Guide to Best Management Practices

100% Closed-Loop Recycle Systems at Vehicle and Other Equipment Wash Facilities

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This document was published as a guide only and it does not include all the applicable legal requirements. The document is intended to help owners and operators of vehicle and other equipment wash facilities using 100% closed-loop recycle systems understand applicable Department regulations. The document also offers recommendations for best management practices (BMPs) that make good business sense and at the same time protect the environment. Business owners are responsible for obtaining complete information about applicable regulations. The Department does not relieve any person from any requirements of federal regulations or Florida law though this guidebook. As this document is only a guidebook, facilities may find that some aspects contained in this publication may not be applicable in their case.

For use with Vehicle Wash Checklist Guide

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Guide to Best Management Practices for 100% Closed-Loop Recycle Systems at Vehicle and Other Equipment Wash Facilities

Introduction

This guide is addressed primarily to owners and operators of vehicle and other equipment wash facilities using 100% closed-loop recycle systems. Owners and operators of other types of non-recycling equipment wash facilities, including mobile wash units or pressure washers, should consult with the local office of the Florida Department of Environmental Protection (DEP) for regulatory requirements.

By design, facilities equipped with 100% closed-loop recycle systems should not discharge wastewater to ground or surface waters of the State. However, because of various conditions, discharges do occur at some facilities. These conditions include improper operating methods, inadequate maintenance, inappropriate storage, handling and disposal of materials, poor storm water management, leaks, runoff to the ground, or accidental discharges. Such discharges can cause significant contamination of the waters of the State. As a result, DEP may require an industrial wastewater permit for facilities equipped with 100% closed-loop recycle systems. **If these facilities implement successful Best Management Practices (BMPs) that prevent pollution and contamination of waters of the State, they may be exempt from obtaining such a permit, provided other Departmental requirements are met.**

This document contains guidelines for implementing BMPs at facilities operating 100% closed-loop recycle systems, briefly describes different options for managing the wastewater, and lays out basic regulatory requirements for the discharge of the wastewater. This guide is intended to serve as a tool and as a resource. When used as a tool, the owner and operators of vehicle and other equipment wash facilities can better understand applicable Department regulations; when used as a resource, the owner or operator may find and implement recommendations that make good business sense while protecting the environment. Other facilities, such as those utilizing partial recycle systems, may also benefit from implementing some of the BMPs described in this document, as appropriate.

Vehicle washing is the cleaning of privately owned vehicles (cars and trucks), public vehicles (school buses, vans, municipal buses, fire trucks, and utility vehicles), and industrial vehicles (moving vans or trucks, tractors, etc). Other equipment (airplanes, boats, tanks, wheeled tactical vehicles, farm equipment, trailers, construction equipment such as dozers, backhoe loaders, excavators, dump trucks, etc) is also being washed at some facilities. If not properly managed, the wash water can pollute the water supply and/or surrounding water bodies. It can carry sediment and contaminants (for

example oil, grease, metal (paint chips), phosphates, detergents, soaps, cleaners, and other chemicals) to surface waters, or it can contaminate ground water by infiltration or by drainage to subsurface wells and septic systems. Once a water supply becomes contaminated, it is very difficult and costly to treat; moreover, the treatment process is not always successful.

The recommended way of managing the large amounts of wastewater resulting from vehicle and other equipment washing, is by recycling it through a system that purifies the wastewater and pipes it back for reuse. This results in water conservation as well as real savings to the vehicle wash facility in terms of water bills and sewer connection charges.

There are two types of recycling systems: 100% closed-loop recycle and partial recycle.

100% Closed-Loop Recycle System, also called a Non-Discharging/Closed-Loop Recycle System, is a total recycle system that recycles both wash water and rinse water with no discharge of wastewater to waters of the State.

A Partial Recycle System is a system where wash water is separated from the rinse water. The wash water is recycled, and the excess rinse water may be disposed of to an absorption field system designed and installed in accordance with Department requirements

1. 100% Closed-Loop Recycle Systems

100% closed-loop recycle systems are the preferred choice for many dischargers. These systems reduce or eliminate contaminated discharges to surface or ground water, or to Publicly Owned Treatment Works (POTWs). These systems require somewhat significant capital costs up front, for engineering, purchasing and installation of the equipment. However, water conservation, along with the additional monetary benefits of cost savings associated with lowered water bills and sewer connection fees make these systems a wise investment choice. Water conservation is achieved by piping the wash water through a purification system and reusing it. Therefore, there is no need to purify the wash water to meet drinking water or surface water quality standards. When the wash water reaches a certain level of contamination, it can be disposed of by using one of the alternatives discussed below.

Since the volume of wastewater to be disposed of is much less than in a non-recycling system, the cost associated with the discharge of the wastewater is also less. Some vehicle wash facilities report savings as high as 80% in water and sewer bills after implementing a recycle system. The length of time for a payback depends on local sewer and water rates, the purchase price of the recycling equipment, and the average number of vehicles being cleaned per day. Some facilities report a payback after just a couple of months, while others take as long as two years.

There are additional benefits resulting from the implementation of recycle systems. Due to severe droughts, water restrictions are becoming common. Recycling and reusing are extremely beneficial for the environment because of the savings of large quantities of water. In addition, the business is also provided with a sense of security, in that it can continue operating even under drought-imposed water restrictions. Some car washes are even using recycling as a marketing tool. In response to public awareness of the environmental issues, recycling is being presented as a way to save the environment, without giving up the luxury of a clean car.

