

Ensuring Safe and Secure Water

Tripartite talk Actions against PFAS and Water Safety

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Actions against proceeding and water Safety

Discussed topics such as a "PFAS-free" society (in the conference room of the Kenseikai Social Medical Corporation in Tachikawa, Tokyo)

PFAS (organic fluorine compounds), which have been linked to health effects, have been detected in groundwater and in many other locations throughout Japan. Given the situation, the PFAS Expert Committee of Social Medical Corporation Kenseikai (Tachikawa, Tokyo) published the "PFAS Guidebook: Study Material" in October 2023. Yasuhiko Hasuike, Executive Director of the committee, says, "There is no need to be overly worried, but we want people to be aware of the issue first." Meanwhile, Europe and the U.S. are leading the way in regulating PFAS, and the globally operating Mitsubishi Chemical Group (MCG) has launched a company-wide effort to achieve a "PFAS-free" society. In this tripartite talk, under the theme of "Actions against PFAS and Water Safety," Mr. Shigeki Habuka, Executive Officer of MCG, talked about the regulatory situation in Japan, Europe and the U.S. regarding PFAS and the outlook for countermeasures. Mr. Masakatsu Yasuguchi, President and CEO of Mitsubishi Chemical Aqua Solutions (MCAS), a subsidiary of MCG and being engaged in water treatment business, presented examples of how the water cycle, from water source to wastewater, can contribute to a PFAS-free society. (Their job titles are as of the February 2024 tripartite talk.)

-What motivated you to work on PFAS actions?

Mr. Hasuike

It was in January 2020 when I heard about a news report that PFAS had been detected in a well in Tachikawa, Tokyo, near the Yokota U.S. military base. As our organization intended to work with the local residents to build a community through non-discrimination, equal healthcare, and peace issue, we decided to hold study sessions on PFAS.

However, at that time, the entire country was in turmoil, with people infected with COVID-19 among the passengers of the Diamond Princess cruise ship. While carrying out our duties, such as admitting patients infected with COVID, we held several online study sessions to deepen our awareness of the PFAS issue. With the support of the chairman of our organization Kenji Kusama, saying "since we are to protect the health of local residents, let's work together with them on this issue," and in August 2022, together with local residents, we established the "Association to Reveal PFAS Pollution in Tama Region."

From November 2022 to March 2023, the association conducted PFAS blood tests for local residents at 18 clinics, including Kenseikai, with 791 residents from 30 municipalities throughout Tama region participating. We were in the midst of the eighth wave of the pandemic, and some doctors who were dealing with infected patients said, "This is unnecessary at this difficult time." However, the test results were

shocking: PFAS was detected in nearly all the subjects. Furthermore, in 46.1% of all cases, blood PFAS levels exceeded the American Academy's "possible health hazard" level, reaffirming the need for us as a medical institution to work to eliminate the health risks to the residents.

To make these issues known to as many people as possible, we published the "PFAS Guidebook: Study Material" (shown in a separate column) in collaboration with Professor Emeritus Akio Koizumi and Associate Professor Koji Harada of Kyoto University.

Also, in May 2023, Kenseikai and Fureai Clinic opened the first PFAS Outpatient Consultation Service in the country and it continues to support local residents.



-Please tell us about your efforts at the PFAS Outpatient Consultation Service. *Mr. Hasuike*

We have established the PFAS Outpatient Consultation Service to address the concerns of residents who have undergone the blood test. We do not believe there is so-called "PFAS disease" although publications in Europe and the U.S. have suggested that some PFAS may be carcinogenic. For this reason, we are advising people, especially those with high levels of PFAS in blood, to be more conscious of their health, to get health-checkup, and to talk to their primary care doctor if they have any health concerns. Ultrasonic scan is also available if needed. They seem relieved when we tell them, "There is no need to be overly afraid of PFAS." Given the fact that the PFAS issue has not yet been established as a field of medical expertise, we believe that the local primary care doctors could address this issue. With that said, I hope that the blood tests will be conducted to find out the actual situation throughout Japan

PFAS regulations advancing in Europe and the U.S.

-What is the status of PFAS regulations? *Mr. Habuka:*

In Japan, the production and import of toxic PFAS is prohibited, but regulations on PFAS in general are still at the stage of being discussed. In this sense, Europe is rather more advanced.

According to government data, Europe had previously implemented separate regulations for each type of fluorine compound, such as PFOS and PFOA. However, recent PFAS regulations have resulted in confusion in the industry because the regulations comprehensively cover all fluorine compounds, including substances that are essential for semiconductor manufacturing and those that have a significant impact on daily life.

