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Surface Cleaner Control Guideline Development for Bay Area POTWs

Prepared for:

San Francisco Bay Area
Pollution Prevention Group

SURFACE CLEANER CONTROL GUIDELINE DEVELOPMENT FOR BAY AREA POTWS

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Introduction

In 1996, the Bay Area Stormwater Management Agencies Association (BASMAA) established an incentive based program for mobile cleaners to address the discharges from their cleaning operations. The initial focus of this program has been on surface cleaning. Surface cleaners are mobile businesses that wash surfaces including parking areas, sidewalks, streets, and building exteriors. Businesses that pressure wash other items (e.g., vehicle cleaning) and businesses that conduct most or all of their operations at a fixed facility are not included in this group.

The BASMAA program discourages surface cleaners from discharging certain types of wastewater to the storm drain and instead recommends that, for most situations, the wastewater be discharged to the sanitary sewer. With respect to surface cleaning activities, wastewater must be discharged to the sanitary sewer if soap is used or if paint is removed by the cleaning process. The wastewater may be discharged to the storm drain if no paint or soap is involved and the surface is first cleaned using dry clean-up methods.[1]

Initially, 166 surface cleaners received recognition through the BASMAA program as Recognized Cleaners who conduct their operations using recommended Best Management Practices. In 1997, 75-80 cleaners applied for recertification in this program.[2]

Stormwater regulations prohibit non-stormwater discharges from being discharged to the storm drain and stormwater agencies are expected to move in the direction of enforcing these regulations more vigorously in the near future. In addition, as mentioned above, BASMAA recommends that non-stormwater discharges from surface cleaners should go to the sanitary sewer instead. In response to these stormwater requirements, the Bay Area Pollution Prevention Group (BAPPG) developed guidelines to assist Bay Area POTWs with developing local policies for accepting mobile cleaner discharges.

Issues associated with developing guidelines and local policies using these guidelines include:

- Determining if pollutant levels in mobile cleaner wastewater have the potential to exceed of Bay Area POTW local discharge limits.
- Developing an approach for mobile cleaners that is consistent with existing programs targeting small stationary sources (i.e., commercial businesses such as vehicle service facilities and restaurants).
- Identifying viable collection and treatment options to address potential wastewater quality issues.
- Developing flexible guidelines and program options that will accomodate the varying resources and priorities of Bay Area pretreatment and pollution prevention programs.

To provide insight into these issues, the BAPPG surveyed mobile cleaners, Bay Area POTWs, and programs in other states. Specifically, the survey addressed the following areas:

- **Water Quality Assessment.** Surface cleaner wastewater quality data was analyzed and compared to Bay Area local discharge limits.
- **Mass Loadings.** Volumes of wastewater and resulting mass loadings were estimated.
- **Treatment and Collection Options.** Treatment and collection options for mobile cleaner wastewater were identified and evaluated.

- **Approaches Used in Other States.** Approaches to mobile cleaners used outside of California were summarized and evaluated.
- **Existing Bay Area Policies.** Existing programs targeting stationary and mobile sources in the Bay Area were summarized.

Based on the results of this survey and evaluation, proposed guidelines to be used for developing local surface cleaner policies were developed. The evaluation of the issues associated with mobile cleaner wastewater discharges and the proposed guidelines to address these issues are discussed below.

Wastewater Quality Assessment

The wastewater generated from surface cleaners' operations was evaluated based on sampling conducted in the Bay Area by CCCSD, EBMUD, Santa Rosa, and Palo Alto. Data provided by programs in Arizona and Texas were also included in the analysis. Sampling results for wastewater generated by surface cleaning and vehicle washing were obtained and are presented in Appendix A. Maximum and median concentration values were then compared to local discharge limits for several Bay Area POTWs. Local discharge limits for the surveyed Bay Area municipalities are also presented in Appendix A. The comparison of wastewater quality to local limits for constituents that had at least one exceedance of a local discharge limit is shown in Table 1. Mobile cleaner wastewater exceeded at least one of the local limits for cadmium, copper, lead, mercury, zinc, pH, oil and grease, and total petroleum hydrocarbons.

Table 1: Comparison of Surface Cleaner Wastewater to Local Limits (mg/L)

Constituent	Wastewater Characteristics			Local Limits		Assessment		
	Lowest MDL for undetected values	Median Con-centration	Max. Observed Con-centration	Minimum local limit	Median local limit	Number of samples	number > lowest local limit	number > median local limit
Arsenic	**<0.1**	0.0115	0.0302	0.06	0.5	28	1	0
Beryllium	**<0.05**	<0.002	<0.002	0.02	0.5	6	1	0
Cadmium	**<0.05**	0.02605	**2.3**	0.04	0.14	28	8	4
Chromium	<0.05	0.0585	**0.28**	0.2	1.71	30	1	0
Copper	0.04	**0.37**	**1**	0.2	2	27	23	0
Lead	<0.07	**0.35**	**5.3**	0.2	1	35	26	5
Mercury	<0.0002	**0.0009**	**0.14**	0.0003	0.01	29	19	3
Selenium	**<0.1**	<0.0003	0.009	0.04	1	28	1	0
Zinc	N/A	**2.85**	**19.3**	1	2.25	34	30	21
pH	N/A	**9.2**	**10.5**	9	11.5	16	13	0
O&G	N/A	82.85	**1953**	100	100	16	6	6
TSS	N/A	900.5	**7900**	6000	11400	8	1	0
TDS	N/A	1287.5	**11627**	10000	N/A	4	1	1
TPH	N/A	**28**	**40**	5	7.5	3	3	3
COD	N/A	838	**5130**	2600	N/A	7	2	N/A

Bold = exceeds lowest local limit; Shading = exceeds median local limit; MDL = method detection limit; N/A = not applicable (i.e., no undetected values)

A follow-up assessment was completed to compare wastewater from different types of surface cleaning to local limits. This assessment was done using the data presented in

Appendix A for samples where the surface cleaned was identified. Pollutant concentrations for cleaning of garages, vehicle tunnels, sidewalks/ streets, gas stations, building exteriors, and parking lots as presented in Appendix A were evaluated. The concentrations for these different types of surface cleaning were compared to local limits for metals with potential compliance problems (i.e., cadmium, copper, lead, mercury, and zinc). The results of this comparison are shown in Table 2.

Table 2: Number of Samples Exceeding Lowest Bay Area Local Limit for Different Types of Surface Cleaning

Surface Cleaned	Cadmium	Copper	Lead	Mercury	Zinc
Garages (5 samples)	1	4	5	5	5
Vehicle Tunnel (4 samples)	0	3	3	0	3
Sidewalks/ Streets (4 samples)	1	3	4	4	4
Gas Station (4 samples)	1	3	4	3	3
Building Exterior (8 samples)	5	8	7	8	8
Parking Lot (3 samples)	3	1	1	1	0

Estimation of Mass Loadings

Mass loadings were estimated based on the estimated number of cleaners in the Bay Area, the estimated volume of wastewater generated per surface cleaner, and the average pollutant concentration from Table 1. This estimate was limited to loadings from surface cleaners. The method used to determine these values and the resulting mass loadings calculated for cadmium, copper, lead, mercury, zinc, oil and grease, and TPHs are discussed below.

