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Accumulated Pollution and the Polluter Pays Principle **— Mainly Heavy Metal Pollution —**

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The application of the P. P. P. (the Polluter Pays Principle) to Japan, established in the early 1970s to deal with long-term accumulated pollution caused by such agents as heavy metals and PCB (which are not included in the P. P. P. agenda of the OECD) has been evaluated as a policy unique to Japan. We have found, however, that since the establishment of U. S. Superfund System (CERCLA/SARA) in the 1980s, the application of the Polluter Pays Principle to cases of accumulated pollution is not necessarily exceptional. We have therefore to re-investigate the theory of the actual conditions for the application of the P. P. P. to accumulated pollution.

The author aims to examine these issues in this paper, making a precedent of cases of accumulated pollution caused by heavy metals and the way in which, in Japan, the P. P. P. has been applied.

When we consider the application of the P. P. P. to accumulated heavy metal pollution, we can see that the use of the P. P. P. has been only partially successful in carrying out measures in pollution prevention to restore polluted soil and to remove accumulated heavy metal.

For various reasons, such as the “natural” and “other sources of pollution” distinction, public money has come to be substituted for the P. P. P.: that is, the central government and local authorities have provided a subsidy.

Yet, as we have seen from the cases of the workings of soil pollution prevention measures at the Jinzu River Site, in order to reduce the polluter's share of the costs, the application of the “natural” and “other sources of pollution” distinction does not always match the facts.

Since the P. P. P. has not been strictly adhered to, it is unrealistic to try to settle the whole issue of pollution by the application of the P. P. P. alone. We badly need another principle that will be persuasive enough in itself to ensure the removal of accumulated pollution through the payment of expenses out of public money.

1. Introduction

When the OECD first formulated the policy that an industrial polluter should pay for any pollution caused by heavy metal and PCB in the soil or water, the policy was mainly targetted at the prevention of pollution in the first place: when

the cost of any preventative measures would be absorbed as a preliminary cost undertaken by the industrialist: "the internalization of the external cost" (the polluter pays principle: P. P. P.)

When Japan, taking its lead from this policy, initiated its own unique form of P. P. P., it extended the original concept to take in as well the payment of retrospective costs for the clean-up and compensation for any long-term accumulation of heavy metal and PCB: this has been defined as "the retrospective environmental cost". Thus, Japan's P. P. P. has the character of a legal liability, and lays down that the polluter has to pay for the cost of clean-up and compensation.¹

Since the establishment of U. S. Superfund System (CERCLA/SARA) in the 1980s, however, the application of the Polluter Pays Principle to cases of accumulated pollution is no longer exceptional. We have therefore to re-investigate the theory of the actual conditions of accumulated pollution for the application of the P. P. P. to obtain. In this paper the author aims to examine these issues afresh, and will make a precedent of cases of accumulated pollution caused by heavy metals and the way in which, in Japan, the P. P. P. has been applied.

2. Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works and Agricultural Land Soil Pollution Prevention Law

Of fourteen pollution-related bills approved in December, 1970, during "the Environmental Diet," the 64th Diet of the Lower House, the Agricultural Land Soil Pollution Prevention Law was enacted against the background of both the Itai-Itai Disease, which was the result of cadmium poisoning, and the nationwide soil pollution problem that has afflicted agricultural land. In 1968, the case of Itai-Itai Disease was brought before the court, and the Ministry of Health and Welfare was forced to acknowledge that the Itai-Itai Disease had, indeed, been caused by cadmium. Sufferers have, at last, been certified as victims of Itai-Itai Disease. The revision of the Law added "soil pollution" to six kinds of pollution which had by then been recognized. In order to complement the addition, the Agricultural Land Soil Prevention Law was enacted. The reason for its enactment was that against the background of rice contaminated by cadmium, and because of a concern for public health, the prevention of land soil pollution and the elimination of existing pollutants had come to be recognized as an unavoidable issues.²

During Diet discussions of the Committee of Agriculture, Forestry and Fisheries, members emphasized the close relationship between "a human being's health" and "rice for food." Nevertheless, the problem of heavy metals other than cadmium and issue of the soil pollution of non-agricultural land still remained unattended to. Such heavy metals as copper, zinc and arsenic were,

one by one, added to the list of recognized contaminants. Although the direct relationship of pollutants to "human health" was stressed, no mention was made of the conservation of the whole ecosystem. Soil pollution of non-agricultural land was referred to only in a supplementary resolution, for the reason that "human health cannot be damaged unless a human being eats a sufficient quantity of contaminated agricultural products."³

The discussion thus focused on the relationship between "human health" and "agricultural products." The next crucial point-of who should bear the expenses of any remedial action-was settled during the discussion of the Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works in the same 64th Diet, with emphasis, as a whole, on the need "not to place a burden on the farmers"; after the polluter's payment had been deducted, the remaining expenses were to be paid out of public money.

As to the allotment of the P. P. P., both MITI (the Ministry of International Trade and Industry) and the Ministry of Health and Welfare spent as long as three years attempting to adjust a suitable ratio, but in vain.⁴ It was only when the successor of the Environmental Pollution Control Headquarters-the Environment Agency-was established that the differences of opinion were finally recognized and balanced. According to the Ministry of Health and Welfare's interim report⁵ regarding the work of treating accumulated pollutants, the agricultural land soil clean-up business set a minimum rate of up to three-fourths of the whole expenses as the share to be borne by the private sector. But Article 4, Item 1 of the newly-established Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works, states "the total amount borne by the Entrepreneur should be correspond to (the degree of recognition of) how much the Entrepreneur's activities have affected the cause of the pollution." Item 2 of the same Law points out three reasons for reducing the amount of the Entrepreneur's costs; 1, "the function other than pollution control"; 2, "the degree of pollution needing pollution control"; 3, "circumstances covering the period of contamination by environmental pollution as these relate to the relevant work of pollution control."

