

## Chapter 2

### *The Outbreak and Origins of Minamata Disease*

#### 1 Outbreak of Minamata Disease

##### Official Recognition

The area around Minamata Bay in the Yatsushiro Sea of Kumamoto Prefecture was a beautiful and fertile sea blessed with a natural fish reef. It was also a spawning site for many species of fish. However, in the 1950s, strange phenomena appeared in the bay. Shellfish began to die, fish floated on the surface of the water, seaweed failed to grow, and cats died in strange ways.

On April 21, 1956, a child from Tsukinoura, in Minamata City, Kumamoto Prefecture was admitted, with severe complaints such as the inability to talk, walk and eat, to the Shin Nippon Chisso Fertilizer Co., Ltd. Minamata Factory hospital (hereafter called Chisso Hospital). The present name of the company is Chisso Corporation. (hereafter called Chisso).

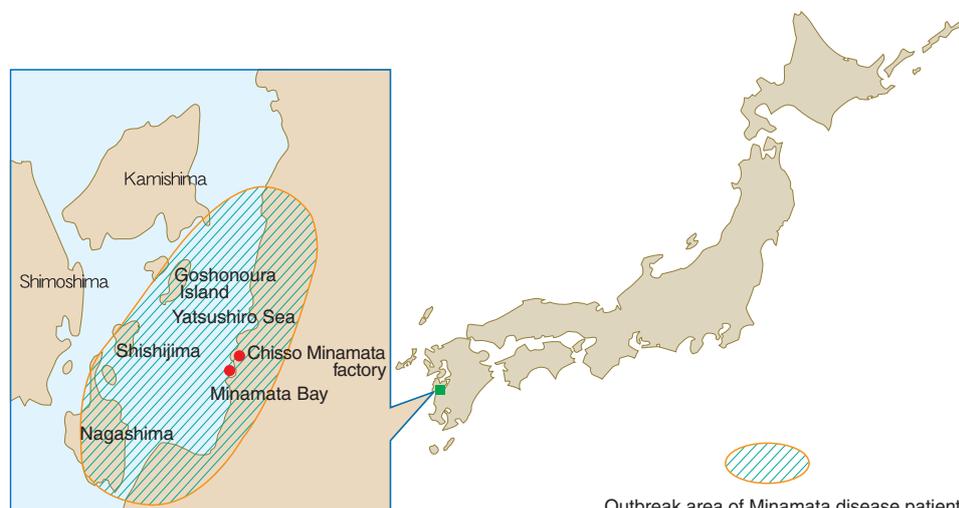
Following that, three patients were admitted to the hospital with similar symptoms. On May 1 of the same year, Dr. Hajime Hosokawa, Director General of the hospital, reported to Minamata Public Health Center (Head: Dr. Hasuo Ito) that four patients were in the hospital showing cerebral symptoms with an unknown cause.

The day of official recognition of Minamata disease had come. In the days of the official recognition, people were afraid of this strange disease, as they thought it might be infectious.

After official recognition of the first patients, a survey by the Minamata Public Health Center, Minamata City, Minamata Medical Association, Chisso Hospital and Minamata Municipal Hospital, confirmed the existence of other patients with the same condition. Fifty-four cases were confirmed, including seventeen deaths, since the outbreak in December 1953 and a child diagnosed with cerebral paralysis was certified as a congenital Minamata disease patient (the first official recognition of a congenital Minamata disease patient) in November 1962.

As the investigation into the cause took a long time, the outbreak of Minamata disease continued and expanded along the Yatsushiro Sea coast.

Fig. 1 Outbreak Area of Minamata Disease



Outbreak area of Minamata disease patients  
(Taken from Environment Agency. Environmental Health Dept.  
Our Intensive Efforts to Overcome the Tragic History of Minamata Disease.  
Tokyo:Environment Agency. 1997. slightly amended)

## 2 Investigation into the Cause of Minamata Disease

### 'Strange Disease' and Infectious Disease Theories

After the disease was officially recognized on May 1, 1956, new patients were confirmed one after another. This unknown illness was called the 'strange disease' by the local community, and on May 28 the Minamata Strange Disease Action Committee (formed by the Minamata Health Center, Minamata City, the City Medical Association, the Municipal Hospital, and the Chisso Hospital) was established. Action on behalf of patients, and investigation into a cause were begun. As the first cases had occurred mostly in the Tsukinoura and Detsuki area, the possibility of the disease being infectious was considered, and patients' houses were disinfected.