This move toward blanket PFAS regulations began

Mr. Shigeki Habuka

Executive Officer, Mitsubishi Chemical Group

Born in Chiba, Japan in 1958, graduated from the University of Tokyo, Faculty of Law in 1981 and joined the Ministry of Finance in the same year. In 2005, joined the Ministry of Finance, and served as Director of the Second Taxation Division, Taxation Bureau, Ministry of Finance. In 2008, assumed Deputy Director General in Ministry of Defense. In 2011, Deputy Director General of the Budget Bureau of Ministry of Finance. In 2014, Director-General for Policy



Planning, Cabinet Office. In 2016, Cabinet Office Deputy Director General. In 2017, assumed position of Executive Officer in Business Planning Office of Business Strategy Department of Mitsubishi Chemical Holdings. In 2019, became Executive Officer and General Manager of the Corporate Communications and Investor Relations Office of Mitsubishi Chemical Holdings Corporation. 2020, became Executive Officer of Mitsubishi Chemical Holdings Corporation. 2022, assumes his current position.

with proposals from five countries (Germany, Sweden, the Netherlands, Denmark, and Norway), and the process is now underway for inclusion in the EU's REACH regulation. Following the publication of the draft regulations in February 2023 and the period of public comment collection from March to September of the same year, the regulations are expected to take effect in 2025 or later. After an 18-month transition period, the proposed regulations would be implemented as early as in 2027.

In the U.S., efforts have started with transparency, such as requiring businesses that manufacture or import goods containing PFAS to report the amount of PFAS contained in their products, emissions, and environmental impact information. In 2021, the Environmental Protection Agency Administrator announced PFAS Strategic Roadmap. Some states are adding regulations not only on drinking water and soil, but also to general consumer products such as cosmetics and children's products. In light of these developments in Europe and the U.S., the Japanese government is expected to consider regulating PFAS.



Mr. Habuka explaining the regulations

Committed to the water treatment business, including groundwater membrane filtration systems

-Please tell us about MCAS's response to this issue.

Mr. Yasuguchi:

MCAS started in 1952 as a distributor of ion exchange resins by the name of Nippon Rensui, our predecessor company. In 2017, a groundwater membrane filtration systems company joined our group. Having celebrated our 70th anniversary in 2022, we have been committed to the water treatment business.

Our groundwater membrane filtration systems have been installed in more than 1,400 facilities, primarily in hospitals and nursing homes, because of their ability to reduce cost of water supply in normal times and to help maintain medical functions even when water is cut off due to

Mr. Masakatsu Yasuguchi

General Manager, Aqua Solution Department, Amenity Life Division, Advanced Solutions Business Group, Mitsubisbi Chemical Corporation (and) Representative Director, President and Chief Executive Officer, Mitsubishi Chemical Aqua Solutions Co., Ltd.

Born in Osaka, 1965, joined Mitsubishi Plastics in 1989 and was assigned to the Osaka Branch. In 1999, Facilities Equipment Division (Business Planning) of Mitsubishi Plastics. In 2010, Sales Manager of Mitsubishi Plastics Sales Kansai Branch. In 2011, GM of Mitsubishi Plastics Lifeline Division. In 2013, General Manager of New Product Planning Division of Mitsubishi Plastics Infratec. In 2017, General Manager of Facilities



and Equipment Division of Mitsubishi Chemical Infratec. In 2020, became General Manager of the Sales Support Division of Mitsubishi Chemical Cleansui Corporation. In 2021, assumes his current position.

disasters.

Hospitals must maintain their medical functions for at least 3 days during a disaster, so we offer filtration of groundwater for use in dialysis and surgery. When the earthquake struck the Noto Peninsula on New Year's Day this year, more than 20 systems we had supplied in the area was operating without any problems, even when the water supply was cut off.

Recently, it has become very difficult for municipalities to operate their water utilities, especially water treatment plants, due to aging pipes. So, we have been talking to municipalities across the country to see how our technology can help them. During the process, we have encountered this PFAS issue more often than ever and we are asked if there are any good countermeasures.

Water quality analyzer for PFAS introduced, R&D for its removal is underway

Mr. Hasuike:

I see that MCAS is working to make PFAS harmless. However, I assume companies that are global or trying to be successful in the U.S. or in Europe are likely to move toward working on "PFAS-free."I think the Japanese government should take the lead in making efforts to realize "PFAS-free" and provide a certain amount of subsidy.

