causal relationship.

4.1.3 Environmental quality standards and causal relationships

The causal relationship, including its elements, is designed to fix liability, i.e. to find who shall bear the liability and in what scope, to achieve fairness, justice and the proper settlement of disputes. So, without finding the causal relationship no disputes over environmental pollution liability can be properly solved. However, this element needs to be further rolled out theoretically and practically, since Tort Law defines the causal relationship as an element but gives no word to elements that are part of it or any way to find such elements. Under the civil law system, the causal relationship generally consists of factual and legal dimensions, which outside substantially differs from that under the common law system and inside accommodates a range of theories (Wang, 2009, pp. 186-215; Wang, 2008, pp. 349-362). Regardless of these differences, some consensuses have been reached, including that the causal relationship is a legal judgment made on facts and found on the premise of a factual causal-and-effect linkage, and the legal causal relationship demonstrates a value judgment and consideration to the policy of law. If analyzed from the perspective of norms, environmental quality standards merely explain the legal causal relationship or equivalence.

As the confirmation argument held, environmental quality standards reflect the boundary of legal values and policies. In detail, equivalence would be established only when environmental quality exceeds the standard. Even if the factual causal relationship or conditional relationship is established, the fact that environmental quality meets the standard can exclude the legal causal relationship or its equivalence, thus exempting the defendant from assuming environmental pollution liability.

This practice is not right, however. For damage is mainly caused by the plaintiff's unique personal physique or property, it would be inappropriate to ask the defendant to assume tort liability. However, in cases where damage occurs when the plaintiff's physique or property is not so sensitive, the legal causal relationship or equivalence shall be established. For example, though sensitive to sulfur dioxide, both wheat and barley are common crops which have a demand for an environment higher than those of medium sensitivity and resistance, and their sensitivity does not go beyond the extent to which a remedy should be provided in general knowledge. As mentioned above, in the scenario where sulfur dioxide reaches the daily average level under the Ambient Air Quality Standards but exceeds 50μg/m^3 during the growing seasons, such sensitive crops will sustain damage, which is clearly foreseeable and not an accident. For the farmland where sensitive crops could be planted before pollution, their death or output reduction caused by pollution should be considered to fall within the range of legal values and policies. Based on this analysis, it is not right to negate the legal causal relationship or equivalence with environmental quality standards.

Similarly, with respect to energy contamination like noise pollution, neither the legal causal relationship nor equivalence should be denied because the environmental quality meets the standard. For example, noise that remains under the limits set in the Environmental Quality Standard for Noise may constitute an improper disturbance. According to the Code for Design of Sound Insulation of Civil Buildings (GB50118-2010), noise with respect to general residences shall not exceed 45dB (A) for a bedroom in day-time[①] and 37dB (A) at

night, and 45dB (A) for a sitting room day and night, all of which are stricter than those for type 0 sound functional area (areas that demand quietness such as rehabilitative zones) (55dB (A) in day-time and 40dB (A) at night). The differences are visible between the first standard (basic) and the second one (the highest), since noise has a negative impact on the human body and its pollution must be reduced as practically as possible to the extent of economic and technological development.

This norm-based analysis reveals that environmental quality standards are not applicable to identify environmental pollution liability. Just as Naohiko Harada (1999), a Japanese scholar said, environmental quality standards "do not directly set rights and obligations for citizens."

4.2 Analysis based on facts

These negative results derived from the analysis do not naturally lead to negative conclusions of factual analysis. Fact-based analysis is also necessary for examining the role that environmental quality standards play in finding environmental pollution liability. Because of its technical attributes, the environmental quality standard presents scientific evidence which has validity and authenticity without question. Its relevance, however, needs to be studied further.

4.2.1 Identification of torts

The question is, as an element of environmental pollution liability, does "polluting environment" refer to an act that produces negative impact on the environment or every act that affects the environment? Generally, it means emitting pollutants, an act that has a negative impact on the environment (Wang, 2010). But some scholars considered it one-sided, holding that any activity that affects the environment and therefore infringes another person's body or property is a tort under environmental pollution liability. They further held that environmental pollution produces an impact on the environment in the context of natural science, and damages other person's bodies and property rights in the context of law (Hou, 2014). Unlike the general theory that emphasizes the negative impact on the environment, this idea merely considers any change that the impact causes to the environmental system and function. In nature it replaces "polluting the environment" in legislative language with "affecting the environment," which overlooks the underlying value judgment. But given the complex connection, even environmental protection and improvement which pose positive impacts may in part cause damage to other persons. So, no requirement of negative impact will bring environmental protection and improvement under Article 65 of Tort Law, which clearly does not serve the purpose of the legislation. Based on this analysis, the general theory should be endorsed. Environmental improvements will of course lead to remedy if it causes damage to other people, which, however, should not be established through environmental pollution liability.

