Chapter 3 Background to air pollution regulations in Japan

3.1 Overview

The air pollution status in a specific area are determined by the amount of pollutants emitted into the atmosphere and the climatic conditions, but the former is dependent on the desire of the local residents to keep the air clean. Quite naturally, a direct indicator of the desire held by the local residents is the air pollutant emission regulations. The background and topics related to these regulations cannot be ignored as a part of their effective implementation. Many events have occurred in the course of the enactment of air pollutant emission regulations as was touched upon in Chapter 2, and this Chapter will focus on the background and topics related to these processes.

3.2 Impetuous and background to establishment of regulations

The direct impetus behind air pollution regulations has been the activities of local citizen groups which have complained about the damage caused by air pollution. These citizen groups prompted the surveys and research on air pollution that formed the foundation for the air pollution regulations. As touched upon in Chapter 2, complaints from the public focused on damage from black smoke, falling ash and sulfur dioxide, and at times these pollutants have lead to economic loss and deterioration of health. Thus the pollution control administrations were begun by the local governments confronted with directly these problems based on the enaction of the local ordinances on pollution control. Surveys and research on the air pollution attributes and effects which were launched at the coordination of local governments were behind elucidation of the exact causes of pollution and the damage it caused together with the subsequent enactment into law of air pollution regulations [1].

Then with the moving forward of these surveys and research, although electric power plants and gasworkers were to be exempted and a debate arose, the Smoke and Soot Regulation Law was enacted which created the basic framework for today's air pollution regulations. As was touched upon in Chapter 2, Naohiko Harada of the University of Tokyo [2] has stated that "It is not enough to tackle the current complex pollution based on the principle of individual civic responsibility (such as criminal responsibility, responsibility for illegal activities and police responsibility). A new social system is required that differs from the principles of civic law to eradicate pollution and protect the natural environment." The need for a new social order and the concrete codification of this order into law is a major result of the civic movements which brought suits against air pollution damage and the research into air pollution which took place against this backdrop. If it is considered that the settlement and mediation system which is set down under this law has gone past the private dispute non-intervention rules [2] based on traditional administrative law theory, then the presence of a major significance can be discerned in the impetus behind the creation of regulations and its background.

3.3 Technical aspects behind the implementation of regulations

A wide range of technical issues were involved in not only the survey and research, but also the execution of

the air pollution regulations. The first that will be considered herein are the analytical and measuring methods of air pollution. In other words, it can be said in both the survey and research on the attributes of air pollution and also in the development of countermeasures, and technology that any debate on the environment without data is simply an empty argument thus, objective data which can be used to objectively evaluate these areas is absolutely essential. Analytical and measuring methods of atmospheric pollutants were sorely lacking in Japan at that time. The paucity of appropriate techniques lead to the development of the continuous automated analysis technology which is in use today and serves as the foundation for Japan's analytical chemistry. Furthermore, it goes without saying that these analysis and measurement techniques made a major contribution to the development of countermeasures and technology. The creations of the emission factors required complete an air pollution model for carrying out streamlined regulations and of the methods for evaluation of countermeasure technology are the tabulation of measurement data at the emission sources and fuel components. In addition, climatic data, air pollution dispersion theory and wind tunnel experimental results were critical in the construction of an air pollution model.

Thus engineering knowledge and experience was required in the development of the dust collector, the exhaust gas desulfurization, denitrification equipment and fuel desulfurization technology to achieve the emission standards set down in the air pollution regulations. These were comprehensive technologies which formed the foundation of equipment engineering knowledge such as chemical engineering and mechanical engineering. These technologies together with their maintenance control systems which were fruits of this technology along with the efforts of the engineers who were involved in their development and the engineers who worked in industry should be paid particular attention. In addition, public health and sanitation knowledge related to health effects of air pollution based primarily on immunology was essential for the establishment environmental quality standards that is object of administration on air pollution control. The construction of the air pollution monitoring systems and their maintenance and control which was critical to the air pollution regulations would have been inoperable without the backing of a wide range of technical fields such as analytical chemistry, electronics and meteorology. Furthermore the factory inspection which is a direct regulatory action would be impossible to execute smoothly without not only the technical knowledge required to measure air pollutants in these emission sources, but also a deep technical knowledge of their operation. The same is true of checking of countermeasures against emission sources of air pollution. For such reasons, it should be understand that a wide range of technical achievements are found in the backdrop to Japanese air pollution regulations.