The committee also requested on August 14 that the Kumamoto University Medical School investigate the cause (Kumamoto Prefecture was requested on August 3).

On August 24, at Kumamoto University Medical School Minamata Disease Study Group (hereafter called Kumamoto University Study Group) conducted medical examination of patients, patients were admitted to the University hospital under strict clinical observation. Autopsies were conducted in the Pathology Department on the bodies of fatal victims of the disease.

### Heavy Metal Poisoning Theory

Along with clinical observation and autopsies, the Kumamoto University Study Group carried out field surveys in the epidemic area, and investigation and research were begun in the Departments of Microbiology, Hygiene, and Public Health. Samples of drinking water, soil, seawater, fish and shellfish were collected in the area. The Kumamoto University Study Group held an interim report meeting at the Kumamoto University Medical School on November 3, 1956, which was attended by Study Group members, Prefectural Public Health Department staff, and Minamata Strange Disease Action Committee members. They reported that the disease was not an infectious disease as had earlier been suspected, but a kind of heavy metal poisoning, and that the poison had entered the human body through consumption of fish and shellfish caught in the area.

Although it had then been recognized that Minamata disease was caused by eating large amounts of fish and shellfish produced in Minamata Bay, the substance causing contamination of the fish was not confirmed for a long time. Several hypotheses were proposed, in which manganese, selenium, thallium, or the multiple action of two or three of these might be the causative agent of Minamata disease. However, they could not be confirmed because discrepancies existed with clinical and pathological literature, and reproduction of Minamata disease was not successful in experimental animals.

### Organic Mercury Poisoning Theory

On July 22, 1959, the Kumamoto University Study Group, based on the pathological and clinical research of Professor Tadao Takeuchi and Assistant Professor Haruhiko Tokuomi, made a formal announcement that "Minamata disease is a disease of the nervous system which is caused by eating fish and shellfish of the local area (Minamata Bay). Mercury has come to our attention as a likely cause of pollution of the fish and shellfish".

### Chisso Counterclaims

On August 5, 1959, at a Special Minamata Disease Committee meeting of the Kumamoto Prefectural Assembly, Chisso reported that "The organic mercury theory of Kumamoto University is a speculation without actual proof, and it is irrational in view of chemistry common sense". They announced an inspection of the factory regarding the so-called organic mercury theory. In the same year, experiments were carried out at the Chisso Hospital, in which factory drainage was given to cats, and development of Minamata disease was confirmed (October 6, Cat no.400), but it was not officially announced.

### Explosive and Amino Poisoning Theories

In addition, as possible causes of Minamata disease, the Japan Chemical Industry Association proposed an "explosive theory" on September 28, 1959, and Professor Raisuke Kiyoura of Tokyo Institute of Technology advocated an "Amino poisoning theory" on April 12 of the next year.

### Opinion of the Ministry of Health and Welfare Food Sanitation Investigation Council, Minamata Food Poisoning Special Committee

The Minamata Food Poisoning Special Committee of the Ministry of Health and Welfare Food Sanitation Investigation Council, which was in charge of investigation into the cause of Minamata disease, submitted a report on November 12, 1959, to the Ministry of Health and Welfare, saying that, "the organic mercury compound in the fish and shellfish around Minamata Bay is the main causative factor of Minamata disease".

### Identification of Methyl Mercury Compound by the Kumamoto University Study Group

As research proceeded on organic mercury, Professor Makio Uchida of the Kumamoto University Study Group announced on September 29, 1960, that "we extracted the crystal of an organic mercury compound from the shellfish of Minamata Bay". Furthermore, Professor Katsurou Irukayama announced in August, 1962, that methyl mercury chloride had been isolated from the mercury dregs of an acetaldehyde acetic acid factory".

The Kumamoto University Study Group made a formal announcement on February 20, 1963, stating that "Minamata disease is a disease of the central nervous system caused by eating fish and shellfish from Minamata Bay. The cause of intoxication is a methyl mercury compound found in the shellfish, as well as in the sludge of the Chisso Minamata factory. However, at the present stage, the structures of the two chemicals are slightly different".

## 3 Confirmation of the Cause of Minamata Disease

### The Government's Official Opinion

As the investigation into the cause of Minamata disease proceeded, on May 31, 1965, Niigata University reported to the Niigata Prefectural Public Health Department that "there have been sporadic cases of mercury poisoning of an unknown source in the lower Agano river", and the outbreak of Niigata Minamata disease was officially recognized.