Article 7 of the same Law states that "in case where the cost of reducing pollution cannot be calculated under the regulation," it should be possible to establish a standard amount multiplied by the amount of money mentioned in Article 4, Item 1, by an approximate ratio of a half to three-fourths. Owing to hastily enacted regulations designed to reduce the various kinds of cost to be borne by the polluter, the resultant rate of reduction (of costs) was fixed at a maximum of three-fourths. Once paid, the polluter was allowed to calculate his costs as necessary temporary expenses or financial loss. Although the "reduction of costs" item incurred much criticism, even in the Diet, the Law was

finally passed without any amendment, so as not to further burden the farmer.⁶

In the draft of the bill, there is no mention of "the rationalization of agricultural land utility," which nevertheless appears as Article 1 (the purpose) of the Agricultural Land Soil Pollution Prevention Law. It was a newly added item, there was additional concern that it would stimulate the conversion of contaminated land to non-agricultural uses.⁷

The Environmental Pollution Control Headquarters commented on Article 4, Item 1 of the Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works in these terms: "It is not so difficult to calculate the rate of the cause of pollution as it relates to the relevant work of pollution control" because almost nothing was to be considered in relation to any other causes of pollution, such as the creation of a green belt or soil dressing of farm land. As for soil pollution caused by heavy metals-what came to be called the "natural pollution" theory-the Headquarters was negative.⁸ But in a book published later, *Comment on the Agricultural Land Soil Pollution Prevention Law*, co-edited by the Water Quality Control Bureau of the Environment Agency and the Agricultural Administration Bureau of the Ministry of Agriculture and Forestry, we find the statement that "the share to be borne should correspond to the degree of recognition that the entrepreneur's total business activity has caused the relevant pollution, namely to the exclusion of other indirect causes of pollution and so on." This comment made way for the development of the "natural pollution" theory.⁹

A request for the reduction of payment because of natural pollution had already been presented by the mining industries at the time, and was mentioned in a report presented by the Mining Council in July, 1974, entitled "On How To Carry Out Measures to Prevent Accumulated Pollution in Metal Mining, etc."¹⁰ As a whole, the Agricultural Land Soil Pollution Prevention Law and the Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works, simultaneously enacted in the 64th Diet, were epoch-making and, at the time, were the most advanced provisions on the world for ensuring a practical way of covering the expenses of agricultural land soil restoration in terms of the P. P. P.

The soil restoration stipulated by the two laws, however, applied only to agricultural land, and for two reasons: "man's health" and "security of food;" the stipulation did not extend to land soil pollution in general since it lacked any recognition of the need to secure a healthy ecosystem and environment; as a consequence, the P. P. P. was hardly stuck to. "Not burdening the farmer" is a common understanding of the two laws, and what we can say from the recognition of this background is that it is prescription to pay clean-up expenses out of public funds provided by both the central government and local authorities, which

results, as a matter of fact, in paying for the cleaning-up of accumulated pollution by tax-derived subsidies.

3. Measures Against Soil Pollution by Two Laws

The Agricultural Land Soil Pollution Prevention Law led to the designation for soil pollution prevention of land amounting to 6,260 ha of 66 districts. The number of cases of soil dressing with additional top-soil replacement, in line with the Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works came to 39 altogether, for the 25 years from the May of 1971, when the law was first applied, to the end of 1995. The total of business expenses amounted to ¥79 billion, and the share borne by entrepreneur (the polluter) was 42.6%. Compared with the number of dredging operations, 33, and the entrepreneur's share of the costs, 66.6%, based on the same law over the same period, the figures are characteristic of the smaller share borne by the entrepreneur.¹¹

The entrepreneur's share of the costs of measures for the prevention of soil pollution had originally been relatively high, however, mostly 75%. (See Case 1 to 6 of Table 1, from 1972 to 1975). Once soil pollution measures to be undertaken by Takanosu District and the Shinjo and Tokomai Districts of Akita Prefecture had been announced on December 9, 1975, and for areas around Ikuno Mining in Hyogo Prefecture in 1976, the entrepreneur's share of the burden began to drop: that for Akita Prefecture, for instance, went down to 44.3%, while in Hyogo Prefecture, the entrepreneur's share of the costs dropped dramatically, from 75% (during the first application of the measures) to 59.5%. Since, in the case of Akita Prefecture, there was no direct polluter, the ratio of contribution to pollution was calculated for the first time (see Article 4, Item 1) and there was a still greater reduction by the approximate ratio of a half because of its being "a unique case of geological deposit."¹² Two cases in Akita Prefecture were given prominence by the Japanese Mining Association, which claimed that "our insistence (that we were not the guilty party) was finally accepted, at least in part."¹³

In the case of Ikuno Mining, especially, what has been called the "natural pollution" theory was given publicity because of the impossibility of denying completely that the "natural pollution" had been caused by cadmium.¹⁴

In the Agricultural Land Pollution Prevention Measures for the Jinzu River Site (first application of the measures), announced in February of 1980, the entrepreneur's share of the costs was set at 33.15%, the rest, 66.85%, was covered by national and local government funding. With regard to the Jinzu River Site, contaminated with cadmium of Mitsui Metal Kamioka Mining, an extent of 1,500 ha was designated as a pollution prevention measures district: this is equiv-

alent to approximately a quarter of the total area covered by the Japanese pollution prevention measure: 6,080 ha at that time.

Two oaths were undertaken and an agreement was concluded in August of 1972 in negotiations between the Tokyo Head Office of Mitsui Metal Mining and the resident victims, who were well known to have won a full-scale suit in the second hearing of the Itai-Itai Disease case. In the oath on "the soil pollution problem," Mitsui Metal Mining stated: Once the agricultural land soil restoration measures are put into operation, Mitsui Metal Mining will bear, (A), as a polluter, the total amount of expenses for the measures, (B), the expenses for land re-adjustment and so on to compensate the farmer for damages suffered, and (C), offer indemnity for the reduction of the farmer's rice crop.

All the Japanese Agricultural Land Pollution Prevention Measures were made operative by the Agricultural Land Soil Pollution Prevention Law (see Table 1), and, in 1976, the Liberal Democratic Party calculated that the restoration expenses for 5,000 ha of land would exceed ¥50 billion. It was at the beginning of 1974—under the financial pressure caused by the recession following the oil crisis of that time and the strong appreciation of the yen after 1973—that the Metal Mining Industries began to take measures to reduce the heavy burden of the increasing expenses that had undertaken for the prevention mining pollution.¹⁵ The first step was taken by a member of the Liberal Democratic Party, in the Diet on April 4, 1974, who argued for the withdrawal of the Health and Welfare Ministry's claims with regard to the effects of cadmium, for the relaxation of the standard set for contaminated rice, and for a stop to be put to the soil restoration measures.

The LDP's proposal was the start of a series of discussion of the cadmium problem. Many questions were raised in the Diet, and Mr. Takaya Kodama, a journalist, published a paper, entitled "Is Itai-Itai Disease a Case of Fictitious Pollution?" in February, 1975, issue of "Bungei Shunju (Popular Journal)," while, in April of 1976, a report on the cadmium pollution problem prepared by the Policy Research Council of LDP was made public by the Department of the Environment of it.

