7 SOLUTIONS

Industry & Agriculture using the PursaDisk

Green and sustainable water treatment

Living Springs
ACTIVATED HYDROGEN STRUCTURED WATER

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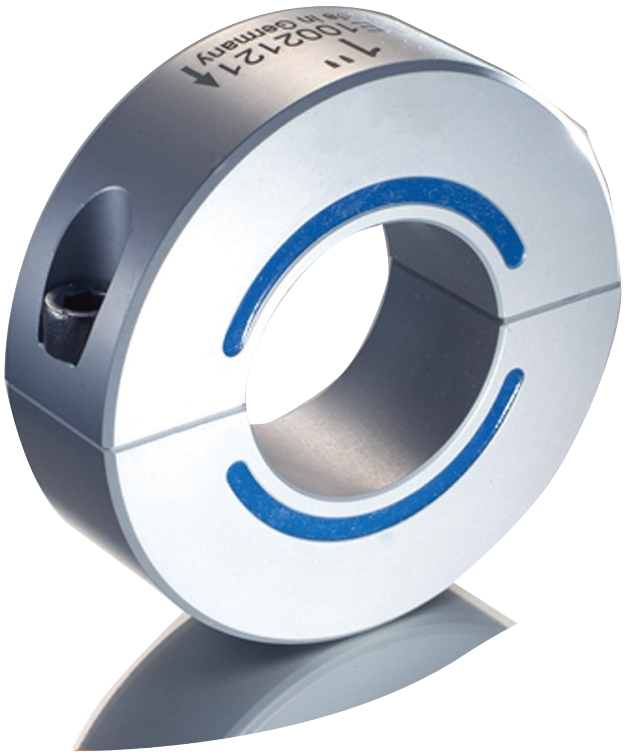
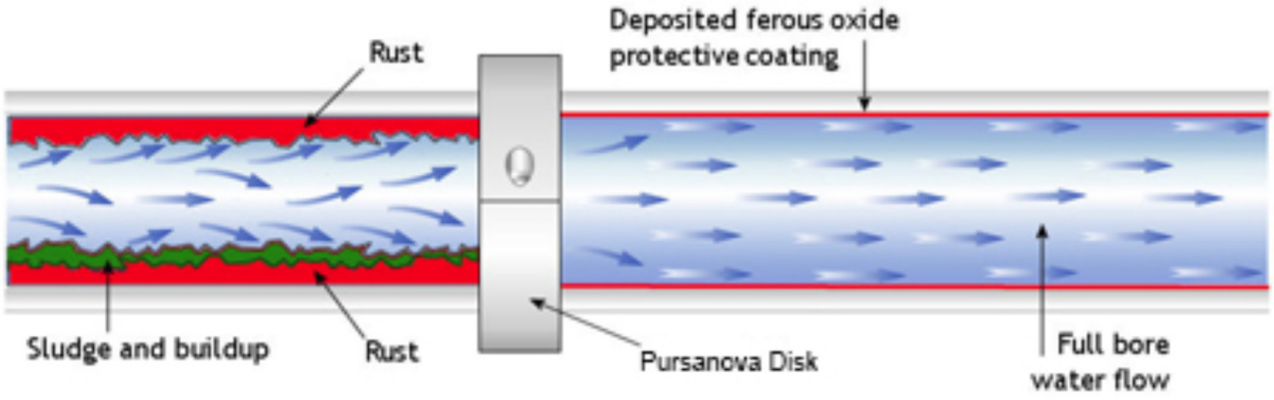


The Living Springs PursaDisk is a revolutionary product that has proven it's value install after install in the Industrial & Agricultural industries. Our water vitality has weakened. Scientist are finding chemicals such as glyphosate (Round Up) & Uranium in our natural rivers and streams due to the hydrologic cycle. Thats right, we have weed killer in our rivers! Hard water build up has increased as a result of this, and in applications where water is crucial for production, this hard water / limescale build up and microbiological problems can be very expensive to service machinery and remove. Our PursaDisk has been proven to reduce and in some cases remove this sediment build up and save factories a lot of money by additionally reducing chemical costs and maintenance.

When paired with our PursaLex revolutionary mineral ore technology, our Activated water is very beneficial for agricultural applications & has been proven to reduce chemical costs and increase plant yields. This eBook will cover 7 chapters of our science broken down and what applications we have proven ROI repeatability for. From real case studies in large applications, to the benefits for residential, hear our Scientist's 7 solutions for Industry & Agriculture using the PursaDisk.



Introduction to The PursaDisk

What our Molecular Oscillation Technology is: This unit has has succeeded in measuring and storing the molecular oscillations of pollutants such as rust and lime. Starting from these natural oscillations Living Springs develops new active oscillations. The active oscillations are stored on a carrier material [P-DiskTM], which is capable of constantly emitting these oscillations into the water. This occurs without any external energy input; only energy supplied by environmental warmth is used. The water accepts/ absorbs these oscillations and spreads them in the direction of its flow. The oscillations spread through the entire succeeding water column faster than the actual flow velocity of the water. That's the reason why this method also works well in pipes which are seldom or never used. In the water, the active oscillations interfere with the natural oscillations [con•nat•u•ral] and alter the characteristics of substances. The result: The physical properties of substances contained in water (or other liquids) are modified. For example in the case of rust, oxygen no longer recognizes trivalent iron as such and hence no new rust is formed.

The engineering services we offer are not limited solely to issues pertaining to the treatment of water to tackle scaling, corrosion and biofilm problems, but include important objectives like optimising performance in terms of water and energy consumption. One of the major areas we can bring positive change is in terms of the volume of chemical additives that are used. We are committed to helping our clients to adjust the amount of chemicals they add to raw water, producing a multitude of different benefits including cost reductions and safety improvements