Regarding MCAS's groundwater membrane filtration systems, what about installing them in areas where PFAS have been detected? With such technology, we would probably be able to identify the source of contamination and this would lead to removing it. What are your thoughts on that?

Mr. Yasuguchi:

Groundwater membrane filtration system requires water quality testing, and we have our own water analysis laboratory (in Higashimurayama, Tokyo) for in-house testing. The lab is accredited by the Ministry of Health, Labour and Welfare (MHLW), and as a water quality testing laboratory, it also performs testing at the request of outside organizations. These days, more customers with a strong interest in PFAS issues are asking for the testing service.

We have also been interested in PFAS issues and introduced a PFAS water quality analyzer. Initially, the analysis was done in response to customer requests, but in response to recent situations, we doubled the number of analyzers to broaden the scope. Also, the MHLW notified that water utilities operators and water suppliers should confirm and report the results of water quality tests in its October 2023 administrative



Without extreme fear, Mr. Hasuike says, ``First of all, be aware of the problem.''

communication "Confirmation of Water Quality Test Results for PFOS and PFOA and Implementation of Water Quality Test". In response to this, we have created a dedicated PFAS page on our website to respond to the notice. Consultations are available through this web page. As for removal, activated carbon is the most effective method so far. For example, schools in areas where the PFAS problem has been identified are trying to remove it with activated carbon by attaching a home water purifier to the faucet. We don't think that's wrong, but the question is what to do with the activated carbon after PFAS removal. Unfortunately, we don't yet have a definitive answer to this question. The only way is to burn activated carbon, but it has to be burned at very high temperatures, which is not good for

the environment because it emits CO2, and they do not seem to have the facilities for it.

So, what can we do? Other than activated carbon, removal may be possible using ion exchange resins, UV, biological treatment, or reverse osmosis membranes used in seawater desalination. However, how to decompose them after removal is still unanswered worldwide but if a technology to decompose them can be developed, it would be a great breakthrough and contribute to society.

We hope to somehow achieve this through a combination of different technologies.

Mr. Hasuike:

I look forward to the success of your development. As a technology-driven country, I would like the government to focus on this.

As for the source of PFAS contamination, the fact that foam fire extinguishers used at airports and U.S. military bases have leaked is a concern, but the disposal of PFAS that companies have used in their business operations is also a major issue. I feel that the problem is similar to that of radioactive waste disposal, in that it is difficult to handle. As I was listening to you, I thought that this issue would be very important in the future.

Mr. Yasuguchi:

In addition to removing contaminants, I believe it is also necessary to prevent contamination. We are considering a precautionary simulation that can detect any contaminant seeping into the ground and contaminating the groundwater. Our groundwater membrane filtration systems are installed in 1,400 locations across the country, so we know where the groundwater is readily available in the areas we serve.

We believe that with a little more development of research and analysis using this groundwater potential information, we can propose preventive measures, although they are not easy.

Tighter regulations expected in Japan toward PFAS-free society

-Will awareness of the problems with PFAS spread and regulations be stricter in the future?

Mr. Hasuike:

As mentioned earlier, our standards are lax compared to those of Europe and the U.S., there are currently no standards for soil or blood in Japan. How, do you think, is this going to change?

Mr. Habuka:

Japan is still behind, but as the EU begins to regulate, Japan cannot be the only country without regulation and will be forced to adapt to the EU's direction because the companies are doing business globally.

In addition, although the PFAS issue is not well known to the general public today, the government will see the need to seriously address the issue as public opinions grow. So, it is only a matter of time.

This is similar to the case with carbon neutral regulations. At that time, Japanese industry questioned whether these regulations were necessary or thought it was too strict. So, Europe took the lead. This is partly due to cultural differences. In Europe, they first come up with a general vision of what it should be, and then decide specific measures later. In Japan, on the other hand, people tend to set realistic goals because they feel obligated to meet the goals once they are set.

Mitsubishi Chemical Group has adopted the concept of "KAITEKI." This means comfort for people and the earth, as well as comfort for producers and consumers, and this PFAS issue absolutely must be addressed to realize this KAITEKI. We will continue to work on the issue with such mindset.

Mr. Hasuike:

I wish the government would support companies like MCG that is going to work on PFAS-free.

Mr. Habuka:

Our group has already engaged in developing PFAS-free materials, such as polycarbonate, which has high thermal insulation properties without the use of PFAS.