Since 1974, the Japanese Mining Association has argued in its annual "Request for the Policy Building of Mining": (1), for a reconsideration of "the Health and Welfare Ministry's views of the cause of Itai-Itai disease," and (2), for further research into the influence of cadmium on human beings, as well as 1, the abolition of the dual regulation of rice contaminated with cadmium, which forbids the circulation of rice contaminated by cadmium of 0.4 to 1.0 ppm, and (2), a re-examination of the agricultural land soil pollution prevention measures that relate to heavy metal and a reconsideration of soil restoration. They also argue, (3), that it is sufficient to set a safety standard for rice as human good

which would grant permission to blend rice contaminated with cadmium.¹⁶

Let us now investigate more precisely the method of calculation used to determine the ratio of the share borne by the entrepreneur in the agricultural pollution prevention measures undertaken at the Jinzu River Site. We do so because the grounds for the argument presented here can be applied to the entrepreneurs share of expenses for mining pollution prevention measures nationwide for all closed and abandoned metal mine workings.

The Sub-Committee of Soil Pollution Prevention Measures Body set the share of the costs borne by the entrepreneur (Mitsui Metal Mining) for measures in Public Pollution Control in Toyama Prefecture, reported in November of 1979, at 35.13%. Their calculation took the following steps: first of all, they excluded the portion relating to regional characteristics as well as the non-existent entrepreneur's ratio as a contribution to be paid by the polluter, as decreed in Article 4, Item 1, of the original law. The portion relating to regional characteristics was excluded from the calculation of the polluter's share of the burden (see Table 2) because the regional characteristics featured a high concentration of cadmium in the area upstream of the mineral deposit zone when compared with other areas.

By calculating the quantity of crude ore output in the Jinzu River headwaters from 1492 of the late Muromachi Era to 1971, the year when the Water Pollution Control Law took effect, and by distinguishing the Mitsui Metal Kamioka Mining's share from the share borne by the non-existent entrepreneur, the committee appropriated 79.45% of the burden to Mitsui Metal Mining. They calculated two-thirds of the approximate ratio given in Article 7, Item 3, of the "Share-Bearing Law", because, they argued, it is difficult to make a calculation based on Article 4, Item 2, of the "Share-Bearing Law."

After close criticism and investigation of this method of calculation, Mr. Haruo Tonegawa (Waseda University) put together a full picture of the pollution problem caused by closed and abandoned mines.¹⁷ I summarize and supplement his explanations. When calculating the ratio of costs to be borne by Mitsui Metal Kamioka Mining, the Toyama Local Government calculated the regional characteristics ratio by dividing the agricultural land into two: the contaminated land within an alluvial fan, and the non-contaminated land at the outskirts of the fan-while similarly dividing the non-agricultural land into two, the land contaminated by natural pollution within the alluvial fan and the non-contaminated land of the outskirts of the fan. The soil of the non-agricultural land within the alluvial fan influenced by the Jinzu River contained a higher percentage of cadmium than that of the non-agricultural land of the outskirts of the fan, which can, thus, be interpreted as a regional characteristic. It was later shown, however, that Toyama Prefecture's sample of soil from the non-agricultural land

contained soil taken from flooded land and the fill of contaminated land. According to the analysis carried out by Prof. Shin Honma of Tokyo Agriculture and Engineering Univ., there was no significant difference in the density of cadmium between the under layer of the non-agricultural land on the outskirts of the alluvial fan of the Jinzu River and the upper layer of the agricultural land investigated by Toyama local government, which thus cancels the implication of its being a regional characteristic.¹⁸

If we suppose that cadmium flows naturally from the mineral zone and accumulates in the downstream cultivated land, where the contaminated rice was grown, we can also suppose that rice grown in mining zones throughout Japan will also be contaminated. Since rice was grown within the limit of all the valleys influenced by mining throughout the mining zones, we can suppose that such rice must have been contaminated. According to an investigation carried out by Dr. Kohji Iimura and others, no pollution was found in the untouched natural rivers in the mining area, while less natural content of heavy metal was found in rivers running through many Japanese mining operations.¹⁹

The local government in Toyama Prefecture calculated that the non-existent entrepreneur's ratio, other than for Mitsui Metal Kamioka Mining, would be 20.55%, and they excluded it from the entrepreneur's share of the burden of costs. But the process of mining, ore dressing, and refining have different environmental influences on the downstream area, and since the bulk differential flotation process was brought into effect, the influence on environment of ore dressing technology has been decisive.²⁰ Up until 1971, before the adoption of a bulk differential floating process designed to increase the quantity of ore, the ratio for the quantity of crude ore to total period was only 2%. The contribution decreed for the non-existent industry was therefore negligible, and could easily be excluded.

In response to such criticism, the local government of Toyama Prefecture slightly raised the burden-bearing ratio of Mitsui Metal Kamioka Mining for soil pollution prevention measures at the Jinzu River Site, to 39.39% at the most.

As we can see, the item relating to "the degree of recognition as a cause of pollution" in Article 4, Item 1, of the Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works functioned to reduce the amount of the costs borne by the polluter, whether or not the pollution was caused by regional characteristics, natural contaminants, or a non-existent entrepreneur.

4. Measures Against Soil Pollution at the Jinzu River Site

In the summer of 1972, the Itai-Itai Disease Case was finally settled and the victims made an agreement with Mitsui Metal Mining. Based on the agreement, soil prevention measures came into operation. But things did not go so smoothly as had been expected. This was because the assessors were obliged to designate

an area and make a plan for soil pollution prevention so that they could start soil pollution prevention as a public works measure.

As a result, between 1974 and 1977, more than four attempts were initiated to designate land as soil pollution prevention areas, and from the first, when 1,500 ha was designated, to the third when over 1,000 ha was stipulated for soil dressing. As we have seen, there was a "rollback" in the controversy over the cause of the Itai-Itai Disease, and consequently the local government of Toyama Prefecture, which had planned the land use project, drastically changed its plans for paddy fields contaminated by cadmium. The result was a delay in the public works project.

The first pilot scheme, which was undertaken from the fiscal year 1979 to the fiscal year of 1984, covered a small area of only 90 ha, amounting to approximately ¥2.4 billions of business expenses, with the share to be borne by the industry fixed at a rate of 35.15%, equal, approximately, to ¥0.88 billion.