Number of Bay Area Surface Cleaners

During the 1996 effort, BASMAA developed a database of mobile cleaning companies in the Bay Area. The companies were divided into categories of auto detailers, carpet cleaners, janitorial services, surface cleaners, truck washers, water proofers, and window cleaners.[1] The number of businesses in each category is shown in Table 3. Based on this database, it was estimated that there are approximately 125 surface cleaning businesses operating in the Bay Area. The total number of mobile cleaners of all types in the Bay Area is approximately 2900.

Table 3: Estimated Number of Bay Area Mobile Cleaning Businesses

Category	Businesses
Auto Detailers	297
Carpet Cleaners	1235
Janitorial Services	959
Surface Cleaners	125
Truck Washers	10
Water Proofers	125
Window Cleaners	125
TOTAL	2876

As a result of the BASMAA Recognition Program for Mobile Cleaners, 166 employees of surface cleaning companies were identified and included in a database of Recognized

Cleaners in 1996. Based on this information from BASMAA, the number of individual surface cleaners working in the Bay Area is estimated as 166. This number is used because it is consistent with the estimate of surface cleaning companies (i.e., 125) using BASMAA's initial research which was based on the number of surface cleaners advertising in Bay Area phone books. It has been suggested that this number may be an underestimate of surface cleaners working in the Bay Area because it does not include surface cleaners who do not advertise through phone books and painters who conduct surface cleaning.

Volume Determinations

Surface cleaners in the Bay Area were surveyed regarding the volume of wastewater generated and the number of hours worked per week. Because some of these businesses have more than one truck and/or more than one employee, estimates were adjusted to determine the volume per week per operator. Based on the conversations with the surface cleaners, it appears that most of these businesses operate 5 days per week. Therefore, volume generated per week was divided by 5 to determine an estimated volume generated per day. Volume estimates from different sources are shown in Table 4. Based on the information collected, an average volume per week per operator is approximately 8,800-12,000 gallons or approximately 1700-2400 gal/day.

Another approach for estimating the wastewater volume is to consider the operation of the cleaning equipment. Using this approach, the volume of wastewater generated is estimated to be between 720 and 2400 gal per day per operator based on assuming a machine flow of 3-5 gal/min., operating 20-40 hours per week, and an operator working 5 days per week. This approach compares well with the approach used in Table 4.

Table 4: Estimated Wastewater Volumes

Contact	type of job	Low weekly volume per operator (gal)	High weekly volume per operator (gal)
Bob Van Gelder	Plazas, sidewalks	6000	6000
Jim Gamble	Parking lots	23000	60000
Kathy Parker	Parking lots	2000	3333
Richard Sprinkle	Parking lots	100	300
Rick Christian	Plazas, sidewalks	5250	5250
Jim Sherry	Plazas, sidewalks	7500	7500
Frank Valequez	Plazas, sidewalks	6000	6000
Tom Boyce, Colorado *	2 4-hr jobs/month	360	360
	40 hrs/week	12000	12000
	40 hrs/week, hi flow	24000	24000
	8 4-hr jobs/day	9600	9600
Ted Lanway, Michigan	Parking lots	9600	9600
Average Volume		**8784**	**11995**

* T. Boyce of Colorado DEQ indicated that this represented the range of mobile cleaning operations in his area.

Using the assumptions of 720 to 2400 gal/day/operator and a total of 166 surface cleaning operators working in the Bay Area, a total volume of surface cleaner wastewater generated

would be in the range of 120,000 to 400,000 gallons/day. This equals approximately 0.02-0.07% of the total daily flow of 554 MGD for the 34 POTWs in the Bay Area. It has been suggested that this may be an overestimate of the total volume of surface cleaner wastewater that would be discharged to the sanitary sewer because certain types of wastewater will go elsewhere. This includes:

- certain types of surface cleaning wastewater that, according to the BASMAA BMPs, may go to the storm drain (i.e., washing of plazas and sidewalks without soap). It should be noted that more of this wastewater may be directed to the sanitary sewer in the future as a result of concerns that sidewalk washwater has been seen to exceed local limits in some cases.
- wastewater from surface cleaning that may flow to landscaped areas. This is an acceptable disposal method for certain discharges according to the BASMAA BMPs.
- the portion of the wastewater that is difficult to collect (i.e., wets surfaces, absorbs into asphalt, bypasses dams,etc.)

Estimated Mass Loadings

Mass loadings for surface cleaners were determined for metals with potential compliance problems (i.e., arsenic, beryllium, cadmium, chromium, copper, lead, mercury, selenium, and zinc). Loads were not determined for arsenic, beryllium, chromium, and selenium because, as shown in Table 1, only one value for each of these constituents exceeded a local limit. For arsenic, beryllium, and selenium, the exceedance was based on a high detection limit.

Loads were determined as the product of the average concentration from all surface cleaning activities and the total daily flow for 166 mobile cleaners. The results are shown in Table 5. As a comparison, total influent loading for these metals to Bay Area POTWs was also estimated. This estimate is rough and based on the average influent metal concentrations for CCCSD and the total daily flow of 554 MGD.

Table 5: Estimated Daily Load from Bay Area Surface Cleaners

	Average Surface Cleaner concentration (mg/L)	Load from 120,000 gal (lb/ day)	Load from 400,000 gal (lb/ day)	Average CCCSD influent concentration (mg/L)	Influent load for 554 MGD (lb/day)	% of Influent load from surface cleaners
Cadmium	0.042*	0.042	0.140	0.0004	1.85	2-8%
Copper	0.443	0.443	1.48	0.0424	196	0.2-1%
Lead	0.688	0.688	2.29	0.004	18.5	4-12%
Mercury	0.003*	0.003	0.010	0.00033	1.5	0.2-1%
Zinc	4.3	4.3	14.5	0.093	430	1-3%

* Two data points excluded from determination of average due to extreme/ outlier values

The estimated load from surface cleaners for cadmium and lead may be signifcant compared to the estimated influent load for Bay Area POTWs.

Treatment and Collection Options

Managing mobile cleaner wastewater involves collecting the wastewater so that it can be diverted from storm drains and sent to the sanitary sewer (or to landscape/ dirt for some

types of discharges). When appropriate, the wastewater can be treated prior to discharging to the sanitary sewer. Collection and treatment options are described below.

Collection of Surface Cleaner Wastewater

Wastewater can be collected in order to send it to the sanitary sewer using booms to contain the area, pumps to transfer the wastewater, and possibly tanks to collect the wastewater for interim storage. Information on representative collection equipment is summarized in Table 6. In general, these are inexpensive items: $23 for an 8-foot boom; tank prices range from $150 for a bare 100 gallon tank to approximately $400 for a 200 gallon tank plus accessories. Pumps and "Wet-Dry Vacs" cost between $70 and $100. Industrial strength pumps that can handle higher flow rates are more expensive and cost up to $1500.

A "Vacu-boom" costs $2500 and is used to surround the area or item to be cleaned.[3] It is attached to a vacuum unit which helps to seal it to the pavement. Wastewater within the perimeter of the boom is vacuumed into slits in the boom and conveyed to a holding tank. The Vacu-boom can be used with a standard shop vac.

Other items available to prevent wastewater from entering the storm drain include portable wash pads, drain covers, portable dams, oil absorbent pads, pillows and tubes, plastic sheeting, buckets, pans, and squeegees.

