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# The Class V Underground Injection Control Study

## Volume 4

## Wells That Inject Fluids From Carwashes Without Engine or Undercarriage Cleaning

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# WELLS AT CARWASHES WITHOUT ENGINE OR UNDERCARRIAGE CLEANING

The U.S. Environmental Protection Agency (USEPA) conducted a study of Class V underground injection wells to develop background information the Agency can use to evaluate the risk that these wells pose to underground sources of drinking water (USDWs) and to determine whether additional federal regulation is warranted. The final report for this study, which is called the Class V Underground Injection Control (UIC) Study, consists of 23 volumes and five supporting appendices. Volume 1 provides an overview of the study methods, the USEPA UIC Program, and general findings. Volumes 2 through 23 present information summaries for each of the 23 categories of wells that were studied (Volume 21 covers 2 well categories). This volume, which is Volume 4, covers Class V wells at carwashes without engine or undercarriage cleaning.

## 1. SUMMARY

Wells used to dispose of washwater that was used to wash only the exterior of vehicles (sometimes called "wand washes") are the only carwash wells within the scope of this volume of the Class V UIC Study.[1] These are typically located at coin-operated, manual carwashes where people use hand-held hoses to wash vehicles. Even though the term "carwash" is used, the category includes wells that receive used washwater at facilities designed for washing all kinds of vehicles, including cars, vans, trucks, buses, boats on trailers, etc.

The cleaning solutions used at these carwashes generally consist of soap solutions, rinsewater, and wax, and are not expected to contain significant amounts of degreasing agents or solvents such as methylene chloride or trichloroethylene (because these wells, as defined, are not supposed to be receiving engine or undercarriage washwater, which is more likely to contain such substances). As a result, the spent washwater disposed in a carwash well (as defined in this report) primarily contains detergents, road salts, sediments, and incidental contaminants that may be washed from a vehicle's exterior, comparable to typical storm water runoff. Although there are no data on the issue, there is also concern that de-icing agents may be rinsed from cars and enter ground water. The data available on the quality of fluids entering carwash wells indicate that the concentrations of antimony, arsenic, beryllium, cadmium, lead, and thallium in the injectate typically exceed primary drinking water maximum contaminant levels (MCLs) and health advisory levels (HALs). Some samples show that ethylene glycol, methylene chloride, naphthalene, and tetrachloroethene also have exceeded primary MCLs or HALs, indicating that degreasers may in fact be working their way into the washwater at some facilities. Injectate pH and aluminum, iron, and manganese concentrations exceed secondary MCLs.

[1] Class V wells used to inject fluids from carwashes where engine or undercarriage washing is performed were classified as industrial wells and wells that receive both carwash wastewater and waste fluids from vehicle maintenance activities were classified as motor vehicle waste disposal wells in the July 29, 1998 proposed revisions to the USEPA Class V UIC regulations.

Two possible contamination incidents involving carwash wells were reported in Hawaii in the early 1990s. The nature and extent of contamination are unknown, but both wells were closed.

Although there are only these two reported contamination incidents associated with carwash wells, there is concern over the potential for such wells to be vulnerable to spills or illicit discharges. Because the facilities are usually unsupervised (meaning an attendant is not onsite), individuals may in fact 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 these drains. No actual contamination incidents associated with this kind of illicit discharge, however, were discovered during the course of this study. Industry representatives also assert that illegal dumping of unauthorized materials into drains at self-service carwashes is less of a problem now than in the past, due to increased environmental awareness and the greater availability of hazardous material collection centers.

The inventory results for these wells are very uncertain because most responses to the state and USEPA Regional survey conducted for this study did not distinguish carwash wells from other kinds of commercial or industrial wells. These survey results suggest that there are up to 4,651 documented carwash wells and approximately 7,192 estimated carwash wells in the U.S. Although the wells are documented in 14 states, 99 percent of the documented wells and 98 percent of the estimated wells are located in nine states: Alabama, Mississippi, New York, Washington, Maryland, Iowa, West Virginia, California, and Maine. Many states estimate that more than the documented number of wells exist, although these estimates are typically based only on best professional judgment and the true number of wells is unknown. As sewer system hookups become increasingly available to carwash owners, it is expected that the number of Class V carwash wells will decrease. Many states close carwash wells when they find them.

Although West Virginia permits carwash wells by rule (in accordance with the existing federal UIC program), other states with the majority of documented and estimated carwash wells are developing and implementing more extensive regulatory programs to address these wells. Specifically:

- Alabama, Maryland, Mississippi, New Hampshire, New York, and Washington (when the well meets best management practice requirements) issue individual permits.

- California requires reporting of discharges from carwash wells.

- Iowa bans carwash wells.

- Maine issues discharge licenses for new wells and permits for existing wells.

# 2. INTRODUCTION

Wells that inject wastewater from carwashes qualify as Class V injection wells as long as the wastewater is not a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) and implementing regulations. Using the existing list of Class V well types in 40 CFR §146.5(e), carwash disposal wells are either "dry wells used for the injection of wastes into a subsurface formation" (per §146.5(e)(5)), or if the wastewater is disposed via a septic system, "septic system wells used to inject the waste or effluent from ... a business establishment" (per §146.5(e)(9)). In the *1987 Class V UIC Report to Congress*, carwash wastewater disposal wells were considered to be industrial process water and waste disposal (5W20) wells (USEPA, 1987).

Carwashes are commonly divided into three types: tunnel, rollover, and wand. These different types of carwashes are characterized in the following way in USEPA's development document for effluent limitations guidelines and standards for the "auto laundries" point source category (USEPA, 1980):

- *Tunnel wash*: This is the most common type of carwash in the U.S. and is usually housed in a long building. The vehicle is pulled by a conveyer or driven through the length of the building, passing through separate washing, rinsing, waxing, and drying areas. In the washing area, detergents and water are applied and dirt is mechanically removed either by brushes or high-pressure streams of water. The vehicle is then rinsed with clean water to remove the dirt and soap. Finally, the vehicle is dried, usually by a blower. All of the used wash and rinse water is collected in a floor trench. In many tunnel washes, the wash and rinse waters are kept separate by a dam placed in the trench.

