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Selection of Japanese Skills

Dualizing the water source is an effective anti-disaster measure

Technology to Purify Groundwater

Photography/Susumu Nagao, Interview & Text/Kyoko Ohtsu

Shoichi Fukuda, president of Wellthy Corporation, has a gentle demeanor, but has boldly led the company with carefully planned strategies.



The fact that water will pour from a tap when twisted is no longer a given. Japanese were reminded of this reality on March 11. One corporation considered cases in which the public water supply could not be used, for whatever reason, and has worked to promote the spread of a system that dualizes the water source. Wellthy Corporation is the pioneer of the groundwater membrane filtration system.

The groundwater membrane filtration system changes groundwater into drinkable water using an advanced membrane-filtration technology and provides a stable water supply. The system, which ensures quality water as stipulated in article 50 of the Water Supply Act, is maintained once a month and monitored all year round. The Wellthy system effectively functioned when the water supply was cut off over a wide area immediately after the Great East Japan Earthquake. Hospitals and food companies that had installed the system continued to

use safe water, as usual. They could also supply water to nearby residents and the families of their employees.

When the lifelines of electricity, water, gas, telephones and other utilities are severed, electricity and telephones are usually restored comparatively quickly, but water and sewerage are the slowest to be restored. From the viewpoint of public hygiene, such as hand washing and bathing, more importance should be placed on everyone having their own water supply to maintain their lifestyle. "After the latest earthquake, I am convinced that we have been working in the right direction," President Shoichi Fukuda proudly said. That's only natural because there was little data, until now, to support the theory that groundwater is immune to earthquakes. The 1995 Great Hanshin Awaji Earthquake struck soon after Wellthy's system was developed, so this is the first time the theory was substantiated.

Installation has multiple merits

This system has many other advantages, such as cost reduction. Compared to using only the public water supply, companies can budget for a significant reduction in costs per year, even when including installation and maintenance costs. When working with local communities and neighborhood associations, drinking water can be supplied to neighboring residents in times of disaster. By ensuring the availability of safe water at all times, companies contribute to the region and also improve their image. Fukuda dived into the water business 15 years ago. Before that, his company was doing well manufacturing and selling electricity-saving equipment. One day, a client commented while signing the contract on the completion of fitting work, "With this, we are saving electricity. Is there any way to save gas and water?" Within days, Fukuda heard



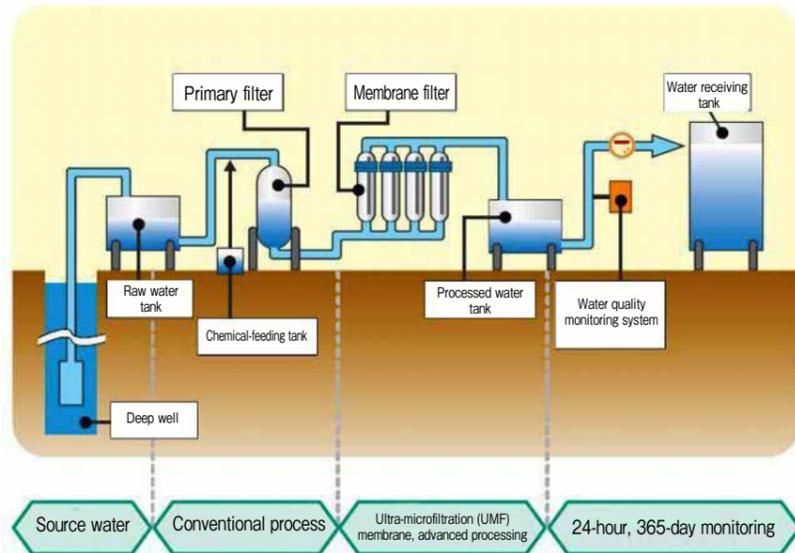
← Cross section of the membrane, the nucleus of the membrane-filtration system. Each membrane is like a straw. The 0.01-wide pores on the surface of the membrane fiber filter the water that passes through.



An example of a membrane filtration system (Aso General Hospital)

→ This one-meter-long device – the membrane – can process 1–2 tons of water per hour.

Groundwater Membrane Filter System Flowchart



Groundwater pumped from a deep well is filtered through sand and activated charcoal and then filtered using the advanced ultrafiltration (UF)-membrane process. The membrane also completely removes bacteria and parasites. The safety equipment monitors the process 24 hours a day, all year round.

the same comment from other customers, so he searched the library to see if it was possible. He found that only the government was involved in supplying water with no competition.

"The field of electrics in which I was involved was highly competitive. Technology was evolving fast and constantly being honed. But one book mentioned that water technology had not advanced for 30 to 50 years due to a lack of competitors." Fukuda said.