Environmental quality standards present evidence to prove whether the impact on the environment is negative. They list several "indexes" that demonstrate environmental quality, which are not necessarily pollutants. Of these indexes, most are negative, i.e. higher values indicate worse environmental quality,

① Decibel (dB) mentioned in this paper is measured in A–weighted sound levels(unit: dB (A)), i.e. the sound pressure level measured with A–weighted network. The State Environmental Protection Administration (SEPA) expressed repeatedly that no provisions are set under the Law of PRC on Prevention and Control of Pollution from Environmental Noise with respect to the noise generated by elevators, water pumps and transformers, all of which should be monitored and managed by the competent department of environmental protection administration. Also, the legislation does not set environmental protection standards for these noises. See the replies to the inquiry about the application of environmental protection standards to service facilities inside residential buildings made respectively by SEPA (No. [2007] 54), MEPA's General Office (No. [2009] 1014) and MEPA (No. [2011] 88). Even with these replies, however, many trial courts have heard cases involving noises produced by service facilities inside residential buildings as environmental noise pollution.

while the others are positive, i.e. higher values reveal better environmental quality. PH values are supposed to be medium, as too high or low values indicate problems. Changes of these index values therefore provide evidence of environmental pollution. Substance and energy discharges lead environmental quality indexes to become worse, thus indicating a negative impact and environmental pollution, or to become better, which indicates a positive impact and no environmental pollution.

Environmental quality standards provide scientific support for proving negative or positive impacts on the environment, thus making contributions to finding torts that come under environmental pollution liability. However, such a role has been played only with respect to limits on substance and energy included in the environmental quality standards. For those excluded, it is necessary to consider the nature of the impact on the environment.

What should be noted is that finding negative or positive impacts of torts and environmental pollution as a result when measured against environmental quality standards is a practice based on facts rather than on norms. This includes value choice, which merely requires the inclusion of emissions that have a negative impact on the whole environment. But the value choice is made by legislation and follows which evidence must be presented to prove what substance and energy produce a negative impact on the whole environment. As we have analyzed and proved above, environmental quality standards are integral, so their indexes and values are institutional facts that offer scientific evidence for judging the negative impact of torts on the environment.

4.2.2 Identification of damage

According to Tort Law, the plaintiff shall undertake the burden of proof to evidence the damage. But it has been hard to use environmental quality standards to prove whether property disadvantages or organic lesions constitute the damage. On the other hand, environmental quality standards do offer secondary evidence to prove non-organic lesions such as comfort damage and severe anxiety. For example, noise that is well above the standard can be used to prove mental anxiety caused by the noise is remediable.

4.2.3 Identification of a causal relationship

The factual linkage between damage and tort is a factual part of the causal relationship. It is named the conditional relationship under the civil law system or the factual one under the common law system. No matter what it is called, the relationship is necessary. The factual causal relationship provides a kind of hard restraint. Liability should be excluded if no factual causal linkage is found.

Environmental quality standards can be used as scientific literature to prove facts to be evidenced. Interpretation of the Supreme People's Court of Several Issues on the Application of Law in the Trial of Disputes over Liability for Environmental Torts, the infringed party must present evidence to prove the relevance between pollutants emitted by polluters and the derived pollutants and damage (Article 6). For this purpose, in many cases victims have cited academic literature to endorse their claims, while defendants have usually challenged whether the literature is scientific and authoritative. Compared to general academic literature, it would be easier for both plaintiffs and defendants to accept environmental quality standards thanks to their stronger authority. And in a general sense, a positive correlation has been found between pollution concentrations and the possibility and severity of damage. In scenarios where environmental quality standards are not reached the relationship between pollutant concentrations and damage is more likely not to be established. Also, the more the environmental quality standards are exceeded, the more likely the damage

would occur. On the other hand, since environmental quality standards are merely one type of evidence, litigants should be allowed to disprove the claim with other evidence.

However, environmental quality standards are not thresholds that screen out a factual causal relationship. For example, the Ambient Air Quality Standards provides daily average limits for sulfur dioxide in rural areas, which cannot ensure the satisfaction of the demand of common crops like wheat in growing seasons. So, the factual causal relationship between sulfur dioxide and death or output reduction of these crops should not be excluded on the excuse that standards of sulfur dioxide are reached.

Retrievable cases showed that courts have been introducing environmental quality standards in many occasions. For example, in the appeal case of *Wu D.Q. v YanchengSuhai Pharmaceutical Co., Ltd., Caomiao Branch* over water pollution, the court of second instance held that environmental pollution should be established as long as the enterprise discharges waste water in the course of normal production, but gave no discussion over whether environmental quality standards had been exceeded. While finding the causal relationship, the court established free proof with the data above environmental quality standards together with expert opinions.[①] Its language showed that the court may find the damage suffered by the victim and the causal relationship even if the environmental quality standard is satisfied.