- *Rollover wash*: In a rollover wash, the vehicle remains stationary while the washing equipment passes over the vehicle. This is similar in design to exterior pressure washes that utilize high-pressure streams of water in lieu of brushes. At both of these types of carwashes, all of the wastewater is collected in a single trench, usually situated beneath the vehicle.

- *Wand wash*: In this type of wash, the car remains stationary in a garage-type structure (called a bay) while the customer washes the vehicle using a high-pressure stream of soap and water from a hand-held wand. The wash and rinse waters are typically collected in a single trench or sump.

On July 29, 1998 (63 FR 40586), USEPA proposed revisions to the Class V UIC regulations. This notice proposed to put wells used to inject fluids from carwashes into two different well categories depending on whether the carwashes perform engine or undercarriage washing (see 63 FR 40599). Wells at carwashes "that are specifically set up to perform engine or undercarriage washing" would be included in the "industrial well" category. By contrast, wells at coin-operated, manual carwashes where people use hand-held hoses to wash only the exterior of vehicles would be classified as "other industrial

wells,"[2] as would those at any other vehicle washing facility not set up to perform engine or undercarriage washing.

Following this proposed distinction, this volume of the Class V UIC study focuses only on wells that inject fluids from carwashes where no engine or undercarriage washing is performed. These are primarily wand wash facilities described above, although USEPA recognizes that engine or undercarriage washing can and does occur at some wand washes.

# 3. PREVALENCE OF WELLS

For this study, data on the number of Class V carwash wells were collected through a survey of state and USEPA Regional UIC Programs. The survey methods are summarized in Section 4 of Volume 1 of the Class V Study. Table 1 lists the numbers of Class V carwash wells in each state, as determined from this survey. The table includes the documented number and estimated number of wells in each state, along with the source and basis for any estimate, when noted by the survey respondents. If a state is not listed in Table 1, it means that the UIC Program responsible for that state indicated in its survey response that it did not have any Class V carwash wells.

Many states and USEPA Regions administering the UIC program acknowledge that wells at carwashes without engine or undercarriage cleaning probably exist, but they have not been able to determine exactly how many exist for a variety of reasons. Chief among these reasons is that many states do not permit or inventory these wells. Other states group carwash wells with wells at laundromats or with other industrial wells.

Ninety-nine percent of the documented wells and 98 percent of the estimated wells are located in nine states: Alabama, California, Iowa, Maine, Maryland, Mississippi, New York, Washington, and West Virginia. Washington reports the largest number of wells, 3,900. However, this number is an estimate based on the number of registered non-contact cooling water wells and carwash wells (both with and without engine or undercarriage cleaning) in the state. These wells are grouped together in one category and, according to state staff, cannot be differentiated in the state's records. Several other states also group carwash wells with other well categories and report a single documented number based on the total number of registered wells in those categories: New York (<174), West Virginia (<223), Alabama (<162), and New Jersey (<28). Only three other states document more than 10 carwash wells: New Hampshire (as many

[2] The wells in the proposed "other industrial well" category are: (1) wells used to inject fluids from carwashes that are not specifically set up to perform engine or undercarriage washing; (2) wells used to inject noncontact cooling water that contains no additives and has not been chemically altered; (3) wells used to inject fluids from laundromats where no onsite dry cleaning is performed or where no organic solvents are used for laundering; and (4) wells used to inject wastewater from food processing operations. The other three kinds of wells included in the other industrial well category are addressed in separate volumes of the Class V Study.

## Table 1. Inventory of Wells at Carwashes Without Undercarriage or Engine Cleaning in the U.S.

| State | Documented Number of Wells | Estimated Number of Wells | |
|---|---|---|---|
| | | Number | Source of Estimate and Methodology[1] |
| **USEPA Region 1** | | | |
| MA | 6 | >6 | No estimate provided, but state suspects more than 6 exist. |
| ME | 63 | <63 | Best professional judgement. No estimate provided, but state suspects that fewer wells exist than documented. |
| NH | 11 (response)<br>14(inventory) | 11 (response)<br>14(inventory) | The documented number of wells is inaccurate because they are found only when inspections are performed. |
| **USEPA Region 2** | | | |
| NJ | <28 | <28 | Permits database documents 28 “other industrial” wells, of which carwash wells are a subset. |
| NY | <174 | 1,000 | Estimate of 1,000 “other industrial” wells based on best professional judgement. |
| VI | 0 | 50 | Region 2 estimate based on review of inspection reports and business directory. |
| **USEPA Region 3** | | | |
| MD | 38 | >38 | No estimate provided, but state suspects more than 38 exist. |
| WV | <223 | >223 | Based on best professional judgement, state estimates that more than 223 other industrial wells exist. |
| **USEPA Region 4** | | | |
| AL | <162 | >162 | 162 represents the number of permitted other industrial wells. State estimates that more than 162 other industrial wells exist. |
| MS | 9 | 410 | Estimate based on best professional judgement; 5 carwashes in each of 82 counties. |
| **USEPA Region 5** | | | |
| MI | $8 | $8 | N/A |
| **USEPA Region 6 -- None** | | | |
| **USEPA Region 7** | | | |
| IA | NR | >1,000 | Best professional judgement based on ten years of Iowa experience and discussions with trade organizations and county sanitarians. |

**Table 1. Inventory of Wells at Carwashes Without Undercarriage or Engine Cleaning in the U.S. (Continued)**

| State | Documented Number of Wells | Estimated Number of Wells | |
|---|---|---|---|
| | | Number | Source of Estimate and Methodology[1] |
| **USEPA Region 8** | | | |
| WY | 0 | 3 | Estimate provided by Robert Lucht, Wyoming Department of Environmental Quality, Water Quality Division. |
| **USEPA Region 9** | | | |
| CA | 20 | 220 | Best professional judgement. |
| HI | 5 | 5 | N/A |
| NV | 0 | 30 | Best professional judgement and gross estimates. |
| **USEPA Region 10** | | | |
| AK | 1 | 10 | Best professional judgement. |
| OR | 0 | 25 | Wells are closed when found; the number of existing wells is not documented. |
| WA | <3,900 | >3,900 | No estimate provided, but state expects that more wells exist. |
| **All USEPA Regions** | | | |
| All States | 4,651 +/- | 7,195 +/- | As indicated above, many of these documented and estimated numbers are for all types of "other industrial" wells, of which carwash wells are a subset. |

[1] Unless otherwise noted, the best professional judgement is that of the state or USEPA Regional staff completing the survey questionnaire.