100% closed-loop recycling can be accomplished by several methods, each with its advantages and disadvantages. Some recycling system designs incorporate the use of a small evaporator to burn off excess water regularly to allow the constant use of additional fresh water. Other recycling systems attempt to close the loop by creating rinse-quality water, which would eliminate the need for any new fresh water except to compensate for drive-off and evaporation. The important factor in all 100% closed-loop recycle systems is an awareness of the increased amount of maintenance and attention that will be needed to keep the system in balance.

As mentioned previously, 100% closed-loop recycle systems require periodic disposal of the wastewater. Two disposal options are available: discharge to a permitted Domestic Wastewater Treatment Facility, or contain and haul. Both options are discussed below.

A. Discharges to Domestic Wastewater Treatment Facility

The wastewater produced at a vehicle or other equipment washing facility may be discharged to a domestic wastewater facility (commonly referred to as a POTW). This method includes discharge into the collection system served by the POTW. Facilities should contact the POTW authority to determine the applicable fees and local permitting requirements that may include a pretreatment permit, before connecting to the system. The fee for the connection and discharge to the utility system varies depending on the volume of water discharged.

The POTW will inform the vehicle wash facility of any pretreatment requirements. A pretreatment method commonly required is separating the oil, water and suspended solids. This pretreatment method is typically performed in an oil-water separator outfitted with a grit-settling chamber. Other pretreatment methods may be required as well.

Oil-water separators cannot be used for treating water-soluble chemicals, such as anti-freeze and solvents, detergents that emulsify oil, or the emulsified oil itself. Oil-water separators require periodic servicing to maintain their

performance. Accumulated solids must be removed regularly from the bottom of the separator, as well as the oil floating at the top. The frequency of servicing depends on the size of the separator, and the volume and make-up of the wastewater flowing through it. Periodic inspections allow facility personnel to determine when the sludge must be pumped out and the oil removed. The oily waste generated by the oil-water separator generally can be sent off to a used oil recycler and managed as "used oil". Separator sludge must be sampled to determine if it is a hazardous waste, due to metals content. If the test results indicate the sludge is hazardous waste, the local DEP office should be contacted for information on handling and disposal methods.

B. Contain and Haul

Depending on the volume of wastewater produced, this option may require considerable storage, as well as high transportation costs to manage the wastewater and sludge produced. It is imperative to maintain accurate records indicating the name of the hauler, date, the amount of wastewater and sludge picked up, as well as the location of disposal. The wastewater should be disposed of at a pretreatment facility, a POTW, or other Department approved manner.

2. Partial Recycle Systems

Partial Recycle systems can be divided into two categories: limited recycling (pumping stations, etc.) and multi-stage filtration systems.

Limited recycling typically provides minimal filtration of water, offering approximately 50 to 80 percent wash water reuse depending on the technologies used. These systems are designed to remove the heavy solids and provide recycled wash-quality water for reuse. In some situations, oxidation may be necessary to control the odors and bacteria growth. This is usually achieved by the addition of a disinfecting system (using ozone, chlorine, etc).

Multi-stage filtration systems can provide 80 to 95 percent water reuse by incorporating the use of several water treatment technologies. The initial (first) stage is designed to settle out heavy solids while separating oils from the wash water. The majority of the filtration takes place in the second stage. This stage typically incorporates aeration, filtration and chlorination to ensure the removal of dirt, oils and waxes and to eliminate odors and organic buildup. The final stage consists of several methods which filter, polish and re-pressurize the water just prior to feeding the carwash equipment.

Partial recycle systems are designed to separate wash and rinse water, and recycle the wash water. The excess rinse water may be disposed of to an absorption field system. Wash water is prohibited from disposal on site and must be managed in a different way (i.e., contain and haul, or discharge to a POTW). Refer to section 4 of this guide for regulatory requirements for partial recycle systems.

3. Types of Facilities Using 100% Closed-Loop Recycle Systems

There are many different types of facilities utilizing 100% closed-loop recycle systems, such as:

A. Car wash: rollover, tunnel, wand
B. Heavy equipment wash
C. Boat cleaning
D. Other equipment wash

A. Car wash facilities

1. **Rollover car wash** is a car wash where the vehicle remains stationary while washing, rinsing, waxing and drying equipment passes over the car.

Figure 1. *Example of a rollover car wash. The wash water is well confined inside the system. Also, no significant amount of rainwater is introduced into the system.*

In-bay automatic car washes often use friction and/or pressure along with chemicals to achieve a good wash. Brush-type automatic car washes use 30 to 45 gallons of water per car, with a lower amount of chemicals. This water can be reused with minimum treatment. Touch-free automatic car washes consume a comparable amount of water per car, but require an increased amount of chemicals to achieve the same degree of cleaning. As a result, additional treatment steps are necessary before reusing the water.

2. **Tunnel car wash** is a car wash where the vehicle is pulled through a building by conveyor or other means, passing through separate washing,

rinsing, waxing, and drying areas.

Figures 2, 3 and 4. *Examples of a tunnel car wash.*

Tunnels can wash from 100 to 1,000 cars a day, using an average of 80 gallons of water per car. This high water volume lends itself well to water recycling, since the water collection can be segregated in the trenches to permit separate treatment and reuse of wash and rinse water.

