the Rain events

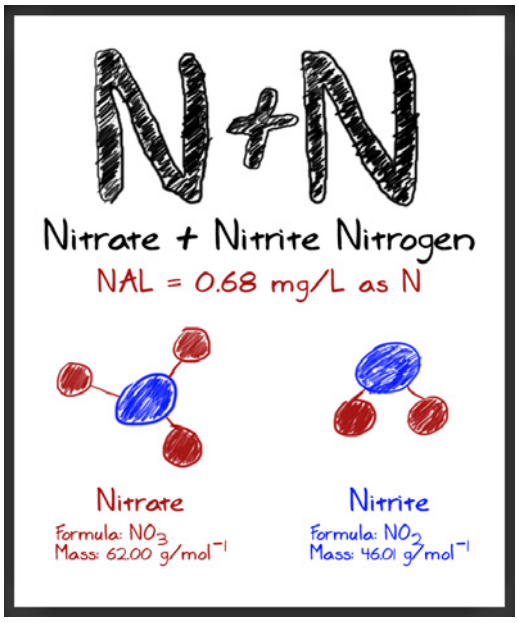
January 2017

phosphorus	oxygen	lutetium	tantalum	nitrogen	tennessine
15	8	71	73	7	117
P	O	Lu	Ta	N	Ts
30.974	15.999	174.97	180.95	14.007	[294]

*Part 1 of a 12-part **exclusive series** on understanding storm water pollutants*

Table 1 and Table 2 in the Industrial General Permit list a number of common industrial pollutants and their associated NAL values. But some of these "common" parameters aren't very well understood. For instance, do you know what cadmium is? How about arsenic? Which industrial materials or processes would contribute these pollutants? To help you be able to confidently answer these questions, we at The Rain Events have decided to start off the year with a series on pollutants. In this and each of the next 12 issues, we're going to look at one of the pollutants listed in Table 1 of the IGP and examine its properties, its sources, and ways that you can keep it out of your storm water runoff. To begin the series, we're going to look at Nitrate + Nitrite as Nitrogen – a common pollutant that is difficult to remove once it mixes with storm water.

So first, let's find out what this pollutant is. "Nitrite" refers to the nitrite ion, which has the chemical formula NO_2. One of its more common forms is sodium nitrite, or $NaNO_2$. Sodium nitrite is a salt that is commonly used in the food industry to preserve foods and prevent botulism. When dissolved in water, nitrites will rapidly convert into nitrates. "Nitrate" also refers to an ion, and has the chemical formula NO_3. Nitrates are also commonly found in salt form, the most common of which being potassium nitrate, or saltpeter. When analyzing for nitrogen in storm water runoff, the results for both nitrate and nitrite ions are added together and reported as Nitrogen - hence the name Nitrate + Nitrite Nitrogen, or N+N as N.



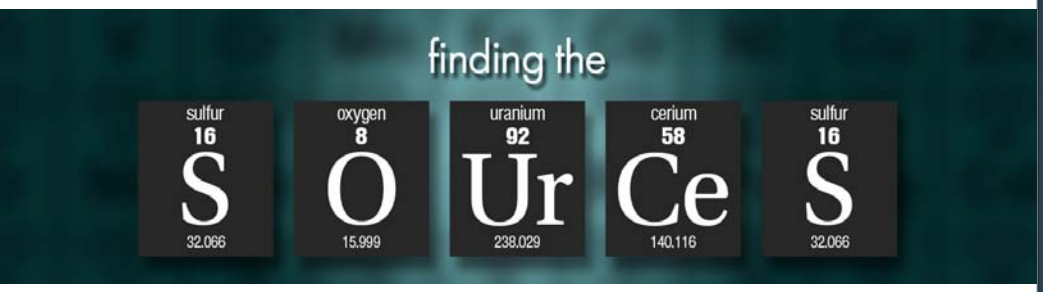
OK, so we know what nitrates and nitrites are. But most industrial facilities won't be using sodium nitrite or potassium nitrate – so where do high N+N numbers come from? Nitrates and nitrites are both commonly found in fertilizers, wastewater, and waste from animal feedlots. So, if your industrial facility handles any of those materials, your storm water could potentially contain traces of nitrates or nitrites.

Nitrates can also be used as an oxidizing agent, and is sometimes used in glass, metal, and plastic production. And remember that 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.

Assuming that your facility has nitrate or nitrite sources on-site, what are some ways that you can prevent them from getting into your storm water runoff? Well, a good BMP strategy uses a combination of source reduction, pollution prevention, and treatment. Since nitrates and nitrites are not easy to remove from storm water runoff, the best approach is to keep it out of the storm water in the first place. The first thing you'll want to consider is whether the nitrate-containing materials at your facility are necessary. Is there another non-nitrate based material you can use that will have the same effect? This is source reduction. But in some cases, such as animal feedlots, nitrates are inescapable since they occur naturally in the waste products. Secondly, practice good pollution prevention strategies, such as good housekeeping

and discharge reduction. Keep all fertilizers and animal feedlot wastes contained on-site, and where possible, under cover. If feasible, direct your storm water runoff into a bioretention pond, and try to minimize your storm water discharges as much as possible. Make sure fertilizers are applied correctly and your irrigation program is not creating a nitrate-charged runoff situation. Keep in mind that neglecting source reduction and pollution prevention strategies will create a problem that is not easily treatable. However, if you have reduced your pollutant source as much as possible and have good pollution prevention measures in place, treatment BMPs can help lower your numbers even further. Most treatment options will not completely remove nitrates from your storm water – depending on how much money you spend, you should only expect between 25-90% reduction. The more expensive treatment systems may be more towards the 90% side of the spectrum, while less expensive options may remove less than 50% of the pollutant.