N/A Not available.

NR Not reported.

as 14), Maryland (38), and California (20). Many states estimate that more than the documented number of wells exist.

# 4. WASTEWATER CHARACTERISTICS AND INJECTION PRACTICES

Very little information is available on the characteristics of carwash well injectate. There are several reasons for this lack of data. First, these wells are often not a high priority for state programs. Instead of requesting sampling and analysis of injectate, states may simply close the wells when they are discovered. Second, wells that receive carwash water often receive wastes from car maintenance areas or from carwashes that also clean engines or undercarriages, qualifying the wells as motor vehicle

waste disposal wells or industrial wells. The injectate going into these wells is not representative of that entering carwash wells as defined for the purpose of this study.

The information that is available for carwash injectate is presented in Section 4.1 below. This is followed by a summary of the limited information available on carwash well design characteristics (Section 4.2) and operational practices (Section 4.3).

### 4.1 Injectate Characteristics

Injectate from carwashes has been shown by limited data to contain detergents, dissolved solids (salts), elevated biochemical oxygen demand levels, and elevated levels of suspended solids (sand and grit) (NC DEHNR, 1997 and USEPA, 1994). Some detergents may contain metals such as arsenic and nutrients such as phosphorus and nitrogen (ECOL, 1995). The injectate also often contains metals (lead and chromium, among others), volatile organic compounds (VOCs), and oils and grease. However, metals are not expected in appreciable concentrations at carwashes that do not perform engine or undercarriage washing.

The injectate characteristics information presented in this section is based on data from 16 carwash facilities in New York, one sampling event each in 1997 at two carwashes in Montana, sampling events at 17 carwash facilities in Maryland, and three sampling events at a combined carwash and laundromat facility in Montana in the 1997 to 1998 time period. The quality of the background or feed (i.e., source) water was not measured in any of these events, even though it could affect the quality of the injectate samples.

The New York Department of Environmental Conservation sampled 16 wells at carwashes without engine or undercarriage cleaning in Suffolk and Nassau counties, New York. The complete data set is included as Table A-1 in Attachment A to this volume. The injectate was sampled and analyzed following any type of water treatment that may have occurred, which is indicated on the table. State officials explained that, although these facilities are not set up to perform undercarriage or engine washing, it is possible that these activities could occur at the two self-service facilities. Table 2 presents a summary of the parameters for which there are MCLs and/or HALs.

The most common inorganic constituents present in the New York carwash well injectate are total Kjeldahl nitrogen (TKN), chloride, methylene blue active substance (MBAS), oil and grease, total dissolved solids (TDS), and total suspended solids (TSS). Of the detected inorganic constituents, only chloride and TDS exceeded the secondary MCLs. In addition, several metals were detected above the MCLs: aluminum, antimony, beryllium, cadmium, iron, lead, and thallium. Of these, the following metals also exceeded the HALs: antimony, arsenic, beryllium, cadmium, and thallium. Of the detected organic constituents, methylene chloride and tetrachloroethene were present above the primary MCLs.

## Table 2. Summary of Data from Car Wash Samples in New York

| Parameter | Number of Observations | Range of Concentrations (mg/l) | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|
| | | | mg/l | P/S | mg/l | N/C |
| Chloride | 14 | 10.8 - 302 | 250 | S | - | |
| Nitrite | 8 | <.05 - 0.931 | 1 | P | - | |
| Nitrate | 8 | <.05 - 3.71 | 10 | P | - | |
| TDS | 7 | 230 - 546.0 | 500 | S | - | |
| Chloroform | 5 | 0.001 - 0.057 | 0.1/0.08[†] | P | 0.6 | C |
| Ethylbenzene | 3 | 0.001 - 0.017 | 0.7 | P | 0.7 | N |
| Methylene Chloride | 3 | 0.0017 - 0.016 | 0.005 | P | - | |
| Tetrachloroethene | 1 | 0.079 | 0.005 | P | - | |
| Toluene | 4 | 0.0012 - 0.038 | 1 | P | 1 | N |
| Xylene | 1 | 0.017 | 10 | P | 10 | N |
| m+p-Xylene | 3 | 0.0045 - 0.060 | 10 | P | 10 | N |
| o-Xylene | 3 | 0.002 - 0.013 | 10 | P | 10 | N |
| Aluminum | 15 | 0.295 - 13.100 | 0.05 - 0.2 | S | - | |
| Antimony | 15 | 0.0066 - 0.123 | 0.006 | P | 0.003 | N |
| Arsenic | 1 | 0.0032 | 0.05 | P | 0.002 | C |
| Beryllium | 2 | 0.0014 - 0.026 | 0.004 | P | 0.0008 | C |
| Cadmium | 16 | 0.001 - 0.009 | 0.005 | P | 0.005 | N |
| Chromium | 15 | 0.001 - 0.0278 | 0.1 | P | 0.1 | N |
| Copper | 16 | 0.0139 - 0.460 | 1.3 | S | - | |
| Iron | 15 | 2.120 - 19.700 | 0.3 | S | - | |
| Lead | 16 | 0.0044 - 0.0598 | 0.015 | P | - | |
| Nickel | 16 | 0.0118 - 0.0682 | 0.1 | P | 0.1 | N |
| Selenium | 1 | 0.0026 | 0.05 | P | - | |
| Silver | 3 | 0.0011 - 0.007 | 0.1 | S | 0.1 | N |
| Thallium | 4 | 0.0024 - 0.0068 | 0.002 | P | 0.0005 | N |
| Zinc | 16 | 0.0895 - 0.482 | 5 | S | 2 | N |

Source: New York Department of Environmental Conservation, 1999

* Drinking Water Standards: P= Primary; S= Secondary.