CHAPTER 1

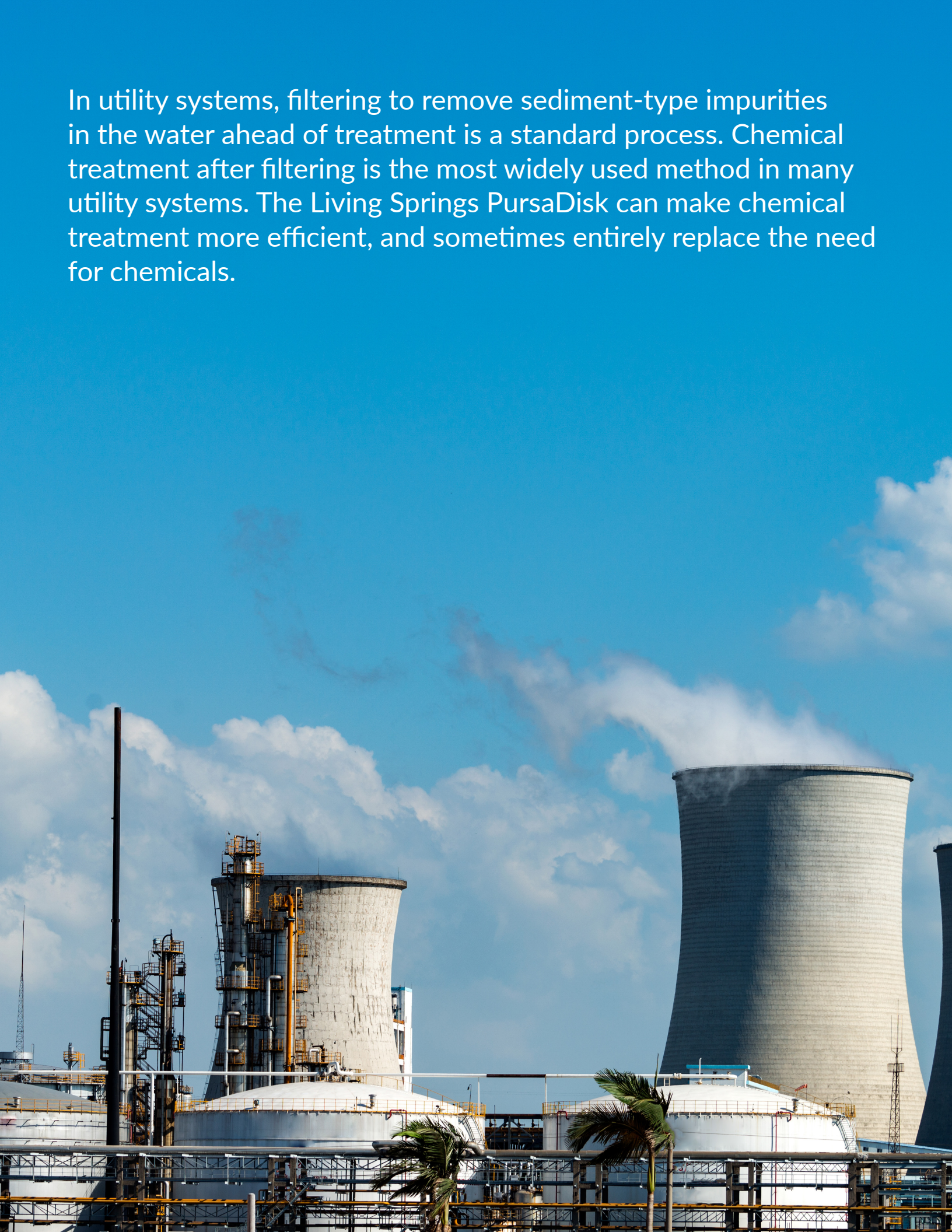
Enhancing current water treatment systems

More than 70% of our earth is covered by water. Unfortunately, only very little of this water can be used as drinking water without proper water treatment to clean and purify it.

Water is an excellent solvent for all kinds of substances. When water comes in contact with minerals, it dissolves some of the minerals. This leads to scaling, corrosion and fouling in water systems.
When water is used for industrial processes, it has to be treated to make it suitable for each kind of technical use. Often, water is part of a final product such as chemicals, and must be pure. This is especially critical when producing pharmaceuticals: Water should only hold the active substances and not be polluted by contaminants.

Water used in cooling or heating systems must also be conditioned to avoid scaling and corrosion. These systems are one of the major applications for our Living Springs PursaDisk.

In utility systems, filtering to remove sediment-type impurities in the water ahead of treatment is a standard process. Chemical treatment after filtering is the most widely used method in many utility systems. The Living Springs PursaDisk can make chemical treatment more efficient, and sometimes entirely replace the need for chemicals.