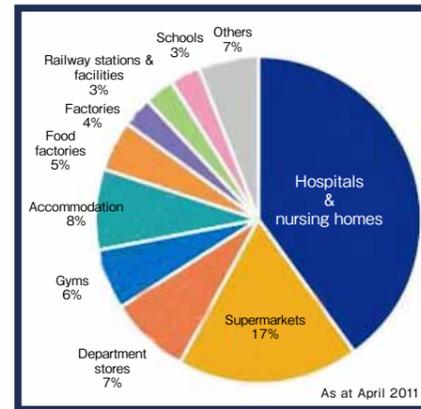
From electricity to water

Before long, the company saw that it was a viable business and decided to begin research and development into groundwater purification. But purifying groundwater for drinking was nearly impossible. Water of a high enough quality to supply to people had to clear 48 criteria as stipulated in the Water Supply Act at the time. The well water the Japanese had used through the centuries was essentially used by everyone at their own risk. But when Wellthy actually inspected this well water, they

discovered that its quality was not nearly good enough to meet the Water Supply Act requirements. Unlike river water, groundwater contains more heavy metals than one might expect, making it difficult to process. Even if the bacteria and heavy metals were removed, repeated processing was necessary to make it stable enough to supply over prolonged periods.

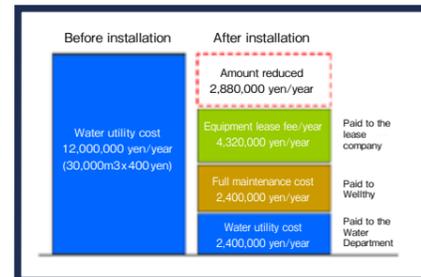
"We headhunted water-processing technicians from other companies and created a research team. But the research came to a standstill when the research team was greeted with hostility from the electricity-saving equipment team. Team

Ratio of New Installations



Most of the corporations installing the system are facilities that use large volumes of water daily and must be prepared for emergencies, such as hospitals, department stores and hotels. These facilities must ensure a safe water supply to protect the lives of their patients and customers.

Water Cost Reduction



The introduction of a system leased for nine years for 30 million yen realized an annual cost reduction of 2.88 million yen (public water supply unit 400 yen/ton, annual use 30,000 tons).

* The cost of the system differs depending on negotiations and conditions.

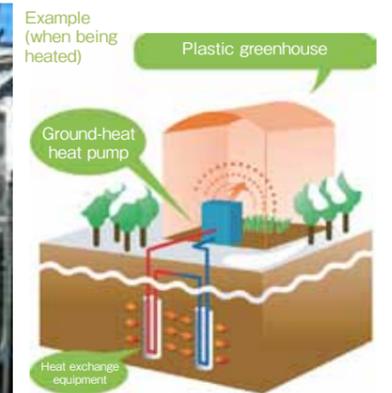
members wanted the research stopped, and they threatened to resign. It was a trying time," Fukuda explained. The team leader eventually resigned, and Fukuda himself continued the research and development as team leader. The complex system, developed after many twists and turns, ended up following Fukuda's own original design.

"It was actually rather difficult. Groundwater processing is challenging, even today. The fact our company overcame these obstacles may be the very reason we are still in business," Fukuda said.

Other Business Developments

Well Thermal Heat Pump

The Well Thermal Heat Pump combines ground heat and a heat pump, focusing on utilizing the stable underground temperature, and exchanges energy more efficiently than conventional heat pumps. The pump has a wide variety of uses, such as heating and cooling conventional homes, gyms and agricultural facilities. (The diagram illustrates agricultural use.)



The amount of heavy oil used by a boiler can be significantly reduced when using the ground-heat heat pump, reducing both energy consumption and cost.

Seoale

Seoale is a compact water-purifying device which is highly effective at purifying river or lake water into emergency drinking water in four stages. The purifier is easily operated using a manual pump, so no electric power is required. Weight: 13kg, external dimensions: H550mm x W380mm x D390mm, purifying capacity: 60l/h.



← Seoale can be carried by hand, pulled, or carried on the back.

↓ [Accessories] Purifier set (primary processing screen, quartz sand filter, activated charcoal filter, UF membrane), replacement paper filters, replacement cartridges (activated charcoal, UF membrane), plastic gloves



Faster progress through practical technology

Apart from making groundwater drinkable, Wellthy also has the technology to process water into various qualities depending on its end use. Bountiful rainwater stored in a tank, for example, can be processed into water for watering or washing cars by controlling the water quality. The water, in this case, does not need to be processed to a drinkable quality. Also, factories that discharge large volumes of wastewater can effectively use the water, and cut water and sewerage costs by installing a wastewater

recycling system.

Fukuda declared, "The day is coming soon when people will not only want water safe for drinking, but water that suits their tastes and needs, e.g. soft water for the elderly, or water with a high mineral content. We are preparing for the day when each household can create the water they want." Technology plunges into unexplored worlds and is always advancing.



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