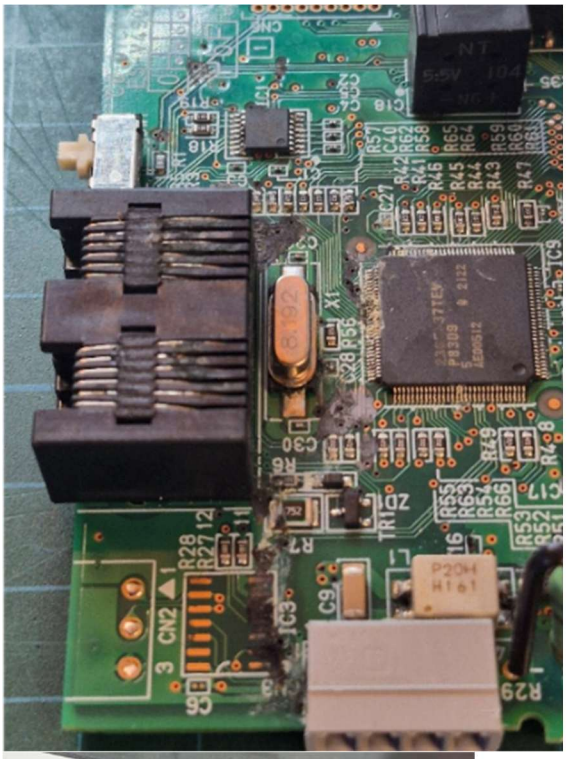
Hydrogen Sulfide (H2S) corrosion and ways to mitigate it.

Here at OmniSite, we strive to provide the highest quality, reliable, alarm monitoring systems for our customers. Our products are built for the long run. As reliable as our products are, they can sometimes fail. But if they do fail, we can usually repair the electronics instead of replacing the entire unit. This saves you, the customer, money and reduces the amount of electronics ending up in a landfill. When a unit does need to be repaired, we usally request that customer send the unit in. This way our technician can fully evaluate the unit, determine the failure, fix it, and update the firmware to the latest release. When repairing the units, we see many kinds of different problems such component failure or damage from a lightning strike or incorrect wiring. A problem that we commonly see on units sent in for repair is corrosion caused by Hydrogen Sulfide gas, or H2S. It is often referred to as "sewer gas" and is the by-product of the bacteria in the sewer breaking down plant, animal and human waste. It is very corrosive and damaging to electrical equipment. It is especially corrosive to copper. We conformally coat our PC boards and use dielectric grease where possible to minimize the effects when the units are built. But H2S gas can still find its way to the copper traces and components and damage the electronics, and it does this at a microscopic level.

Since the problem arises when the H2S finds its way into the control panel, we need to find a way to stop it. There are many factors that contribute to the ingress of H2S into a control panel. The first being the concentration that is in the sewer system. The more gas there is in the sewer system, the more there is to cause problems. Some of the H2S may enter the panel by the proximity of the panel to the wet well and the surrounding air, but this tends to be of very low concentration and have less effect. Most of the H2S gas that migrates from the wet wells into control panels do so through the conduits that connect the two together. This path exists because the devices that the panels control live in the wet well. Inside the control panel, electronics are not the only thing that can be attacked and damaged by H2S. All electrical

devices that have copper inside them can also be affected. This includes starters and drives, switches and lights, terminal blocks, and even the wire itself. Because the copper is continuously being eaten away by the H2S gas, electronics are usually the first things to fall victim, because of the small size of the copper circuits and components.







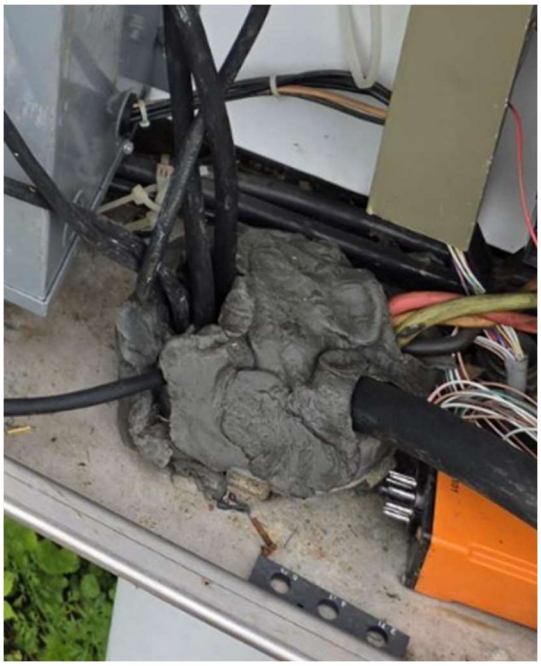


To prevent the damage and to ensure long term use and reliability, you should strive to prevent the H2S gases from entering the control panel in the first place. Some of the common approaches are:

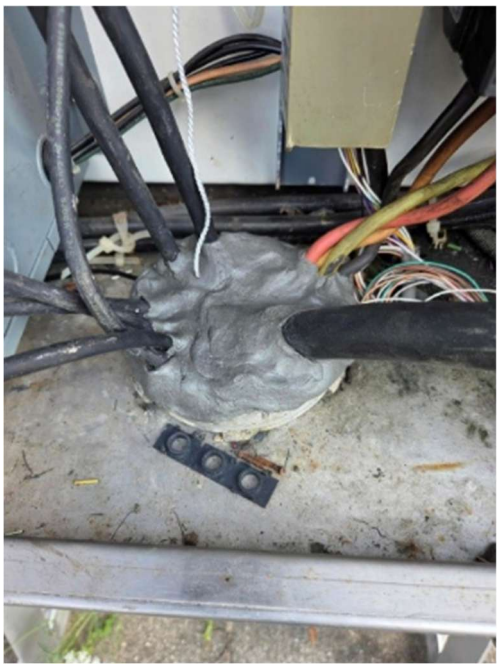
1. Physically blocking the path

Physically blocking the path by using electrical duct seal, will prevent the gas from migrating up the conduits and into the panel. Electrical duct seal is recommended over spray foam or silicone because it holds up well and is easily removed later, allowing for easy cable removal and replacement. Whereas, silicone and spray foam can be difficult to remove later. When duct seal is used, it should be installed in all conduits leading to the wet well and carefully placed around the cables to fully enclose the conduit opening and purposefully placed in between the individual cables to fill the gaps. If gaps are left between the cables, the gas will find its way into your panel and not provide the protection that you are trying to achieve. This panel shown below already had duct seal installed, but it was done poorly and allowed the sewer gases to enter the panel. A little effort to properly seal the panel can go a long way. This is panel B used in our test below.

Before:



After:



2. Pressurize the panel

Pressurize the panel by using a fan to blow outside air into the panel. Increasing the pressure will prevent the gas from migrating in. Many panels already have cooling fans, but these fans are often installed as exhaust fans that draw air out of the panel. This will increase the H2S coming into the panel by lowering the pressure inside and drawing the gas up from the wet well. It also draws in dusty, unfiltered air from the outside through any unsealed gaps. Many of these cooling fans can be easily reversed to push outside air into the panel and create the pressure needed. It is best if the fan has a filter with it to minimize dust and dirt from entering the panel. You can still have an exhaust vent for heat dissipation. For heat considerations, is usually advised to have the filtered fan at the bottom of the panel with the vent at the top to help remove the heat more efficiently.

3. Breaking the path

The other means of mitigation mentioned above is breaking the path that the H2S can use to enter the panel. This is done by creating an airgap. The electrical conduits are a direct pipeline for the gases to enter the panel. This approach is usually best done when the panel is installed or when the lift station is being engineered. Often, when a lift station is designed and built, H2S is not considered or its effects are ignored. Seal-offs are sometimes installed in the conduit run to prevent the H2S and explosive gases from entering the panels, but this creates service challenges down the road when sensor and pump cables need to be removed or replaced. These selloffs are usually filled with concrete or silicone, which can be difficult, if not impossible to remove. This then forces maintenance personnel to cut the conduit seal-off out, to replace the cables. Even worse, sometimes they will splice the cable in the wet well itself. Our recommendation would be to install the panel with an air gap underneath the panel by using a 12-18” leg kit. Cut the conduits off just above the concrete and provide a protective screen or panel for the cables. The cables can then enter the bottom of the enclosure through weather tight cord-grips. This design creates the airgap needed. The cord-grips will prevent the H2S gases from entering the panel, allow for the

easy cable removal, storage of the extra cable without filling up the interior of the panels and make the overall servicing of the panel easier.