To sum up, nitrates and nitrites are pollutants that primarily come from fertilizers and animal feedlots, though they can also be produced by a few other industrial activities. Nitrates are difficult to remove from storm water runoff, so your best strategy is to keep nitrate- or nitrite-containing materials away from storm water. Stay tuned for the next issue of The Rain Events and the next part of this series on understanding pollutants.



Do you have nitrates or nitrites at your facility? The most common form of nitrates or nitrites is in a salt – such as sodium nitrate. Below is a list of some industrial activities that could generate nitrates or nitrites. This is not meant to be a complete list, so check the chemicals and materials you use at your facility to determine if there are nitrates or nitrites present on-site.

- Using or producing fertilizers
- Animal feedlot operations
- Using or producing explosives
- Wastewater treatment plants
- Metal finishing (using **potassium nitrate** when nitriding steel)
- Production of meat products and canned goods (using **sodium nitrite**)
- Plastic production (especially celluloid, from **nitrocellulose**)
- Concrete manufacturing (when using **calcium nitrate**)
- Petroleum refining (when using **aluminum nitrate**)
- Wood finishing (when using **nitric acid** as an aging compound)
- Leather tanning (when using **aluminum nitrate**)

Have questions about the Industrial General Permit?
Give us a call at (209) 334-5363, ext. 114

"To Do List" for January:

- Perform the January monthly inspection
- If not done already, get everything ready to collect the last two storm water samples for the 2016-2017 year
- Make sure all of your sample results for the first half of the 2016-2017 year have been uploaded to SMARTS (Ad Hoc reports). Ad Hoc reports must be submitted **within 30 days** of collecting a sample.

Treatment Options for Nitrates and Nitrites

1. The most cost-effective treatment option would be a **drain insert** or **compost sock** that has been formulated to remove nutrients (phosphates and nitrates/nitrites). Expect less than 50% removal rate.
2. **Engineered wetlands** or **bio retention ponds** are probably the most effective treatment strategy, but can be cost and space prohibitive. Expect up to 90% removal.
3. **Floating treatment wetlands** are a great alternative to Option #2. These rubber "islands" grow native plants hydroponically in your retention basin, and the plant roots effectively remove pollutants. Expect up to 90% removal.

Please contact us if you have any questions …

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NAL REFERENCE SHEET

(Taken from Table 2 on Page 43 of the Industrial General Permit – 2014-0057-DWQ)

PARAMETER	TEST METHOD	REPORTING UNITS	ANNUAL NAL	INSTANTANEOUS MAXIMUM NAL
pH*	See Section XI.C.2 of the IGP	pH units	N/A	Less than 6.0; greater than 9.0
Suspended Solids (TSS)*, Total	SM 2540-D	mg/L	100	400
Oil & Grease (O&G)*, Total	EPA 1664A	mg/L	15	25
Zinc, Total (H)	EPA 200.8	mg/L	0.26**	
Copper, Total (H)	EPA 200.8	mg/L	0.0332**	
Cyanide, Total	SM 4500-CN C, D, or E	mg/L	0.022	
Lead, Total (H)	EPA 200.8	mg/L	0.262**	
Chemical Oxygen Demand (COD)	SM 5220C	mg/L	120	
Aluminum, Total	EPA 200.8	mg/L	0.75	
Iron, Total	EPA 200.7	mg/L	1.0	
Nitrate + Nitrite Nitrogen	SM 4500-NO3-E	mg/L	0.68	
Total Phosphorus	SM 4500-P B+E	mg/L	2.0	
Ammonia (as N)	SM 4500-NH3 B+ C or E	mg/L	2.14	
Magnesium, Total	EPA 200.7	mg/L	0.064	
Arsenic, Total (c)	EPA 200.8	mg/L	0.15	
Cadmium, Total (H)	EPA 200.8	mg/L	0.0053**	
Nickel, Total (H)	EPA 200.8	mg/L	1.02**	
Mercury, Total	EPA 245.1	mg/L	0.0014	
Selenium, Total	EPA 200.8	mg/L	0.005	
Silver, Total (H)	EPA 200.8	mg/L	0.0183**	
Biochemical Oxygen Demand (BOD)	SM 5210B	mg/L	30	

SM – Standard Methods for the Examination of Water and Wastewater, 18th edition

EPA – U.S. EPA test methods

(H) – Hardness dependent

* Minimum parameters required by the Industrial General Permit

**The NAL is the highest valued used by the EPA based on their hardness table in the 2008 MSGP.

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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:

A facility applying for NEC coverage has an on-site tank yard that is uncovered but is located in a secondary containment structure that will not discharge. Does this qualify for NEC coverage?

You're right, Ruthanne Walker, it is a tough question. **Assuming that the rest of the facility meets NEC requirements, having a tank farm as described in the question wouldn't necessarily prevent the facility from qualifying for NEC coverage.** According to IGP Section XVII.D, the tanks (and associated pipes) are exempt from needing a storm-resistant shelter, ***as long as they don't leak and don't contain any residual materials on the outside surfaces.*** IGP Appendix 2.B.4.b adds that ***above-ground storage tanks must be physically separated and not associated with vehical maintenance*** operations, and should be ***in secondary containment*** where feasible. Secondary containment "that will not discharge" means an engineered secondary containment structure that will never discharge, no matter how much precipitation it receives. **Ruthanne wins a 1-lb box of See's Candy!**

This Month's Contest Question:

A good BMP strategy uses a combination of what three things? (Hint: read this month's cover article)

By February 17, 2017, submit your response to the above question by sending an email to 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 Chipotle Mexican Grill.

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SURVEY:

Which pollutants do you want us to feature?

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jteravskis@wgr-sw.com
and let us know!