

THE IMPOSSIBLE COPPER DREAM?

“To dream, the impossible dream, to fight the unbeatable foe...”

—The Impossible Dream by Joe Darion

While you may not quite be Don Quixote on a quest to obtain the impossible dream, as a facility dealing with copper, the quest for ways to stay below NAL levels may feel just as impossible. Copper can be really hard to control to the minute levels that are required of industrial facilities under the IGP. Hopefully over the next several years this will become an easier feat as pollution sources from vehicles starts decreasing (*keep reading to find out why*). That being said, copper is still very difficult to control and reduce to appropriate levels in storm water. So, whether you are a facility which directly handles this pollutant source, or a facility with additional sampling parameters, this month’s edition of **The Rain Events** will help you on your quest to reach the impossible copper NALs.

Copper is one of the oldest metals used by mankind and is a malleable and ductile metal with very high thermal and electrical conductivity properties. A freshly exposed surface of pure copper reveals a reddish-orange color, which turns green as the metal oxidizes. Since copper is one of the few metals that naturally occurs in a usable metallic form, it was likely one of the first metals to be used by mankind. Copper was also the first metal to be purposefully alloyed with another metal – tin – to create bronze, circa 3500 BC. During the Roman empire, copper was mainly mined on the island of Cyprus, and was called *aes cyprium*. The name was corrupted to *cuprum*, from which our English word copper and the chemical symbol **Cu** are derived. Copper is an essential trace mineral for all living organisms, and is found naturally in foods such as oysters, lobster, beef and lamb liver, Brazil nuts, blackstrap molasses, cocoa, and even black pepper. “Copper is commonly found in aquatic systems as a result of both natural and anthropogenic sources. Natural sources of copper in aquatic systems include geological deposits, volcanic activity, and weathering and erosion of rocks and soils.

Anthropogenic sources of copper include mining activities, agriculture, metal and electrical manufacturing, sludge from publicly-owned treatment works (POTWs), pesticide use and more. A major source of copper in the marine environment is antifouling paints, used as coatings for ship hulls, buoys, and underwater surfaces, and as a contaminant from decking, pilings and some marine structures that used chromated copper arsenate (CCA) treated timbers.”¹ It can also be found in algaecides, historic buildings which used copper roofing and building material, and vehicle brake pads. While copper may be a naturally occurring element in the earth’s crust and a useful metal, “in higher concentrations, copper is toxic to aquatic organisms. Chronic exposure to copper can affect the survival, growth, reproduction, brain function, blood chemistry and metabolism of fish and other living organisms.”²

Listed as a constituent in Table 2 of the Industrial General Permit, copper has a *seemingly impossible low* NAL of 0.0332 mg/L. Copper can have several sources for industrial facilities including: historic,

background pollutant, brake pads from onsite vehicles, metalworking, scrap yards, pesticide production or application, and wood working. But according to Table 1 of the Permit, sampling for copper is only required for dischargers involved in wood preserving (SIC 2491), iron and steel foundries (332X), metal rolling, drawing and extruding of non-ferrous metals (335X), and nonferrous foundries (336X). So, unless your facility is involved in metalworking or wood preserving, you’re not specifically required by the Industrial General Permit to sample for copper.

While scrap yards may not be required to sample for copper, according to the SIC code requirement in Table 1, in all reality, the vast majority of scrap yards are going to handle and work with copper. So, it may not be an SIC code requirement, but it will be a requirement based on the assessment of their industrial activity (General Permit XI.B.6.c) – in our experience generally 99% of scrap yards would be handling copper in some form, and honesty is the best policy when it comes to this assessment. Even if you don’t want to add another pollutant to your sampling list, let the consequences of not

listing it motivate you. If you list it and it's not an issue, the parameter is not applicable anymore. Basically, prove it's not applicable to you, and then outline it in your SWPPP. But if you test for it and it shows up, at least you can show that you've done everything you can to address it and that you're in compliance with the Permit. If you try to hide it and the Waterboard finds out, then you are in trouble with the Waterboard or possibly a third party.

The Permit also requires sampling for additional parameters that serve as indicators of the presence of industrial pollutants – so, if your facility uses copper or a copper-containing product as part of your industrial activities, you may need to include copper as a sampling parameter. But be careful! Non-industrial sources of copper are very common, and it can be hard to tell if your elevated copper levels are from industrial or non-industrial activities. For instance: tire and brake dust from nearby roads can have heavy concentrations of copper but would not be considered as industrial sources of copper. But if your facility has industrial sources of copper and brake dust causing an NAL exceedance, you will have to continue sampling for copper regardless of whether it's from an industrial source or not. If this is the case, you may find yourself in a Level 2 ERA and need to do a non-industrial pollutant source demonstration.