We hope to get government support for such PFAS-free efforts, but they seem to be still in the research phase.

Mr. Hasuike:

I hope the industry will push for government support. We, in the medical field, will try to approach from a health risk perspective.

To date, there have been no known cases of health problems caused by PFAS in Japan. However, this may be due to lack of research. The health of the Japanese people must be protected from PFAS by taking appropriate measures before health hazards occur. For areas already known to be contaminated with PFAS, proactive health measures need to be taken. However, if you take the environment as a whole, technology has to be advanced first. So, I think this is something we can work on together.

Mr. Yasuguchi:

Currently, prefectural and municipal officers are much more interested in this issue than the national government. There is also large difference in the level of interest between areas with wells where PFAS have been detected and areas where they have not. The first step would be to start with the municipal and



Mr. Yasuguchi says he will continue his research.

prefectural governments, and eventually with the national government. Also, I think that the government should look at another approach to this issue, such as encouraging companies to use alternative materials, if we want to advance measures to address the problem.

This is a very serious problem for areas such as three Tama areas of Tokyo, where the PFAS problem has been pointed out. I believe that, as interest in this issue grows throughout Japan, there will be an accelerated efforts towards this issue.

The same is true for development, where speed is the key. Various companies around the world, including ours, are competing with each other in development.

We hope to find some kind of solution as quickly as we can using our technologies and knowledge of ion exchange resins and membranes.

Mr. Hasuike:

The most common way of exposing to PFAS is from (drinking) water, and in some areas, it may be from food. In this sense, this issue should be the concern of the entire country, not just of one company.

Today, the Tokyo Metropolitan Government and the national government are encouraging the water quality testing, but I believe that subsidies and other type of support are necessary for taking such measures as purchase of equipment for this purpose, and the development of technology for decontamination, let alone the water testing itself. In addition, there is a need for more testing providers to make blood tests available to those who want them. I think it would be possible to expand testing capacity by subsidizing institutions to install PFAS testing devices, just as the government subsidized the installation of COVID testing devices.

Some people moved to Kunitachi and Kokubunji in Tokyo for "good tasting water." The water in Japan is something to be proud of even globally speaking. So, I believe that Japan can contribute to the world by advancing the decontamination technology. The global trend is toward PFAS-free. Therefore, we need to address the water issue in particular, using a variety of technologies.

Our organization will continue to disseminate information and work with various people to address this issue.



From left: Mr. Yasuguchi, Mr. Hasuike, and Mr. Habuka





What is **PFAS**? Widely used in household and industrial products

According to the "PFAS Guidebook: Study Material," PFAS are synthetic compounds that do not exist in nature; they were developed in the U.S. in 1940s and there are more than 10,000 types. They are widely used in household products such as waterproofing sprays and fluoroplastic coatings for frying pans and pots. In industrial products, it is used in foam fire extinguishers used in military bases, airports and large parking lots, as well as in semiconductor manufacturing, metalworking and metal plating.

PFAS released with wastewater from factories and military bases remain in the environment for long periods of time and are absorbed into the human body through tap water drawn from groundwater or river water, raising concerns about their health effects. Some PFAS have been identified as potential carcinogens, and regulations are being tightened worldwide. The WHO's International Agency for Research on Cancer (IARC) has classified PFOA among PFAS as "carcinogenic to humans," the highest of the four categories used to safely manage carcinogens and reduce their health effects.

Mitsubishi Chemical Group provides a wide range of water solutions to the customers of hospitals and medical institutions for maintaining medical treatment functions in the event of a disaster.



Mitsubishi Chemical Aqua Solutions Co., Ltd. https://www.wellthy.co.jp/water/

Compact Membrane Filtration Equipment





Mitsubishi Chemical Aqua Solutions Co., Ltd. https://www.mcas.co.jp/feature/feature-88458/

Emergency private power generator/LP gas



Taiyo Nippon Sanso Energy Corporation https://www.tn-energy.com/

Mitsubishi Chemical Group Co., Ltd.

Dialysate water purifier





Mitsubishi Chemical Aqua Solutions Co., Ltd. https://www.mrc-medical.jp/iryoyosui/

FRP quake-resistant water storage tank



Mitsubishi Chemical Infratec Co., Ltd. https://mchem-infratec.com/products/equipment_01/

5-year-life drinking water



Mitsubishi Chemical Cleansui Co., Ltd. http://www.cleansui.com/

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