3. **Wand car wash** is a self-service car wash where the vehicle remains stationary and the car is washed using a high-pressure stream of water from a hand-held wand.

Figure 5. *View of a wand car wash.*

On the average, a self-serve facility uses 20 gallons of water per vehicle with 3-5 gallons of water loss through evaporation and carryout. Although the number of cars per day is relatively low, because of the variety of vehicles and equipment passing through the bays, the wastewater is heavily contaminated and it must go through a higher degree of treatment before reuse.

All facilities that provide wax, add drying agents or other additives, or have water softening equipment, should install a total recycle system that recycles both wash water and rinse water, with no discharge of wastewater to waters of the State. As discussed above, when needed, the wastewater can be pumped out and hauled to a pretreatment facility or to a POTW.

B. Trucks and Heavy Equipment Facilities Using 100% Closed-loop Recycle Systems

Facilities washing trucks and other heavy equipment will require larger wash pads than the typical car wash facility. The amount of water needed for each cleaning cycle is higher (up to several hundreds of gallons) and so is the amount of cleaning agent needed. Large vehicles can carry significant amounts of dust, sand, soil, gravel and other large particles. Removal of

these larger particles can be enhanced by mounting a series of weirs within the drain trench, normally along the center of the wash bay. The loss of water through carry out is high. For example, a tractor-trailer can carry out of the wash bay up to 40-50 gallons of water on the vehicle and on top of the trailer. The options for containing and recycling the wash water can vary as depicted in the pictures below.

Figure 6. *Truck wash facility, with open, roofed structure. The berm prevents the wastewater from running off the wash pad.*

Figure 7. *Covered concrete wash pad. Wastewater collects into the adjacent pit via the gate.*

Figure 8. *Example of heavy equipment washing facility equipped with a 100% closed-loop recycle system.*

C. Marinas and Boatyards

Pressure washers may be used to remove barnacles and marine life from boats. The wastewater generated from pressure washing must be contained and directed to a recycling system, or to a POTW. For detailed information on BMPs for boat cleaning visit Florida's Clean Marina Program at http://www.dep.state.fl.us/law/Grants/CMP/default.htm.

D. Other Equipment Wash

The 100% closed-loop recycle system is often used at a variety of other facilities. Such facilities may wash small aircraft, heavy equipment, and military vehicles. Significant savings in water usage as a result of installing the closed-loop recycle systems are reported.

4. Regulatory Requirements

There are many factors that determine the need for a wastewater permit from the Department. The regulatory requirements for these types of systems are discussed below.

A. General Permit

There is a General Permit (GP) for Car Wash Systems available under the Industrial Wastewater Program pursuant to Rule 62-660.803, Florida Administrative Code (F.A.C.). The GP is valid for 100% as well as partial recycle Car Wash Systems that meet the requirements established in the rule. However, it is not applicable to truck or heavy equipment wash facilities.

Under this rule, spent process water must be disposed of at a Department-permitted wastewater treatment facility or a pretreatment facility connected to a Department-permitted wastewater treatment facility. Small residential car washes that meet the exemption criteria of Rule 62-660.803(1)(b), F.A.C., are not required to obtain coverage under the GP or an Individual Industrial Wastewater Permit.

B. Individual Industrial Wastewater Permit

Facilities that do not qualify for coverage under the GP may be required to obtain an Individual Industrial Wastewater Permit. However, facilities may seek an exemption from permitting and should provide the Department with a description of and information regarding the processes involved including the type of operation, location, site specific BMPs and justification supporting their request for an exemption. To grant an exemption, the Department staff must make a determination that the facility has provided reasonable assurance that water quality standards will be met, thereby protecting Florida's natural resources.

Note: Before applying for an industrial wastewater permit, you are encouraged to contact the Industrial Wastewater Section of your local DEP District Office (http://www.dep.state.fl.us/water/wastewater/iw/contacts.htm) to ensure that the proper permit, if required, is obtained.

C. Discharges to Municipal Separate Storm Sewer System (MS4)

A Municipal Separate Storm Sewer System (MS4) is a public-owned conveyance or system of conveyances (i.e., ditches curbs, catch basins, underground pipes, etc.) that is designed for the discharge of stormwater to surface waters of the State. Water from individual residential car washing can be discharged to a MS4. The discharge of industrial wastewater from car washing is not authorized by MS4 permits. However, some MS4s require Best Management Practices (BMPs) at their municipal fleet and or equipment maintenance facilities. Please contact the MS4 authority in your area for additional information.

5. Developing BMP Guidelines

Each facility operating a 100% closed-loop recycle system should develop a BMP plan. The BMP plan is a documented step-by-step process for ensuring that pollutants from the facility are not discharged from the site and thus potentially adversely affecting the quality of waters of the State. BMPs should include schedules of activities, recommended practices to help operate the recycle system in the best possible manner, practices to avoid, maintenance procedures, and other management practices to prevent runoff from the site.

The guidelines discussed in this document are designed to assist the owners and operators of 100% closed-loop recycle systems in developing a BMP plan. It must be noted that these are general guidelines and should be tailored by each individual facility according to their specific conditions. The manufacturer's instructions and the operator's manual should be closely followed in preparing site-specific BMPs, as well as during operations.