** Health Advisory Levels: N= Noncancer Lifetime; C= Cancer Risk.

-No standards or advisory levels available.

[†]0.1 is the current MCL, 0.08 is the proposed rule for Disinfectants and Disinfection By-products: Total for all THMs combined cannot exceed the 0.08.

Table 3 summarizes quality data for injectate sampled at Dano's Carwash and Libby Auto, two carwash facilities in Libby, Montana, in 1997. The complete data set is included as Table A-2 in Attachment A to this volume. The samples were analyzed for the presence of several metals. Iron, lead, and manganese exceeded the MCLs. In addition, the concentration of total cadmium at Libby Auto equaled the primary MCL, and antimony exceeded the noncancer HAL. The Montana carwash well samples were not analyzed for the presence of organic constituents.

**Table 3. Summary of Data from Carwash Samples in Montana**

| Parameter | Concentrations (mg/l) | | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|
| | LibAuto | Dano | mg/l | P/S | mg/l | N/C |
| Aluminum, Total | 0.105 | 3.22 | 0.05-0.2 | S | - | |
| Antimony, Total | <0.003 | 0.004 | 0.006 | P | 0.003 | N |
| Arsenic, Total | <0.025 | <0.025 | 0.05 | P | 0.002 | C |
| Barium, Total | <1 | <1 | 2 | P | 2 | N |
| Benzene | NA | NA | 0.005 | P | 0.1 | C |
| Beryllium, Total | <0.002 | <0.002 | 0.004 | P | 0.0008 | C |
| Cadmium, Total | 0.0050 | <0.0025 | 0.005 | P | 0.005 | N |
| Chromium, Total | <0.05 | <0.05 | 0.1 | P | 0.1 | N |
| Chromium, Dissolved | <0.05 | <0.05 | 0.1 | P | 0.1 | N |
| Copper, Total | <0.5 | <0.5 | 1.3 | P | - | |
| Iron, Total | 0.91 | 3.90 | 0.3 | S | - | |
| Lead, Total | 0.0096 | 0.0172 | 0.015 | P | - | |
| Manganese, Total | 0.077 | 0.243 | 0.05 | S | - | |
| Mercury, Total | <0.001 | <0.001 | 0.002 | P | 0.002 | N |
| Nickel, Total | <0.05 | <0.05 | 0.1 | P | 0.1 | N |
| Selenium, Total | <0.025 | <0.025 | 0.05 | P | - | |
| Selenium, Dissolved | <0.025 | <0.025 | 0.05 | P | - | |
| Silver, Total | <0.025 | <0.005 | 0.1 | S | 0.1 | |
| Thallium, Total | <0.001 | <0.001 | 0.002 | P | 0.0005 | N |
| Zinc, Total | <2.5 | <2.5 | 5 | S | 2 | N |

Source: USEPA Region 8, 1999

* Drinking Water Standards: P= Primary; S= Secondary.

** Health Advisory Levels: N= Noncancer Lifetime; C= Cancer Risk.

-No standards or advisory levels available.

Table 4 displays a summary of water quality data for one sampling event at each of 17 car dealerships and car washes in Maryland. Thirteen of these facilities are new and used car dealerships or automotive sales and service facilities. Also included is one truck and construction equipment repair facility; one vehicle repair, servicing, and cleaning facility; one geotechnical construction company; and one maintenance facility for transportation vehicles. These data are for samples taken from wells receiving exterior vehicle washwater. If a parameter is not included in the table, it was either not detected or the sample was not analyzed for that parameter. The complete data set is included as Table A-3 in Attachment A to this volume. Measurements of pH exceeded the upper end of the secondary MCL range, with two of five samples above the range. Two metals, cadmium and iron, exceeded MCLs. Cadmium was the only inorganic constituent reported above the HALs. A large number of organic constituents were reported above detection limits in the Maryland carwash samples. Three of these organic constituents were reported at levels above the MCLs and HALs: ethylene glycol, naphthalene, and tetrachloroethene.

On March 19, 1992, the Jackson Hole Airport Rental Carwash septic system in Jackson, Wyoming was sampled. Table 5 presents the water quality data from this sampling event. None of the organic or inorganic constituents were reported above the MCLs or HALs.

A&J Suds and Scrub in Libby, Montana, submitted the results of three sampling events as part of the requirements for a UIC permit. The facility's well receives a combination of carwash and laundromat effluent. As a result, the injectate data are not entirely representative of carwash well injectate. Table 6 summarizes these data; the complete data set is included as Table A-4 in Attachment A to this volume. Several of the metals were reported above the MCLs: aluminum, cadmium, iron, lead, and manganese. The cadmium concentration also exceeded the noncancer HAL. None of the organic constituents were present in concentrations above the MCLs or HALs.

### 4.2 Well Characteristics

Figures 1 and 2 display standard treatment systems for wand wash carwash facilities in Tennessee. Based on these diagrams, some wells consist of septic systems and/or sand filters. Others may simply be dry wells.

Arkansas strongly suggests that car and truck washing facilities include a grit chamber and grease trap in the design of their injection wells; however, this is not a requirement (ADPC&E, 1996). In Wyoming, carwash septic systems are designed to accommodate 200 gallons per vehicle unless they can show that they use a lesser amount based on the design of an automatic system (WYDEQ/WQD, 1999). No additional information is available on the design, construction, or siting of carwash wells.