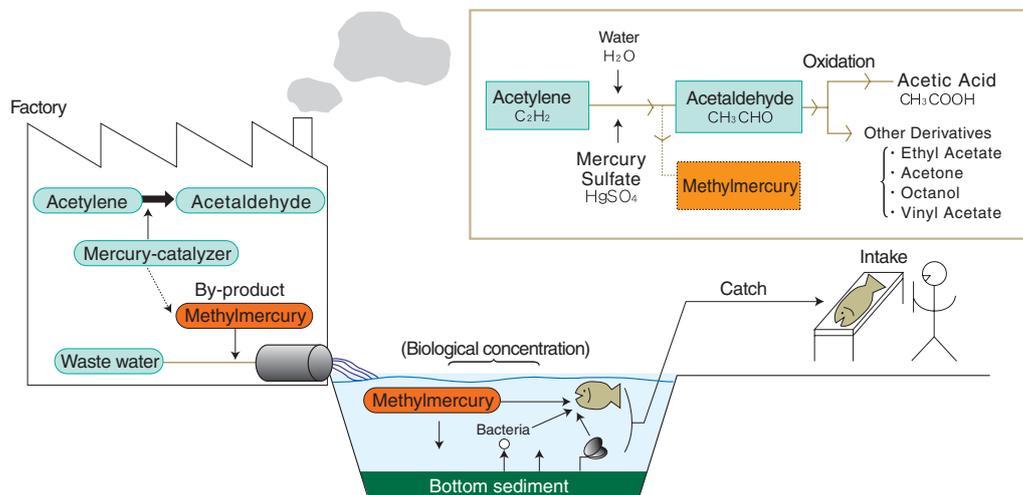
On June 12, 1967, Niigata Minamata disease patients sued Showa Denko as the pollution source of Niigata Minamata disease, and took the compensation claim to Niigata District Court. Thus the country's first full scale pollution trial began.

As this was happening, the national government announced its official opinion on Minamata disease on September 26, 1968. They concluded that "Minamata disease is a disease of the central nervous system caused by a methyl mercury compound. The disease occurred in residents who ate large amounts of fish and shellfish contaminated by methyl mercury compounds. Chisso Minamata factory polluted the environment by discharging factory drainage containing these compounds, which were formed as by-products in the acetaldehyde synthesizing process". Thus Minamata disease was recognized as a pollution-related disease. It was twelve years after May 1956, when Minamata disease was found. Niigata Minamata disease was recognized at the same time.

#### Note

Acetaldehyde manufacturing ceased in May of the same year at the Chisso Minamata factory and at the Denkikagaku Industry Oume factory, which had remained as the last producers of acetaldehyde in the country. The production of acetaldehyde was no longer performed in Japan using mercury as a catalyst.

Fig.2 The Route of Methyl Mercury from Generation in Acetaldehyde Process to the Human Body.



(Taken from Kumamoto Prefecture.

An Outline of the Environmental Restoration of Minamata Bay. 1997. slightly amended)