Several important elements needed for developing a good BMP plan include: site assessment, good housekeeping, preventive maintenance, visual inspections, record keeping and reporting, and employee training.

Site assessment

The first step in developing a BMP plan involves conducting an assessment to identify the sources of pollution. This may include taking a look at the facility to determine what materials and practices are (or may be) a possible source of contamination; conducting a material inventory and recording the types of material stored, handled, or processed at the facility (i.e. gasoline, paints, solvents, etc.); evaluating past spills and leaks, etc. After conducting the assessment, the BMPs discussed below may be used, making sure that any other items specific to each individual operation are also included.

Good housekeeping

This means keeping a safe, orderly, and clean work environment. Some ways of doing this include: improving operation and maintenance of machinery and process; implementing careful storage practices; keeping a current, up to date inventory; properly labeling all containers; scheduling routine clean-up operations; training employees on good housekeeping techniques, etc.

Preventive maintenance

A program must be developed that insures regular inspections and routine maintenance of the equipment, including pipes, pumps, storage tanks, drums, containers, and all other facility operations. This will help maintain the equipment and structures in good condition, and will in turn, prevent pollution of the waters.

Visual inspections

Conduct regular inspections on site, making sure all BMPs are followed, and record any problems that require correction (i.e. runoff offsite, housekeeping, foul smell, leaks, improper material storage, etc).

Record keeping and reporting

Record all spills, leaks, inspections, and maintenance activities. Date, times, weather conditions, causes, and resulting problems should also be noted. Keep all pertinent records on site.

Employee training

A training program should be developed, covering such topics as spill prevention and response, good housekeeping and material management practices (including the use of MSDS and using personal protective equipment (PPE) as needed). The goal of the training should be to teach all personnel good operational practices, safety, methods of pollution prevention, and create an awareness of the environmental concerns.

BMP Guidelines

Wash Site

The wash site must be designed with proper curbing and sloping to ensure that neither stormwater nor wastewater will pond at the site, flood the adjacent property, or create nuisance conditions (severe odors, etc).

Figure 9. *The rinse water at this car wash facility is allowed to collect on site, creating nuisance conditions.*

Wash areas should be located on well constructed and maintained impervious surfaces, with drains piped to the disposal devices. The wash area should extend at least four feet on all sides of the vehicle to trap all overspray.

Figure 10. *The wash area at this facility is large enough to accommodate the size of the heavy equipment being cleaned. However, this unit is placed too close to the edge of the wash area, allowing wash water to run off the pad.*

It is recommended to enclose the washing areas with walls to prevent the dirty overspray from leaving the area. Also, the floors should be properly graded to allow the wash water to drain into the collection pit or sump.

Figure 11. *The gap between the overspray abatement curtains and the curb at this car wash facility allows wash water to escape outside the impervious area.*

Figure 12. *Outside view of the same facility. Because of the improper containment, the wash water runs outside, off premises, and onto the ground.*

Washing areas should not be located near uncovered vehicle repair areas or chemical storage facilities, to prevent the transport of chemicals in the wash water runoff.

Warning signs should be posted for customers and employees not to dump vehicle fluids (such as oil or engine coolant), pesticides, solvents, fertilizers, organic chemicals or toxic chemicals into the drain or collection sump. No engine degreasing solvents shall be used at the facility. All signs should be displayed in a visible location and should be easy to read. Facilities should stencil warnings on the pavement next to the drain or collection sumps. This is especially important for the self-service car wash facilities, where an attendant is not usually on site and as a result individuals may tend to wash their engines or undercarriages using degreasers, wash the exterior of their vehicles with chemicals other than common soap solutions, or may pour used oil, antifreeze, or other hazardous materials down the drains. Such practices are not acceptable.

Oil

Materials such as absorbent pads should be available for use if an oily sheen appears. Used oil should be stored in compatible tanks which are in good condition and labeled with the words “Used Oil.” The tanks should be stored in an area with an impervious floor, drip pans and curbed spill containment, adequate for the volumes stored. Any used oil from the oil-water separators should be managed by a used oil recycler registered with the Department, in accordance with Chapter 62-710, F.A.C. For information regarding the management of used oil, or to contact the used oil coordinator, visit the used oil program web page at: http://www.dep.state.fl.us/waste/categories/used_oil/default.htm

Wastewater

A recycle system that recycles both wash water and rinse water, with no discharge of wastewater to waters of the State or to a POTW, should be considered. In any event, wastewater should be disposed of at a permitted wastewater treatment facility, a pretreatment facility connected to a permitted wastewater treatment facility, or other Department approved manner. Please refer to section 4 of this guide for details on regulatory requirements.

When problems occur (i.e., an unanticipated bypass, upsets in the system, an unauthorized discharge to surface or ground waters), DEP or the POTW authority, if the discharge is to a permitted wastewater treatment facility, should be notified. For unauthorized releases or spills of untreated or treated wastewater that are in excess of 1,000 gallons per incident, or where information indicates that public health or the environment will be endangered, oral reports shall be provided to DEP by calling the STATE WARNING POINT TOLL FREE NUMBER (800) 320-0519, as soon as practical, but no later than 24 hours from the time the facility becomes aware of the discharge. A detailed written report (describing the problem, remedial measures taken, and steps implemented to prevent the problem from happening again) may also be required at a later stage.