An interesting side note is that copper pollution from brake pads may start decreasing over the next several years. “On January 21, 2015, EPA, states, and the automotive industry signed an agreement to reduce the use of copper and other materials in motor vehicle brake pads. The agreement calls for reducing copper in brake pads to < 5 percent by weight in 2021 and 0.5 percent by 2025. In addition to copper, this voluntary initiative reduces mercury, lead, cadmium, asbestiform fibers, and chromium-six salts in motor vehicle brake pads.”³ Which is next year! So as time progresses, this pollutant source may start to decline.

What to do, what to do indeed?

As always, the most effective BMP strategy involves a combination of source reduction, pollution prevention, and treatment. In the case of copper, source reduction may be a challenge, because many sources of copper on an industrial site are likely unavoidable. But

effective pollution prevention and good housekeeping techniques can help keep your copper results under control. Since brake and tire dust are a big copper source, regular and thorough sweeping is essential. Treating for copper (either particulate or dissolved) can be done with an active or passive filtration unit, or with compost socks that have been specifically formulated for metals removal.

So how does all of this play out in real life? Here are a couple actual examples of facilities that are doing their best to control NAL exceedances especially in copper.

Example Facility #1

This scrap yard facility, between historic copper pollutants, and industrial sources, was having issues with copper NAL exceedances. The facility chose the Industrial Activity BMP Demonstration XII.D.2.a.i-iii which included installing BMPs and treatment systems. And it should be noted that the facility already had an established treatment system before 2015 when the major Permit revisions came out. The treatment options worked in reducing the levels of copper but didn't drop it below the NAL standard. Parameters for iron and aluminum and COD dropped below the NALs and stayed below their NALs consistently. And copper did drop down dramatically, but they just couldn't reach that impossible dream. But because of the financial investment they continually were making into their storm water system, there was no feasible way they could afford a better system than what they already had without bankrupting their company. The facility opted to keep their current treatment system and improve on it yearly with the allotted budget and do their best to over time reduce the copper to below NAL levels. They do their best to keep storm water clean, but at the end of the day obtaining those NAL levels is beyond their control. The treatment options they implement include: grated trench systems for their site with filtration socks and filtration fabric which flow to sumps that are fitted with multiple layers of filtration media. The sump filters water and then discharges it into a treatment system for further treatment which is targeted to remove pollutants of concern. The water is then discharged into the local MS4's system.

Example Facility #2

This facility receives a minimal amount of copper, and they do some bending and cutting of copper materials as part of their industrial activity. But here's the rub, it meets with the NEC requirements. Here's why:

1. They receive it under a covered dock.
2. It's stored inside a warehouse.
3. It is handled in the center of their plant away from doors and ventilation.
4. Any copper scrap is stored inside the center of the facility and not outside.
5. And because it's copper, they don't ship it out with the other metal, they ship it out in containers. Which is again unloaded and loaded in a covered dock.

Yes, this facility handles copper, but they have no exposure because it is handled with great care, and good housekeeping and sweeping is done internally to keep the warehouse clean with no trackout. There is no reasonable expectation of exposure to storm water runoff. So even though they have copper, they don't list it as a potential pollutant because it's not.

Proving Otherwise...

If you want to claim copper is coming from a non-industrial source as outlined XII.D.2.b or from natural background sources as outlined in XII.D.2.c you're going to have to do your diligence. Determining that an NAL comes “solely” from non-pollutant sources could entail off-site run-on sampling or air deposition sampling. Whereas with the natural background, you have to prove that the NAL is coming exclusively from naturally occurring pollutant sources. You can have natural occurring sources in the soil, but if you have any activity that taps into the natural background you can no longer claim it as natural background. Because it's your industrial activity which is mobilizing your pollutants.

¹<https://www.epa.gov/wqc/aquatic-life-criteria-copper>

²<https://scvurppp.org/copper/>

³<https://www.epa.gov/npdes/copper-free-brake-initiative>

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Storm Water Contest...

Each month, we invite our readers to participate in a contest to test their knowledge of the Industrial General Permit and show their storm water compliance program. We enter all submittals to our monthly newsletter question into a drawing and one person is selected at random to receive a \$25 gift card. Last month's contest question was:

What happens if your facility wasn't able to collect all 4 samples?

Congratulations to Ali who replied with the Permit references and details about what happens if a facility doesn't collect samples. Ali, you did some awesome research on this question, we hope you enjoy a delicious meal from Chipotle!

...This Month's Contest

What type of facilities are required to sample for copper?

We need industrial storm water sleuths to help us with this month's question. Submit your answers by Friday, February 16th. Email your answer to jteravskis@wgr-sw.com. One winner will be selected by a random drawing to receive a \$25 gift card to Outback Steakhouse.

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