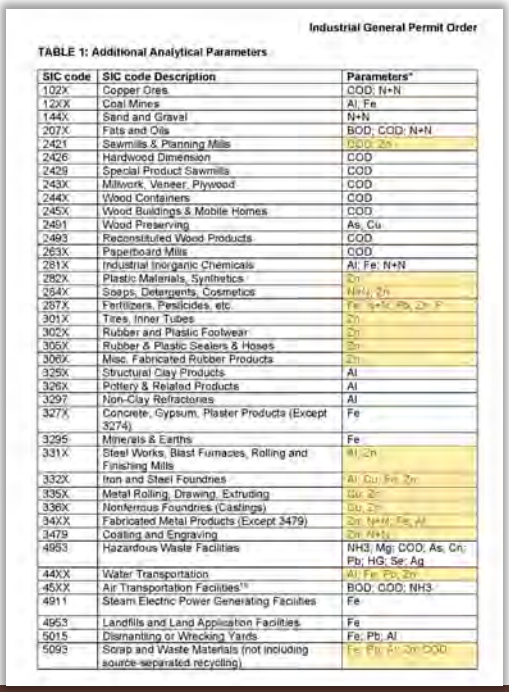
Good for your immune system, but not for aquatic life.

Unfortunately, while industrial facilities tend to have a wide variety of activities which contain this pollutant of concern – industrial activities aren't the only source. Tires, chain link fences, industrial buildings and roofing materials, paints, brake pads, and more contain significant amounts of zinc. Not to mention that it's also a naturally occurring metal in our environment. This bluish-white heavy metal is a very abundant and useful element, and is an essential nutrient for humans, animals, plants, and microorganisms. However, too much zinc can cause toxicity problems (especially in plants and invertebrates), and due to its widespread occurrence, it's one of the most prolific pollutants listed on Tables 1 and 2 in the Industrial General Permit. In this month's edition of **The Rain Events**, we will be taking a look at this heavy metal pollutant and how to control it before it becomes a problem.

Zinc is most commonly used as either a metal or an oxide. In its pure metallic form, zinc is a bluish-white, lustrous, diamagnetic metal. Over 50% of the metallic zinc produced each year is used as an anti-corrosion agent, the most familiar form of which is galvanization –coating a corrosive metal such as iron or steel with a layer of zinc. Metallic zinc is also used in alloys such as brass (consisting of 33% zinc and 67% copper), nickel silver, and bronze. The rubber industry is the largest consumer of zinc oxide, which is used as an activator during the vulcanization process, as a catalyst during manufacturing, and also in the final product to disperse heat. Zinc oxide is also used in pigments, plastics, pharmaceuticals, and anti-corrosive paints and coatings for metals. Zinc is the 24th most abundant element in Earth's crust, and is the 4th most commonly used metal. Soil concentrations range between 5 and 770 ppm, with an average concentration of 64 ppm. Most zinc is mined from China, Australia, Peru, and the United States. Okay, so at an average industrial facility, what might be some common sources of zinc? As mentioned above, the most common uses of zinc are galvanized metals and rubber products – and both of these materials can be found at probably every industrial facility in the State of California. Galvanized metal buildings, chain link fences, flashing, gutters, and hot-dipped steel pieces are all strong sources of zinc. Tires and other rubber materials contain zinc, and tire wear can be a significant source of zinc in storm water runoff. Many other common products could also contain zinc – such as brake pads, wheel weights, motor oil and lubricating oils, asphalt, pesticides, fungicides, and wood preservatives. But if zinc is an essential nutrient for life and health in humans and animals, why can't it be in storm water? Especially if it's naturally occurring. The biggest problem excessive zinc in runoff causes is suffocation of aquatic life. Zinc, as a bioavailable compound, binds to the gills of fish and slowly suffocates them. In addition, only a few species of plants can grow in a zinc contaminated area. Too much zinc in the soil or water will cause sparse vegetation.

