

## HOW TO HANDLE INDUSTRIAL AND **locally sourced pollutants**

### **The ironic pollutant**

Doesn't it seem ironic that there can be an industrial pollutant that is considered a pollutant even though it is the most common element found on Earth! It's in the soil. It's in food items. It's already found in drinking water in trace amounts. Talk about locally sourced! Not to mention it's also a part of quite a few manufacturing processes. It's everywhere naturally, yet at the same time, this pollutant will require you to look out for sampling exceedances. Iron does seem to be a bit of an ironic (*pun intended*) pollutant. Especially when it comes to some No Exposure Certificates (NECs). In this month's edition of **The Rain Events**, we are going to be discussing this common pollutant and ways your facility can tackle this potentially problematic locally sourced metal.

Iron is the most commonly used metal, and the most common element found on Earth. However, because of its widespread occurrence, it's also one of the toughest pollutants to trace back to industrial activity. Elevated iron levels could be coming from any number of sources – exposed metal equipment, soil erosion, industrial products and additives, or even from cast iron storm drain grates! Iron is an essential element for almost all living things and is found in the human body in the range of 3 to 415 ppm. In excess, iron can be toxic, and overconsumption of iron containing supplements is one of the more common toxicological causes of death in children under the age of six. Iron deficiency is a much more common problem, though, and if left untreated it will develop into a host of problems like anemia, hair loss, tiredness, and much more. It's a vital nutrient for human life. In terms of mass, iron is the most abundant single element on Earth and is thought to be the main component of the Earth's inner and outer cores, which together comprise about 35% of the Earth's mass. In its pure form, iron is a relatively soft, lustrous silver-gray metal. Fresh iron surfaces will

quickly oxidize in normal air to create hydrated iron oxides, or common rust. Since iron oxides occupy more volume than the metal itself, the rust will flake off and expose a fresh surface to oxidation. Because of the quick oxidation process, most of the iron



found on the Earth's crust is in iron oxide minerals such as hematite, magnetite, and siderite.

As a metal, iron has been used since antiquity, most notably during the Roman era. Though pure iron is a relatively soft

metal, it can be considerably strengthened by impurities, such as carbon. Adding a small proportion of carbon (from 0.002% to 2.1%) produces steel, which can be up to 1000 times harder than pure iron. Today, iron is the most widely used metal, accounting for over 90% of metal production worldwide. Most iron is alloyed with other elements to make steel or other iron alloys. So, where might iron be coming from at an average industrial facility? Well, because iron is such a commonly used and naturally occurring element on Earth, it could be coming from any number of places. One obvious source would be an iron alloy metal that is exposed to the weather – such as steel equipment and parts. But iron could also come from erosion and sedimentation problems. We've all seen the black sludge commonly caused by standing water and organic material – the black (or brown) color and pungent odor is usually from iron sulfide. But maybe a more important topic is not the possible iron sources at your facility, but whether those iron sources should be considered as industrial or non-industrial sources. This is especially important to discuss if the Industrial General Permit doesn't require facilities with your SIC code to analyze storm water samples for iron.

If your SIC code doesn't require you to sample for iron, that is, if your industrial facility could conceivably apply for NEC coverage regarding your use of iron, there's a good chance that your sources of iron are non-industrial. For instance – steel buildings and forklifts that are well maintained could very well be sources of iron, but would both be allowed under NEC permit coverage, and hence are non-industrial sources. But if your facility processes metal products or stores them outdoors, then you'll have to analyze for

### Who May File for NEC Coverage

Sections 301 and 402(p) of the Clean Water Act (CWA), and Sections 1311 and 1342(p) of 33 United States Code prohibit the discharge of storm water associated with industrial activity to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit. However, NPDES permit coverage is "conditionally excluded" for discharges of storm water associated with industrial activities (industrial storm water discharges) if the Discharger can certify that a condition of "No Exposure" exists at the industrial facility. A condition of "No Exposure" means that a Discharger's industrial activities and materials are not exposed to storm water. Industrial storm water discharges from construction and land disturbance activities are ineligible for the NEC coverage. Dischargers who file valid NECs in accordance with these instructions are not required to implement Best Available Technology Economically Achievable /Best Conventional Pollutant Control Technology and comply with the Storm Water Pollution Prevention Plan (SWPPP) and monitoring requirements of this General Permit.

### Obtaining & Maintaining NEC Coverage

A Discharger must electronically certify and submit NEC Permit Registration Documents (PRDs) via State Water Resources Control Board's (State Water Board's) Storm Water Multi-Application and Report Tracking System (SMARTS) to obtain NEC coverage. This conditional exclusion does not become effective until the PRDs are submitted and the annual fee is paid. Upon receipt of the annual fee, the Discharger will electronically receive an NEC acceptance notification via SMARTS, which will include a Waste Discharge Identification (WDID) number. A Discharger must maintain a condition of "No Exposure" at the facility for the conditional exclusion to remain applicable. The Discharger must annually electronically re-certify the NEC via SMARTS to confirm that the conditions of "no exposure" are being maintained. If conditions change resulting in the exposure of materials and activities to storm water, the Discharger must electronically certify and submit PRDs via SMARTS for Notice of Intent (NOI) coverage under the General Permit for Storm Water Discharges Associated with Industrial Activities (General Permit).

