

# Public Works®

City, County and State



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*The street sweeper behind San Antonio's Director of Public Works John L. German (left), P.E., and Streets and Drainage Division Manager Armando A. (Rocky) Aranda, Jr., plays an important role in that city's efforts to control water pollution. More on pages 13 and 53.*

# Cleaning San Antonio | An Environmental System that Works



■ APPROXIMATELY 25 tons of debris are deposited at a service center and transported to a local landfill.

**JOHN L. GERMAN, P.E.**  
and  
**ARMANDO A. (ROCKY) ARANDA, JR.**

Mr. German is Public Works Director and Mr. Aranda is Streets and Drainage Manager, Department of Public Works, San Antonio, Texas.

**T**HE Clean Water Act of 1972, passed by Congress and amended by the Water Quality Act of 1987, established requirements, policy measures, and standards to be regulated and enforced by the EPA. The EPA later established regulatory components under the National Pollutant Discharge Elimination System (NPDES). Permit requirements for storm water discharges were levied upon associated industries and municipalities with populations over 100,000. The city of San Antonio, with its population well over one million residents, clearly was included in the scope.

The goal of NPDES, through permits and management plans, is to reduce, to the maximum extent practicable, the amount of pollution discharges from municipal storm drainage systems. Although the EPA/NPDES regulations seem complex, the goal is simple—"Improve water quality in all waters of the United States." The municipal NPDES permits provide for several components, one of which addresses storm water pollution prevention and management programs. The City of San Antonio Storm Water Management Program focuses on Best Management Practices experience through case stud-

ies, technical criteria, and water quality and quantity relationships.

In June 1993, the San Antonio City Council charged the department of public works with the responsibility for water quality maintenance while the responsibility of water quality monitoring aspects of the Storm Water Management Program was placed with the San Antonio Water System (SAWS). SAWS is a city-owned agency that is charged with the management of all water related issues. The Water Management Division of the EPA issued the "Authorization to Discharge under the National Pollutant Discharge Elimination System" (the Permit) to the city of San Antonio, SAWS, and the Texas Department of Transportation (TXDOT), District 15, as co-applicants. The permit, which has been in effect since February 1996, identifies the responsibilities of each permittee with regard to the implementation of an approved storm water management program.

The collaborative programs and activities included in San Antonio's Storm Water Management Program are the result of interagency partnerships between the city, SAWS, and TXDOT and partnerships with the private sector. These effective partnerships are critical for the development of programs, the coordination of activities, and to the success of improving the quality of water in San Antonio and Bexar County. Program activities include the following:

- Management and Assessment
- Community Education and Public Relations

- Water Quality Monitoring
- Illicit Connection Monitoring
- Household Hazardous Waste Collection/Hazardous Material Spill Response
- Curbside Recycling
- Floatable Debris
- Street Cleaning
- Storm Sewer Maintenance
- Development Clearing and Grading Permit Administration

Funding for program development and the implementation of activities under the San Antonio Storm Water Management Program comes from revenue generated by a storm water utility fee, which generates revenue from storm sewer users throughout the San Antonio city limits amounting to approximately \$12.5 million, charges the typical residential property owner \$1.99 per month. The fee escalates beyond that based upon type of development and impact on storm water runoff.

### Street Cleaning

Street cleaning has been associated with positive effects on the environment for many years. An accurate evaluation of the effectiveness of street cleaning programs must go beyond simple visual inspections of the streets for cleanliness. The positive impact on the environment, as well as increased street life-cycle, must be included in any comprehensive evaluation of the program's effectiveness. The level of street cleaning practices significantly affects water pollution control by removing potential pollutants from the

runoff before it enters the Municipal Separate Storm Sewer System. Philosophically, the appearance of the streets may constitute a high profile; however, environmental protection must be emphasized as one of the most important results of cleaning streets regularly and effectively.

Each community has unique characteristics and must be evaluated on their own merits. Climate, precipitation, level of construction activity, soil cover, soil type, roadway construction, right-of-way, infrastructure design, traffic, and maintenance all have an impact on the environmental aspects of street cleaning. Material typically found on the streets appears to be largely local and of urban origin and is not usually affected by remote sources. Removal of these materials has a significant impact on water quality.

San Antonio has initiated a street cleaning program and this article illustrates the collaborative, cost-effective program that has been implemented. The street cleaning program is a component of San Antonio's Storm Water Management Program.

### **Background**

In September 1995, the San Antonio Public Works Department assumed the existing street cleaning operation previously performed by SAWS and limited to the downtown area. Ten employees and six sweepers (two regenerative air and four conventional) were transferred to the city. This preliminary phase of the operation accounts for 60.64 gutter miles x 312 cycles per year or 18,920 lane miles. The transition was accomplished swiftly, smoothly, and with no interruption of service—thanks to the full cooperation of city and SAWS personnel.