Table 6: Collection Equipment

Product	Cost	Description
Pump	$70-$85	Need mechanism for directing water into a sump May break down easily
Vacuum	$100	50 gallon reservoir Wet-Dry Vac
Two in one vacuums		
Vacuboom	$2500	See description in text
Vacuum Pumper	$600-$2500	Vacuum plus pump
Scrubber	$20,000-$30,000	Vacuum plus scrubber 100 gallon capacity
Water Containment Equipment		
Drain Plug	$5-$30	2-6 inch
Drain Plug	$75	heavy floor mat
Snake boom	$23	8 ft long
Tank	$600-$2000	500 gallons
Tank (bare)	$150	100 gallons
Tank plus accessories	$2.00/gal	Accessories includes ball valve and inlet and outlet holes
Miscellaneous		
Trailer (with brakes)	$2500-$4000	

Another consideration with respect to cost is that the time taken to collect the wastewater may add to the surface cleaners' costs.

Treatment of Surface Cleaner Wastewater

Surface cleaners have developed systems to treat wastewater to remove oil and grease, solids, and metals. These systems range in cost from $2,000 to $30,000. Operating costs range from $30 to $1000 per year. Their effectiveness in removing metals is not well documented. Most of the systems appear to involve filtration that produces a sludge that requires disposal. Data presented for one system using a clay-based flocculant appears to be effective in removing some metals.[4] Information collected on certain treatment devices is summarized in Table 7.

Table 7: Treatment Options

Treatment System	Capital Cost	Operating Cost*	Description
Oil Water Separator	$2,000-$6,000	none	- Soapy water not ok because disrupts oil separation - Flow rate ranges from 4-20 gpm - Mobile if mounted on a trailer
Oil Water Separator *plus* Filter	$13,000-$30,000	$30-$500 /yr	- Soapy water not ok because it disrupts oil separation - Mobile if mounted on a trailer - Flow ranges from 5-15 gpm. Cost increases with flow - Operating cost dependent on types of filters and replacement frequency
Manual Batch Clay System	$7,000-$30,000	$600/yr (and up)	- Soapy water ok. - Removes dissolved metals - Removal efficiency highly dependent on pH - Will need to store water in a tank and treat in batches
Liquid Chemical System	$10,000	$1000/yr	- Soapy water ok. - Removes dissolved metals - Removal efficiency highly dependent on pH - Will need to store water in a tank and treat in batches - Faster than Manual Batch Clay System

*This does not include cost of additional hours for set up and time needed for treatment of water. Setup and maintenance time can range from 5 minutes a day to an hour each day. The longer waste water is kept in the treatment system, the better the results.

Approaches Used in Other States

Programs have been developed in other parts of the country for mobile cleaners in response to non-stormwater discharge prohibitions. Programs in Texas, Colorado, Arizona, and Kansas were contacted and are described below.

Fort Worth, Texas[5]

Fort Worth has developed a permitting and certification process through their stormwater program. BMP implementation serves as the basis for this program and training courses

are offered through a local equipment supplier. Approximately 50-60 power washers have been permitted through this program.

The City estimates that the total volume of wastewater from power washers is less than 20,000 gallons per day. Based on this estimate and additional water quality monitoring, the City determined that the pollutant load from power washers was relatively small. Consequently, the POTW accepts the wastewater and handles it like other commercial and residential discharges. Testing of wastewater by mobile cleaners is only required if a recycling unit is used. The use of recycling units requires the mobile cleaner to obtain a wastewater discharge permit. To date, none of the mobile washers have chosen to use a recycling unit.

Fort Worth has provisions to take enforcement action against property owners for off-property discharges with fines as high as $1032. However, in Dallas, the POTWs do not allow mobile washer wastewater to be discharged to the sewer.

Grand Prairie, Texas [6]

Grand Prairie's policy is associated with mobile truck washing only. Wash water must be discharged through a sand/ grit trap. Truck washing is allowed if a portable catch basin and active recovery system is used. This is referred to as a "mat/recovery unit" and is required to capture 95% of the wastewater. Plain water (i.e., no soap) from vehicle or parking lot washing may be discharged to the sanitary sewer. Mobile washers who use a recycle unit do not need to discharge through a sand/grit trap but the wastewater must be filtered prior to discharge. In addition, the discharge must be analyzed for O&G, metals, and volatile organics. The sludge must be hauled by a licensed liquid waste hauler. There is a provision for discharging wastewater at an approved discharge facility and the mobile washer is required to carry a copy of the agreement in the mobile wash vehicle. An approved discharge facility is a stationary business like a carwash that has a sand/ grit trap on-site. No other permit or license is required either for the mobile washer or the approved discharge facility

Colorado Department of Public Health and Environment [7]

In Colorado, the Department of Public Health and Environment issues minimal discharge permits to power washers which mostly focus on vehicle washing. The permit fee is $290 per year or $100 for 90 days or less. Approximately 500-600 pressure washers operate in the Denver area and they have issued approximately 170 minimal discharge permits in two and a half years. Wastewater is accepted by the POTWs.

Phoenix, Arizona[3]

The Phoenix Stormwater Program developed BMPs similar to the CETA BMPs. Brochures and fact sheets containing these BMPs were printed and distributed. The City of Phoenix Water Pollution Control Plant requires power washers to collect wastewater and discharge through an interceptor to the sanitary sewer at the site of a stationary partner. The power washer is required to carry a copy of the agreement with the stationary partner when working. The property owner of the stationary site is responsible for discharges. Enforcement is mostly in response to complaints.

Kansas City Metropolitan Area [8,9]

The cities of Kansas City (Kansas), Kansas City (Missouri), Independence, and Olathe; Johnson County Environmental Department; and Little Blue Valley Sanitary Sewer District developed a regional policy for mobile washers. Pollution prevention practices were developed similar to those recommended by BASMAA and are recommended by all the municipalities in the Kansas City metropolitan area. Mobile wash wastewater must be discharged to the sanitary sewer. Power washers are given the option of obtaining a stormwater permit to discharge to the storm drains. The Kansas Department of Health and Environment requires mobile washers to obtain a state permit if washing is done outdoors and discharges are directed to the storm drain system. If washing is conducted indoors or on a paved area, collected and discharged to the sanitary sewer, no stormwater permit is required. Discharging to landscaping is not allowed.

In general, a voluntary approach is used by the Kansas City area municipalities based on the recommended pollution prevention practices. Policies of the individual municipalities with respect to mobile cleaner wastewater are as follows:

- Independence - Power washers must be licensed. Discharge to sanitary sewer is allowed under most circumstances without a permit.
- Kansas City, Kansas - Power washers must be licensed. A brochure with recommended pollution prevention practices is distributed with the licenses. Wastewater must be discharged to the sanitary sewer but no treatment is required.
- Olathe - Power washers are advised to follow recommended pollution prevention practices.
- Johnson County - Power washers are urged to voluntarily comply with pollution prevention practices. Permission to discharge to the sanitary sewer is required. This is accomplished through a Special Wastewater Disposal Request. Approximately 5 mobile cleaners have requested authorizations in the last two years. Johnson County focuses on a non-regulatory approach.
- Little Blue Valley - Urges voluntary compliance with the pollution prevention practices.

Approaches Used by Bay Area Programs

Several Bay Area POTW pretreatment programs were surveyed regarding their local policies toward mobile sources and small stationary sources and their preferences regarding the development of regional guidelines for mobile cleaners. The following municipalities were contacted: Vallejo Sanitation and Flood Control District, Union Sanitary District, East Bay Municipal Utility District (EBMUD), Central Marin Sanitation Agency (CMSA), Central Contra Costa Sanitary District (CCCSD), Palo Alto Regional Water Quality Control Plant (RWQCP), the City and County of San Francisco (CCSF), and the Cities of Sunnyvale, Santa Rosa, San Jose, Richmond, Livermore, Benicia, and Hayward. The results of the survey are summarized in Table 8 (see end of report, p. 15).