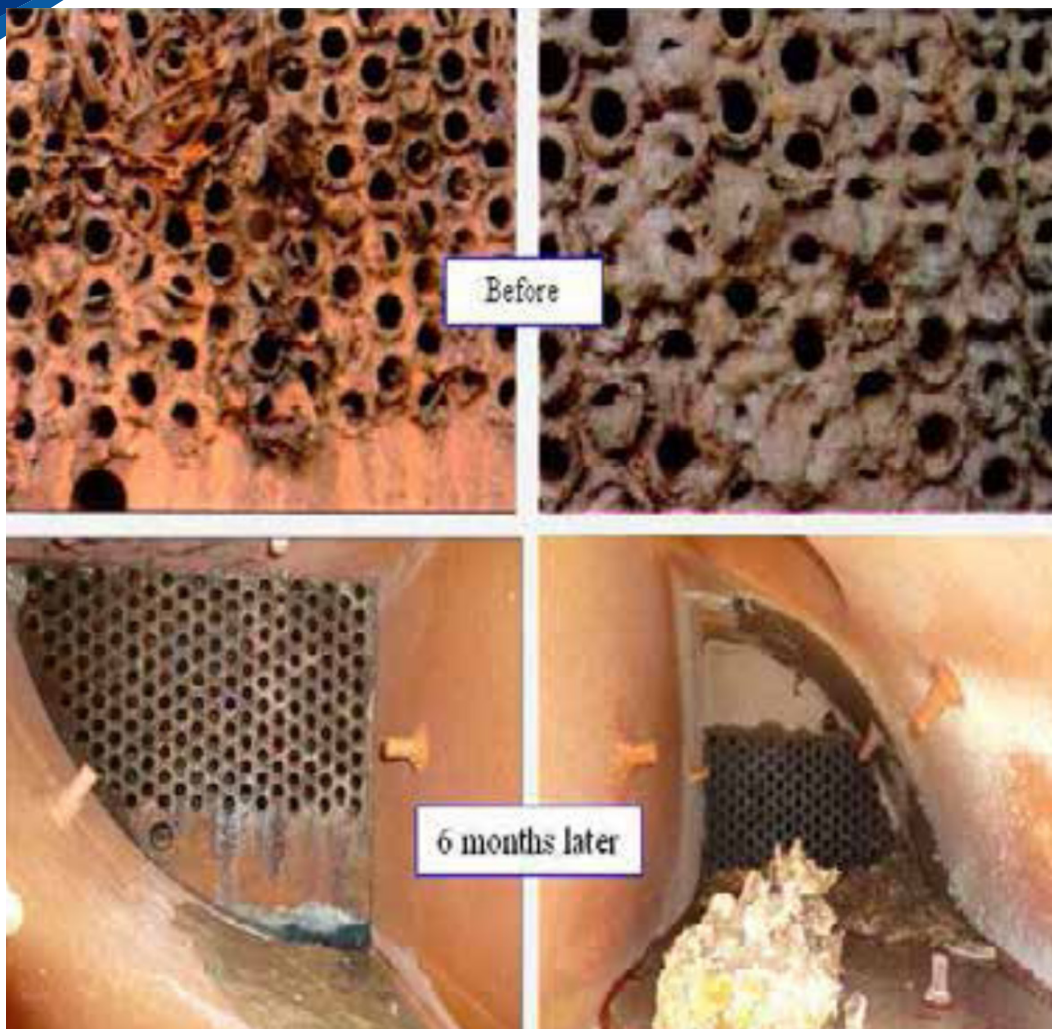
PursaLex – activation pipes

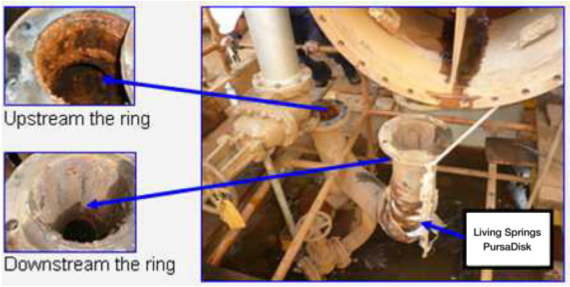
Those results include more stable production with fewer unplanned shutdowns, less cleaning, and less wear or replacement of components. Major savings are often available where the Living Springs PursaDisk — often in conjunction with the PursaLex Tube — can sharply reduce or eliminate water treatment chemicals. In many instances, we've seen new savings pay for all investments in Living Springs technology within six months or less.

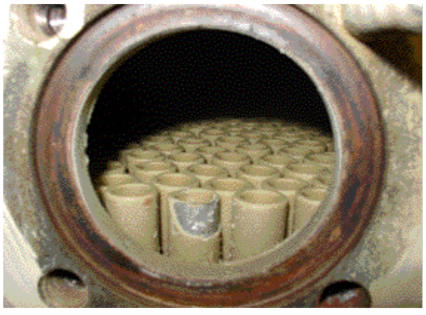
Living Springs expertise is available for a huge array of water treatment needs. This includes treating seawater, coping with algae or marine growth; even purifying water for ships.

We have case studies available for these applications showing how the installation was done and how monitoring and documentation was performed. In many cases, the client has provided follow up data on investment returns.

Custom pipes







Before

After

CHAPTER 2

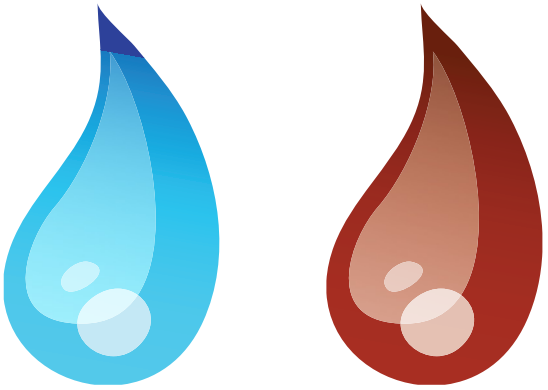
Stop brown rusty water from your tap

Carbon steel pipes or galvanized steel pipes are still used in older water systems. These corrode and emit brown, rusty water. This often shows up if there has been no water flow for some time, such as several weeks. If the brown water flushes out quickly, there's little concern as these are minor corrosion spots.

But if brown water persists every morning, and leaves stains on sinks or other bathroom fixtures, this indicates serious corrosion in the water system.

A Living Springs PursaDisk can probably help, although it can't stop galvanic corrosion caused by mixed metals in the pipes and plumbing; this is a very aggressive form of corrosion. Old and impure metals in piping can also be difficult to deal with. Also, some well water contains large amounts of rust from the soil or well casing.

Before installation of the PursaDisk, take samples from both the hot water tap and cold water tap, so you can learn if both hot and cold water have a problem.



Take the first sample after the tap has been unused a day or two. Then, run some water for a few seconds and take further samples to get an idea of how fast the rust is flushed out. Repeat this for both hot and cold so you have a series of samples. Put the bottles in a row in the order they were sampled, and you can easily see if the water color lightens up as rust is flushed out.

Keep the untreated water samples for comparison, and repeat this procedure after installing the PursaDisk (or a complete Living Springs system).

Another simple check: Fill a sink and observe the water color. A white sink is best for this test. As you upgrade your system, repeat the observation under the same light conditions.

In more complex installations like big apartment buildings, hotels or hospitals, Living Springs does such visual inspections and also documents our own laboratory analysis of iron content in the water. We have hundreds of industrial cases where we brought corrosion under control and reduced the corrosion rate to less than two mils per year. Mils per year (MPY) is a common U.S. standard to describe the corrosion rate in a pipe or other metallic surface.

MPY - Mils per year or MPY is used to give the corrosion rate in a pipe, a pipe system or other metallic surfaces. To calculate the material loss or weight loss of a metal surface, there is a formula using the type of metal, the size of the sample area and the time of exposure, giving the value of mils per year. The expression MPY is mostly used in the United States. One Mil is equal to one thousandth of an Inch. (In metric expression, one MPY equals 0.0254 millimeters per year.)

In an open water system, a corrosion rate of around 1 MPY is normal. If your system has a corrosion rate of around 10 MPY, you should take action. With corrosion rates of 20 MPY and above, you should be very concerned, as the corrosion is eating the metal rather fast.

Based on our experience from several hundred successfully solved cases, we've usually cleared brown water caused by light corrosion within 6 to 8 weeks or less. Investing in the Living Springs PursaDisk could save you a lot of money compared with the cost of replacing a plumbing system.

CHAPTER 3

Reduce limescale, salts and hard water buildup

Lime or calcium carbonate is dissolved in almost all water. Depending on hardness and temperature of the water, the calcium carbonate precipitates and deposits in pipes, machines and on surface areas.

These deposits build up, resulting in clogged pipes and machine malfunctions. Even a thin scale of lime sharply reduces energy transfer in heat exchangers.