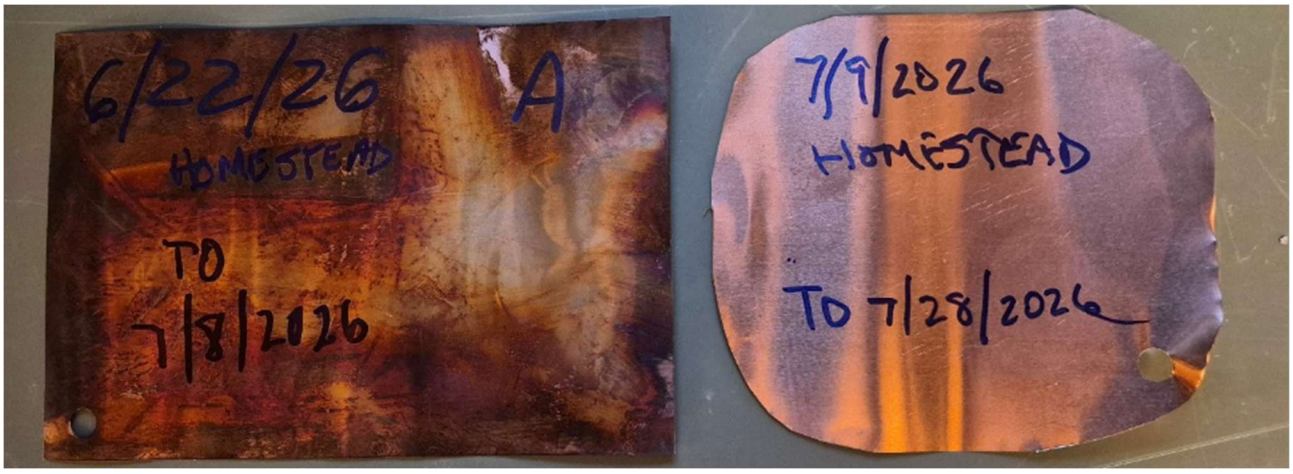




Testing

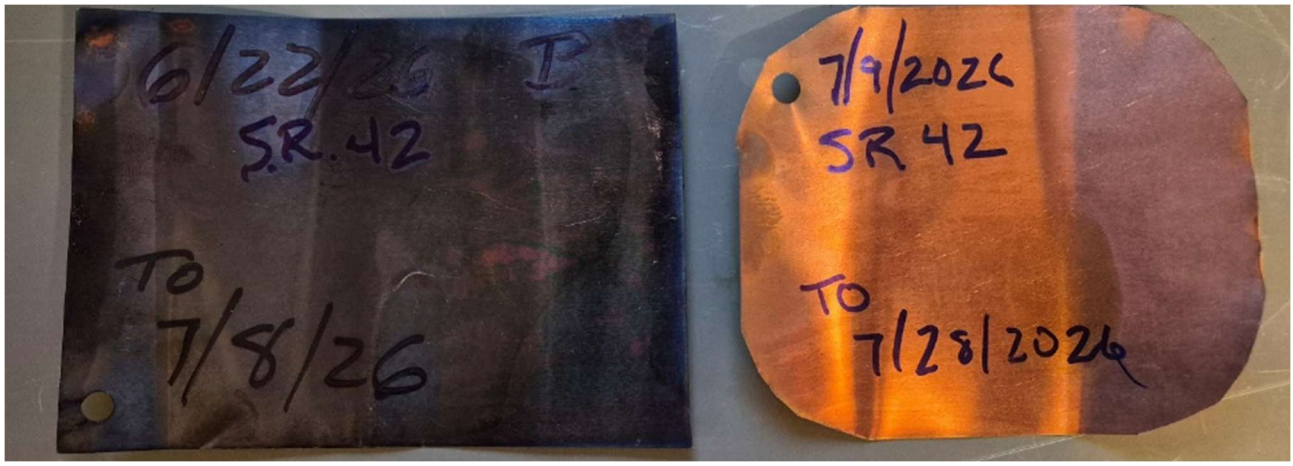
We did some testing to verify the effectiveness of using duct seal and a pressurization fan. We had good results. Both tests were started by placing a clean piece of test copper in the panel for a few weeks before applying the fix. We did this control sample to see how bad the H2S was in the panels. After the mitigation fix was implemented, a different piece of test copper was then placed for a similar amount of time. Below are the results of both tests.

Pressurizing the panel - Lift Station A control panel.
The control sample, shown on the left, was installed on June 22, 2026, and removed one July 8, 2026. 16 days of exposure to H2S gases with no mitigation. We then installed a cooling fan to blow outdoor air into the panel to pressurize it. The control sample was removed and the test sample placed in the panel on July 9, 2026. It was removed on July 28, 2026, 19 days after the mitigation was installed, and is shown on the right:



Physically blocking the path - Lift station B control panel

The control sample, shown on the left, was installed on June 22, 2026, and removed one July 8, 2026. 16 days of exposure to H2S gases with no mitigation. We then carefully installed duct seal around all of the cables in the conduits coming from the wet well. The control sample was removed and the test sample was installed on July 9, 2026. It was removed on July 28, 2026, 19 days after the mitigation was installed, and is shown on the right:



Conclusion

Hydrogen sulfide corrosion is a very common and preventable cause of premature equipment failure in lift station control panels. While modern electronics are designed with protective coatings and other safeguards, no electrical equipment is immune to prolonged exposure when H_2S gases are allowed to enter the enclosure. Preventing the gas from reaching the equipment is far more effective—and far less expensive—than repairing or replacing damaged components after corrosion has occurred.

Our testing demonstrated that simple mitigation methods, such as properly sealing conduits with electrical duct seal and pressurizing the

control panel with filtered air, can significantly reduce H_2S exposure inside the enclosure. Incorporating an air-gap design into new installations provides an even more robust long-term solution while improving serviceability.

At OmniSite, our goal is to help customers maximize the reliability and service life of their equipment. By taking a proactive approach to H2S mitigation during installation or routine maintenance, you can reduce costly downtime, extend the life of control panel components, and improve the overall reliability of your lift stations for years to come.