From the fiscal year 1983 to the fiscal year 1994, further public works projects covering 441 ha with expenses of ¥12.4 billion were planned, but due to the revision and the reduction of the project in the middle of its operation, these were cut down to 356 ha, and to approximately ¥10 billion, while the ratio of costs to be borne by the industry's rose slightly to 39.39%, equivalent to ¥4 billion.

A third area of 437 ha was next designated for treatment from the fiscal year 1992 to the fiscal year 2004, with expenses of ¥25.5 billion, the entrepreneur bearing 39.39% of the burden, equivalent to approximately ¥10 billion, although the converted land excluding agricultural land eventually extended to 563 ha. The reason of the increase in the area of land to be converted in the third selected district was the result of an increase in the area of land to be sold as the site of a housing complex and an industrial plant; this arose because of the problem of a successor and so on, while land designated for agricultural purposes may no longer be diverted from land already treated to soil pollution prevention measures.

Now, although more than twenty years have passed since the Itai-Itai Disease Case was brought before the court, the local government of Toyama Prefecture and Mitsui Metal Mining have succeeded in postponing any further undertaking of soil pollution prevention measures, and have also succeeded in reducing both the area designated for soil restoration and the ratio of expenses to be borne by the entrepreneur.

The actual situation regarding the Polluter Pays Principle, as it relates to Mitsui Mining, is this: On August 10, 1972, Mitsui Metal Mining made an agreement with the victims' organization with regard to the following items; 1, Compensation for Itai-Itai Disease; 2, the clean-up of soil pollution; 3, the preven-

tion of further pollution. Compensation paid by Mitsui Metal Mining, based on 1, was ¥3.6 billion over all, equivalent to ¥8.9 billion in 1996, ¥1.4 billion for nursing allowances, equivalent to ¥2.4 billion in 1996, ¥2.4 billion for medical expenses, equivalent to ¥3.2 billion in 1996, ¥7.5 billion in total, equivalent to ¥14.6 billion in 1996. (See Table 2.)

Expenses for soil pollution prevention measures under 2 were, as we have already seen, approximately ¥0.9 billion for the first project, equivalent to approximately ¥1.1 billion in 1996, approximately ¥4 billion for the second, equivalent to approximately ¥4.6 billion in 1996, ¥4.9 billion altogether, equivalent to ¥5.7 billion in 1996. Although approximately ¥10 billion has been estimated for the third project, this is likely to be lowered before the project is completed.

In addition, compensation for the suspension of planting and the reduction of rice production in paddy fields contaminated by cadmium by more than 1 ppm., amounted to ¥11.8 billion altogether, equal to ¥14.1 billion in 1996. The total amount of compensation originally promised still exceeds the amount of money which Mitsui Metal Mining has so far paid for soil pollution clean-up measures.

The accumulative total of expenses for the source measures based on the Pollution Prevention Agreement came to ¥8.3 billion for drainage (¥11.8 billion in 1996), ¥3.2 billion for smoke treatment (¥5.0 billion in 1996), ¥0.5 billion for treatment of closed and abandoned mines (¥0.8 in 1996), for a grant total of ¥12.0 billion, (¥17.6 billion in 1996). Additional expenses of an on-the-spot inspection came to approximately ¥0.2 billion.

Many other issues which need to be considered—such as death and damaged health due to Itai-Itai and kidney disease caused by cadmium poisoning—are hardly calculated here. The question, for instance, of the amount of compensation to paid for cases of Itai-Itai Disease mentioned in 1, faces the difficult problem of how to estimate an amount that will compensate fundamentally for irreparable damage to health. As for the soil pollution prevention measures under 2, the principle in the Agreement that “the polluter pays the total amount of expenses necessary for the measures (to be) undertaken” has not been adhered to.

As a result of the reduction in the area designated for restoration from 1,500 ha to 1,000 ha, and the reducing of the entrepreneurs burden-bearing ratio to 35% or 39%, Mitsui Metal Mining has been able to get off with an overall burden-bearing ratio of approximately 26% to 27%.

Besides, although Mitsui Metal Mining compensated for the suspension of planting and reduced income, ¥11.8 billion in total, rice contaminated by cadmium to levels of 0.4 to 1.0 ppm., was purchased by the government.

Source measures under 3 were actually over-calculated since investment related to production was included within what was calculated as pollution pre-

vention measures expenses, since, under the Special Law for Mining Pollution Control, investment related to the closed and abandoned mines was intended to finance the undertakings. Consequently, Mitsui Metal Mining's expenses incurred for pollution prevention measures should, as truly burden-bearing, be discounted.

If it is considered a corollary that the restoration of land to its original condition entails that the same pollution-damage should never be repeated, source prevention measures as well as soil pollution prevention measures will be two of the main pillars supporting the recovery of land damaged by pollution.

In this regard, Kamioka Mining's source prevention measures, based on the Pollution Prevention Agreement, have achieved a remarkable success, aiming at the natural background level of less than 0.1 ppb of cadmium outflow to the downstream area, and they should be highly evaluated.²¹

As to the actual honoring by condition of Mitsui Metal Mining of the Polluter Pays Principle, with regard to 1, health casualties compensation, 2, soil restoration, and 3, source prevention measures, the burden-bearing of 2, soil restoration, has been greatly reduced owing to the cut-back in the size of the area to be restored and in the burden-bearing ratio. This was achieved because, in their application of the Agricultural Land Soil Pollution Prevention Law and Law Concerning Entrepreneur's Bearing of the Cost of the Public Pollution Control Works, Mitsui Metal Mining was successful in limiting expenses to the minimum when it came to 3, source prevention measures even partially connected to the rationalization of production, and 2, the utterly unprofitable business of soil restoration, and by managing to cover the resultant shortfall in expenses with public funds.²²

5. Special Law for Mining Pollution Control in Metal Mining Industries and Metal Mining Corporation

Of the various measures taken against accumulated pollution brought about by the metal mining industry, the most important are Special Law for Mining Pollution Control in metal mining industries and the Partial Revised Law of the Metal Mining Searching Promotion Corporation, both promulgated in 1973. The background of the laws can be found in the responsibility of closed and abandoned mining sites for the heavy metal pollution caused by cadmium and arsenic (Toroku mining in Kyushu). As pollution prevention measures are designed to obviate environmental disruption caused by metal mining, so it is required that waste water from mine shafts should be dealt with permanently, in line with source measures for filling up mine shafts, covering sedimentary fields with soil, the planting of trees, and so on.