Under normal conditions, the Living Springs PursaDisk modifies lime in a way that keeps it dissolved in water up to very high temperatures (>100°C) and in high concentrations. Lime and other salts are not removed from the water, but their properties are altered so they don't precipitate as quickly.

We have treated water with 10,000 units or more of total dissolved solids, without getting scaling problems in the machine.

Dissolved lime and other salts are found in almost every type of water. We commonly refer to lime scale as the primary cause of “hard water.” Depending on the amount of calcium carbonate, dissolved carbonic acid and water temperature, the minerals start to crystallize and deposit on pipe surfaces. In homes this is simply annoying in most cases, but mineral deposits cause substantial problems for technical applications.

These deposits reduce heat transfer in heat exchangers and sharply lower efficiency of heating /cooling systems. Other symptoms are increasing pressure losses and decreasing flow rates.

To reduce such deposits, water is processed chemically in many installations. But if great water quantities or very bad water are involved, this proves technically or economically impossible. Currently the Living Springs PursaDisk is treating limescale in several thousand industrial installations around the world. Our years of success prove how successful and reliable the Living Springs PursaDisk is to avoid buildup of limescale in pipes or machines. Experience with extremes such as water temperatures above 150°C (302° F) in pressure lines, or water hardness far beyond 50° dH (1 dH is 17.9 ppm), shows how powerful the Living Springs PursaDisk is.

After starting to use the Living Springs PursaDisks, many customers find they can cut back sharply on chemical products, or not use them at all. An example would be a commercial dishwasher working without softener salt. Another is a big cooling loop, which now needs cleaning only once a year instead of every six weeks.

Commercial Dishwasher Case Study

NOTE: 1 milligram per liter (mg/L) is the equivalent of 1 part per million (ppm). Soft water is 3dH and 0 to 50 mg/L CaCo3; medium soft water is 3 to 6 dH and 50 to 100 mg/L CaCo3; slightly hard water is 6 to 12 dH and 100 to 200 mg/L CaCo3; moderately hard water is 12 to 18 dH and 200 to 300 mg/L CaCo3; hard water is over 18 dH and over 300 mg/L CaCo3.

Here is field example of what existing scale eliminated in a lime slurry system looks like.

Company: SouthWest Water and Northern Ireland Water, UK
SouthWest Water supplies water to the entire southwest of England. Northern Ireland

SouthWest Water is responsible for all of Northern Ireland.

Lime scale, as well as other salts and corrosion, can be found in almost any water. The main cause of scale is calcite, the most common form of calcium carbonate. It occurs naturally in chalk, limestone and marble. For every 0.24 ” (6mm) of lime scale buildup in a pipe, 40% more energy is needed to pump water.

Most water produced or purified by water companies also involves adjusting the pH or acid-alkaline balance to fulfill system requirements. It’s common to infuse the water with lime slurry, which is almost pure lime, to raise the pH. Lime slurry fouling causes multiple technical problems for water companies. Scale that constricts hoses or pipes also builds up in pumps and storage tanks. This leads to much lower pump efficiency and frequent pump breakdowns. Service teams must stand by to fix the problem 24/7, all year long. Often, hoses are used for slurry instead of metal pipes, because hoses are easier to replace.

The picture at left shows a cross section of a pipe as it normally looks after a few days of operation. This example is from another British utility, Crownhill water works at Plymouth, UK. The picture was taken right before installation of the Living Springs PursaDisk. The end of this pipe, about 180 meters downstream, looks the same as at this end, so it can be assumed that the full length is fouled. The Living Springs PursaDisk shown in this report was installed at the feed valve just upstream of this pipe.

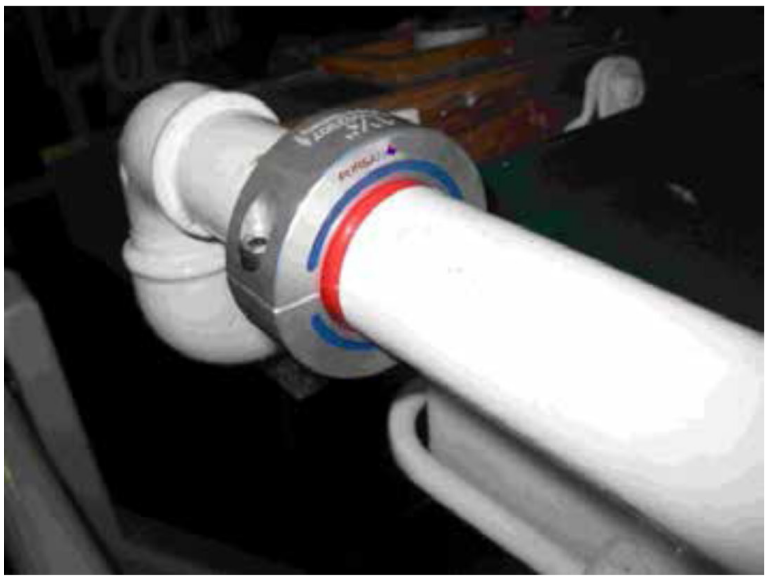
After installing our new PursaDisk, which is made by Living Springs, scale didn’t build up anymore.

The company examined the end of the 180-meter hose and found no further buildup. Pumps feeding the lime slurry got far less wear than before. Seals in the pumps are lasting longer and there are far fewer emergency breakdowns.

Here are some of the most common applications that have benefited from using our PursaDisk technology.

Living Springs PursaDisks in hotels

You've probably noted during your hotel stays that hotels are very concerned about water quality for their guests. They try to maintain a high standard regardless of their local municipal water sources. Hotel managers must also consider water performance in their kitchens, heating and ventilating systems, pools and laundry. Many of our hotel clients face problems in more than one of these areas.



Typical Hotel applications are:

Scaling

Faucets, Glass Shower cubicles and shower heads

Many showers are made of glass, and scaling makes a great mess of them. As well as the dishwasher, critical for sparkling plates and other dining tableware.

Kitchen

We take care of all facilities such as the dishwasher, critical for sparkling plates and other dining tableware.

Laundry

To stop scale in the washing machine and assure clean towels, tablecloths and other items. Customers often find they can reduce detergents as much as 50 % in washing machines, and totally eliminate descaling additives. Managers tell us that towels washed in Living Springs treated water are softer, as less calcium residue is left in the fabric. Also, there's less scaling at washing machine shaft seals and valves, which increases machine life.

Swimming pool

We stop scaling and reduce chemicals required for treating pool water.

Golf course

Where we treat the pump house and irrigation system.

Wellness area

Where we treat various issues such as steam generators for the steam bath.