Figure 13. *Example of a 100% closed-loop recycle treatment unit installed in an enclosed space to prevent rainwater from getting in, as well as, to prevent unwanted tampering with the control panel.*

Do not pre-wash, wash, or rinse vehicles outside or away from the wash area, to prevent wash water discharge to the ground or surface waters.

Figure 14. *Dirty water in this puddle just outside the car wash tunnel indicates some car washing took place outside the wash tunnel, allowing dirty water to run onto the ground instead of into the collection pit.*

Stormwater

Do not allow intrusion of stormwater into the recycle system. Install overhangs, roofing, or other devices on buildings. Also, install curbs around wash bays or tunnel entrances (or elevate bays or tunnels) as appropriate. This will avoid the overloading of the system's storage capacity, and the potential to cause a discharge.

Figure 15. *The collection pit at this car wash facility is located outside, adjacent to the wash tunnel. The pit is not covered, there is no overhang, and the downspout brings rain water right into the pit. This situation must be corrected.*

Figure 16. *The rain falling onto this wash pad can be diverted to the stormwater sewer via a removable rain water dam. This prevents the recycle system from overflowing due to excess volume. The wash pad must be thoroughly cleaned before diverting the rainfall off the pad and into the storm sewer.*

Figure 17. *This facility does not have a roof or other cover over the wash area. As a result, excess stormwater occasionally creates an overflow of wastewater into the stormwater pond adjacent to the system. This is not a desirable situation.*

If a wash pad can not be covered with a roof for various reasons (including cost), another way to prevent stormwater from overflowing the system, is to install a stormwater diversion valve. This allows the system to discharge uncontaminated stormwater runoff from the wash pad to an appropriate stormwater outfall when the pad is not in use.

Figure 18. *The wash pad at this facility is equipped with a stormwater diversion valve.*

If the system is equipped with a stormwater diversion valve, the following procedures must be followed to insure proper results:

- The wash pad must be cleaned with fresh makeup water after each day of use to prevent stormwater contamination.
- The rain diverter valve must be in the proper position (according with the operation procedures) before starting the wash operations.
- Discharge of solids is not allowed.
- The discharge of uncontaminated stormwater must not cause a visible sheen.

Solids

Prior to disposal, separator sludge must be sampled to determine if it is a hazardous waste. (See section I.A. of this document for more information.) Sludge and solids from sedimentation tanks, centrifugal separator, used filter material, and other solid wastes, that are not hazardous, must be disposed of at a Class I or Class II lined, solid waste landfill authorized by the Department to accept solid wastes under Chapter 62-701, F.A.C. A record of the quantity of waste sludge disposed, contract hauler, disposal location, and disposal date for the sludge must be maintained.

Sludges and sediments from the oil section of the oil-water separator can be managed by the used oil handler as an “oily waste” such that both used oil and such sludges can be handled at the same time by one handler. This can also apply to drip pads and sorbent materials used to clean up releases of used oil.

Settled solids must be frequently removed, to prevent drains from clogging, or sumps from overflowing. Used filters and other solid waste must be stored

in covered containers until ready to be sent to a landfill.

Figure 19. *The solid waste collected from the settling pit is improperly stored in an open bucket. The waste should be stored in a closed container until ready to be sent to a class I or II sanitary landfill.*

If it is not practical to store material awaiting disposal in closed containers, the material should be well covered with a tarp to prevent stormwater contamination.

Figure 20. *Example of improper storage of solids. The material is not completely covered and as a result, the rain water can wash it away.*

Figure 21. *Example of improper handling/storage of solids. An attempt was made to cover the pile with a tarp; however the coverage is not complete, so the rain water can wash and carry away solids from the pile.*

Figure 22. *Example of improper handling of solids. Solids should be stored on an impervious surface, well covered, with no exposure to rain.*

Storage

Reusable or recyclable materials should be used whenever possible. The number of different products used should be reduced in order to reduce inventory, incompatibilities, and disposal problems. Purchasing larger quantities than will be used within their shelf life and rotating stock should be avoided.

Materials should be stored securely, tightly covered, and clearly labeled. Spare empty containers should be kept on hand to store materials from leaking or damaged containers. Material Safety Data Sheets (MSDSs) should be

available for all materials handled at the facility. Every employee should know the location of the MSDSs, and how to use them. Absorbents should be kept on hand for spill clean up. A spill containment and clean up program should be implemented.

If heavy equipment is stored at the facility, the dirty portions of the equipment should be covered when not in use, to control runoff contamination.

Figure 23. *At this facility heavy equipment is completely covered for protection from the inclement weather, and also to prevent runoff contamination. If a roofed structure is not feasible, at least the dirty portions of the equipment should be covered.*

Operations

The principle of water recovery is based on removing suspended and dissolved solids. Suspended solids can be removed through settling tanks, hydrocyclones (for larger particles), and centrifuges and filters (for smaller particles). Settling tanks are usually designed with sloped bottoms for easy sludge removal. The sludge needs to be removed at regular intervals by pumpout truck, or by a sludge pump incorporated into the system.

Figure 24. *Pumpout truck used to remove the sludge from the settling tank at this facility.*

Plate and frame filters, pressure sand filters, mixed media filters, and pressure leaf filters can be used in car wash operations for final rinse water treatment. Particles larger than 40 microns must be removed from the recycled water to prevent equipment wear and abrasions on car finishes.