## Table 4. Summary of Data from Carwash Samples in Maryland

| Parameter | Number of Detections | Range of Concentrations (mg/l) | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|
| | | | mg/l | P/S | mg/l | N/C |
| pH | 7 | 3.5 - 9.5 | 6.5 - 8.5 | S | - | |
| Benzene | 1 | 0.004 | 0.005 | P | 0.1 | C |
| Chloride | 1 | 26 | 250 | S | - | |
| 1,2-Dichlorobenzene | 1 | 0.009 | 0.6 | P | 0.6 | N |
| 1,4-Dichlorobenzene | 1 | 0.0065 | 0.075 | P | 0.075 | N |
| Diethyl Phthalate | 3 | 0.012 - 0.019 | - | | 5 | N |
| Ethylene Glycol | 9 | <.01% - 9.6 | - | | 7 | N |
| Ethylbenzene | 3 | 0.025 - 0.182 | 0.7 | P | 0.7 | N |
| Methylene Chloride | 1 | 0.004 | 0.005 | P | - | |
| Naphthalene | 4 | 0.0074 - 4.620 | - | | 0.02 | N |
| Tetrachloroethene | 2 | 0.002 - 0.022 | 0.005 | P | - | |
| Toluene | 6 | 0.016 - 0.077 | 1 | P | 1 | N |
| Xylene | 1 | 0.057 | 10 | P | 10 | N |
| Cadmium | 1 | 0.016 | 0.005 | P | 0.005 | N |
| Chromium | 1 | 0.008 | 0.1 | P | 0.1 | N |
| Iron | 1 | 2.4 | 0.3 | S | - | |
| Lead | 1 | 0.013 | 0.015 | P | - | |
| Magnesium | 1 | 14 | - | | - | |
| Nickel | 1 | 0.055 | 0.1 | P | 0.1 | N |
| Zinc | 1 | 0.24 | 5 | S | 2 | N |

Source: Maryland Department of the Environment, 1999

-No standards or advisory levels available.

* Drinking Water Standards: P= Primary; S= Secondary.

** Health Advisory Levels: N= Noncancer Lifetime; C= Cancer Risk.

**Table 5. Data from Carwash Samples Taken at Jackson Hole Airport Carwash Facility**

| Parameter | Concentration (mg/l) | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|
| | | mg/l | P/S | mg/l | N/C |
| Ammonia (as N) | 0.55 | - | | 30 | N |
| Benzene | 0.0006 | 0.005 | P | 0.1 | C |
| Chloride | 12 | 250 | S | - | |
| Ethylbenzene | 1.0 | 0.7 | P | 0.7 | N |
| Methylene Chloride | <1 | 0.005 | P | - | |
| Nitrate | 0.25 | 10 | P | - | |
| TDS | 372 | 500 | S | - | |
| Total Phenols | <0.05 | - | | 4 | N |
| 1,2-Dichlorobenzene | <0.001 | 0.6 | P | 0.6 | N |
| 1,4-Dichlorobenzene | <0.001 | 0.075 | P | 0.075 | N |
| 1,1-Dichloroethane | <0.001 | - | | - | |
| 1,2-Dichloroethane | <0.001 | 0.005 | P | 0.04 | C |
| 1,2-Dichloroethene | <0.001 | - | | - | |
| 1,2-Dichloropropane | 0.0026 | 0.005 | P | 0.06 | C |
| Tetrachloroethene | <0.001 | 0.005 | P | - | |
| Trichloroethene | <0.001 | 0.005 | P | 0.3 | C |
| 1,1,1-Trichloroethane | <0.001 | 0.2 | P | 0.2 | N |
| Toluene | <0.0005 | 1 | P | 1 | N |
| Total Xylenes | 0.0075 | 10 | P | 10 | N |
| Arsenic | <0.05 | 0.05 | P | 0.002 | C |
| Barium | 1.23 | 2 | P | 2 | N |
| Cadmium | <0.001 | 0.005 | P | 0.005 | N |
| Chromium | <0.05 | 0.1 | P | 0.1 | N |
| Lead | <0.005 | 0.015 | P | - | |
| Mercury | <0.001 | 0.002 | P | 0.002 | N |
| Selenium | <0.005 | 0.05 | P | - | |
| Silver | <0.05 | - | | 0.1 | N |

## Table 5. Data from Carwash Samples Taken at Jackson Hole Airport Carwash Facility

| Parameter | Concentration (mg/l) | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|
| | | mg/l | P/S | mg/l | N/C |

Source: WDEQ/WQD, 1999

-No standards or advisory levels available.

* Drinking Water Standards: P= Primary; S= Secondary.

** Health Advisory Levels: N= Noncancer Lifetime; C= Cancer Risk.

## Table 6. Summary of Water Quality Data from A&J Suds & Scrub Libby, Montana

| Parameter | Concentrations (mg/l) | | | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|---|
| | 11/05/97 | 1/12/98 | 7/27/98 | mg/l | P/S | mg/l | N/C |
| Aluminum, Total | 13 | NA | NA | 0.05-0.2 | S | - | |
| Antimony, Total | <0.003 | NA | NA | 0.006 | P | 0.003 | N |
| Arsenic, Total | <0.025 | NA | NA | 0.05 | P | 0.002 | C |
| Barium, Total | <1 | NA | NA | 2 | P | 2 | N |
| Benzene | NA | <0.0005 | <0.0005 | 0.005 | P | 0.1 | C |
| Beryllium, Total | <0.002 | NA | NA | 0.004 | P | 0.0008 | C |
| Bromodichloromethane | NA | <0.0005J † | <0.0005 | 0.1/0.08‡ | P | 0.06 | C |
| Bromoform | NA | <0.0005 | <0.0005 | 0.1/0.08‡ | P | 0.4 | C |
| Bromomethane | NA | <0.0005 | <0.0005 | - | | 0.01 | N |
| Cadmium, Total | 0.0064 | NA | NA | 0.005 | P | 0.005 | N |
| Carbon Tetrachloride | NA | <0.0005 | <0.0005 | 0.005 | P | 0.03 | C |
| Chlorodibromomethane | NA | <0.0005 | <0.0005 | 0.1/0.08‡ | P | 0.06 | N |
| Chloroform | NA | 0.015 | 0.009 | 0.1/0.08‡ | P | 0.6 | C |
| Chloromethane | NA | <0.0005 | <0.0005 | - | | 0.003 | N |
| 2-Chlorotoluene | NA | <0.0005 | <0.0005 | - | | 0.1 | N |
| 4-Chlorotoluene | NA | <0.0005 | <0.0005 | - | | 0.1 | N |
| Chromium, Total | <0.05 | NA | NA | 0.1 | P | 0.1 | N |
| Copper, Total | <0.5 | NA | NA | 1.3 | P | - | |
| 1,2-Dichlorobenzene | NA | <0.0005 | <0.0005 | 0.6 | P | 0.6 | N |
| 1,3-Dichlorobenzene | NA | <0.0005 | <0.0005 | - | | 0.6 | N |
| 1,4-Dichlorobenzene | NA | <0.0005 | <0.0005 | 0.075 | P | 0.075 | N |