Gardens

Where we treat the irrigation system or fountains.

Heating

Ventilating and cooling systems, where we treat the chiller, the cooling tower or the supply system of cold water.

Bacteria

All hotels fear having bacteria like legionella in the water. They exert a lot of effort to avoid an accident with water-borne bacteria, which can give them a bad reputation and expose them to liability.

Water - for drinking and bathing

Where we install Living Springs technology right at the water supply to protect the piping, hot water boiler and circulation pump system.

If the hotel's local water is rather soft, then corrosion of the pipes or tanks is a big issue. If a guest stays in an expensive hotel and sees brown water in the tub or sink, he or she will not be pleased.

8 PursaDisk

Company: **Divani Hotel Group, Greece**
The Divani Hotel Group has business hotels in cities

The photo above shows one of their large laundry systems. Lime scale accumulated in the washing drums, forcing an expensive cleanup with labor and chemicals twice a month.

Lime scale also built up in the hotel's dishwashers, requiring monthly chemical cleaning.

Two Living Springs PursaDisks were installed around the cold and hot water supply lines to the dishwashers and washing machines in this hotel. Dishwashers no longer need extra chemical cleaning. No new lime scale develops on the inner surfaces.

8 PursaDisk

Closed loop water cooling systems

Many customers have problems with corrosion in spite of extensive chemical treatment. Rust and mold can build up a closed loop, blocking the heat exchange channels causing performance to quickly degrade. When starting a project, we often find the iron content is far above 10 parts per million. Living Springs PursaDisks are installed at the most efficient points. Often, this is directly upstream of the chiller itself. In a big system like a shopping mall or large apartment building.

Cooling tower water treatment

We have many successful Living Springs PursaDisk systems where cooling towers and their connected heat exchangers are not fouling anymore. Also, corrosion is stopped or reduced to a very low level. There are very few algae found — mainly at parts of the cooling tower without a constant flow of water — and they're no longer reducing efficiency.

The picture to the right shows a heat exchanger tube bundle from chiller where the supply water is an open system cooled in a cooling tower. You can see a lot of scale and fouling coating the tubes. This is the open side of the cooling loop, connected to a cooling tower (where the debris is coming from.) Inside the tubes, the cooled water is protected by a Pursanova Disk. Internal the water is flowing and perfectly clean.

Hot water pump four weeks after installation

Same pump 10 weeks after installation

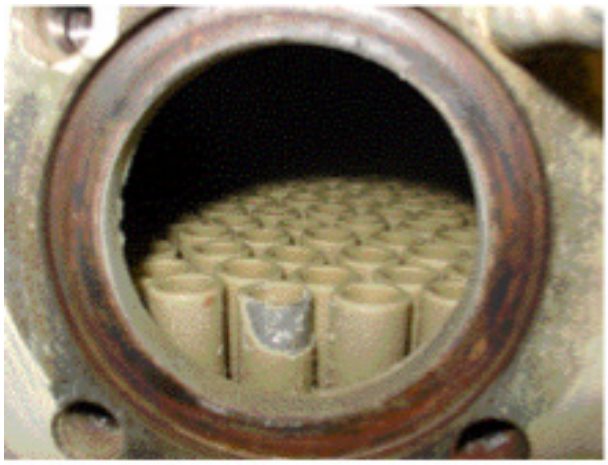
Reduces scale buildup in ships

The common problem on such systems is buildup of scale, reducing performance of the evaporators. Salt and lime scale from the seawater reduce heat transfer and constrict water flow.

Problem: The ships were experiencing increased energy cost to operate the evaporators, and output of fresh water was reduced. Also, the company was using a lot of chemicals to try to keep the evaporator clean.

Solution: A 1-inch high capacity & 1.25 inch high capacity Living Springs PursaDisk Disk was fitted on the cold water supply to the evaporator and one on the supply to the water clarifier.

Results: After only 12 weeks of operation the ship experienced an increase in fresh water production. When engineers opened the evaporation chamber inspection cover, the results were amazing.



Evaporator before installation of Living Springs PursaDisk

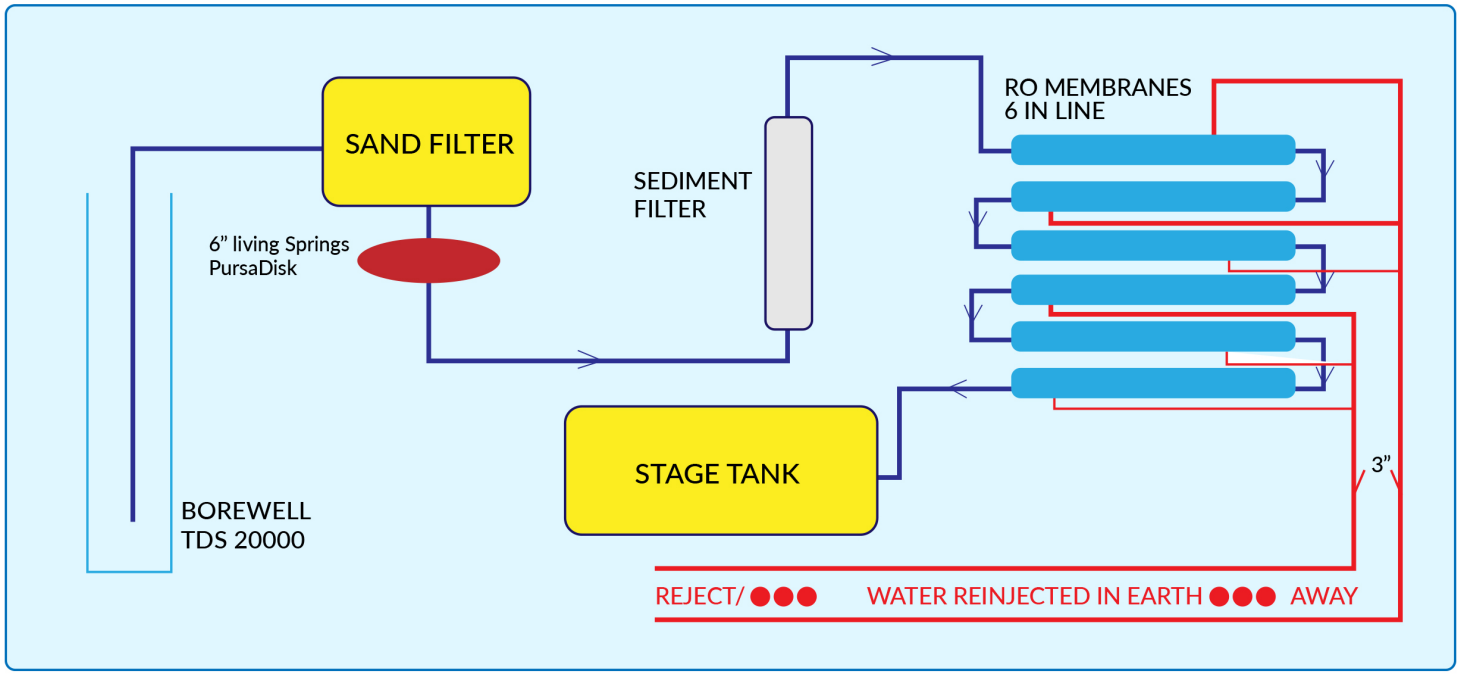
Evaporator 12 weeks after installation of PursaDisk

