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Practical Pollution Prevention Emphasized for Industrial Stormwater

by L. Donald Duke, Assistant Professor, University of California, Los Angeles

Automotive service stations have been characterized as potential "hot spots" for hydrocarbon pollutants and heavy metals in urban storm water discharges. In an urban area, industrial activities can also be considered hot spots as sources of pollutants. While residential and commercial land uses typically account for the majority of the mass of pollutants discharged in runoff from an entire urban region, routine or accidental discharges from a few industrial facilities can discharge pollutants such as petroleum hydrocarbons, heavy metals, and toxic organic materials in quantities far beyond the proportion of industrial land use.

Pollutants from a single industrial hot spot could outweigh the gains of a regional program's entire campaign of information-based residential pollution controls. This is the reason that industrial activities continue to draw attention from regional storm water pollution control programs, even though industrial facilities are addressed by federal and state-level NPDES storm water regulations.

The practical pollution prevention measures for automotive-related industrial activities developed by the Santa Clara Valley Nonpoint Source Program make up part of the Santa Clara Valley program's pollution prevention outreach efforts for private industry. A second document is designed to address construction activities, with their obvious potential for short-term stormwater impacts by disturbing soils and ecosystems. A third, described here, promulgates stormwater management practices intended for general industrial facilities. Industrial activities, even small businesses and relatively small facilities, have the potential to be stormwater pollutant hot spots if the facility operator does not pay attention to routine operations that may discharge pollutants.

The "operational practices" approach to pollution prevention can be especially attractive to smaller facilities, which may not generate pollutants in the large and regular quantities that make hydraulic treatment methods feasible but which nevertheless can be occasional sources of significant amounts of pollutants. Further, small businesses may not have the wherewithal to implement extensive structural controls or to develop in-house expertise on specialized environmental issues, but need to comply with U.S. EPA stormwater NPDES regulations issued in 1992. The Santa Clara Valley program's stormwater practice manual is designed to be practical for smaller businesses: it is a highly readable document, features easy to follow recommendations, and lists measures that can be incorporated into everyday practices.

The intent of the pollution prevention approach is to control pollutants so well that stormwater need not be treated in a hydraulic detention facility or a pollutant removal device. The approach is highly practical from a business standpoint because it focuses on industrial operations and low-cost pollution control practices rather than expensive constructed solutions like new industrial structures or new storm water detention or treatment facilities. This approach is especially preferable in the kind of highly seasonal semi-arid rainfall regimes that are found in much of California and most of the western U.S.

The Santa Clara Valley document's pollution prevention approach utilizes three basic principles: (1) prevent stormwater from contacting working areas; (2) keep pollutants off of surfaces that do come into contact with water; and (3) if necessary, manage stormwater before it is discharged to the storm drain (i.e., promote infiltration into the soil or install devices to remove pollutants). The approach emphasizes changing everyday operating routines in a way that prevents stormwater pollution, and suggests using structural practices only after it has been demonstrated that operational practices are not sufficient to control pollutants.

Industrial pollution prevention practices can be divided into four groups (see Table 1). The first two categories concentrate heavily on operational practices and pollution prevention methods. Stormwater practices in this first group include some that the Santa Clara Valley program recommends to all industrial facilities: employee training, customer awareness, spill prevention, and eliminating non-stormwater discharges. The second includes pollution prevention practices that may be conducted at a typical facility (e.g., methods for handling wastes, pollution prevention for outdoor equipment, and proper methods of building and grounds maintenance, vehicle maintenance, shipping and receiving, and equipment washing).

The third group may entail some structural modifications to an industrial facility to enhance pollution prevention: design features for loading dock areas, vehicle fueling and maintenance areas; access roads on

the plant site; and rail facilities on the plant site. The fourth group describes in brief outline some hydraulic control stormwater practices and pollutant removal practices that can be implemented if necessary. Hydraulic detention and treatment approaches are not emphasized, although some facilities elsewhere in the U.S. use these as the cornerstone of their stormwater compliance efforts.

Ongoing research around the U.S. continues to focus on industrial stormwater pollution, including characterization of pollutants conveyed in storm drains from industrial areas and promulgation of pollution prevention controls for industrial facilities.

Additional research is ongoing at UCLA to better characterize industrial discharges. The self-monitoring requirements for industry that are included in the current round of regulations will address this to some extent. However, the range of substances and concentrations that we can typically expect in stormwater discharges from industrial activities is not currently being evaluated in any integrated, comprehensive nationwide program, and only in a fragmented fashion in a few regionwide programs. This kind of information will be necessary if regulatory agencies intend to develop guidelines for required stormwater practices, design criteria for structural controls, and capability to predict costs and effectiveness of industrial storm water pollutant control programs.

References

Santa Clara Valley Nonpoint Source Pollution Control Program. 1992. Duke, L.D. and Shannon, J.A. *Best Management Practices for Industrial Storm Water Pollution Control.*

Table 1: Industrial Stormwater Practices

A. Storm water pollution prevention practices recommended for all industrial facilities

- Training and education for employees and customers
- Eliminating improper discharges to storm drains
- Spill prevention, control, and cleanup

B. Categories of industrial activity for which pollution prevention pratcices may be adequate for stormwater control

- Outdoor process equipment operations and maintenance
- Outdoor materials storage and handling
- Waste handling and disposal
- Vehicle and equipment washing and steam cleaning
- Trucking and shipping/receiving
- Fleet vehicle maintenance
- Fueling fleet vehicles and equipment
- Building and grounds maintenance
- Building repair, remodeling, and construction

C. More extensive practices that may be needed for some industrial activities

- Loading dock design features
- Equipment yard design features
- Fleet or equipment fueling area design features
- Controls and design features for access roads and rail corridors

D. "Last-resort" storm water management and treatment controls

- Onsite storm water management
- Redirect discharge from storm drain to sanitary sewer
- Storm water management: hydraulic controls
- Storm water management: water quality (treatment) controls
- Storm water management: removing oily contaminants (treatment controls)