3.4 Social aspects behind the implementation of regulations

The Japanese air pollution regulations were initiated based on the enactment of the Smoke and Soot Regulation Law, and this Act was established against the backdrop of a wide range of social considerations. Hideo Nakajima, a member of the Diet stated in a General Session of the 40th Diet during which a draft of the Soot Regulation Act was debated that "it is true that a politician stated that soot and smoke are the soup of the citizens living in industrial areas. Thinking about that today, it can be said that statement was extremely intemperate, and this way of thinking had become generally accepted and taken root, and a dark canopy has come to cover the lives of our urban residents. The rising smoke was a sign of industrial prosperity and it should be welcomed. There are many who think that the

movements that emerged that called for the elimination of this smoke were a dangerous threat to the development of industry. However the development of science has bolstered the performance of equipment for removing and prevent smoke and dust such as dust collector and in particular, the new electrostatic precipitator have advanced to a level where both soot and dust as well as bacteria such as tubercle bacillus and E. coli can be eliminated. Accordingly, the anti-pollution movement has gradually expanded over time with the support of public opinion, and pollution prevention ordinances have been set up by local governments. This movement has worked hard for the benefit of the regional population, and they have provided financial support for pollution prevention equipment in some prefectures. It has been only the government over the years which has been lacking in the zeal to attack this problem. When the Ministry of Health and Welfare drafted the Air Pollution Control Bill in 1955 and 1956, it was opposed by the Ministry of International Trade and Industry, and the bill was tabled and forgotten. Now I have heard that the Air Pollution Control Law has been presented to the Diet, and while what it is the past is past, I have great expectations for the future..." [3]. Nakajima's statement indicates that a forward looking approach was not taken at that time.

The Air Pollution Control Law was established in 1968, subsequently revised in 1970 and then followed by the implementation of setting down regulation of total emission on sulfur oxides and nitrogen oxides. These regulations were greatly affected by the social circumstances at the time which extended to the historic shift described in Chapter 2 and the severe air pollution health damage and environmental pollution trials as illustrated by the Yokkaichi which is described in Chapter 5 and 12 [4]. If a corporation cannot verify that there is no cause and effect relationship between damage to health and air pollution, then corporate joint illegal action and responsibility is recognized with the establishment of the cause and effect relationship, and this had an impact on environmental pollution policy.

It goes without saying that local governments were caught in a dilemma at the time of trying to balance the citizen movements which were attacking the corporate intransigence. At the time, the situation may have been overly sensationalized, but the power of the mass media to appeal to public opinion surrounding air pollution could not be discounted. The power of the press cannot be ignored if we look at shocking news that sounded a warning to industrialized society including the criticisms leveled by the mass media which provided the direct impetuous for the "environmental crisis" of 1970.

Of course, there is the economic background to the power of Japanese corporation, but with this social background, corporate executives have been spurred on to strive to prevent air pollution in accordance with air pollution regulations.

3.5 Administrative structure as an aspect of implementation of regulations

The smoke and soot emission regulation law unmistakably has created the first step of air pollution control administration in Japan, and while it is regrettable, it was the regulations that were effective in the prevention of air pollution. For that reason, administration of regulations is important.

As was previously stated in [2], this law correspond to the demands of a new social order and they exceeded traditional theories of public policy. It was thus for that reason that the establishment and operation of this

administration organization was relatively difficult. It was those in charge of administration that succeeded in overcoming these difficulties. An Administrative officials found themselves struggling with science and technology which they knew little or nothing about and despite their lack of experience grappling with legal interpretations, technical officials struggled to get appropriate qualifications because without a wide scope of scientific knowledge, policy could not be moved forward, and researchers strove to obtain essential scientific knowledge through measurement and analysis to promote policies to preserve the atmosphere. All found themselves faced with enormously difficult tasks and groping in fields they were inexperienced.

The researchers who were involved in survey and research on air pollution went through an era in which they encountered conditions that ruined measurement instrument [1]. In addition, almost no scientific support system was in place, and only a few people in society actually understood what was going on.