Enhances performance of small steam generators

Lime and other solids form thick layers of scale quickly. Normal maintenance procedures are to shut down and cool the generator, open it and clean manually by using lots of chemicals. Investing in an ion exchanger or chemical water treatment isn't economical. Living Springs has equipped many such machines. When a is installed on steam generators where expanded steam is replaced by fresh water, very little scale will form, even if the water supply has higher concentrations of dissolved solids. — no need for aggressive chemicals.

Improves Desalination RO plant performance by using Living Springs Disk

TDS create a series of high-maintenance challenges. Salts and other dissolved solids quickly foul the RO membranes. This requires higher and higher pressure at the supply side to overcome clogging of the membranes. Immediately, water production will begin to increase — indicating that membrane fouling has stopped. Over several weeks you may entirely quit adding chemicals to the water thus saving a major expense and experience no further fouling of RO membranes.


SAND FILTER
6" living Springs
PursaDisk
SEDIMENT
FILTER
RO MEMBRANES
6 IN LINE
STAGE TANK
BOREWELL
TDS 20000
3"
REJECT/
WATER REINJECTED IN EARTH
AWAY

CHAPTER 4

Reduces Corrosion in pipes and machinery

Pitting - Corrosion

Metal pipes are subject to corrosion, and typically they'll leak as the corrosion eats through them. This is often called "pitting," though this term is not technically correct.

Pitting occurs on metals from galvanic action — electrical voltage — when two different metals, e.g. copper and iron, come into electrical contact via touch or a conductive medium. Because of this corrosion, holes slowly develop, starting inside the pipe. To stop this conductive and corrosive activity, a section of brass must always be fitted between copper and iron pipes to prevent direct and avoid galvanic corrosion. Living Springs technology reduces or stops pitting caused by normal corrosion in metal pipes carrying water. Reduced corrosion in pipes extends their leak-free life.

From more than a decade of industrial experience, Living Springs has proven able to reduce "Microbiological Influenced Corrosion" often called MIC in industry jargon. This includes significant reduction of corrosion from Sulfur Reducing Bacteria (SRB). We've seen very good case studies with Living Springs technology against other kinds of biofilm or bio fouling.

Of course Living Springs is not always able to prevent pitting, since strong chemical forces are at work. Thus it's always advisable to install a particle filter, with the appropriate connective fittings, at the branch line entering the industrial site or home to prevent a reactive metal setting up galvanic action from the outside.

There are other reasons for pitting as well, such as internal erosion from high velocity water movement, or corrosion from soil or chemicals outside the pipe. The Living Springs Disk has no effect on these external chemical forces.

Treating rust and corrosion

Rust or iron oxide is often found in steel or iron pipe work, or systems with iron components. This leads to poor water quality, high maintenance costs, or premature failure of equipment.

Rust — its chemical formula is Fe2O3 — is oxidized iron. Where iron pipes are used for water in industry and in some homes, brownish discoloration of water and pressure losses occur frequently as water and organisms in the water oxidize the pipes. Eventually, rust eats through the pipe and creates leaks. Under normal conditions, Living Springs technology can reduce or even totally stop less persistent forms of rusting. Rust particles are dissolved and flushed out; then a protective coating of black iron oxide (Fe3O4) forms on the iron surface.

CHAPTER 5

Saves energy and reduces down time

The Malaysian Palm Oil Board is a national organization of the government of Malaysia to support and promote palm oil plantations and use of palm oil products. Palm oil is used locally for cooking, and the food industry uses it in processed food products.

Company: MPOB Malaysian Palm Oil Board, Kuala Lumpur,

About the customer

The Board sponsors “Centers of Excellence” where researchers test new technology that could improve palm oil plantations and processing mills. Malaysia is the global technology leader in palm oil. As Malaysian plantations crowd existing land, the industry is expanding into Indonesia.

In each mill there is a steam boiler with capacity to produce 20 to 40 cubic meters of water per hour into steam. Steam is used for power generation and in the refining process of the palm fruits or seeds. Steam is used to cook the seeds and separate the desirable seed from the unwanted covering husk. Palm oil mills are located all over the country.

Because palm mills are located in many remote areas, they rely on a wide variety of water sources for steam boiler feed water: Surface water, water from reservoirs, or groundwater. In most of these steam boilers, corrosion and scaling is never brought really fully under control. Thick encrustations are a costly headache as they interfere with heat transfer.

The Problem

Living Springs got the chance to do a 12-month case study monitored closely by the Palm Oil Board in one mill to see if the Living Springs Disk is able to improve source water quality and save money. We installed just one 4-inch Living Springs PursaDisk at the feed line of the boiler. To assure that this was the only change, the mill continued chemical treatment of the water.

The solution

Over the 12-month trial, the customer found that the five types of chemicals used could be reduced 15% to 55% with less scale and corrosion. This alone contributed to big savings.

The result and findings

After 12 months, the scheduled annual cleaning was far easier, faster and with less manpower because encrustations were very soft compared to buildup before installing the Living Springs PursaDisk. Also, the Board determined that there was more efficient steam generation due to fewer deposits on boiler tubes and in the heat drum, for improved heat transfer.

Reduces costs spent on chemicals

The PursaDisk reduces chemical costs by keeping scale and biological film from building up. A big advantage of using a Living Springs PursaDiskTM is that it doesn't involve any additives to the water. This means there is absolutely no change in the waters chemistry so there are no additional treatments required as a result.

We are committed to helping our clients to adjust the amount of chemicals they add to raw water, producing a multitude of different benefits including cost reductions and safety improvements.