Proposed Guidelines and Local Policy Development

The information collected regarding surface cleaners and guideline options based on an assessment of the collected information are discussed below.

Summary of Collected Information

Evaluation of surface cleaner wastewater data indicates that there is a potential for the wastewater to exceed local discharge limits for more than one Bay Area POTW for

cadmium, copper, lead, mercury, and zinc. Based on the available information and the assumptions made in this report, the estimated total volume of wastewater generated by surface cleaners is small when compared to the total daily flow of Bay Area POTWs (i.e., <0.1% of 554 MGD). Moderately priced options are available to collect surface cleaner wastewater and divert it to the sanitary sewer. Options for treating the wastewater prior to discharge are also available. However, treatment options may be expensive and information available on their effectiveness is limited.

Other states have developed policies for discharging mobile cleaner wastewater to the sanitary sewer. In general, it is allowed and permits are not issued. Some municipalities have chosen to issue a license or a special discharge authorization. Most municipalities rely on a voluntary approach that encourages mobile cleaners to use BMPs similar to those recommended in the Bay Area. In certain areas (i.e., Michigan and Kansas City), mobile cleaner discharges to the storm drain are prohibited. In Kansas City, discharges to groundwater or landscaping are not allowed; thus, discharge to the sanitary sewer is the only option.

Treatment required by municipalities in other states is limited to requiring that the wastewater be discharged through an interceptor prior to the sanitary sewer. However, enforcement of this requirement is limited. One approach used is to require the mobile cleaner to develop an arrangement with a stationary facility to discharge the mobile cleaner's wastewater through the stationary facility's interceptor. Another element to the approach used by certain other municipalities is to require the business or property owner of the facility where the wastewater is discharged to bear responsibility for the discharges.

In general, the Bay Area POTWs surveyed, expressed a preference for a flexible approach with low level of regulation and minimal or no monitoring. The approach, however, should be consistent with existing policies for small, stationary sources such as vehicle service facilities.

Bay Area POTWs also indicated that, for their programs for surface cleaners to be effective, Bay Area stormwater programs needed to focus more effort on actively enforcing stormwater regulations associated with non-stormwater discharges.

Guideline and Policy Options

The impacts of surface cleaner wastewater on POTW influent appear to be minimal for most pollutants based on the available information and the assumptions made in this report regarding the number of surface cleaners, and the volume and quality of their discharges. In addition, there are a relatively small number of surface cleaners working in the Bay Area when compared to the number of similar, small stationary sources (i.e., carwashes, vehicle service facilities, restaurants). Therefore, it is recommended that the Bay Area POTWs develop local policies for accepting surface cleaner wastewater using the guidelines developed by the BAPPG.

Input from representatives of the Bay Area POTWs indicated that the guidelines should include the following elements:

1. It should be consistent with policies for small, stationary sources

2. It should not result in a significant additional administrative burden.

3. Additional monitoring of surface cleaner wastewater may be necessary to clarify the potential of these discharges to exceed local limits and to further evaluate cadmium and lead loadings from these discharges.

4. It should have requirements that are specific to different types of surface cleaning operations.

Guidelines were developed by reviewing options with respect to program implementation, and program elements as described below.

Implementation Options

Options with respect to program implementation range from voluntary, BMP-based programs to permit based programs. While each POTW should develop a policy that is consistent with its existing programs, some program options are described below:

- **Voluntary program (no permit).** Under this option, implementation of BMPs is encouraged through outreach and education. BMPs that would form the basis of this program are described below. No permits or other control mechanisms are issued.

- **Permit program.** There is more than one approach that can be used to permit a commercial business. Permit based programs could be based on one of the following:
  - Special discharge authorization. Authorization to discharge is handled on a case-by-case basis. An abbreviated permit could be developed that is similar to those used for authorization of other batch discharges by Bay Area POTWs.
  - Wastewater discharge permit. A permit is issued to each surface cleaner containing provisions such as required BMPs, monitoring and reporting requirements, and discharge limits.
  - General permit. A general permit similar to the general permit for industrial activities used in the stormwater program may be issued by each POTW. Under this permit, surface cleaners would be required to notify a POTW of their intent to operate in the service area. The surface cleaners would then be required to follow the requirements of the POTW's general permit when working in its service area.

Program Elements

Certain elements need to be addressed regardless of the type of program that is developed. These elements include:

- **Party responsible for wastewater discharge.** Responsibility should be shared by the surface cleaner and the property owner. POTWs should encourage the surface cleaners to implement BMPs and require them to discharge the wastewater in the same service area that it is generated. POTWs may also decide to include other requirements for the surface cleaners (i.e., monitoring or reporting). The property owner and/or surface cleaner should work with the POTW to identify an acceptable location for sewer access (i.e., a sewer cleanout on the business' property). Other specific responsibilities could also be identified for the business owner or property owner where the cleaning is conducted, or (in the situation where the wastewater is transported to another disposal point) the business owner or property owner where the wastewater is discharged to the sanitary sewer. Outreach to the customer (i.e., property owners) could be developed in coordination with efforts by BASMAA to emphasize property owner's responsibility for discharges and to encourage use of certified mobile cleaners.

- **Monitoring and reporting requirements.** If monitoring and reporting were determined to be necessary, the following information would be specified:
    1. For monitoring: frequency, collection and analytical methods, and constituents to be sampled.
    2. For reporting: report recipient, and required information. In addition to reporting analytical results, a description of the cleaning operation would be required. This description would include type of surface cleaned, BMPs used, and volume of water used.

  Some specific monitoring and reporting requirements that a local policy could contain include notification and monitoring to further characterize surface cleaner discharges. Mobile cleaners would be required to notify local POTWs that they are working in the service area. In addition, monitoring could be conducted to further evaluate cadmium and lead loadings and to obtain information regarding the potential to exceed local limits. If additional monitoring is generally considered necessary, a Bay Area-wide coordinated monitoring effort should be considered to maximize the usefulness of information obtained.
- **Best Management Practices.** Recommended practices to be employed for different types of surface cleaning would be specified. BMPs developed by BASMAA could be used to ensure some level of uniformity throughout the Bay Area. The BASMAA BMPs require that all surfaces be cleaned using dry cleanup methods and that washwater is screened for debris prior to discharge to the sanitary sewer or the storm drain. Several of the BASMAA BMPs indicate that the cleaner should check with the local POTW before discharging to the sanitary sewer. The POTW should be able to provide information regarding local discharge limits and its policy upon request. The following requirements for individual surfaces are recommended with respect to discharging to the sanitary sewer or the storm drain:

    Plazas, sidewalks, building exteriors: Washwater from these surfaces may be discharged to the storm drain if no soap is used. If soap is used, these discharges should go to the sanitary sewer but no additional treatment is necessary.

    Restaurant/ food handling areas, dumpsters, grease storage areas, parking garages, vehicle service facility floors and parking areas: These surfaces may have higher levels of metals and oil and grease. Washwater from these surfaces must be discharged to the sanitary sewer. Each POTW should consider requiring pretreatment for these activities only as necessary to consistent with their existing policies for small stationary sources.