Dissolved solids (mainly chlorides) are more difficult to remove. Removal can be accomplished via ion exchange, reverse osmosis, absorption, electrolysis, etc. Dissolved solids must be less than 500 mg/l to avoid spotting. Water with a higher content of dissolved solids will leave stains on the car upon drying. This is why many car wash facilities prefer to use fresh water for rinsing. The final fresh water rinse serves the double purpose of providing high quality wash as well as providing the necessary make-up water that is lost within the system. There is an unavoidable loss of water from the system (about 3-5 gallons of water per car wash) due to drag out on the washed cars, and use within the system (i.e. evaporation, etc.).

There are several BMPs to be observed during operations of the equipment:

- The recycle equipment (such as sedimentation tanks, oil-water separators, filtration units, evaporators, pumps, etc.), should have adequate capacity to handle maximum hourly flows based on expected usage and the size of the facility.
- Washing operations should be performed such that all wastewater is directed into the treatment system, with no leaks or spills outside the wash pad and onto the ground.
- To prevent foul odors due to decomposing of organic matter by bacteria, a chlorination system should be installed. Other disinfecting methods are also available on the market such as: hydrogen peroxide, bromine, ozone, catalytic oxidation (UV and ozone), and a combination of catalytic oxidation with hydrogen peroxide. Some manufacturers of disinfecting systems

recommend catalytic oxidation (UV and ozone) as the most effective combination to be used.

- Regular inspections and maintenance of the disinfecting system should be performed to help prevent odors from developing. If repeated attempts to reduce smell or to clear up the recycled water fail to improve the water quality, or if an extremely large amount of soap is needed to clean the vehicle properly, the water likely contains too many dissolved and suspended solids and needs to be replaced. The system should then be drained and the spent wastewater should be disposed of according to local, state, and federal regulations.
- The recycle equipment should be maintained in accordance with the manufacturers' recommendations, to ensure proper operation.
- The operator's manual must be kept handy, for easy reference.
- A regular maintenance schedule must be kept and each activity should be logged.
- The recycle system must be inspected regularly, and any leaks must be repaired.

Figure 25. *The recycling system at this facility is enclosed and it is therefore protected from stormwater intrusion. The liquid on the floor indicates a spill or leak. This situation must be corrected.*

- The circulation in the recycle system must be maintained when not in use, to prevent foul odors and clogging caused by sedimentation.
- The operation of the 100% closed-loop recycle system should be under the supervision of a person who has formal training or practical experience in the field of water pollution control.
- A reduced pressure zone backflow preventer or an equivalent device must be installed on the water supply line from the water system to the wash facility if a drinking water source is used as the makeup water source for the facility.

- The soap/detergent used must be of neutral pH, break down quickly (biodegradable), and must be used sparingly. Some cleaning agents may cause oils to emulsify. When this happens, the oils cannot be removed through treatment and end up right back on the equipment. This is why the cleaning agents used in the system should produce low or moderate foaming and have less emulsifying properties while remaining pH neutral. Some soaps designed for closed-loop recycle systems also prevent bacteria and algae growth, inhibit corrosion, and help flocculate oil accumulation. They contain no dyes, perfumes or thickeners.
- Housekeeping activities must be performed since they are important in insuring proper operation of the facility.

Figure 26. *Scattered pieces of different materials in a puddle of liquid on the floor are signs of poor housekeeping. Poor housekeeping creates safety hazards, as well as operational problems.*

- Water conditioners on the market may be used as additives to the 100% closed-loop recycle system. These conditioners help maintain a good water quality, help in releasing and flocculating of suspended solids, help soften the water, inhibit corrosion on the system, and lower the total suspended solids (TSS) count which improves the color and quality of the recycled water. It has to be noted, however, that while the additives can have a positive effect on some water qualities, at the same time their use increases the Total Dissolved Solids (TDS), which is a negative effect.

Figure 27. *Example of good housekeeping.*

Maintenance

Preventive maintenance must be practiced according to the operations manual provided by the manufacturer of the recycle system. The following are some examples for setting a regular maintenance schedule. (The schedule will vary according to the specific recycle unit and other conditions existing at each facility. Manufacturer's recommendations should be used when setting up the maintenance schedule):

Daily

- Flush solids from the system.
- Remove any floating debris or scum from the surface of the tanks.
- Drain off oil from the oil/water separator.
- Wipe any accumulated scum from the oil skimmer(s). Check the operation of the oil skimmer(s) while the system is flowing and if necessary, adjust the skimmer(s).
- Check the system while running, record pressure gauge readings; check the status of indicator lights, meters, and chemical injection pumps; check the water levels.
- Check the filter gauges, manually clean filters and back flush if necessary.
- Check the chemical system; verify the setting on the output; check the level in the chemical container, and refill as needed. Record the amount of chemicals used in the 24-hr period.

Weekly

- Check the trenches, sumps, pits, and clarifiers for sediment level. Dig out and properly dispose of the sediment.

- Clean the system, back-flush multi-media tanks and repair leaks.
- Clean or replace cartridge filters.
- Briefly drain the storage tank to remove accumulated solids at the bottom of the tank.
- Remove any accumulated debris or scum from the surface of the water.

Monthly

- Check the Hydrocarbon absorber for oil and solids loading. Replace if necessary.
- Clean the UV catalytic chamber.