The Special Law for Mining Pollution Control provides that the owner of mining rights has a duty to organize a yearly business program of pollution pre-

vention measures (which does not entail current use), special facilities, and a reserve fund set aside for pollution prevention, though this does not include a compensation fund. Along with this Special Law, the reserve fund system for pollution prevention in Metal Mining Industries was established to ensure that the reserve is exempt from tax. In response to the Special Laws, the Metal Mining Corporation reorganized the Metal Mineral Searching Promotion Corporation to take the necessary steps to prevent metal mining pollution, with a guarantee of obligation, management and guidance for the prevention of the mining pollution. If it takes advantage of the pollution prevention reserve fund provided for by the Special Law, the Corporation ought to be able to cover the expenses of measures for the closing of shafts, the covering of sedimentary field with soil, the cultivation of plants, and so on.

The fundamental principles for the business of pollution prevention in used special facilities which had been established under the Special Law were put into effect twice, first for a project from 1973 to 1982, with a budget of ¥46 billion at 1977 prices, and the second in 1983, with a budget of ¥20 billion at 1982 prices, but neither project was completed, and a third project had consequently to be drawn up.

From the fiscal year 1975, the Metal Mining Corporation began to make loans to entrepreneurs bearing pollution prevention expenses, and from the latter half of the fiscal year 1978, they also began to make loans towards the running costs of shaft mine drainage treatment measures in the used special facilities.

Mines which mining rights had expired more than five years previously are not subject to the mining pollution prevention order of the Mine Safety Act, and even within five years after the expiry of mining rights, due to dissolution or bankruptcy of the company, as many as approximately six thousand closed and abandoned mine workings throughout Japan had already escaped from their entrepreneurial obligation for pollution prevention business.²³

To cope with the closed and abandoned mines with a non-existent executor of obligation for mining pollution prevention, the Pollution Prevention Subsidy System came into effect for the fiscal year of 1971; initially, the government subsidy was two-thirds, but then, from the fiscal year of 1975, it was increased to three-fourths of the whole subsidy to the Local Government Authority; from the fiscal year of 1974, shaft water drainage treatment expenses were also eligible for subsidy. Over the fiscal years 1973 to 1991, the expenses of mining pollution prevention construction amounted to approximately ¥47 billion, approximately ¥35 billion of the ¥47 billion coming from the government subsidy, which meant that 126 of 177 mine workings in the process of planning have already completed construction. Over the same period, the closed and abandoned mine workings with an existent executor with an obligation to pay pollution prevention

expenses were financed with approximately ¥17 billion to cover mining pollution prevention construction expenses, the Metal Mining Corporation making a loan of approximately ¥11 billion. (The number of the mine workings due to be constructed was 255.)²⁴

During the third mining pollution prevention project, designed to run from 1993 to 2002, the mining pollution prevention business is to be financed with ¥4.5 billion annually for mine drainage treatments, which will amount to ¥45 billion over ten years. In detail, for the approximately 80 mines all told, ¥1.8 billion is to be financed to mines which have a legally obliged person in charge; these include five mines where the post-owner is independently carrying out mining pollution prevention activities; ¥2.7 billion will go to those mines where there is no legally-obliged person in charge.

As we can see, a huge amount of subsidy has been granted to cover closed and abandoned mining pollution measure, in disregard of whether or not the mine is managed by a person who is legally obliged to prevent pollution.

Since metal mine workings have to continue the mine drainage treatment almost permanently, the resultant problems concern who is mainly responsible for this work, and who should bear its cost. "The Round Table Conference on the Mine Drainage Problem," the private consultative body to the Director of the Site and Environment Bureau of MITI (the Ministry of International Trade and Industry), reported in May of 1980 as follows; "Given a new interpretation that 'the maintenance and management of the facilities' should be included in the description of 'the necessary facilities' to safeguard them from mining damages, in Article 26, Item 1 of the Mine Safety Act, on the causal basis that "pollution was caused by the operation of the mining industry," "expenses to dispose of natural and other sources of pollution" should be borne by another body, that is, the government "because each mining company's share of burden of mine drainage treatment expenses should be reduced in view of the (national) mineral resources policy," while the local authority's share should also be investigated, since "the mine drainage treatment is deeply connected to the preservation of the regional environment."

The decision that other costs for treating "natural and other sources of pollution (other polluter causation)," based on the P.P.P., ought to be covered by the government was determined "in view of the (national) mineral resource policy," while, at the same time, the local government authority's share of the burden would be determined by adopting remunerative principle.

In response to the 1980 report, it was decided that, from the fiscal year 1981, the "closed and abandoned mining pollution prevention construction expenses subsidy system should be applied to natural and other sources of pollution in mine drainage treatment given to the closed and abandoned mine workings

managed by a person legally obliged to keep the site clean (the ratio of the central government's subsidy was three-fourths and that of the local government authority one-fourth). In disregard of the calculation formula of "natural" and "other sources of pollution" ratio, a subsidy ratio was, from the beginning, set at one-third of the treatment expenses, which meant that an assistant coefficient had to be introduced in order to hold down the expenses within the budget. We may from this infer, half-hidden in the background behind this calculation of the "natural" and "other sources of pollution" ratio, the nominal ground of the demand for a central government subsidy.

Then, in 1992, the Special Law for Mining Pollution Control was amended for the purpose of establishing fundamental principles for the measures that needed to be taken in mine drainage treatment, issues that had been raised by the problems of closed and abandoned mine workings. This Law established a Mining Pollution Prevention Measures Fund and set up a Designated Pollution Prevention Business Organization, so that the owner of mining rights will, in the first place, be required to donate, for a period of six years, money to a fund controlled by the Metal Mining Corporation, to cover 50 appropriate closed and abandoned mine workings. With this fund, measures can be taken against pollution. If it is possible to set the rate of interest at 5% in order to secure approximately ¥1.5 million per year to cover mine drainage treatment expenses, a total fund of approximately ¥30 billion will be required. The fund is deductible as expenses.

After the completion in 1998 of these requirements, the designated mining pollution prevention business organization, now named the Resource Environmental Center, is to take measures for mine drainage treatment. The fund is run by the Metal Mining Corporation. That the owner of mining rights in closed and abandoned mine working should make a contribution to such a fund, and that mine drainage measures should be financed by the use of the interest on that contribution, seems to be based on the idea of the P.P.P., but there are two problems:

one is that we are not simply dealing with the clean-up of the environment by the removal of past contaminants, but with the indefinitely continuing work of the prevention of mining pollution after the completion of the clean-up operation;

the second is whether or not the interest on the owner's contribution can correspond adequately to the economical burdens that the measures will impose.

