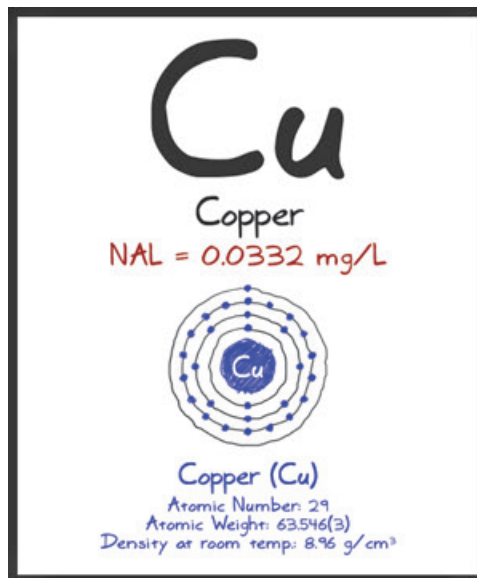


Part 5 of a 12-part **exclusive series** on understanding storm water pollutants

What does the Statue of Liberty have to do with storm water? Not much, except for a reddish-orange metal that makes up most of the iconic structure (the green color is caused by oxidation). Copper is one of the oldest metals used by mankind, and is listed as a constituent in Table 2 of the Industrial General Permit, with a notoriously low NAL of 0.0332 mg/L. In this month's edition of **The Rain Events**, we're going to take a closer look at this common metal.

Copper 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. But too much copper in water can harm marine and freshwater fish and mollusks by causing damage to the gills, liver, kidneys, and nervous system.

Table 1 in the Industrial General Permit requires sampling for copper for dischargers involved in wood preserving (SIC 2491), iron and steel foundries (332X), metal rolling, drawing and extruding (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.



But 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 is 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.

Just as we have said in past articles in this series on industrial pollutants, 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. ☁

#### Sources:

Wikipedia contributors. *Copper*. Wikipedia, The Free Encyclopedia.

<https://en.wikipedia.org/w/index.php?title=Copper&oldid=790307578> (accessed July 17, 2017).

State of Oregon. *Reducing Copper in Industrial Stormwater*. State of Oregon Department of Environmental Quality.

<http://www.deq.state.or.us/wq/stormwater/docs/ReduceCopperIndSW.pdf> (accessed July 17, 2017).

## COPPER: INDUSTRIAL OR NOT?

There's a lot of debate over when copper should be considered an industrial storm water pollutant or not. One of the largest sources of copper on industrial facilities – brake wear – isn't always an industrial activity. And for recycling facilities, does exposed copper wiring require you to add copper as an activity assessment sampling parameter? In this SWPPP Radio podcast, we sat down with our in-house Industrial Permit expert Aaron Ortiz to hear his take on these tricky questions.



<http://swpppradio.org/listen.php?ID=22>

### finding the

sulfur 16 <b>S</b> 32.066	oxygen 8 <b>O</b> 15.999	uranium 92 <b>Ur</b> 238.029	cerium 58 <b>Ce</b> 140.116	sulfur 16 <b>S</b> 32.066
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We talked about metal foundries and wood preserving facilities being sources of copper, but here are a few other copper sources you may not have thought about:

- Architectural copper (flashing, gutters, domes, spires, statues, etc.)
- Anti-biofouling paints and compounds (used to protect ships against barnacles and mussels). Keep in mind: this would count as an industrial activity for boatyards.
- Color stains in glassmaking and ceramic glazes (copper oxide)
- Pyrotechnic manufacture (copper chloride)
- Fungicides/herbicides/algicides (copper sulfate)

Have questions about the Industrial General Permit?

Give us a call at (209) 334-5363, ext. 114

## "To Do List" for July:

- ☁ Perform the July monthly inspection
- ☁ Confirm whether your facility entered Level 1 or 2 status on July 1. If Level 1, you have until Jan. 1 to submit a Level 1 ERA Report. If Level 2, you have until Jan. 1 to submit a Level 2 ERA Action Plan. Do not wait until the last moment, it can take 3 – 6 months to prepare these.

## Copper in Brake Pads

Copper is commonly used in brake pads because it transfers heat efficiently, helps brake effectiveness in cold weather, and prevents squeaking and shuddering during braking. In the 1990s, it was found that 30-60% of copper in California's urban watershed runoff was from brake pads. In 2010, California and Washington passed laws that brake pads sold in each state must contain no more than 0.5% copper by weight. In California, the law will take effect on January 1, 2025. Source: [www.copper.org](http://www.copper.org)

## Architectural Copper

Do you have any architectural copper on or near your industrial facility? Here's an interesting article written by the Copper Development Association, Inc., that talks about the impact of architectural copper on storm water toxicity.



<https://www.copper.org/environment/impact/NACE02225/>

**Please contact us if you have any questions ...**

## The Rain Events

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Average Effluent	25	2.5	104	0.68	0.0310	0.82	0.024	0.04
IGP NALs	100	15	120	0.75	0.0332	1.0	0.262	0.26
Average % Reduction	88%	85%	61%	89%	73%	91%	90%	89%
n (Number of 3rd-Party, Full-Scale Data Points)	15	15	12	16	17	8	17	17

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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 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 question was:

**You are writing a SWPPP for your lumber yard facility, and you decide you need to sample to see if sawdust is affecting your storm water runoff. Should you use the BOD or COD test?**

Congrats, **Sherri Santellan**, you won! This is a tricky question. It's a common misunderstanding that the BOD test targets biological pollutants, and the COD test targets chemical pollutants. The difference is in the analytical method, not the target pollutants. But even though BOD and COD essentially test for the same thing, some target pollutants may perform better on a certain test. **So, because the tannins and lignins in sawdust are not easily digested by the bacteria used in the BOD analytical method, the COD method would be a better choice in this case.**

## This Month's Contest Question:

**What is the analytical method for copper? (Hint: check out Table 2 in the Industrial General Permit)**

By August 18, 2017, submit your response to the above question by sending an email to [jteravskis@wgr-sw.com](mailto:jteravskis@wgr-sw.com). All persons submitting the correct answer will be placed in a drawing. The winner will receive a \$25 gift card to Amazon.com.



# Save the date

October 9-13, 2017



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