[Instructions For No Exposure Certification](#)

iron in your storm water. And, if you've determined that there are industrial sources of iron on your site, it becomes a bit of an interesting situation. Because iron has such widespread natural occurrence, there probably are many non-industrial sources of iron on your facility which could significantly contribute to your facility's iron levels. For example – even the cast iron storm drain grate could introduce iron and rust flakes directly into your sample bottle if you're not careful. Because of this, it's in your best interest to design a BMP strategy which targets all sources of iron on your facility, industrial or not. Remember, a good BMP strategy includes source control, pollution prevention, and treatment. Control iron sources by keeping exposed metal inside rain-proof structures. Prevent pollution by painting, powder coating, or covering metal that is used or stored outdoors. Since sediment can be an iron source, control erosion on your site with vegetation, hydroseeding, erosion control mats, or similar measures. Use filtration technologies to reduce pollutant loads – depending on your site and how many iron sources you have, it could entail installing some compost socks, or possibly a passive or active treatment system.

### Facts and Sources Of Iron:

Iron's a pretty common element. But here's a few not-so-common uses of iron that you might not have thought about:

- Flocculant in wastewater and drinking water applications (iron chloride or iron sulfate)
- Additive in animal feeds (iron chloride)
- Copper etchant in producing circuit boards (iron chloride)
- Manufacturing inks and pigments (iron chloride, iron sulfate)
- Manufacturing fortified foods (elemental iron, iron sulfate)
- Manufacturing dietary supplements (iron fumarate, iron sulfate)
- Concrete staining (iron sulfate)
- Reducing chromate in cement manufacturing (iron sulfate)
- Treated wood (iron sulfate)

There are also interesting correlations between iron and Total Suspended Solids (TSS). The higher the TSS, usually the higher the iron concentration is. What

causes high TSS numbers? The obvious culprit is sediment – but what may not be so obvious is the source of the sediment. Sediment could be coming from erosion, industrial activities (sawdust, concrete or lime dust, etc.), tracked in from off-site, or blown onto your facility from next door. Fortunately, sediment is almost always visible, and can be cleaned up fairly easily. Staying on top of any loose sediment, dust, or dirt on your site can have the added advantage of keeping your other sampling parameters under control (like iron, other metals, and more).

If you have industrial related sources of iron at your facility, you might want to also take note that often, iron manufacturers will use a process called "bluing" to make iron resistant to rust. While there are different types of bluing methods, some of the more popular ones involve using substances rich in nitrates. Nitrates are used as an oxidizing agent, and can be found in glass, metal, and plastic production, as well as in the production of explosives, and concrete manufacturing. Don't be fooled into thinking indoor only use of nitrates will be totally contained. Even if nitrites or nitrates are used indoors, they can still impact storm water by escaping through roof vents in particle (such as fertilizer dust) or gas (such as fumes from oxidizing reactions) forms. So, if your facility works with iron and either treats iron with nitrates or works with nitrate treated iron, be on the lookout for potentially higher nitrate concentrations in your water samples too.

As important as the element of iron is for the earth and for human life, it can be a big problem for industrial facilities with iron related industrial activities. Be sure to take the steps you need to reduce this pollutant's chances of escaping your facility through storm water discharges.

#### Sources:

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Wikipedia—Iron <https://en.wikipedia.org/wiki/Iron>

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EMAIL [KBEAN@WGR-SW.COM](mailto:KBEAN@WGR-SW.COM) TO PURCHASE SILT SOXX OR OTHER BMPS

## Attention

Need a SWPPP for your facility? Or a QISP? Or just some advice?

Yes

Remind me later

*contact us for more information*

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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 are the demonstrations an industrial facility can choose from?*

Congratulations to Chuck who answered, *“There are three demonstrations an industrial facility can choose from and these are an Industrial Activity BMPs Demonstration, Non-Industrial Pollutant Source Demonstration, and a Natural Background Pollutant Source Demonstration.”* We hope you enjoy a delicious meal from Chick-fil-A.

## *...This Month's Contest*

*What other pollutants have a correlation with iron?*

We need industrial storm water sleuths to help us with this month's question. Submit your answers by Friday, March 6th. Email your answer to [jteravskis@wgr-sw.com](mailto:jteravskis@wgr-sw.com). One winner will be selected by a random drawing to receive a \$25 gift card to Home Depot.

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