Of approximately 80 Japanese mines that require mine dressing treatment, only about 50 of them can be managed by the fund and the Resource Environment Center, and the remainder of the mines, because of the non-existence of any person who can be held legally responsible, have nothing to rely on, other than subsidies from the government and the local authority. (According to the

Mining Dept. of MITI.)

As to the issue of subsidies, we should look at many tax incentive measures established during this period that relate in some way to issues of pollution. The first is the Pollution Prevention Reserve System, in effect from 1972 to 1978, when, in spite of the limited amount of reserve capital, a substantial profit was counted as loss and exempted from tax. In Mitsui Metal Mining, as much as ¥4.4 billion accumulated over the accounting period of March, 1975, and was later appropriated for purposes "other than the original ones." In 1967, a "Pollution Prevention Equipment Specially Recognized Depreciation System" had been established, in order to recover invested capital in order to achieve a quick return. And in 1974, the Metal Mining Pollution Prevention Reserve System, based on the Special Law, was established.

In addition, it was found very useful to extend the range of Pollution Prevention Facilities, and so reduce the fixed property tax. From 1971, in case of the re-use of after-treatment contaminated water as water for industrial use, the production facilities were exempted from tax, so that almost all production facilities that related to water use were exempted from tax, while, from 1978, closed and abandoned mining pollution prevention construction expenses also came to be treated as loss or necessary expenses.

Thus, such tax or other financial benefits as those provided by the Pollution Prevention Reserve, the Metal Mining Pollution Prevention Reserve, the Pollution Prevention Facilities Specially Recognized Depreciation System, the Reduction of Fixed Property Tax, and so on, all came to work as indirect or a "hidden" subsidies.

6. Conclusion

Japan has taken very strict measures to prevent mining pollution, and some of them have, in principle, been so advanced that they could be effectively carried out there would be a good prospect that the level of pollution in the natural background might be reduced overall.

Japanese technology and experience ought therefore to be utilized in areas such as those found other countries where people live largely on river water and where paddy fields are a characteristic of feature of national land use countries.

But when we consider the application of the P.P.P. to cases of accumulated heavy metal pollution, we are forced to conclude that since the P.P.P. has been only partially applied, it has been only partially successful in carrying out measures to prevent pollution, to restore polluted soil and to remove accumulated heavy metal.

For various reasons, such as the distinction that is drawn between the "natural" and "other sources of pollution", the authorities have substituted public

money for the costs that ought to be paid by the polluter: that is, the central government and local authorities have provided a subsidy.

Yet, as we have seen from the way in which the soil prevention measures were carried out at Jinzu River Site, steps were taken in order to reduce the polluter's share of the costs, and the way in which the "natural" and "other sources of pollution" distinction was made, did not always match the actual facts of the case.

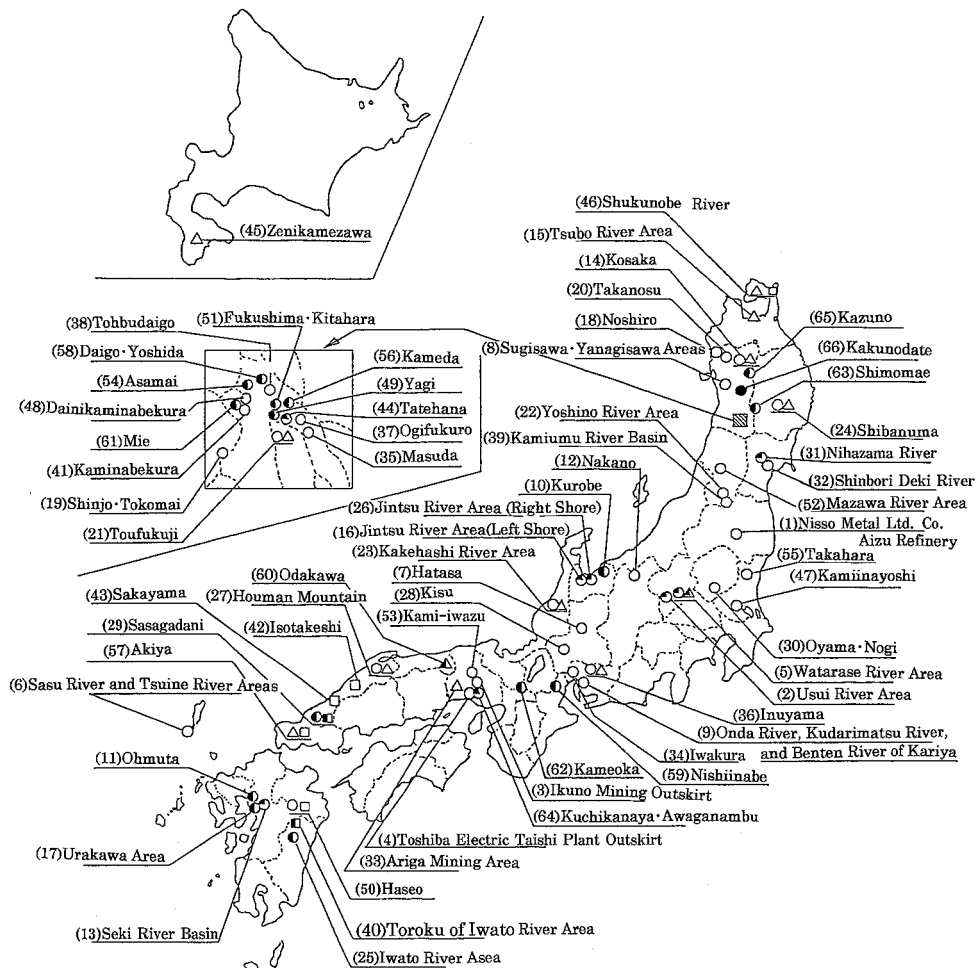
Since the P.P.P. has not been strictly adhered to, it is unrealistic to try to settle the whole issue of pollution by hoping to apply the P.P.P. alone, without other safeguards and provisions. We badly need a defined principle that will be persuasive enough in itself to ensure the removal of accumulated pollution through the payment of expenses out of public money.

Historically, Japan's P.P.P.-which is not quite equivalent to OCED's P.P.P.-has character of legal liability. It is therefore easy to combine this principle with the principle of causation and responsibility, and it is embodied in the "degree of recognition as a cause of pollution" clause of the Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works. The Japanese Government has used this principle as a tool to reduce the burden upon the polluters by interpreting and applying the principle rather flexibly.