Twice a year or as needed

- Drain the tank, remove filters to clean or replace.
- Clean or replace multi – media bed.
- Clean membranes.
- Clean valves.

General Safety Issues

- Follow all manufacturer's instructions, procedures, cautions, and warnings when operating the recycle system.
- Follow all OSHA guidelines while performing the operations required.
- Place all material safety data sheets (MSDSs) in a known location, with easy access for all employees.
- Use appropriate personal protection equipment (PPE) when handling chemicals and when operating the system.
- Make sure all work areas are well ventilated.
- Do not add excessive amounts of chemicals to the recycle system.
- If using an UV light for disinfecting, do not look at the UV light in the chamber Permanent damage or burns to eyes or skin may result.
- Make sure all employees using the recycle system are trained in operating the system according to the manufacturer's instructions, and that they know how to handle leaks and spills, and how to dispose of used oil, other liquids, and solid waste.
- Provide employee training. It is an important tool to prevent vehicle and other equipment wash water from entering stormwater drains, and injection wells and contaminating source waters. Employees should be aware not only of the operation and maintenance procedures and general housekeeping rules, but also of any toxic chemicals with which they may come in contact. They also need to have access to a chemical management plan and an emergency contact list (if applicable).
- Plan and design spill prevention and control management at all designated washing areas, to prevent any spills of pollutants from entering surface

water, ground water, or a publicly or privately owned treatment works.

- Implement a chemical management plan at closed-loop recycle facilities that use metal brighteners, caustics or acids, hallogenated hydrocarbons, or solvents. The plan should include a list of the chemicals used, the method of disposal (such as reclamation or contract hauling), and procedures for assuring that toxic chemicals are not discharged into source water. The plan should also provide procedures for preparedness and response to emergency situations including fire, spills, hurricane and other severe weather conditions. Personnel must be trained on procedures to prepare for and respond to an emergency. The contact persons and their telephone numbers should be readily available.

Onsite pollution prevention assessments should be considered in identifying optimal source reduction technologies and processes. Information regarding the Pollution Prevention (P2) program can be obtained through their website: http://www.dep.state.fl.us/waste/categories/p2/default.htm. The Pollution Prevention Program is available to provide technical assistance for development and implementation of a Vehicle Wash BMP plan.

Glossary of terms

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, residuals, industrial sludge or waste disposal, or drainage from raw material storage.

BPJ means Best Professional Judgement.

Chemical Flocculation is the addition of a chemical coagulant or flocculent to improve the settling characteristics of suspended solids.

Conventional Pollutants means five day biochemical oxygen demand (BOD5), total suspended solids (TSS), pH, oil and grease, and fecal coliforms.

Department means the State of Florida Department of Environmental Protection.

Ground water means water below the land surface in the zone of saturation where water is at or above atmospheric pressure.

Industrial sludge means the accumulated solids, residues, and precipitates generated as a result of industrial wastewater treatment.

Industrial wastewater means process and non-process wastewater from manufacturing, commercial, mining, and silvicultural facilities or activities, including the runoff and leachate from areas that receive pollutants associated with industrial or commercial storage, handling or processing, and all other wastewater not otherwise defined as domestic wastewater.

Non-process wastewater means water that does not come into direct contact with or does not result from the production or use of any raw material, intermediate product, finished product, by-product, waste product or

wastewater. It includes sanitary wastes, restaurant or cafeteria wastes, and non-contact cooling water used only to reduce temperature.

Oily wastes means those materials which are mixed with used oil and have become separated from that used oil. Oily wastes also means materials, including wastewater, centrifuge solids, filter residues or sludge, bottom sediments, tank bottoms, and sorbents which have come into contact with, and have been contaminated by, used oil.

Percolation means the generally vertical movement of water through soil or other unconsolidated medium to the water table and to lower aquifers where occurring.

pH is a measure of the hydrogen ion concentration of water or wastewater (expressed as the negative log of the hydrogen ion concentration in mg/l). A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is alkaline (or basic).

Process Wastewater means any water, which during manufacturing or processing comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by- product, and other waste product.

Publicly owned treatment works (POTW) means any device or system used in the treatment, including recycling and reclamation, of domestic sewage or industrial wastes of a liquid nature which is owned by the State, a county, or a municipality. This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

Residential car wash means any facility located in a single-family or multi-family housing development, which is designed specifically for the purpose of vehicle washing.

Rinse water for car wash recycle systems means the treated or fresh water sprayed on the car after washing.

Rollover car wash means a car wash where the vehicle remains stationary while washing, rinsing, waxing and drying equipment passes over the car.

Spent process water for car wash recycle systems means the water contained in the system (tanks, pumps and piping) that is no longer suitable for use, because of long term build up of salts or other contaminants.

Stormwater is stormwater runoff, surface runoff, and drainage.

Surface water means water upon the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs shall be classified as surface water when it exits from the spring onto the earth's surface.

Total Dissolved Solids (TDS) represents the total material actually dissolved in the water that can be measured by electric current.

Total Suspended Solids (TSS) represents total amount of particles floating in a liquid, large enough to be seen by human eye, but too small to settle down.

Treatment means the use of any device, system, process or method for preventing, abating, reducing, treating, separating, recycling, reclaiming, reusing, recovering, or eliminating pollutants in industrial waste.