    Painted surfaces, graffiti removal: Washwater from these surfaces may go to the sanitary sewer unless levels of toxic pollutants such as lead, mercury, tri-butyl tin or solvents exceed local limits or result in the washwater being a hazardous waste. The washwater must be collected and disposed of as a hazardous waste if pollutant levels indicate it is hazardous.

- **Compliance with local ordinances:** Surface cleaners are required to comply with local ordinances requirements and their wastewater discharges are required to meet local discharge limits.

- **Pretreatment Options.** Options with respect to treatment include:
    Requiring implementation of BMPs

Requiring treatment of all types of mobile cleaner discharges
Requiring treatment of certain discharges
Requiring no treatment

Summary

In summary, the above guidelines address the following issues:

- **Consistency**: Based on the assumptions made in this report, it has been estimated that surface cleaners discharge a small volume of wastewater overall and that there are a relatively small number of these businesses operating in the Bay Area. The operation at a stationary business that is most comparable to surface cleaning is floor cleaning and other cleaning operations. Cleaning operations such as these are not typically monitored or regulated at stationary sources. In addition, it should be noted that some stationary businesses will conduct their own pressure washing rather than contracting it out. These stationary businesses should also be educated regarding the recommended surface cleaning BMPs. The local policy developed by each POTW should be consistent with its policies for small stationary sources.

- **Administrative Burden**: Because of the small number of businesses and volume of wastewater, it may not be the best use of resources to establish a permit program for surface cleaners at this time. However, each POTW must determine the best approach for its service area based on its available resources and local issues.

- **Monitoring**: The monitoring of surface cleaners wastewater conducted to date has provided preliminary characterization of the wastewater. However, additional monitoring may be necessary to further evaluate cadmium and lead loadings as well as the potential to exceed local limits. As noted above, wastewater discharges from cleaning operations at stationary businesses are not typically monitored so it may be consistent to only monitor surface cleaner wastewater under special circumstances.

- **Requirements for specific types of cleaning**: The types of operations that may have treatment requirements at small, stationary businesses include cleaning associated with increased levels of oil and grease or metals. These would include food handling areas, grease storage areas, and floors where oil, grease, or metals may accumulate (i.e., parking garages). Paint removal activities may also fall into the category of requiring some pretreatment. For small, stationary businesses, the treatment requirement typically includes discharging the wastewater through an interceptor. Each POTW may want to consider applying this requirement in a way that is consistent with their policies for small, stationary businesses.

- **Limitations of approach.** This approach is designed to apply to surface cleaners and does not address vehicle cleaning operations. Consistency between mobile cleaning of vehicles and stationary vehicle cleaning operations should be addressed by a future policy for mobile vehicle cleaning. In addition, the approach only addresses the discharge of washwater to sanitary sewers. Stormwater agencies and their programs address discharges to the storm drain system and enforcement of requirements pertaining to non-stormwater discharges. However, outreach developed for the wastewater program should be coordinated with existing outreach efforts by BASMAA.

[1] Larry Walker Associates. Mobile Cleaners Pilot Program: Final Report. Prepared for the Bay Area Stormwater Management Agencies Association. June, 1997.
[2] Brosseau, Geoff. Personal communication. August 7, 1998.
[3] Karnes, Ken, City of Phoenix. Personal communication. July 13, 1998.
[4] Parker, Cathleen, Parker West. Letter to Tammy Chew, Central Contra Costa Sanitary District. July 23, 1998.
[5] Camp, Brian, City of Fort Worth. Personal communication. July 15, 1998.
[6] Winchell, Julie, City of Grand Prairie. Personal communication. August 12, 1998.
[7] Boyce, Tom, Colorado Department of Public Health and Environment. Personal communication. July 14, 1998.
[8] Gill, Glenn, Kansas City, Kansas Water Pollution Control. Personal communication. August 10, 1998.
[9] Harmon, Roger, Johnson County Environmental Department. Personal communication. August 6, 1998.

Table 8: Bay Area POTW Survey

POTW	Santa Rosa	CCCSD	Benicia	CMSA	EBMUD
Contact Name	Laura Perucchi	Tim Potter	Jeff Gregory	Bob Adamson	Stan Archacki
Phone Number	707-543-3396	925-229-7380	707-746-4336	415-459-1455 x140	510-287-0333
Plant size (MGD)	18	38	2.5	10	70
Population	135,000	400,000	27,000	90,000	600,000
stationary source policies	permit to track dischargers, interagency Sonoma Green, restaurants self monitor and are permitted	Required to meet local limits. restaurants inspected and required to have interceptors. vehicle service are inspected and often required to have interceptors.	only special cases are permitted. restaurants, vehicle wash businesses are not.	vehicle service permitted, inspected and sw monitoring occurs. no regulation of restaurants	zero discharge for vehicle service, permitted and inspected, local limits
stationary source	restaurants, vehicle service. print shop, photo processing.	restaurants, vehicle service	restaurants, vehicle service	vehicle service	vehicle service, others

Table 8: Bay Area POTW Survey

POTW	Santa Rosa	CCCSD	Benicia	CMSA	EBMUD
Requirements for vehicle service facilities that wash cars	interceptor - 3 stage	if water only, and only exterior then can go to storm. All others, req'd to pretrt, send to sanitary, cover and meet limits.	Uncovered wash area must be bermed under 1000 ft2. No permit unless violation detected during inspection.	Interceptor is req'd and sampling done every 2 years. If stm clean, more frequent sampling and limits specified in permit which usually means pretrt necessary.	Discharge to sanitary allowed if no oil and fl. drain must be plugged when not washing vehicles.
When interceptors are required	if discharge doesn't demonstrate ability to meet water quality concerns	Interceptor or other pretreatment required if local limits are exceeded.	Separator req'd if >150 gal/day and if likely generate oil and/or lesser amouts of solids	See above.	Pretreatment not specifically required but may be necessary to meet limits.
waste haulers	permitted septic waste haulers - $178.50 per gallon.	$1000 deposit and permit fee for septage tanks, grease interceptors, portable toilets, discharges sampled periodically.	$4000-5000 per load for septic haulers	septics from county no industrial waste allowed	Septic haulers allowed, $1085 per permit, $0.12/gal, +$18/ truckload.
batch dischargers	$165 plus $4.50/1000 gal	Case-by-case special discharge permit	allowed without extra charge, very rare	rare, one silver plater w/ SIU permit	allowed w/ permit

Table 8: Bay Area POTW Survey

POTW	Santa Rosa	CCCSD	Benicia	CMSA	EBMUD
on-site facilities /procedures for waste haulers	yes, septic tank waste accepted	yes, permitted haulers	yes, septic tank waste accepted	yes, septic tank waste accepted	yes, septic tank waste accepted
mobile source policy	Permit mobile cleaners, no charge for discharge, form for each time they discharge	special discharge permit w/ fee. some cleaning requires pretreatment w/ influent and effluent analysis; must meet local limits and comply w/ ordinance.	BMPs, pressure wash must go to sanitary sewer. Letter of agreement available but has not been used.	short form permit, no sw regulation, no pretreatment, recommend BMPs	recommend BMPs, no permits. Subject to local limits.
experiences w/ mobile cleaners	4 permitted, three active using one page form.	4 permitted	one carpet cleaner discharging to stormdrain	seven mobile cleaners have called to wash buildings, parking lots, vehicles	<20 have called in 1.5 years
Water quality data	yes	yes	no	no	yes
concerns	worst case - i.e., battery yard	sidewalks, parking lots may exceed local limits.	no	none	not really
Preferences	No permits -too much paper work, one pager is good, workshops and certificates are good.	require pretreatment and monitoring; permit enables oversight and authorizes access to sanitary sewer	no permits because low volume but wants to see info on significance	none	discharge to sanitary sewer, low volume, low impact on treatment plant, sampling not necessary