## Table 6. Summary of Water Quality Data from A&J Suds & Scrub Libby, Montana (Continued)

| Parameter | Concentrations (mg/l) | | | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|---|
| | 11/05/97 | 1/12/98 | 7/27/98 | mg/l | P/S | mg/l | N/C |
| Dichlorodifluoromethane | NA | <0.0005 | <0.0005 | - | | 1.0 | N |
| 1,2-Dicholoroethane | NA | <0.0005 | <0.0005 | 0.005 | P | 0.04 | C |
| 1,1-Dichloroethene | NA | <0.0005 | <0.0005 | 0.007 | P | 0.007 | N |
| cis-1,2-Dichloroethene | NA | <0.0005 | <0.0005 | 0.07 | P | 0.07 | N |
| trans-1,2-Dichloroethene | NA | <0.0005 | <0.0005 | 0.1 | P | 0.1 | N |
| 1,2-Dichloropropane | NA | <0.0005 | <0.0005 | 0.005 | P | 0.06 | C |
| Ethylbenzene | NA | <0.0005 | <0.0005 | 0.7 | P | 0.7 | N |
| Fluorotrichloromethane | NA | <0.0005 | <0.0005 | - | | 2 | N |
| Hexachlorobutadiene | NA | <0.0005 | <0.0005 | - | | 0.001 | N |
| Iron, Total | 12.5 | NA | NA | 0.3 | S | - | |
| Lead, Total | 0.0453 | NA | NA | 0.015 | P | - | |
| Manganese, Total | 0.474 | NA | NA | 0.05 | S | - | |
| Mercury, Total | <0.001 | NA | NA | 0.002 | P | 0.002 | N |
| Methylene chloride | NA | <.0005 | 0.00081 | .005 | P | - | |
| Naphthalene | NA | <0.0005J† | 0.00056 | - | | 0.02 | N |
| Nickel, Total | <0.05 | NA | NA | 0.1 | P | 0.1 | N |
| Selenium, Total | <0.025 | NA | NA | 0.05 | P | - | |
| Silver, Total | <0.005 | NA | NA | 0.1 | S | 0.1 | N |
| Styrene | NA | <0.0005 | <0.0005 | 0.1 | P | 0.1 | N |
| 1,1,1,2-Tetrachloroethane | NA | <0.0005 | <0.0005 | - | | 0.07 | N |
| 1,2,3-Trichloropropane | NA | <0.0005 | <0.0005 | - | | 0.04/0.5 | N/C |
| Tetrachloroethene | NA | 0.00085 | 0.00085 | .005 | P | - | |
| Thallium, Total | <0.001 | NA | NA | 0.002 | P | 0.0005 | N |
| Toluene | NA | <0.0005J † | 0.0021 | 1 | P | 1 | N |
| 1,2,4-Trichlorobenzene | NA | <0.0005 | <0.0005 | 0.07 | P | 0.07 | N |
| 1,1,1-Trichloroethane | NA | <0.0005 | <0.0005 | 0.2 | P | 0.2 | N |
| 1,1,2-Trichloroethane | NA | <0.0005 | <0.0005 | 0.005 | P | 0.003 | N |
| Vinyl Chloride | NA | <0.0005 | <0.0005 | 0.002 | P | 0.0015 | C |

## Table 6. Summary of Water Quality Data from A&J Suds & Scrub Libby, Montana (Continued)

| Parameter | Concentrations (mg/l) | | | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|---|
| | 11/05/97 | 1/12/98 | 7/27/98 | mg/l | P/S | mg/l | N/C |
| Xylenes | NA | <0.0005J † | 0.00059 | 10 | P | 10 | N |
| m+p-Xylene | NA | 0.0005J † | 0.00059 | 10 | P | 10 | N |
| o-Xylene | NA | <0.0005 | <0.0005 | 10 | P | 10 | N |
| Zinc, Total | <2.5 | NA | NA | 5 | S | 2 | N |

Source: USEPA Region 8, 1999

* Drinking Water Standards: P= Primary; S= Secondary.

** Health Advisory Levels: N= Noncancer Lifetime; C= Cancer Risk.

NA = Not analyzed for that constituent.

- No standards or advisory levels available.

† J = Estimated value. Present, but less than the limit of quantitation.

‡ 0.1 is the current MCL, 0.08 is the proposed rule for Disinfectants and Disinfection By-products: Total for all THMs combined cannot exceed the 0.08.