The transition of the street cleaning operation from one organization to another was not without challenges, however. City-owned facilities were needed to accommodate the new city street cleaning operation and since the existing operation provided for street cleaning in the central business district only, a site within the general vicinity was preferable. A one-acre site previously used during the construction of the San Pedro Creek Flood Control Tunnel (SPCT) was identified as an appropriate site. It lies within 100 ft of the SPCT outlet structure, is in an industrial-zoned district, and is within two miles of the city's central business district.

### **Primary Challenge**

The primary challenge associated with this site was the existence of two historically significant structures, which were cleaned, secured, and fenced-off. The remainder of the site was then cleared and paved. A mobile office trailer for staff and crew is being leased until permanent office space can be identified. Meanwhile, the Office of Historic Preservation is evaluating the feasibility of rehabilitating

the existing historic buildings for office space.

The next step was to install a wash rack to clean the sweepers. Streets and Drainage Manager Armando "Rocky" Aranda, Jr. designed a street cleaner wash rack that includes a multi-chambered, environmentally-safe water filtration system, (another key element of the NPDES permit). The water is then discharged from this initial treatment process into the sanitary sewer for further treatment and to provide for water quality monitoring before being discharged into "Waters of the United States." According to Aranda, "Once the water is discharged into the sanitary sewer system, the quality of the effluent is free of solids and any contaminated waste."

It is noteworthy to point out that this service center was designed, constructed, and operational within 30 days.

### **Program Implementation**

The previous level of street cleaning service that had been provided by SAWS was specifically geared toward the visual appearance of street cleanliness in the central business district only. Both organizations determined that SAWS did not have the capability to adequately address the magnitude of the requirements as set forth in the NPDES permit. Therefore, the city, in cooperation with SAWS and TXDOT, developed a progressive plan to address the need for street cleaning throughout the entire San Antonio community. The street cleaning program is being implemented in phases to accommodate funding constraints.

In May 1996, the operation was expanded from the original 10 employees and 4 aging conventional main broom elevator-type sweepers by adding 15 employees and 12 new Tymco Model 600 regenerative air sweepers. Because most of the city streets had not been cleaned for many years, preparatory measures were required to remove vast quantities of well-established vegetation and silt buildup. This was accomplished, in part, by using front-end loaders in conjunction with motor graders to clear the gutters of accumulated debris, to re-establish drainage/runoff flow-lines, and to eliminate situations that were causing water ponding. This thorough preparatory work allowed for the rapid establishment of a standard street cleaning schedule. This measure also provided for compliance with the NPDES permit before the deadline.

**Phase 1—Arterial Classified Streets.** The FY 1995-96 Budget funded 15 additional employees, 12 new Tymco Model 600 Sweepers (purchased from an aggressive formal advertisement process), operational activities, and miscellaneous capital for support equipment and tools. A total of 798 center-line miles or 3,192 gutter miles of arterial classified streets are being cleaned a minimum of four

times annually. Phase 1 was fully operational on June 1, 1996 at a total cost of \$2.25 million.

**Phase 2—Collector Classified Streets.** The FY 1996-97 Budget includes 13 additional employees, 6 new Tymco sweepers, operational activities, and miscellaneous capital for support equipment and tools. Included in this phase, 447 center-line miles or 1,790 gutter miles of collector classified streets are committed to be cleaned four times annually. Phase 2 is scheduled to be fully implemented by June 1997 at a total cost of \$1.1 million.

**Phase 3—Residential Classified Streets.** The city's residential streets, which account for 2,659 center-line miles or 10,636 gutter miles, will be cleaned twice annually. Personnel and equipment requirements are currently being evaluated and this portion of the street cleaning program is scheduled for implementation over a three-year period beginning in 1998 at an estimated cost of \$2.38 million.

The street cleaning operation is expected to be fully implemented by the year 2000.

### **Performance Measures**

It is important to note that the EPA is allowing municipalities as much flexibility as possible with their storm water management plans with the philosophy that these plans will evolve and mature over time. After only three months of operation involving the central business district and the Arterial Street Cleaning Program, we have established an excellent database and reporting system. Our NPDES reports are compiled weekly, and are incorporated within the standardized Governmental Accounting Standards Board performance measure format—which includes input, output, efficiency, and effectiveness measures. These data allow for analysis of our performance relative to local conditions as well as providing an effective tool to compare our street cleaning operation with others around the country.

The initial reports included extraordinary preparatory work performed in the first cycle. Subsequent cycles are expected to be more cost-effective as we will be on a standard schedule and will not be removing previous years accumulation of material from the streets.

A key element of this street cleaning story was the extensive training offered by Waco, Texas-based Tymco, Inc. and Jack Curtis of Industrial Disposal Supply (IDS) of San Antonio. The employees that were hired for the street cleaning operation had little or no significant street cleaning experience, and no experience whatsoever with the new street sweepers that had been purchased. Consequently, the training program provided by Tymco and IDS was absolutely necessary to achieve optimum utilization of resources and technology. This training was

accomplished quickly, at no cost, and has proven to be very effective.

