

TRIBUTARY TRIBUNE

IS YOUR ROOF RUNOFF POLLUTED?

The popular song *Up on the Roof* by the Drifters, tells of escape from the daily grind by seeking sanctuary up on the roof. It must be true, after all who would go up on the roof to look for you? However, if the only ones that do venture up on the roof are facility maintenance staff, you may be missing an opportunity to reduce pollutants in stormwater discharges from your facility.

Facilities covered under the State NPDES Industrial Activities Storm Water General Permit should include roof runoff in their assessment of potential pollutant sources.

The Concern

Roof runoff in industrial areas can be a significant source of pollutants to stormwater. Early studies of roof runoff have shown that galvanized metal roofs are sources of zinc at concentrations two to twenty times greater than other urban source areas, and often produce runoff that exceeds acute toxicity for aquatic life. Materials, paints,

and coatings associated with roofing are also suspected of being important sources of copper and lead.

Local Studies

Recent studies conducted by the cities of San José and Sunnyvale show that metal finishing and electroplating processes contributed greater amounts of copper and nickel to stormwater runoff than other industrial and commercial activities.

The City of Sunnyvale Industrial Storm Water Monitoring Pilot Project examined whether stormwater copper and nickel concentrations are significantly different at electroplating, metal finishing, and semiconductor manufacturing facilities, than at other commercial/industrial sites. The City of San José Industrial Storm Water Monitoring Pilot Program collected samples to determine the significance of pollutant sources and the effectiveness of Best Management Practices used.

DID YOU KNOW?

- *Ventilation from etching equipment & acid plating baths can be a source of roof contamination.*
- *Sometimes roof runoff has higher Cu & Ni concentrations than runoff from chemical & waste handling areas.*
- *Roofs with no visible contamination may be a significant pollutant source.*
- *Scrubbers may be less effective than you think.*

Findings

Potential sources of copper and nickel in roof deposition were identified as copper chloride etchers, ammonia etchers, and acid plating bath exhaust vents. The deposition was visible at most facilities, ranging from a slight discoloration

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www.ci.san-jose.ca.us/esd

The **Tributary Tribune** serves the cities of San José, Santa Clara, Milpitas, Cupertino Sanitary District, West Valley Sanitation District (including Campbell, Los Gatos, Monte Sereno, Saratoga), County Sanitation Districts 2-3, Sunol & Burbank Sanitary Districts

tion to a dark blue or deep green deposit. Leaks in exhaust pipes and containment vessels could be seen as localized deposition directly below the pipefitting. Air deposition of exhaust vapors could be seen as a plume radiating out from the

exhaust pipe. However, data from one of the pilot facilities showed that an absence of visual deposition does not imply an absence of pollutants.

To see an example of roof contamination go to:

www.ci.san-jose.ca.us/esd/com-stormwater-discharges.htm

BMPs

The type of structural Best Management Practices (BMPs) to control pollutant release from ammonia etcher exhaust vents varied considerably from site to site. The maintenance and condition of exhaust vents also varied greatly.

The most basic type of control method is a

vent cover and drip pan collection system. The vent cover provides a surface for condensation of exhaust vapors and protects from rain entering the system. Condensate in the drip pan is plumbed to the waste treatment system or emptied manually. In some cases ammonia etchant vapor condenses readily in the vent pipe. In other cases, the vapor contacts the vent cover and condenses into the collection pan. Sometimes, however, vapors escape to the atmosphere and condense on the roof.

To promote condensation, one facility employed chiller coils at

the junction of the ammonia etcher and exhaust vent. This technique also helps reduce chemical loss.

Another BMP is to treat ammonia etchant vapors with a scrubber system. The effectiveness of the scrubber seems to depend on the type of scrubber solution used. Using plain water in the scrubber system appears ineffective in controlling emissions, leaving deposits of copper salts on the roof. A dilute sulfuric acid solution seems to be the most effective means of treating exhaust vapors from an ammonia etcher.