Table 8: Bay Area POTW Survey

POTW	Hayward	Livermore	Vallejo	Palo Alto	Richmond
Contact Name	Gayle Tupper	Darren Greenwood	Dan Tafolla	Phil Bobel	Steve Linsley
Phone Number	510-881-7993	925-373-5233	707-644-8949x261	650-329-2285	510-412-2014
Plant size (MGD)	12	5.2	15.5	39	6
Population	125,000	64,000	112,000	220,000	50,000
stationary source policies	vehicle wash permitted, charity wash required to plug drains and disch. to sanitary sewer, restaurants inspected on as needed basis.	steam cleaning and vehicle service required to have wash rack,etc. and discharge to sewer, inspections, SW BMPs	Pemits w/ discharge limits, requi0re SW BMPs.Discharger responsible for parking lot	some permits w/ limits, monitoring, inspections. Others just outreach w/ BMPs	mostly permits w/ local limits. Some zero discharge
stationary source	vehicle wash, restaurants	vehicle service, steam cleaners	body shops, print shops, pest control printers, laundry, machine shops	vehicle service facilities, photo shops, restaurants, others	vehicle service, restaurants

Table 8: Bay Area POTW Survey

POTW	Hayward	Livermore	Vallejo	Palo Alto	Richmond
Requirements for vehicle service facilities that wash cars	If use soap then req'd to disch. to sanitary. Cover over washpad req'd. No cover, then other restrictions like limiting area draining to sanitary. If no soap then no permit, no washpad req'd.	All car dealers have a wash rack but if car being washed has never been driven, not required to use wash rack.	Wash pad with oil/water separator req'd for all facilities washing cars. Auto dealers: if no soap then no washing facility req'd.	Permitted and required to meet limits.	Required to meet limits. Covered req'd for car washes.
When interceptors required	If there does not exist a reasonable potential for compliance, intcpt req'd.	If steam cleaning under-carriage or facility is gas station washes cars, intcpt req'd.	see above	If wastewater is oily pretrt req'd.	If initial sampling by inspectore indicates local limits not met, intcpt. req'd.
waste haulers	not allowed	not allowed	allowed, $0.10/gal	septic haulers permits, $0.03/gal	Permit for septic, not used much
batch dischargers	comm, industrial allowed based on conc. and volume	allowed, no permit	allowed, no policy	none	none
on-site facilities /procedures for waste haulers	no	no	yes, septic tank waste accepted	yes, septic tank waste accepted	yes, septic tank waste accepted

Table 8: Bay Area POTW Survey

POTW	Hayward	Livermore	Vallejo	Palo Alto	Richmond
mobile source policy	site owner is responsible for discharges. no permits yet for mobile cleaners	no permits, recommend use of BMPs, some inspections to verify BMP use, recommend discharge to sanitary sewer	require discharge to sanitary sewer. Any discharge taken due to small volume	certain discharges allowed to storm drain(i.e., cleaning w/o soap) others to sewer	no permit, respond to contact by checking for certification and identifying a discharge point
experiences w/ mobile cleaners	recommend discharge to sanitary sewer, received a few calls	aware of 6-7 mobile cleaners in area	received calls from about 5 for parking lots.	most get discovered, asked to follow BMPs	no
Water quality data	no	no	no	yes	no
concerns	lead paint, not following BMPS, difficult to track	none	none	lead paint, tank trucks, how to monitor mobile cleaners	none
Preferences	prefers limits on paper work and restrictions	no sampling required, enforce SW ordinance, certification, consistency w mobile sources	send to sanitary sewer	send to sewer, no testing except special cases, allow discharge to storm drain if they meet CETA BMPs	none

Table 8: Bay Area POTW Survey

POTW	San Jose	Sunnyvale	Union Sanitary District	San Francisco
Contact Name	Bruce Frisbey	Cathleen Brennan	Wade Jackson	Daniel Rourke
Phone Number	408-945-3041	408-730-7267	510-790-0100 x204	415-695-7363
Plant size (MGD)	140	29.5	30	70
Population	1,400,000	130,000	325,000	750,000
stationary source policies	zero discharge or permits, restaurants inspected	inspected every 2 or 3 years, non-minor discharges are permitted w/ discharge limits, minor disch. not monitored, no limits	inspections, zero discharge, restaurants required to have interceptors	encourage compliance wiht voluntary BMPs
targeted stationary sources	vehicle service, dry cleaners, restaurants	vehicle service, silver processors, other commercial	restaurants, vehicle service, body shops	vehicle service, cooling towers, dentist, others

Table 8: Bay Area POTW Survey

POTW	San Jose	Sunnyvale	Union Sanitary District	San Francisco
Requirements for vehicle service facilities that wash cars	if washing exterior pretrt. req'd but no permit. All other vehicle cleaning req's permit and pretrt device. All steam cleang permitted.	Cover required to keep out storm water. Interceptro and permit required unless cars are water rinsed, exterior only.	Water only, no pretreatment. Soap, then separator required.	Monitoring of permitted vehicle service facilities are monitored.
When interceptors required	see above	Steam cleaning or if service bay has a floor drain and for carwashing as noted above.	If soap is used.	New car washes pretrt. req'd if sig. vol. of discharge (determined case by case basis)
waste haulers	$2000 bond, water monitored prior to discharge	not allowed	class 2 dischargers	yes
batch dischargers	IU permit	same as continuous	permit available	yes
on-site facilities /procedures for waste haulers	yes, septic tank waste accepted c	no	no	yes, septic tank waste accepted

Table 8: Bay Area POTW Survey

POTW	San Jose	Sunnyvale	Union Sanitary District	San Francisco
mobile source policy	send to sanitary sewer unless will not impact Stormwater. No permits yet	approval or permit required with special conditions including BMPs.	allowed to discharge to sanitary sewer without a permit	batch discharge policy includes mobile cleaners.
experiences w/ mobile cleaners	a few calls handled case-by-case	handled case-by case. most calls are vehicle cleaning	mobile cleaners are asked to follow BMPs	none
Water quality data	no	no	no	no
concerns	metals, organics	hazardous mat. from certain jobs.	engine cleaning, greasy parts cleaning would require treatment	Usually no mobile cleaning occurs during storm
Preferences	flexible guidelines, not discharged under a stationary source's permit	Prefer to permit customer of mobile cleaner. Wants consistency between mobile and stationary. Likes to see early notification of a cleaning operation.	Ask mobile cleaners open ended questions	