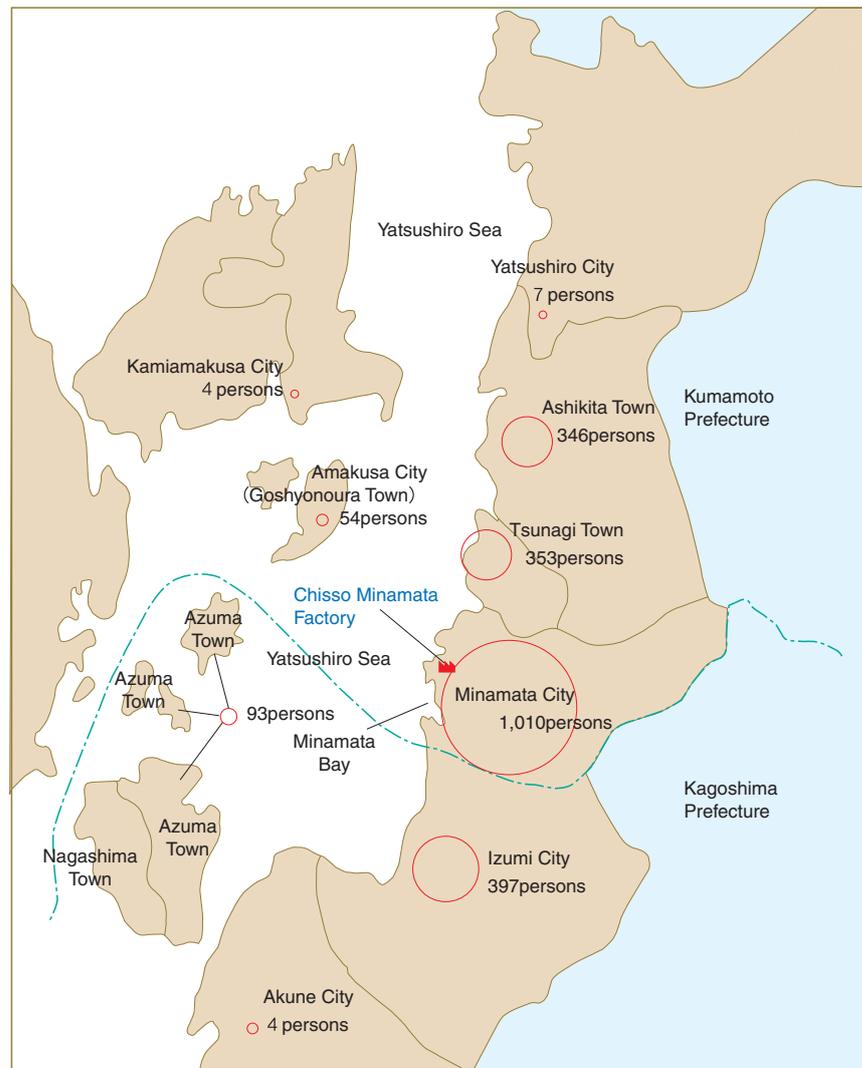
#### 4 Overview of the Incidence of Minamata Disease

At the end of August 2007, the number of certified patients amounted to a total of 2,268 persons, including 1,778 in Kumamoto Prefecture and 490 in Kagoshima Prefecture.

50 years have passed since the outbreak of Minamata disease and 639 patients are alive now.

In addition, although small numbers of new patients are still authorized now, they are people who contracted Minamata disease in the past. Acetaldehyde manufacture by Chisso was suspended in May, 1968, and from the results of various investigations (later mentioned in Chapter 3, part 4), it is thought that the possibility of Minamata disease newly developing had disappeared shortly after 1969.

Fig.3 Distribution of Certified Patients(as at August 31,2007)



(Taken from Environment Agency, Environmental Health Dept.  
Our Intensive Efforts to Overcome the Tragic History of Minamata Disease.  
 Tokyo : Environment Agency, 1997. slightly amended)

## 5 The Name 'Minamata Disease'

### The 'Strange Disease' / Infectious Disease

In the days when Minamata disease was first discovered, since a cause had not been found, it was locally called the 'strange disease', and was thought to be infectious. In the beginning, it was reported as the 'Minamata strange disease' by the mass media .

### Initial Use of the Term 'Minamata Disease'

As 'strange disease' was not an acceptable medical term, the Kumamoto University Study Group tentatively named the disease after the area from which it originated in 1957. Thus the name 'Minamata disease' was born. By August 1958, about one and a half years since the first case was reported, almost all newspapers were calling it Minamata disease.

### Judgment of the Ministry of Health and Welfare

In December 1969, the Examination Committee for Specification of Pollution-Related Illnesses of the Ministry of Health and Welfare, specified the name 'Minamata disease', because of the special conditions under which it had appeared. The name was declared valid for use in Japan and overseas. In March 1970, the Committee commissioned by the Ministry of Health and Welfare to investigate into the effects of pollution-related illnesses. As the name Minamata disease had already been declared for use inside and outside the country, they reported that "taking government ordinance into account, it is appropriate to adopt Minamata disease as the name of this disease".

### Movement to Change the Disease's Official Name

As many people had misunderstandings about Minamata disease, thinking it was an endemic, infectious, or hereditary disease peculiar to the Minamata region, the image of Minamata city became bad. This led not only to damage of product sales and tourism of Minamata , but also to discrimination towards people from Minamata , regarding marriage and employment. In 1973, the Minamata City, Minamata Chamber of Commerce, the Tourism Association and others, conducted a campaign to change the name of Minamata disease, and took a petition signed by 72% of electors in Minamata City to the Environment Agency and other related organizations. This campaign was unsuccessful and to this day it is known as Minamata disease.