Living Springs technology is used successfully in many projects to fight algae in cooling systems.
In most cases where we've installed a comprehensive Living Springs system, chemical treatment to inhibit microbial growth was no longer needed. When biological water pollution is finally defeated, savings can add up fast. Customers tell us their recovery of investment is normally less than three months after the system is clean and clear.

Cleaning up biological water pollution

When talking about microbiological pollution of water, a distinction needs to be drawn between drinking water and technical water for industrial use.

In the United States and Europe, drinking water supplied by public utilities usually adheres to strict regulations assuring it's virtually free of microbiological pollution.

But in huge and complex systems it can happen that bacteria such as legionella spread from parts of the system which have little water flow. These legionella can cause very dangerous diseases. Health authorities monitor this pollution in public buildings and mandate measures against it if necessary.

Biofilm, or fouling from growth of algae, can occur in technical water, especially in open cooling systems. Microorganisms spawn in water and form a so-called biofilm on pipes and machines. This film inhibits heat transfer, and may even clog entire systems.

Most of the time, chemical additives have little success in solving this problem, or the cost is very high. Living Springs technology is used successfully in many projects to fight algae in cooling systems. Because biological processes are persistent, it often takes a year or more until a system is entirely free from microbial or algae growth.

Biological water treatments are very complex and sensitive; they need extremely accurate planning and implementation because each one is unique. In most cases where we've installed a comprehensive Living Springs system, chemical treatment to inhibit microbial growth was no longer needed. When biological water pollution is finally defeated, savings can add up fast. Customers tell us their recovery of investment is normally less than three months after the system is clean and clear.

Less effort cleaning scale and algae in a fountain
City of Berlin, Germany

In big public water fountains, substantial amounts of water evaporate daily and must be replaced by fresh water. Typically, the evaporation intensifies the concentration of dissolved solids, which precipitate on fountain surfaces. The deposits show up first at points with the fastest evaporation.

Such fountains involve both lime scaling and biological growth challenges. This is one reason we developed the Living Springs Bio Disk.

Our Bio Disk was installed in the recirculation pipe of the Berlin fountain pictured at left. The water gets recirculated — and thus treated — many times a day. After our installation, no further chemicals were used. Results appeared quickly.

On the red granite tiers with overflowing water, all surfaces with a constant flow of water became free of scale without any other cleaning.

In many open fountains, a lot of biomass like leaves, bird droppings and pollen get mixed into the water. These accelerate algae growth. Where there is a constant nutrient load like this, the Living Springs Bio Disk probably won't totally stop emergence of new algae. But in fountains we've treated, most of the algae blooms typically last only a few days, turn brown and settle to the bottom.

These residues are easily flushed out by draining the fountain and spraying surfaces with a water hose or pressure washer. Typically, the required time for cleaning such a fountain equipped with a Living Springs Bio Disk is less than half that it was before. Also, the Living Springs system totally eliminates costs for chemicals and the dosing systems used to inject them periodically. Water in the fountains is clearer, more appealing and chemical-free for visitors, who often splash in the water at these public sites.

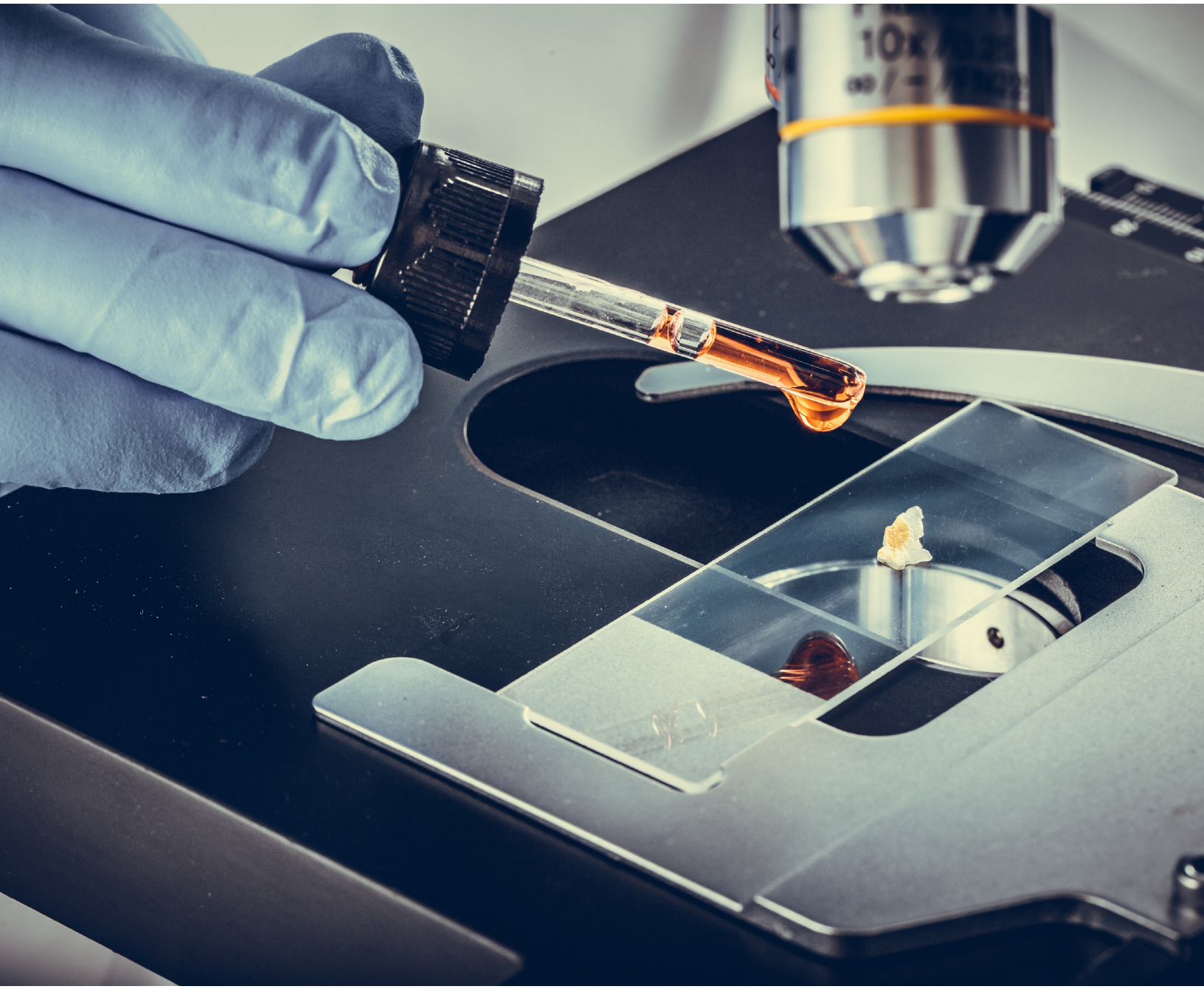
Swimming pools (Algae & Bacteria)

Algae often proliferate in open systems such as water tanks, fountains, ponds and swimming pools. It's an especially difficult problem in warmer surroundings.