APPENDIX A

Mobile Cleaner Data and Bay Area Local Limits

Table A-1: Mobile Cleaner Data

Location	Date	Description	Antimony	Arsenic	Beryllium	Barium	Boron	Cadmium
Mobile Cleaner Data								
Suface Cleaning Data								
Bay Area		Garage/ covered parking	0.036	0.012				0.024
Bay Area		Garage/ covered parking	0.014	0.009				0.016
Bay Area		Garage/ covered parking	0.025	0.0106				0.02
Bay Area		Garage/ covered parking	0.025	0.0106				0.02
Bay Area		Garage/ covered parking	0.025	0.0106				0.04
Bay Area		Vehicle tunnel	<0.06	0.0077	<0.002	0.49		<0.005
Bay Area		Vehicle tunnel		0.01	<0.002	0.071		<0.005
Bay Area	3/19/98	Vehicle tunnel	<0.06	0.014	<0.002	0.23		0.0056
Bay Area	3/19/98	Vehicle tunnel	<0.06	0.015	<0.002	0.29		0.014
Bay Area		sidewalk/ streets		0.0059				0.004
Bay Area		sidewalk/ streets		0.014				0.1
Bay Area		sidewalk		0.013				0.03
Bay Area		sidewalk		0.011				0.01
Bay Area		gas station	<0.005	0.016				0.033
Bay Area		gas station	0.013	0.004				0.014
Bay Area		gas station	<0.005	0.008				0.012
Bay Area		building exterior		0.0302				0.05
Bay Area		building exterior		0.0302				0.03
Bay Area		building exterior		0.0302				0.007
Bay Area		building exterior		0.0302				0.03
Bay Area		building exterior		0.0302				0.08
Bay Area		building exterior		0.0302				0.12
Bay Area		building exterior		0.0302				0.16
Bay Area		building exterior		0.0302				0.17
Santa Rosa	1/18/97	Parking lot						<0.05
Fort Worth	6/11/97	Fueling Station		<0.03		0.98		2.3
Fort Worth	6/11/97	Vehicle Maint. Driveway		<0.03		0.17		0.33
Fort Worth	6/9/97	lot, high traffic area						
Fort Worth	5/13/97	S.E. Service Center						
Other Data								
Fort Worth	6/2/97	power wash water						
Fort Worth	3/3/97	pressure wash						
Fort Worth	3/3/97	pressure wash						
Fort Worth	3/3/97	pressure wash						
Fort Worth	5/22/90	Grand Prairie Wastewater						
Phoenix	1/14/97	Truck washing (treated, through interceptor)		0.005	<0.002		0.16	
Phoenix	7/26/94	Truck washing (treated, through interceptor)	<0.1	<0.1	<0.05			0.0281

Table A-1: Mobile Cleaner Data

Location	Date	Description	Chromium	Copper	Lead	Mercury	Molyb-denum	Nickel
Mobile Cleaner Data								
Suface Cleaning Data								
Bay Area		Garage/ covered parking	0.12	1	1.2	0.014		0.061
Bay Area		Garage/ covered parking	0.28	0.92	5.3	0.0012		0.061
Bay Area		Garage/ covered parking	0.019	0.17	0.29	0.0027		0.022
Bay Area		Garage/ covered parking	0.07	0.37	0.56	0.0044		0.08
Bay Area		Garage/ covered parking	0.08	0.46	0.62	0.0042		0.12
Bay Area		Vehicle tunnel	0.057	0.28	0.37	<0.0002	<0.02	0.065
Bay Area		Vehicle tunnel	<0.01	0.16	0.086	<0.0002	<0.02	<0.02
Bay Area	3/19/98	Vehicle tunnel	0.025	0.49	0.36	<0.0002	<0.02	0.032
Bay Area	3/19/98	Vehicle tunnel	0.042	0.57	0.4	<0.0002	0.022	0.054
Bay Area		sidewalk/ streets	0.047	0.19	0.24	0.0009		0.036
Bay Area		sidewalk/ streets	0.06	0.23	0.3	0.001		0.07
Bay Area		sidewalk	0.08	0.27	0.35	0.0009		0.13
Bay Area		sidewalk	0.12	0.36	0.51	0.0004		0.1
Bay Area		gas station	0.18	0.46	0.48	0.0003		0.13
Bay Area		gas station	0.024	0.64	0.34	0.0003		0.04
Bay Area		gas station	0.048	0.72	0.48	0.0011		0.058
Bay Area		building exterior	0.039	0.59	0.42	0.0048		0.1
Bay Area		building exterior	0.06	0.37	0.61	0.0019		0.11
Bay Area		building exterior	0.017	0.22	0.14	0.0007		0.024
Bay Area		building exterior	0.047	0.3	0.33	0.0008		0.07
Bay Area		building exterior	0.06	0.25	0.66	0.012		0.09
Bay Area		building exterior	0.09	0.47	0.88	0.0098		0.15
Bay Area		building exterior	0.12	0.53	1.09	0.0027		0.16
Bay Area		building exterior	0.12	0.72	2.51	0.001		0.25
Santa Rosa	1/18/97	Parking lot	<0.05	0.33	0.19			<0.1
Fort Worth	6/11/97	Fueling Station	0.08		0.22	<0.0002		
Fort Worth	6/11/97	Vehicle Maint. Driveway	<0.01		<0.03	<0.0002		
Fort Worth	6/9/97	lot, high traffic area			0.29			
Fort Worth	5/13/97	S.E. Service Center				0.14		
Other Data								
Fort Worth	6/2/97	power wash water			0.171			
Fort Worth	3/3/97	pressure wash			0.229			
Fort Worth	3/3/97	pressure wash			0.111			
Fort Worth	3/3/97	pressure wash			0.085			
Fort Worth	5/22/90	Grand Prairie Wastewater	0.125		1.35			
Phoenix	1/14/97	Truck washing (treated, through interceptor)	<0.01	0.04	<0.07	0.0002	<0.04	<0.02
Phoenix	7/26/94	Truck washing (treated, through interceptor)	<0.05	0.224	0.067	<0.0002		0.057

Table A-1: Mobile Cleaner Data

Location	Date	Description	Selenium	Silver	Thallium	Zinc	Cyanide	BOD
Mobile Cleaner Data								
Suface Cleaning Data								
Bay Area		Garage/ covered parking	<0.005	<0.001	<0.005	7.7		
Bay Area		Garage/ covered parking	<0.005	<0.001	<0.005	5.8		
Bay Area		Garage/ covered parking	0.003	0.001		5.67		
Bay Area		Garage/ covered parking	0.009	0.008		5.48		
Bay Area		Garage/ covered parking	0.004	0.0017		8.96		
Bay Area		Vehicle tunnel	<0.005	<0.005	<0.005	1.4		
Bay Area		Vehicle tunnel	<0.005	<0.005	<0.005	0.5		
Bay Area	3/19/98	Vehicle tunnel	<0.005	<0.005	<0.005	1.6		
Bay Area	3/19/98	Vehicle tunnel	<0.005	<0.005	<0.005	1.8		
Bay Area		sidewalk/ streets	0.0005	0.0021		1.31		
Bay Area		sidewalk/ streets	0.001	0.008		2.79		
Bay Area		sidewalk	0.001	<0.0002		3.63		
Bay Area		sidewalk	0.0005	<0.0002		3.24		
Bay Area		gas station	<0.005	<0.001	<0.005	3.3		
Bay Area		gas station	<0.005	<0.001	<0.005	2.8		
Bay Area		gas station	<0.005	<0.001	<0.005	2.8		
Bay Area		building exterior	0.003	<0.0002		3.3		
Bay Area		building exterior	0.003	0.008		2.69		
Bay Area		building exterior	0.0011	0.008		1.4		
Bay Area		building exterior	0.001	0.006		1.58		
Bay Area		building exterior	<0.003	0.0014		7.04		
Bay Area		building exterior	0.0008	0.06		8.01		
Bay Area		building exterior	0.008	0.17		3.86		
Bay Area		building exterior	0.007	0.016		9.28		
Santa Rosa	1/18/97	Parking lot				0.82		
Fort Worth	6/11/97	Fueling Station	<0.04	0.02				657
Fort Worth	6/11/97	Vehicle Maint. Driveway	<0.04	<0.01				167
Fort Worth	6/9/97	lot, high traffic area				19.3		1082
Fort Worth	5/13/97	S.E. Service Center				1		602
Other Data								
Fort Worth	6/2/97	power wash water				2.9		305
Fort Worth	3/3/97	pressure wash				3.3		514
Fort Worth	3/3/97	pressure wash				1.2		67
Fort Worth	3/3/97	pressure wash				1.3		119
Fort Worth	5/22/90	Grand Prairie Wastewater				6.15		1157
Phoenix	1/14/97	Truck washing (treated, through interceptor)	<0.001	<0.01	<0.001	0.13		
Phoenix	7/26/94	Truck washing (treated, through interceptor)	<0.1	<0.05	<0.2	1.63		