In the midst of this, personnel in the local governments were instrumental in supporting and promoting organizations and leaders and the promotion of personnel education activities in the Institute of Public Health in the Ministry of Health and Welfare, National Institute for Resources and Environment, in the Agency of Industrial Science and Technology in the Ministry of International Trade and Industry and the Training Institute for Environmental Pollution Control in the Environment Agency were not just important in policy to preserve the atmosphere but in the development of environmental regulatory policy in Japan.

The activities of academic bodies such as "Japan Society of Air Pollution which was air pollution research nationalwide council (present Japan Society for Atmospheric Environment)" [1] which was established in Japan in 1959 had a major effects on these activities and formed its background.

3.6 Background to the era

The effects of regulations, trials and compensation that were advanced against the background of the air pollution problems that arose were major. A summary of the background to the age is summarized in Table 3.1 [5-7].

Table 3.1.1 (1) Backdrop by Age to Air Pollution Regulations in Japan [5-7]

Year	Proposed air pollution problems (background)	Measures to cope with the air pollution problems (regulations)
1877	Pollution problems frequently arise in Osaka with the three companies of steel plant, smithy and bath house.	The Manufacturing Industries Regulations are released in Osaka
1884	Problems first arise caused by factory smoke and soot from the burning of coal in Osaka because the city was at the forefront of industrialization.	A city circular was issued by the city of Osaka banning the establishment of factories which gas coke is burned in Shimanouchi ship yard.
1888	A smoke and soot problem arose with the Osaka Light Company.	A city ordinance is issued banning the construction of factors with smoke stacks within the city.
1895	Large scale crop damage occurred in Matsukimura in Tochigi prefecture due to the expansion of refinery at the Ashio copper mine. A number of village residents filed suit to stop work because of the crop damage caused by sulfur dioxide from the Besshi copper mine in 1893. The company announced that its work was unrelated to the damage, several hundred farmers stormed the company, and arrests were made.	An out of court was agreed to between the Ashio mine and the farmers. The headquarters of Sumitomo drafted a plant for transferring the Shikyuhama Refinery to Shisakujima. Construction was commenced in 1896.
1909	Hitachi Mining completed a large scale refinery in 1908, damage caused by sulfur dioxide became severe in 1909.	Compensation was paid based on negotiations.
1916	The Zushi plant of Suzuki Seiyakujo (Ajinomoto Plant) caused hydrogen chloride damage.	Kanagawa Prefectural factory regulation rule was enacted.
	Respiratory organ dysfunction in children caused by sulfur dioxide from Osaka Alkali Co., Ltd. Suit brought by farmers	An order is issued by the city of Osaka to install prevention and removal equipment. The suit is won by the plaintiffs (farmers) in 1919
1919	Pine trees, which are called shingenko hatakakeno matsu, located near the Hinoharu Station on the Chuo Line of the national railroad are withering and dying as a result of smoke from the locomotives.	The owners of the trees sue for damages, and win in a decision by the Supreme Court
1924	The Fuel society of Japan (present the Japan Institute of Energy) formed the Special Committee on Fuel for city use. This society focused its attention on the prevention of smoke in response to concerns related to beautification, health and fluctuations in fuel prices as well as proposing regulations requiring the use of only smoke-free fuel (hard coal) in Tokyo.	The Ministry for Home Affairs issued the smoke and soot regulations in December of the same year in six major cities (Tokyo, Osaka, Kyoto, Nagoya, Kobe and Yokohama).
1932	The Osaka Smoke and Soot Prevent Investigation Committee which was inaugurated in 1927 decided upon smoke and soot damage surveys, the use of smoke-free fuel and electrification, complete combustion and smoke and soot regulations.	The Osaka Smoke and Soot Regulations consisting of a total of 13 Articles were announced, and emissions of black smoke with a Ringelman's smoke chart concentration of 3 or higher were prohibited for six minutes or more per hour. The same measures were adopted in Kyoto in 1933 and in Hyogo Prefecture in 1935.
1935	The clouds of war began to gather on the horizon even in the capital. The move toward war could be seen in the expansion of existing and construction of new factories, and air pollution began to gradually attract attention as a problem.	The Smoke and Soot Prevention Guidelines were set down in Tokyo in 1935, and Kanagawa Prefecture enacted the Smoke and Soot Prevention Committee Regulations in 1937.
1949	Along with the reconstruction of industry in the post-World War II era, the level of pollution generated by factories increased.	Tokyo was the first city in the country to enact regulations in the form of the Tokyo Metropolitan Factory Pollution Prevention Ordinance. These regulations did not contain quantitative standards, but instead focused on areas such as the generation of noise.