Some notes must be considered when applying environmental quality standards based on facts. First, values of environmental quality standards might not be neutral because of their institutional attribute. Compared to environmental baselines, environmental quality standards might be more narrow or wider. Overall, compared to compulsory environmental quality standards, the voluntary group could be more neutral but accommodate varying items. Second, limits of specific pollutants are more specific than environmental quality grades. For example, under the Environmental Quality Standards for Surface Water, the water quality would be degraded if any single factor exceeds the standard, and even be graded IV or V if one of the factors well exceeds the standard. But a lower level does not mean damage, as the object involved in specific cases may not be sensitive to the pollutant that exceeds the standard. When analyzing the causal relationship, it is suggested to focus on the concentration of the pollutant that causes damage, rather than the grade of water quality. Third, standards designed for specific objects are more directed and specific than general ones and therefore should prevail in application. For example, the Farmland Environmental Quality Evaluation Standards for Edible Agricultural Product set more specific requirements for the quality of air and irrigation water than the Ambient Air Quality Standards and the Environmental Quality Standards for Surface Water. Fourth, some specific standards are designed by other departments. Examples include the Standards for Drinking Water Quality(GB5749-2006) by the health department for finding pollution of well water, the Safety Qualification for Agricultural Products -Environmental Requirements for Origin of Non-environmental Pollution of Meat and Other Animal Products(GB/T18407.3-2001), the Environmental Quality Standard for Livestock and Poultry Farms(NY/T388-1999) and the Safe Food: Drinking Water Quality for Livestock(NY5027-2001) by the agricultural department for finding the damage caused by fish breeding and poultry raising relative to the causal relationship, all of which set standards more specific than those under the Environmental Quality Standards for Surface Water and the Ambient Air Quality Standards. Finally, pollution needs to be MEPArated by sources. For production activities which cause pollution per se, it is necessary to

① Civil Judgment No. (2013) Suminzhongzi 0014 by Higher People's Court of Jiangsu Province.

reduce pollution from internal and external sources. When introducing these standards, attention should be given to the fact that concentration limits comprise pollution from internal and external sources. For example, under the Environmental Quality Standard for Livestock and Poultry Farms, limits of ammonia, hydrogen sulfide and carbon dioxide include the substance pollution caused by internal sources. We should be cautious when finding the causal relationship on the grounds of environmental quality standards.

But after finding the factual causal relationship, it would be very hard to use environmental quality standards to find the legal causal relationship or equivalence based on the facts. When drawing up environmental quality standards, China's environmental protection agencies and the people's governments of provinces generally have not unveiled basic data or the deduction process, thus making it more difficult to judge whether environmental quality standards conform to legal policies under Tort Law and the boundary of interest protection, both of which change as time passes. As indicated by the analysis of ambient air quality, we have found no conformity in this regard.

5. Conclusion

Basically, laws are enacted and enforced to organize social life, define moral and economic freedoms for individuals from the state, and coordinate and relieve the tensions between interest protections and freedom of actions. In a modern society, rights and interest are protected relying not only on private law, but also on public law. We say there is no escape from the long arm of the law, not only because public and private laws are connected through channels including referral provisions, but also because the net of justice is a three-dimensional structure built by general legislations. With respect to the disadvantage caused by environmental pollution to an individual's body or property, the local party and government responsibility system and the environment administration and general civil liability constitute one layer of the multiple-layered net of justice, where each layer has different functions and densities. Though they cannot be used to directly find tort liability, environmental quality standards can be combined with public legal norms to serve the purpose. Based on this recognition, improving environmental quality may greatly reduce the probability of environmental pollution liability. On the other hand, stricter environmental quality standards do not necessarily deliver better results. As the public law has its own effective boundary, its marginal returns on the protection of victims will diminish if environmental quality standards become stricter, while the cost of system operations (including the restriction on the freedom of actions of polluters, also producers and operators, and government's enforcement cost, etc.) will see marginal increases. To bring down the total social cost, public laws should be limited to the extent to which marginal returns exceed marginal costs. When public legal institutions like environmental quality standards fail to provide sufficient protections, tort liability caused by environmental pollution offers a fine and closed net of justice to redress victims' personal and property interests. Even in the scenarios where environmental quality standards are exceeded, public laws also provide institutions to coordinate the liability under criminal law, civil law and administrative law (Zhang & Zhuang, 2014). Under circumstances where environmental quality meets the standard, tort liability mechanism shall play a bigger role in the absence of applicable remedies under public laws.

In both academic research and legal practice, it is necessary to know that environmental quality standards and the mechanism of environmental pollution liability are different layers of the multiple-layered net of

justice, and the institutional logic observed at different layers are not the same. Some institutions could be applied at multiple layers or in several areas, while others could not. And so, MEPArating facts from norms offers an important perspective for analyzing the significance of one institution to others. It is therefore helpful to make theories self-consistent and concise. With respect to finding environmental pollution liability, environmental quality standards are not applicable if analyzed from the perspective of norms but provide limited evidence from the perspective of facts. So, the negative argument is right if merely analyzed based on norms, while the confirmation argument has some merits to be played if analyzed based on facts.

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