However, it's important to differentiate between industrial and non-industrial sources of zinc. Under the Industrial General Permit, facilities are not required to sample for non-industrial pollutants – so if your facility does not use any zinc containing products as a part your industrial



Industrial General Permit Order

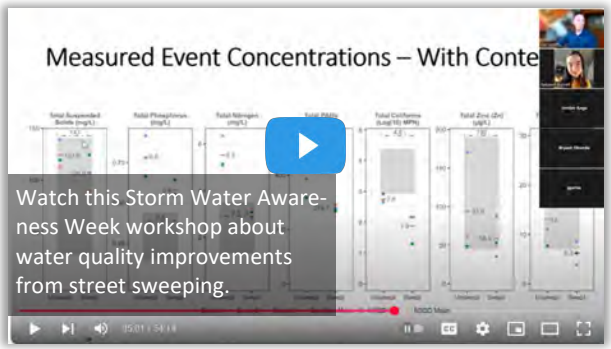
TABLE 1: Additional Analytical Parameters

SIC code	SIC code Description	Parameters*
102X	Copper Ores	COD; N+N
120X	Coal Mines	Al; Fe
144X	Sand and Gravel	N+N
207X	Fats and Oils	BOD; COD; N+N
2421	Sawmills & Planning Mills	COD; Zn
2426	Hardwood Dimension	COD
2429	Special Product Sawmills	COD
243X	Millwork, Veneer, Plywood	COD
244X	Wood Containers	COD
245X	Wood Buildings & Mobile Homes	COD
2491	Wood Preserving	As; Cu
2493	Reconstituted Wood Products	COD
263X	Paperboard Mills	COD
281X	Industrial Inorganic Chemicals	Al; Fe; N+N
282X	Plastic Materials, Synthetics	Zn
284X	Soaps, Detergents, Cosmetics	N+N; Zn
287X	Fertilizers, Pesticides, etc.	Fe; N+N; Pb; Zn; P
301X	Tires, Inner Tubes	Zn
302X	Rubber and Plastic Footwear	Zn
305X	Rubber & Plastic Sealers & Hoses	Zn
306X	Misc. Fabricated Rubber Products	Zn
325X	Structural Clay Products	Al
326X	Pottery & Related Products	Al
3297	Non-Clay Refractories	Al
327X	Concrete, Gypsum, Plaster Products (Except 3274)	Fe
3295	Minerals & Earths	Fe
331X	Steel Works, Blast Furnaces, Rolling and Finishing Mills	Al; Zn
332X	Iron and Steel Foundries	Al; Cu; Fe; Zn
335X	Metal Rolling, Drawing, Extruding	Cu; Zn
336X	Nonferrous Foundries (Castings)	Cu; Zn
34XX	Fabricated Metal Products (Except 3479)	Zn; N+N; Fe; Al
3479	Coating and Engraving	Zn; N+N
4953	Hazardous Waste Facilities	NH3; Mg; COD; As; Cn; Pb; HG; Se; Ag
44XX	Water Transportation	Al; Fe; Pb; Zn
45XX	Air Transportation Facilities[15]	BOD; COD; NH3
4911	Steam Electric Power Generating Facilities	Fe
4953	Landfills and Land Application Facilities	Fe
5015	Dismantling or Wrecking Yards	Fe; Pb; Al
5093	Scrap and Waste Materials (not including source-separated recycling)	Fe; Pb; Al; Zn; COD

activities, then you do not need to sample for zinc *(assuming zinc is not a required sampling parameter for your SIC code in Table 1 of the IGP).* But when doing your facility source assessment, take into consideration the sources of zinc that might be hidden in plain sight – your facility buildings and fencing. Are these a major contributing non-industrial source of zinc at your facility that could be raising your zinc results? Zinc can also be sneaky and hide in industrial activities that wouldn't be obvious at first glance. Here are a few potential sources of zinc that you could have at your industrial facility:

- Ceramic glaze and frit compounds (using zinc oxide)
- Pharmaceutical ointments and creams (using zinc oxide)
- Vitamin-enriched foods (using zinc oxide or zinc sulfate)
- Paints, paper, and photocopiers using zinc white (zinc oxide)
- Methane reforming (using zinc oxide and creating zinc sulfide)
- Manufacturing laser diodes or LEDs (using zinc oxide)
- Metal working (zinc, zinc oxide, zinc chloride)
- Disinfectants (using zinc chloride)
- Manufacturing electroluminescent panels (using zinc sulfide)
- Manufacturing semiconductors (zinc, zinc oxide, zinc sulfide)
- Wood preservatives (using zinc naphthenate)
- Fungicides (using zinc dithiocarbamate)

Regardless of whether your facility should have been sampling for zinc or not, if you reach Level 1 status for zinc, you have the responsibility to bring your zinc numbers back under control – and until then, you're stuck sampling for zinc. So, if you are required by Table 1 or your industrial activities to sample for zinc, what are some practical steps you can take to reduce the amount of zinc present in your storm water runoff? As we've mentioned many times before, the most effective BMP strategy involves a combination of source control, pollution prevention, and treatment. Unless you are a galvanizing plant or a rubber plant, try implementing some source control and see if there is a different product you could use that doesn't contain zinc. Reducing zinc containing sources to storm water by putting them under a cover will also go a long way in reducing pollutant load in runoff. For pollution prevention, good housekeeping can go a long way toward minimizing zinc. Studies have shown that vacuum-assisted dry sweepers can remove a substantial amount of zinc by removing zinc containing materials such as tire dust and other fines. When it comes to treatment, there are many different options on the market for reducing zinc concentrations – but ultimately, the effectiveness of any treatment solution depends on the effectiveness of your source control and pollution prevention strategy. However, there are treatment things you can do to help. Start by replacing older and less effective BMPs with new ones (i.e., drain inserts). Creating areas around drain inlets that slow and filter the flow (rock bags, wattle, compost socks, and inlet protection). The slower the flow, the more solids (particulate metals) are reduced from the discharge. There are various treatment options available - from filtration devices installed at roof drain downspouts to reduce the metal pollutant runoff from roofing, to in-line storm water drainage treatment systems, and compost socks. Peat moss and compost socks are proven to have the ability to capture and filter zinc and heavy metals out of storm water. Compost has proven to be a very effective filtration media for metals. Filtrexx (a manufacturer and designer of compost filter socks) has designed a compost sock which can remove up to 73% heavy metals from runoff.[1] Biochar is also an affordable and effective filtration media that can be used to lower zinc and other heavy metal numbers. Filtration totes or systems utilizing the above media types which are periodically maintained to remove pollutant loaded filtration media have shown very excellent results in removal of heavy metals.



Rain gardens and low impact development devices and areas that allow storm water to infiltrate instead of discharging is another very cost effective, natural and also beautiful solution to zinc problems. Watch the above video created by the Port of Port Townsend about the various approaches they have been taking to keep zinc out of storm water and the Puget Sound in Washington.

As always, the best way to avoid having an exceedance at your facility is to do your best to reduce the exposure of zinc containing activities and industrial materials to storm water. Once it's in your facility runoff, it's a lot harder to remove, than to keep it from getting there in the first place. Using good housekeeping and best management practices, you can get an upper hand at managing zinc pollution at your facility.

[1] https://www.filtrexx.com/en/applications/envirosoxx-pollutant-removal

California Stormwater Quality Association (CASQA) (2015). Zinc Sources in California Urban Runoff.

Emsley, John (2003). Nature's Building Blocks: An A-Z Guide To The Elements. Oxford University Press.

Golding, Steven (2008). Suggested Practices to Reduce Zinc Concentrations in Industrial Stormwater Discharges. Washington State Department of Ecology. Water Quality Program.