Table 3.1.1 (2) Backdrop by Age to Air Pollution Regulations in Japan [5-7)]

1950		Enactment of Osaka Industrial Pollution Prevention Ordinance
1951		Enactment of Kanagawa Prefecture Industrial Pollution Prevention Ordinance
1955	Smog from soot and burning of fuel for building heating systems frequently blankets urban areas, and prevention of such smoke becomes necessary.	Enactment of Tokyo Metropolitan Soot Prevention Ordinance (Regulations covering concentration based on the Ringelman's smoke chart: residential areas 2 and other areas 3)
1962	The amount of fuel used increases along with the advanced economic growth. There is a switch in the energy sources from coal to oil.	Enactment of legislation covering regulation of soot and smoke emissions. (The regulations from Paragraph 7 Article 37 are based on JISZ8808.)
1966	The Ube City Council established a Soot and Dust Countermeasures Committee in 1951 as an inquiry body. This committee was made up of three groups, corporate representatives, city council representatives and academics (nicknamed the Ube approach).	The amount of coal used in 1951 was 85.6 ton/month increased by 79% by 1962. However the amount of soot and dust dropped by one-third from 55.9 t/km^2/month through voluntary regulations promoted through these activities (close to 40 dust collection units were installed, and the soot and dust was sold as cement admixture for a total of 900 million yen over 10 years).
1967	Tatsuo Maekawa, a member of the city council of Yokkaichi began negotiations with a lawyers' group from 1961, and a plan was drafted to bring suit covering pollution damage in Yokkaichi. Nine individuals who were certified as suffering from pollution related problems brought suit in Yokkaichi court against six companies including first complex in 1967. Laws were enacted targeting air pollution and deteriorating water quality in the 1950s, but this piecemeal approach was inadequate.	The plaintiffs won the suit in 1972 and 12 plaintiffs paid 88.21823 million yen (the court ruled that it was not necessary to verify a close cause and effect relationship from the standpoint of assisting the victims, and it was confirmed that a joint illegal action causing injury had been committed). The Basic Law for Environmental Pollution Control was enacted that was designed to promote systematic and integrated pollution policy (Article 9 set down the environmental standard articles, and the Law was revised for sulfur oxides in 1969, carbon monoxide in 1970, suspended particulate matters in 1972, sulfur dioxide, photochemical oxidants and nitrogen dioxide in 1973) (regulations related to the pollution prevention plan were set down in Article 19: (measures to handle the situation were taken for already polluted areas and pre-prevention areas)
1968	Measures against automobile emission became necessary because of the problems that arose related to the regional spread of pollution, diversification of pollutants and the increase in the volume of vehicle traffic.	The Air Pollution Control Law was enacted because of the absence of a tie-up between separate and emergency measures and to cope with the increasingly complex and severe air pollution.
1970	Damage caused by photochemical smog, lead pollution, fluorine compounds, cadmium and chlorine compounds became a problem, and it became necessary to introduce measures to address this problem.	The Pollution Diet which was convened in November of the same year revised and strengthened the Air Pollution Control Law, and five different noxious compounds became regulated.
1971	Many pollution-related problems were arose in 1970, they worsen up until the opening of the Pollution Diet	The Environment Agency was established in May of 1971.

(by Nihei Hisao)

(3.1～3.6) Literature cited

1) Himi, Yasuji et al.; The History of Our Society, *Journal of Japan Society of Air Pollution*, 24, 319-338 (1989).

2) Harada, Naohiko; Pollution and Administrative Law, pp.10-101, Koubundo (1980)

3) Extra Edition of the Official Gazette Proceedings of the 40th Session of the Diet No. 34 (1962).

4) International Center for Environmental Technology Transfer (ICETT), Striving to Contribute to the World Environment Through Improvement of Pollution and the Environment in the City of Yokkaichi (1992)

5) The Tokyo Metropolitan Research Institute for Environmental Protection ed.; Pollution and Tokyo (1970)

6) Kawana, Hideyuki, Document Japan Pollution (1987)

7) Earth Environment and Economic Research Center; Japan Pollution Research (1991)