BMPs TO CONSIDER

- *Install vent covers & drip pans where there are none.*
- *Prevent leaks in pipefittings & containment vessels with routine maintenance.*
- *Dispose of condensate from ventilation properly, or treat it.*
- *Promote condensation within piping containment, such as using chiller coils.*
- *Check that your scrubber solution is appropriate for the chemistry of the fumes.*
- *Look for chemical deposition around vents, pipes & other surfaces.*

Actual Results from One Site

As the table below shows, concentrations from non-process rooftop at one printed circuit board manufacturer consistently produced the lowest values of the four monitoring areas. Parking lot runoff has higher contamination due to cars. For comparison purposes, non-process roof runoff can be a useful gauge for identifying contaminated runoff. The table below illustrates that the waste treatment area had higher pollutant concentrations than non-process and parking lot areas, and roof runoff from process buildings can be even higher.

STORMWATER RUNOFF — COPPER SAMPLES (mg/l)							
Time	Waste Treatment	Parking Lot	Process Roof			Non-Process Roof	
			Downspouts			Downspouts	
			A	B	C	A	B
First Sample	2.58	0.477	0.028	99.1	25.0	0.155	0.267
40 min. later	1.03	0.093	0.012	2.51	12.0	0.097	0.062
80 min. later	2.07	—	0.123	3.10	14.4	—	—
100 min. later	—	0.121	—	—	—	0.053	0.064
120 min. later	—	—	0.118	3.15	3.16	—	—

It is recommended that facilities with electroplating and metal finishing processes evaluate rooftops for pollutant sources, such as exhaust vents, and update their SWPPP accordingly. A SWPPP may be incomplete, or a facility may fail to file a required Notice of Intent (NOI) if roof runoff is not evaluated.



Ultra-Trace Sampling Aids in Data Driven Regulation

The Environmental Services Laboratory recently completed a study of ultra-trace sampling and analysis techniques for organic pollutants.

Lowering Detection Limits

Current techniques limit organic pollutant measurements to the parts per billion (10^{-6}) or parts per trillion (10^{-9}) levels. The goal is to develop techniques that would allow for measurements to the parts per quadrillion (10^{-12}) levels or lower, which are the levels of concern for organic pollutants in water discharged to the Bay.

Without these lower level measurements, excessively conservative requirements may be placed on the Environmental Services Department and local businesses.

This can be avoided if the regulators have high-quality data confirming who is or is not a source of such pollutants, allowing the regulators to limit the scope of regulatory burden.

People interested in more detail on this study can point their browser to:

www.ci.san-jose.ca.us/esd/pub_res.htm

Implications

These new techniques, along with breakthroughs in lab instrument accuracy, have the potential to improve the quality of data used in setting regulatory requirements for water discharged into the Bay, resulting in better informed regulatory decisions.

Slow the Flow

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for reducing their indoor water use

Happy Days Diner, San Jose replaced its water-cooled ice cream machines with air-cooled machines and is saving nearly 500 gallons of water a day

Sanmina Corporation, Santa Clara, modified three DES process lines for a water savings of more than 77,000 gallons of water a day

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www.ci.san-jose.ca.us/esd

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Are you in compliance with the *Industrial Activities Storm Water General Permit*?

Efforts are underway by the State Board and the Regional Water Quality Control Boards to identify:

- 1) dischargers of storm water that have not obtained coverage under the Industrial Activities Storm Water General Permit by filing a Notice of Intent (NOI) form,
- 2) facilities that have not filed a No Exposure Certification (NEC) form or a notice of non-applicability, and
- 3) facilities that have not submitted an annual report as required.

Once these facilities are identified, the local Regional Board will send out notices to each facility notifying them of its need to comply with stormwater laws. A facility can be fined for each year of non-compliance.

How do you know if you need to file?

Not every facility needs to file an NOI. To help you determine if your facility needs to file an NOI, answer the questions on the enclosed insert. If you answer “yes” or “maybe” to any of the questions, call your city’s stormwater management program and request guidance, or contact the Regional Board at (510) 622-2494.

You may obtain a Notice of Intent form or a No Exposure Certification form from the Regional Board by calling (510) 622-2494.

The Industrial Activities Storm Water General Permit and NOI forms are also available at the State Water Resources Control Board web site at:

www.swrcb.ca.gov/stormwtr/induspmt.htm

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