**Figure 1. Carwash Designed with Sand Filter Oil/Water Separator**

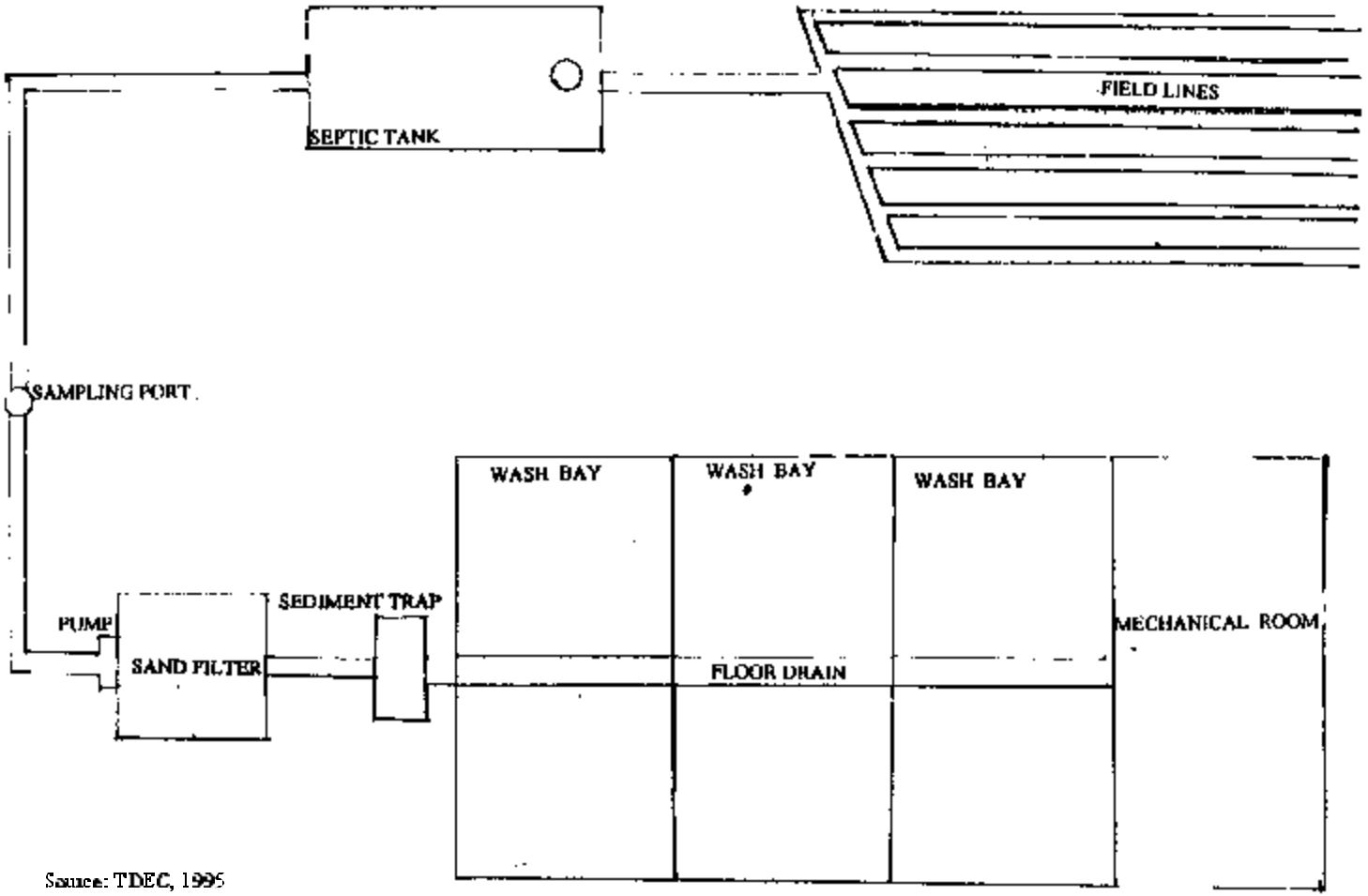
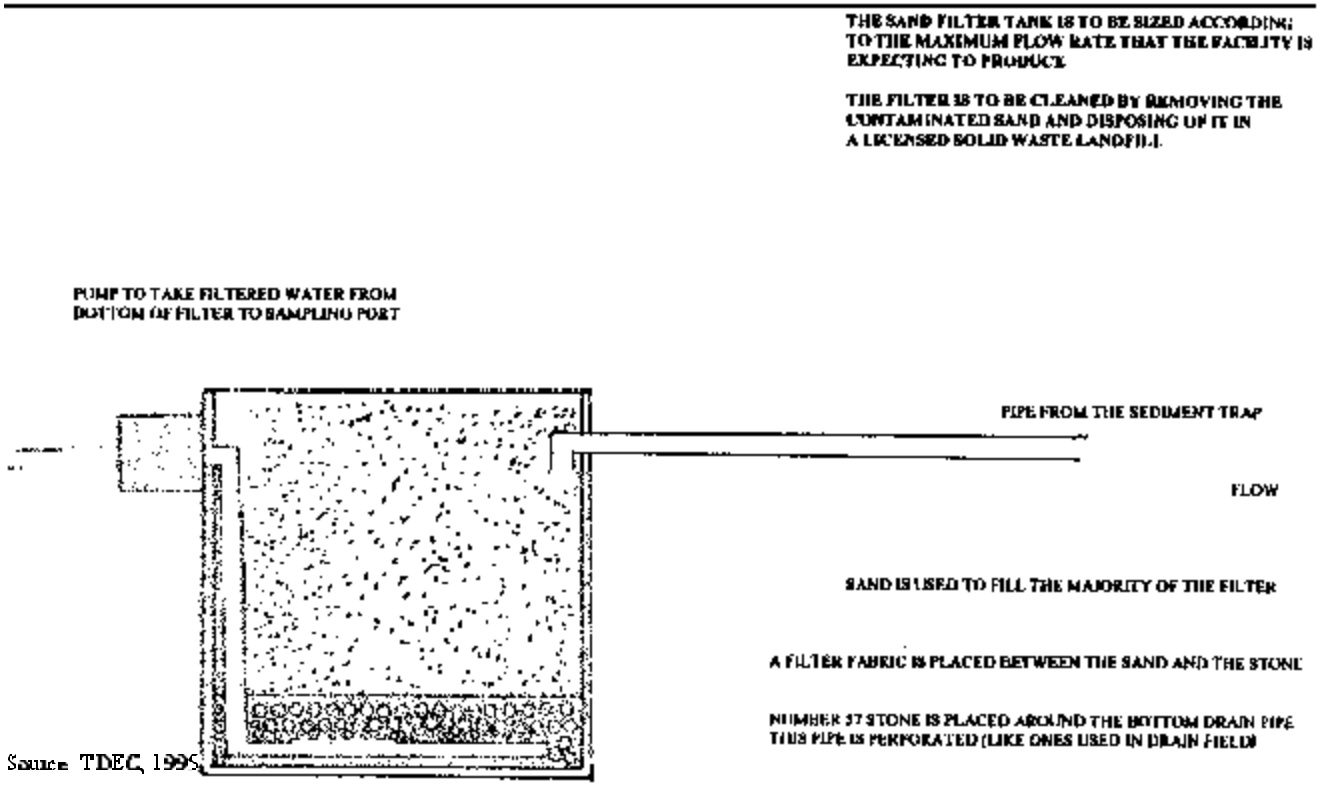