Tymco and IDS continue to be valued partners by providing ongoing support and technical assistance to our city forces.

To continue the operational efficiency, Tymco, IDS, and city staff work closely to maintain minimum standards and to anticipate future needs. Staff meets monthly with factory technicians, operators, mechanics, and management. The results are open dialogues regarding changes, problems, questions, and possible solutions to issues relating to the improvement of efficiency and service levels for the program. Drivers take better care of their vehicles and both driver and vehicle are "on-the-street" for longer periods of time.

This municipal/corporate partnership demonstrates how a successful operation can be implemented when everyone is committed to value, excellence, and qual-

ity. This in turn results in a substantial savings to the citizen-taxpayer.

In conclusion, the results to date include successful project development, multi-agency collaboration, and compliance with the NPDES permit. These results are due to teamwork and a prevailing attitude to do get the job done right the first time. The vision, support, and leadership of the city council and of each of our partners, SAWS, TXDOT, Tymco, and IDS have enabled the public works department to implement the street cleaning program quickly and in a manner that citizens appreciate.

Not only are we fulfilling the requirements of the NPDES permit, we also have additional capability to deal efficiently with customer service issues such as special work, requests, event clean-up, and 24-hour emergency hazardous material spill response. These capabilities are not always available with traditional street

cleaning contractors.

The street cleaning programs in other cities have reported an estimated 10 percent reduction in pollution problems in the receiving waters. Based on the data collected, to date, we expect to achieve these reduction levels as well. The cost of a street cleaning program appears to be high when showing only a 10 percent reduction in pollution, but the secondary effects of public support and compliance with storm water management programs is much more significant. The most critical aspect of this program as well as other storm water management programs is public awareness and cooperation in overall pollution-source control.

San Antonio's street cleaning program has been well received by the general public, and the arterial streets are evidence that a sound street cleaning program can be both pleasing to visitors and residents alike while being environmentally beneficial. □□□

## ABOUT OUR COVER

**John L. German, P.E.**, is the Director of Public Works for the City of San Antonio, Texas. His 31 years of experience combines public works management, traffic engineering, and transportation planning. Since his graduation from the Yale University Bureau of Highway Traffic with the equivalent of a Master's Degree in traffic engineering and transportation planning, Mr. German has carried out various technical and management roles. As Director of Public Works, he is responsible for the engineering, streets, and drainage, solid waste, environmental services, building construction and maintenance, capital improvement projects, traffic engineering, and parking functions for San Antonio's one million citizens.

He supervises a department with over 1,600 employees, an operating budget of \$90 million, and a \$300-million capital improvement program. The Solid Waste Division picks up garbage from 265,000

residences twice per week, provides curbside recycling once per week, and makes three cycles through the city annually picking up brush and large objects. Streets and Drainage Division personnel maintain over 3,600 miles of streets and 4,100 acres of rivers and drainage channels. The Traffic Division operates over 1,030 signalized intersections, installs over 10,000 new and 7,500 replacement signs annually, and stripes over 700 lane miles of streets twice a year. Over 625,000 sq ft of municipal office space is maintained, and 25 parking facilities with over 10,000 spaces are operated.

Other duties for Mr. German include serving as Team leader for the Development Services Team, providing general direction to the Directors of the Planning and Building Inspections Departments. He acts as liaison with the municipally-owned San Antonio Water System and City Public Service (an electric and gas utility). As a member of the 19-member Metropolitan Planning Organization Steering Committee, he helps direct the expenditure of over \$100 million annually in state and federal funds for planning, engineering, and construction. He is also a member of the city's Economic Development Action Team and manages the Alamodome Contaminated Soils remediation program.

**Armando A. (Rocky) Aranda, Jr.**, is Manager of the Streets and Drainage Division of the San Antonio Public Works Department. The division is responsible for gravel and asphalt maintenance, street cleaning, drainage construction and maintenance, flood control facilities (tunnels), and storm water conduit televising and inspection activities. The division's vegetation control responsibilities include mowing and river and channel maintenance.

Mr. Aranda's duties include developing analytical and administration methodology; value engineering techniques; mechanizing divisional operations; and civil and structural design of streets, drainage facilities, maintenance structures, and bridges. His environmental impact analysis/assessment and abatement responsibilities include asbestos, asphalt, and hydrocarbon and petrochemical issues. As Divisional Safety Coordinator, he appraises training programs, workers' compensation; medical, life, and general liability coverage; and accident site analysis and investigations.

The cover photograph was taken in front of the Alamo (upper left), a world-famous landmark. Located in the heart of the city, the Alamo's 186 defenders fell on March 6, 1836, after repeated attacks by Mexican General Santa Anna's army.