Table A-1: Mobile Cleaner Data

Location	Date	Description	pH	MBAS	O&G	TSS	Benzene	Toluene
Mobile Cleaner Data								
Suface Cleaning Data								
Bay Area		Garage/ covered parking	9.2		760			
Bay Area		Garage/ covered parking	9.2		55.8			
Bay Area		Garage/ covered parking	9.2					
Bay Area		Garage/ covered parking	9.2					
Bay Area		Garage/ covered parking	9.2					
Bay Area		Vehicle tunnel			17			
Bay Area		Vehicle tunnel						
Bay Area	3/19/98	Vehicle tunnel			160			
Bay Area	3/19/98	Vehicle tunnel			140			
Bay Area		sidewalk/ streets						
Bay Area		sidewalk/ streets						
Bay Area		sidewalk			19			
Bay Area		sidewalk			40			
Bay Area		gas station	9.3		518			
Bay Area		gas station	9.3		63.8			
Bay Area		gas station	9.3		89.3			
Bay Area		building exterior						
Bay Area		building exterior						
Bay Area		building exterior						
Bay Area		building exterior						
Bay Area		building exterior						
Bay Area		building exterior						
Bay Area		building exterior						
Bay Area		building exterior						
Santa Rosa	1/18/97	Parking lot			127.8			
Fort Worth	6/11/97	Fueling Station	8	2.9	49	7900	<0.002	<0.002
Fort Worth	6/11/97	Vehicle Maint. Driveway	7.9	2.8	33	2370	<0.002	<0.002
Fort Worth	6/9/97	lot, high traffic area	10.5		1953			
Fort Worth	5/13/97	S.E. Service Center	9.6		86.7	523	0.003	0.005
Other Data								
Fort Worth	6/2/97	power wash water	8.8		79	147	<0.001	0.002
Fort Worth	3/3/97	pressure wash	9.2			1278		
Fort Worth	3/3/97	pressure wash	9.4			358		
Fort Worth	3/3/97	pressure wash	9.6			343		
Fort Worth	5/22/90	Grand Prairie Wastewater				1817		
Phoenix	1/14/97	Truck washing (treated, through interceptor)						
Phoenix	7/26/94	Truck washing (treated, through interceptor)						

Table A-1: Mobile Cleaner Data

Location	Date	Description	Ethyl Benzene	Xylene	TDS	TPH	BTEX	Phos.	COD
Mobile Cleaner Data									
Suface Cleaning Data									
Bay Area		Garage/ covered parking							
Bay Area		Garage/ covered parking							
Bay Area		Garage/ covered parking							
Bay Area		Garage/ covered parking							
Bay Area		Garage/ covered parking							
Bay Area		Vehicle tunnel							
Bay Area		Vehicle tunnel							
Bay Area	3/19/98	Vehicle tunnel							
Bay Area	3/19/98	Vehicle tunnel							
Bay Area		sidewalk/ streets							
Bay Area		sidewalk/ streets							
Bay Area		sidewalk							
Bay Area		sidewalk							
Bay Area		gas station							
Bay Area		gas station							
Bay Area		gas station							
Bay Area		building exterior							
Bay Area		building exterior							
Bay Area		building exterior							
Bay Area		building exterior							
Bay Area		building exterior							
Bay Area		building exterior							
Bay Area		building exterior							
Bay Area		building exterior							
Santa Rosa	1/18/97	Parking lot							
Fort Worth	6/11/97	Fueling Station	<0.002	<0.002		40			3140
Fort Worth	6/11/97	Vehicle Maint. Driveway	<0.002	<0.002		28			707
Fort Worth	6/9/97	lot, high traffic area							
Fort Worth	5/13/97	S.E. Service Center	<0.002	<0.002			0.008		
Other Data									
Fort Worth	6/2/97	power wash water	0.028	0.035					851
Fort Worth	3/3/97	pressure wash			900				710
Fort Worth	3/3/97	pressure wash			824				472
Fort Worth	3/3/97	pressure wash			1675				838
Fort Worth	5/22/90	Grand Prairie Wastewater			11627			2228	5130
Phoenix	1/14/97	Truck washing (treated, through interceptor)							
Phoenix	7/26/94	Truck washing (treated, through interceptor)				24.1			

Table A-2: Local Limits for Bay Area POTWs (mg/L)

POTW	Vallejo	USD	Sunny-vale	Santa Rosa	San Jose	Richmond	Livermore	EBMUD	Hayward	CMSA (1)	Benicia	CCCSD	Palo Alto	San Francisco
Antimony			1	15.3	5							5		
Arsenic	0.08	0.35	0.3	0.47	1	1	0.06	2	1	0.59	0.5	2	0.1	4
Beryllium	0.02		0.5	0.5	0.75								0.75	
Barium			1										5	
Boron													1	
Cadmium	0.04	0.2	0.1	0.04	0.7	0.47	0.14	1	0.2	0.13	0.1	3	0.1	0.5
Chromium	0.2	2	1.7	1.71	1	0.5	0.62	2	2	2	2	1.5	2	5
Copper	1	2	0.7	0.2	2.7	1	1	5	2	1.5	3	5	2	4
Lead	1	1	0.5	0.3	0.4	0.3	0.2	2	1	1.6	1	2	0.5	1.5
Mercury	0.02	0.01	0.01	3E-04	0.01	0.002	0.01	0.05	0.01	0.011	0.02	0.05	0.05	0.05
Molyb-denum														
Nickel	1	1	0.5	1.51	2.6	1	0.61	5	1	1	1	3	0.5	2
Selenium	0.04		1	2.7	2							0.3	1	
Silver	2	0.5	0.2		0.7	1	0.2	1	0.5	1	0.3	1	0.25	0.6
Thallium				3.9								1.5		
Zinc	2	3	1.48	1.63	2.6	1	3	5	3	1	1	5	2	7
Cyanide	0.8	0.65	0.5	0.2	0.5	0.76	0.04	5	0.6	1.2	0.3	1.5	1	1
BOD				1400										
pH		6-12	6-10.5	6-9.5	6-12.5			5.5	6	6-12.5	6-9	5.5-12.4	5.5-11	
MBAS														
O&G	100	300/100	100	150				100	300/100	100	100	300/100	200	
TSS				16800									6000	
Benzene						1			0.5			1		
Toluene						1			0.5			1		
Benzene									0.5			1		
Xylene						1			0.5			1		
TDS													10000	
TPH									5			10		
BTEX														
Phos.														
COD				2600										

(1) For vehicle service facilities, zinc discharge limit is 2.5 mg/L