Wikipedia contributors. Zinc. Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/wiki/Zinc

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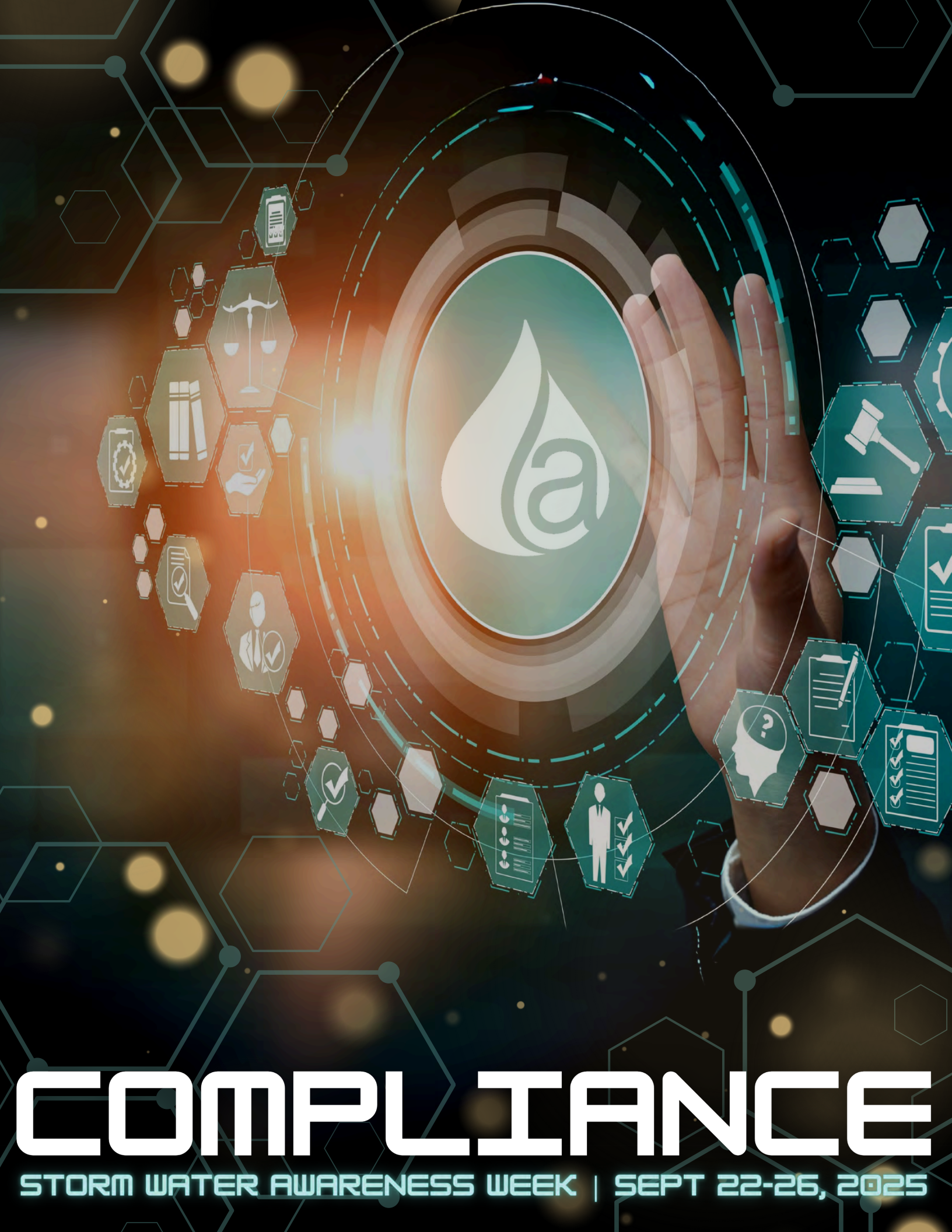

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Storm Water Contest...

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.

What does N+N as N stand for?

Congratulations to Melissa who answered, *"Nitrate + Nitrite as Nitrogen."* We hope you enjoy your next Starbucks on us!

...This Month's Contest

List three ways storm water can be treated for zinc?

We need industrial storm water sleuths to help us with this month's question. Submit your answers by Friday, May 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 Chik-fil-A.

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