Given this situation, Government seems to have two agendas: one, to reduce the burden of payment that falls on the polluter, and two, the need to clean-up any residual accumulated pollution which is not recognised as the "polluters responsibility". To cope with the first item, the Government has introduced many schemes to subsidize the costs, including the use of tax. To answer the second need, the Government introduced a resource policy and local government remunerative principle to rationalize the use of public finance.

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Areas of Agricultural Soil Pollution Control Project in Japan



Introductory Notes

Special Toxic Substances	Cadmium	Copper	Arsenic
Designated Area	●	▲	■
Pollution-Control-Plan Settled Area	○	△	□
Designation Cancelled Area	○	△	□

Notes 1) The underline of ● ▲ shows the pollution caused by the plural specified toxic substances.

2) ○ △ shows the designated area polluted by cadmium and copper, a part of which is canceled the designation.

Table 1 Application Examples of Law Concerning Entrepreneurs Bearing of the Cost of the Public Pollution Control Works related to Agricultural Land Soil Pollution Prevention

Name	Year	Total Cost 1000yen	Entrepre's Bearing 1000yen	Rate	Ratio of Contribution		Approximate Ratio	Works Period		Enforcement	Source	Polluter
1 Usui River	72. 9. 13	630,000	472,500	75%	100%			replace of soil	72-74	Gunma Pref.	Cd	Toho Zinc
	(plan changed)						72-74					
	74. 2. 15	733,300	549,975	75%	100%		72-75					
	(plan changed)											
	75. 2. 14	912,600	684,450	75%	100%							
	(plan changed)											
	76. 3. 19	870,500	652,875	75%	100%		75%		72-76			
	78. 6. 15	1,555,716	1,166,787	75%	100%		75%		72-82			
2 Ikuno Mining	73. 7. 31	354,000	265,500	75%	100%			replace of soil	73-74	Hyogo Pref.	Cd	Mitsubishi Metal Mining
	(plan changed)											
	74. 11. 26	428,778	321,584	75%	100%		75%		73-74			
3 Nakano	74. 1. 10	131,700	79,020	60%	80%		75%	replace	73-74	Nagano Pref.	Cd	Koshina Optics
4 Kariya	74. 1. 28	1,500,000	1,123,875	74.9%	99.9%		75%	replace	73-74	Aichi Pref.	Cd	Nippon Denso
5 Nisso Metal Aizu	74. 7. 3	273,000	204,750	75%	100%		75%	replace	74-75	Fukushima Pref.	Cd	Nisso Metal
	(plan changed)											
	75. 3. 7	362,000	271,500	75%	100%		75%		74-75			
	(plan changed)											
	76. 3. 30	406,316	304,737	75%	100%		75%		74-76			
6 Tsubo River	75. 9. 15	56,800	42,600	75%			75%	replace	75	Tenmabayashi (Aomori)	Cu	Japan Energy
7 Takanosu Shinjo Tokomai	75. 12. 9	344,000	152,478	44.3%	88.65%		50%	replace	75-78	Akita Pref.	Cd	Dowa Mining
	(plan changed)											
	78. 2. 28	280,243	124,219	44.3%	88.65%		50%					
	75. 12. 9	989,290	318,087	32.9%	43.8%		75%	replace	75-78	Akita Pref.	Cd	Dowa Mining
8 Ikuno	76. 12. 17	353,000	210,035	59.5%	79.34%		75%	replace	76-77	Ohkochi (Hyogo)	Cd	Mitsubishi Mining

Name	Year	Total Cost 1000yen	Entrepre's Bearing 1000yen	Rate	Ratio of Contribution		Approximate Ratio	Works Period		Enforcement	Source	Polluter
9 Kakehashi River	77. 8. 2	4,530,000	1,872,249	41.3%	60.76%	68.02%			77-82			
	(plan changed)											
	79. 7. 13	5,840,000	2,413,672	41.3%	60.76%	68.02%		replace	77-82	Ishikawa Pref.	Cd	Japan Energy
	(plan changed)											
	84. 1. 27	9,128,720	3,772,899	41.3%	60.76%	68.02%			84-88			
10 Sasagadani downstream	78. 1. 13	1,117,000	90,477	8.1%	10.8%		75%	replace	77-82	Shimane Pref.	Cd As	Japan Energy
	(plan changed)											
	87. 12. 11	1,195,365	96,824	8.1%	10.8%		75%		77-89			
11 Yoshino River	78. 2. 15	3,442,000	2,099,534	61.0%	81.33%		75%	replace	77-82	Yamagata Pref.	Cd	Japan Energy
	(plan changed)											
	81. 12. 25	4,574,140	2,788,570	61.0%	81.33%		75%		77-86			
	(plan changed)											
	85. 3. 29	4,387,580	2,674,857	61.0%	81.33%		75%		77-86			
12 Shinbori Deki River	78. 7. 11	530,000	326,480	61.6%	89.2%	69.1%		replace	79-80	Miyagi Pref.	Cd	Tohoku Alps
13 Iwakura	78. 9. 20	163,000	101,060	62%	100%	62%		replace	78-79	Iwakura (Aichi)	Cd	Nagoya Rashi
14 Sasu River	78. 12. 12	2,406,576	736,949	32.7%	39.8%	82.15%		replace	78-84	Nagasaki Pref.	Cd	Toho Zinc
15 Motosu	79. 5. 15	1,945,869	1,357,117	69.7%	97%	82%		replace	79-90	Gifu Pref.	Cd	Sumitomo Cement
16 Oyama-Nogi	79. 8. 1	274,700	82,410	30%		30%		replace	79-82	Oyama	Cd	Origin Electric
17 Noshiro	80. 1. 22	321,247	137,733	42.9%	85.74%		50%	replace	79-83	Akita Pref.	Cd	Dowa Mining
18 Jinzu 1st	80. 2. 6	1,783,000	626,368	35.1%	52.7%		66%	replace	79-84	Toyama Pref.	Cd	Mitsui Metal Mining
	(plan changed)											
	84. 7. 28	2,247,436	885,265	39.39%								
19 Nihazama River	80. 4. 25	409,000	130,062	31.8%	47.7%		66%	replace	80-85	Miyagi Pref.	Cd	Mitsubishi Metal
20 Watarase River	80. 10. 1	5,656,983	2,885,062	51%	87.7%	77.6%	75%	replace	80-85	Gunma Pref.	Cd	Furukawa Mining
21 Seki River	81. 9. 22	808,044	379,783	47%	75.5%		66%	replace	81-87	Kumamoto Pref.	Cd	Mitsui Metal Mining
22 Kami Inayoshi	82. 3. 2	215,000	107,500	50%			50%	replace	82-84	Chiyoda (Ibaragi)	Cd	Riken Vacum