The problem in swimming pools begins when untreated, very hard water deposits scale on the walls and bottom. The scale provides an initial habitat for algae and other microbial life. The scale encrustations in a swimming pool show up first along the evaporation edge of the surface. (See the white horizontal band above the surface of the pool in the nearby photo.) These can be hard to remove. But under normal conditions, Living Springs technology removes this scale and keeps it from recurring. Usually, minor scale residues can be simply wiped off. The Living Springs system changes water in a way that sharply reduces or eliminates algae buildup. Often, customers can use only half of the chlorine which they once needed.

CHAPTER 7

Counters Sulfur and reduces bacteria



Sulfur reducing bacteria (SRB) are common in nature. They're a source of the 'rotten egg gas' or hydrogen sulfide odor in many water sources. Strains of such bacteria have been

found in deep-sea volcanic fumaroles labeled "black smokers" or "white smokers." Hot water flowing from these smokers is mineral-rich and sometimes more than 400°C. The SRB live on elemental sulfur from these smokers, reducing the sulfur to hydrogen sulfide. Obviously, bacteria living in such a harsh environment will have a very high resistance against all kinds of treatment.

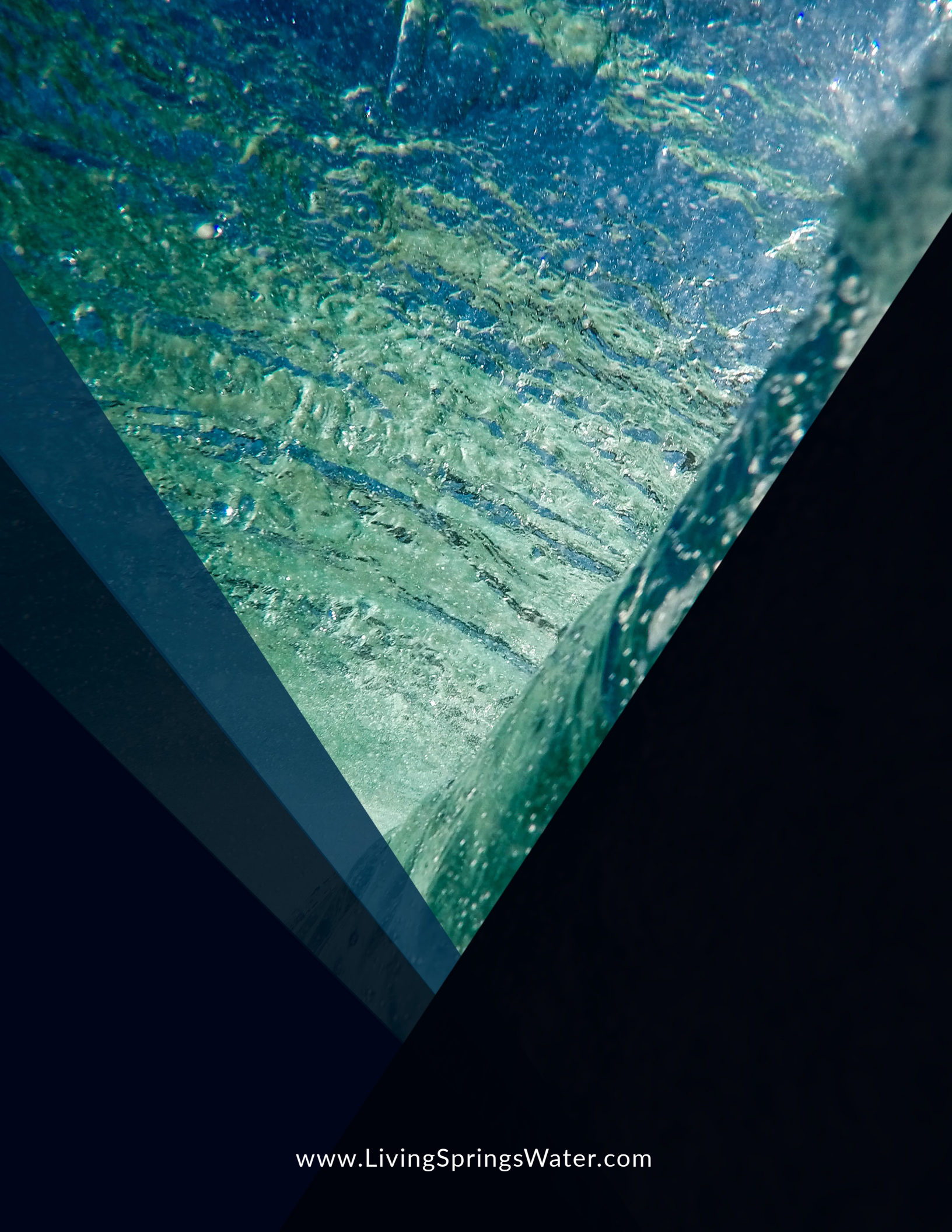
SRB are becoming a bigger problem in polluted water, and are especially challenging in the oil and gas industry. Water coming up from wells with crude oil is separated and reused to maintain pressure in the wells. This recycled water spreads the SRB to all water in the system — and they're very hard to get rid of.

In pipes such as those in oil wells and refineries, SRB attack the sulfide in metal surfaces and corrode them severely. This Microbiological Induced Corrosion can impose corrosion rates of well above 10 millimeters per year — enough to eat through smaller pipes in less than a year.

CONCLUSION

In addition to manufacturing and supplying the Living Springs PursaDiskTM to suit different issues we also provide support and engineering solutions for the industrial sector. This increases the scope of our services a great deal and means we are in the perfect position to deliver the best standards of service for our clients. When applications are extreme or complex we can provide a comprehensive solution. We can work on all aspects of cooling systems, including pipes and heat exchangers. We also have experience with desalination technology and other sophisticated systems that use water.

The engineering services we offer are not limited solely to issues pertaining to the treatment of water to tackle scaling, corrosion and biofilm problems. They are actually far broader than this, encompassing important objectives like optimising performance in terms of water and energy consumption.



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