Tunnel car wash means a car wash where the vehicle is pulled through a

building by conveyor or other means, passing through separate washing, rinsing, waxing, and drying areas.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee.

a) An upset does not include noncompliance caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, careless or improper operation.

b) An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of upset provisions of Rule 62-620.610, F.A.C., are met.

Wand car wash means a self-service car wash where the vehicle remains stationary and the car is washed using a high pressure stream of water from a hand-held wand.

Wash area means the impervious surface specially designed to collect wastewater.

Wash water for car wash recycle systems means the water containing detergent used to remove dirt from the car.

Wastewater means the combination of liquid and water-carried pollutants from residences, commercial buildings, industrial plants, and institutions together with any ground water, surface runoff, or leachate that may be present.

Resources

This Guidebook was developed and published by the Florida Department of Environmental Protection (DEP) Pollution Prevention Program in partnership with the DEP Industrial Wastewater Section and was funded in part by a grant from the US Environmental Protection Agency (EPA).

The Florida Pollution Prevention (P2) Program provides non-regulatory technical assistance in pollution prevention to both the public and private sectors. Pollution prevention (P2) is a management tool that seeks to reduce the generation of waste or pollution while increasing the efficient and sustainable use of resources. P2 is accomplished through source reduction, waste minimization, or on-site recycling. DEP P2 Program provides non regulatory on-site P2 assessments and individual consultations at no cost to your organization. For help with the development and implementation of a Best Management Practices (BMP) Plan or for any questions concerning pollution prevention projects, you may contact the Tallahassee P2 Program, or one of the District P2 Coordinators. Visit the Pollution prevention web site at http://www.dep.state.fl.us/waste/categories/p2/default.htm and click on Contacts, or call the Tallahassee Pollution Prevention Office at (850) 245-8715.

Information on the DEP Industrial Wastewater program can be found by visiting: http://www.dep.state.fl.us/water/wastewater/iw/index.htm

Specific questions regarding permitting should be directed to the appropriate district office as listed in this Guide or by visiting the following site: http://www.dep.state.fl.us/water/wastewater/iw/contacts.htm

Additional information on managing vehicle washing facilities in an environmentally friendly manner is offered by the EPA at: http://www.epa.gov/safewater/protect/pdfs/vehicle.pdf

Florida Department of Environmental Protection (FDEP)

Industrial Wastewater Section District Offices

Northwest District
160 Government Center
Pensacola, Florida 32501-5794
(850) 595-8380

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-1352
(813) 744-6100

South District
(PO Box 2549)
2295 Victoria Avenue, Suite 364
Fort Myers, Florida 33902-2549
(239) 332-6975

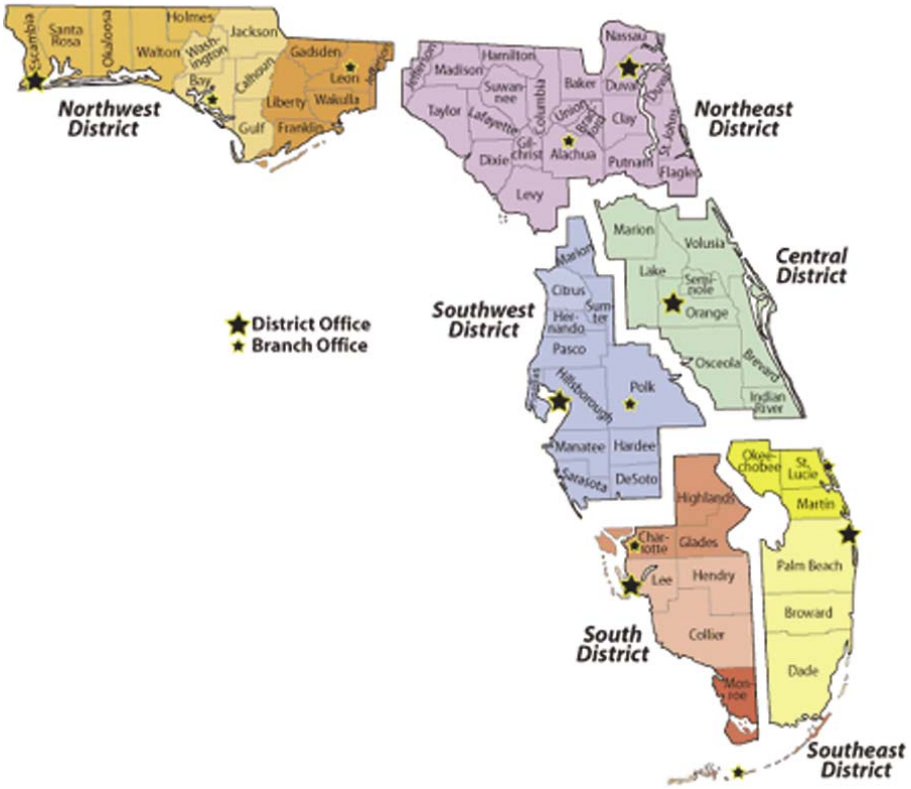
Northeast District
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590
(904) 807-3300

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767
(407) 893-3314

Southeast District
400 North Congress Avenue Ste 200
West Palm Beach, Florida 33401
(561) 681-6600

Florida Department of Environmental Protection (FDEP)

District Offices



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http://www.dep.state.fl.us/water/wastewater/iw/index.htm