Name	Year	Total Cost 1000yen	Entrepre's Bearing 1000yen	Rate	Ratio of Contribution		Approximate Ratio	Works Period	Enforcement	Source	Polluter
23 Kosaka	82. 8. 31 (plan changed) 85. 9. 27	617,000 695,278	201,870 213,981	32.8% 30.8%	65.5%		50%	replace 82-90	Akita Pref.	Cd Cu	Dowa Mining
24 Shukunobe River	82. 12. 24	191,000	25,460	13.3%	26.7%		50%	replace 82-85	Kawauchi (Aomori)	Cu Cd	Tanaka Mining
25 Jinzu 2nd	84. 1. 20 (plan changed) 91. 9. 4	10,940,000 9,054,865	4,309,266 3,566,711	39.39% 39.39%	59.08% 59.08%		66% 66%	replace 83-94	Toyama Pref.	Cd	Mitsui Metal Mining
26 Inuyama	84. 3. 12 (plan changed) 88. 7. 11	993,000 712,000	89,216 63,969	8.98% 8.98%	17.9% 17.9%		50% 50%	replace 84-88 84-88	Aichi Pref.	Cd Cu	developer
27 Takahara	85. 4. 23	607,000	306,333	50.47%	75.7%		66%	replace 85-88	Jyuoh (Ibaragi)	Cd	Japan Energy
28 Haseo	86. 5. 20	691,484	197,117	28.50%	42.8%		66%	replace 86-90	Ohita Pref.	Cd As	Mitsubishi Metal
29 Odagawa	86. 9. 24	716,000	212,366	29.66%	73.7%	80.3%	50%	replace 86-92	Tottori Pref.	Cu	Japan Energy
30 Kami-iwatsu	87. 10. 5	256,710	85,612	33.35%	44.46%		75%	replace 87-90	Asako (Hyogo)	Cd	Mitsubishi Metal
31 Nishi-inabe	87. 10. 30	5,172,100	1,281,000	24.7%	56%	44%		replace 87-99	Mie Pref.	Cd	Onoda Cement
32 Nishikawa Mazawa River	90. 7. 10 (plan changed) 93. 3. 30	140,000 128,400	47,082 43,181	33.6% 33.6%	67.26% 67.26%		50% 50%	replace 90-92	Yamagata Pref.	Cd	Godo Resource
33 Yuta Shimomae	91. 7. 12	668,660	14,576	2.18%	4.36%		50%	replace 91-97	Iwate Pref.	Cd	Tanaka Mining
34 Kurobe	91. 11. 19	2,936,000	1,957,431	66%	100%		66%	replace 91-96	Toyama Pref.	Cd	Japan Energy
35 Jinzu 3rd	92. 2. 3	19,291,900	7,599,079	39.39%	59.08%		66%	replace 92-2004	Toyama Pref.	Cd	Mitsui Metal
36 Urakawa	93. 11. 5	290,000	145,290	50.1%	75.2%		67%	replace 94-97	Arao City	Cd	Mitsui Metal
37 Agawa-south	93. 11. 12	1,214,000	127,349	10.49%	20.9%		50%	replace 94-97	Kanzaki (Hyogo)	Cd	Mitsubishi Material
38 Ohmuta	94. 10. 31	982,000	510,050	51.94%	98%		53%	replace 95-98	Fukuoka Pref.	Cd	Mitsui Metal
39 Kazuno	95. 3. 17	689,000	244,170	35.4%	71%		50%	replace 95-99	Akita Pref.	Cd	Dowa Mining

(Source) Environment Agency, Department of Planning

Table 2 Compensation, Nursing Allowance and Medical Expenses paid by Mitsui Metal Mining

(1000 yen)

Year	Compensation	Nursing Allowance	Medical Expenses
1971	66,000		
1972	2,784,000		
1973	64,000	107,278	70,686
1974	49,000	108,522	106,287
1975	22,000	98,180	103,345
1976	19,000	86,995	127,409
1977	17,000	80,588	144,840
1978	13,000	102,956	144,242
1979	9,000	98,942	130,482
1980	19,000	91,074	135,791
1981	16,000	71,059	117,150
1982	10,000	74,532	136,358
1983	85,000	74,466	146,876
1984	20,000	61,971	142,712
1985	26,000	50,798	122,442
1986	43,000	40,837	128,447
1987	11,000	40,323	130,047
1988	14,000	38,492	126,202
1989	46,000	35,222	114,979
1990	12,000	24,720	48,934
1991	15,000	27,676	56,656
1992	53,000	33,060	49,380
1993	151,000	27,520	68,910
1994	31,000	27,627	78,013
1995	40,000	22,960	88,630
1996	10,000	18,560	80,670
1997	2,000	14,950	
Total	3,647,000	1,459,521	2,599,500

(Source) The Council of Itai-Itai Disease

Table 3 The Pollution Prevention Investment by the Kamioka Mining
(1000 yen)

Year	Drainage	Smoke Treatment	Closed Mining	Total
1970	127,358	230,000		357,435
1971	145,909	291,814		437,723
1972	235,807	130,202		366,009
1973	433,972	34,076	25,132	493,180
1974	731,083	218,332	108,989	1,058,404
1975	501,370	122,142	91,430	714,942
1976	163,700	132,040	92,838	388,578
1977	54,558	54,826	70,587	179,971
1978	66,876	29,068	4,935	100,879
1979	273,538	7,026	6,806	287,370
1980	183,248	34,737	47,914	265,899
1981	306,177	24,286	18,740	349,203
1982	247,226	56,466	10,000	313,692
1983	330,270	86,865	3,646	420,781
1984	383,198	72,037	6,136	461,371
1985	321,825	166,439	6,128	494,392
1986	280,201	75,904	2,484	358,589
1987	256,034	338,700	3,602	598,336
1988	286,635	109,866	5,477	401,978
1989	308,807	87,655	5,258	401,720
1990	372,854	176,007	7,939	556,800
1991	593,519	168,091	6,730	768,340
1992	549,175	269,125	5,522	823,822
1993	245,262	50,618	7,863	303,743
1994	273,103	54,703	4,826	332,632
1995	365,712	48,997	7,199	421,908
1996	277,434	101,030	4,219	382,683
Total	8,314,851	3,171,129	554,400	12,040,380

(Source) Kamioka Mining, *The Pollution Prevention Investment by Kamioka Mining*, 1997

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