**Figure 2. Sand Filter Oil/Water Separator Design**




Source: TDEC, 1999

# 5. POTENTIAL AND DOCUMENTED DAMAGE TO USDWs

## 5.1 Injectate Constituent Properties

The primary constituent properties of concern when assessing the potential for Class V carwash wells to adversely affect USDWs are toxicity, persistence, and mobility. The toxicity of a constituent is the potential of that contaminant to cause adverse health effects if consumed by humans. Appendix D of the Class V Study provides information on the health effects associated with contaminants found above drinking water standards or health advisory limits in the injectate of carwash wells and other Class V wells. As discussed in Section 4.1, the contaminants that have been observed above drinking water standards (i.e., MCLs) or HALs in carwash well injectate are aluminum, antimony, arsenic, beryllium, cadmium, iron, lead, thallium, manganese, chloride, pH, TDS, ethylene glycol, methylene chloride, naphthalene, and tetrachloroethene.

Persistence is the ability of a chemical to remain unchanged in composition, chemical state, and physical state over time. Appendix E of the Class V Study presents published half-lives of common constituents in fluids released in carwash wells and other Class V wells. All of the values reported in Appendix E are for ground water. Caution is advised in interpreting these values because ambient conditions have a significant impact on the persistence of both inorganic and organic compounds. Appendix E also provides a discussion of mobility of certain constituents found in the injectate of carwash wells and other Class V wells.

## 5.2 Observed Impacts

Hawaii state officials report that two possible contamination incidents resulted from the injection of carwash water into a Class V well. First, Budget Rent-A-Car near the Hilo, Hawaii, airport owned and operated a dry well to which they discharged carwash water. Although the nature and extent of contamination were unknown, USEPA issued an administrative order in 1991 for the facility to install a system that recycled the carwash water, and the facility complied. Second, the McKinley Carwash in Honolulu, Hawaii, disposed of carwash water into an oil/water separator with an injection well a few blocks from a lagoon. Although the nature and extent of contamination were unknown, the well was closed (Cadmus, 1999).

Five public commenters on the July 29, 1998 Class V proposed rule (63 FR 40586) described incidents observed at self-service carwashes, where solvents have been used and engine cleaning activities have occurred, resulting in potentially dangerous fluids being disposed in floor drains at these facilities. Some commenters added that VOC contamination of ground water might have been caused by the misuse of solvents at carwashes without engine or undercarriage cleaning. However, none of these commenters provided documentation of any contamination incidents (USEPA, 1998).

# 6. BEST MANAGEMENT PRACTICES

When possible, effluent from carwashes should be discharged to sewer systems or holding tanks, thus reducing the amount of injected wastewater. When discharge to a sewer system or holding tank is not possible, the amount of effluent entering the injection well can be reduced by capturing and recycling as much water as possible, using filters, oil/water separators with recyclable absorbents, reclamation systems, and other appropriate technologies. Using these practices, some carwashes currently recycle 100 percent of their captured waste water (USEPA, 1992).

The State of Washington has published a best management practices (BMP) manual for carwashes entitled "Vehicle and Equipment Washwater Discharges: Best Management Practices Manual." The manual states that an acceptable treatment system should be constructed with a gravity separation unit (e.g., an API Separator, Coalescing Plate Separator, or a containment sump with a gravity separation overflow and positive control valve). Also, the effluent should be treated after gravity separation to further remove residual oil and metals. The manual recommends that a 4 to 5 foot deep multimedia filter (e.g., a multimedia peat sand filter) be used to remove heavy metals. Sampling ports should be installed to facilitate sampling of the influent and effluent of the treatment system and gravity separation unit. With proper operation and maintenance of the system, the average total suspended solids should be less than 75 ppm, while oil and gas should be less than 10 ppm. The treatment system should not be located above the frost line and it should not produce an effluent that will exceed the state ground water quality standards. Sanitary wastes should not be discharged in to the treatment system (ECOL, 1995). The manual also outlines a maintenance program for the carwash well treatment system, which should include the following steps:

- Daily inspection and weekly cleaning of grit traps.
- Maintenance of gravity separation units according to manufacturer's recommended maintenance procedures.
- Regular monitoring of treated effluent is recommended. Oil and grease should be monitored every six months and metals should be monitored annually.
- Multimedia filters should be replaced as necessary.
- Solids removed from the treatment system should be disposed of in a manner that does not cause pollution to waters of the state (disposal methods may include sanitary landfill disposal).
- A log of all maintenance activities should be kept at the site and made available to the Washington State Department of Ecology and/or local authorities when requested.

In 1996, the New York State Department of Environmental Conservation (NYDEC) issued a guidance memorandum on vehicle washing with plain water. According to the memorandum, any facility should conduct all vehicle maintenance operations in a dedicated area that ensures proper disposal of any incidental or accidental spillage of fluids. The facility should use only clean water, as opposed to water that has already been used for cleaning, when washing vehicles and washing should be done in a manner to minimize runoff. Runoff should be directed away from surface waters to the extent practicable. The facility also should take measures to reduce water usage (e.g., the use of high pressure wands which make cleaning more effective in a shorter period of time) (NYDEC, 1996).

The Southwest Carwash Association provides carwash operators with large signs to be placed in public view that outline USEPA regulations and the harmful effects of illegal dumping (Space, 1998).

Finally, the contaminant load of the injectate can be reduced by regularly inspecting treatment equipment, tanks, and chemical containers for leaks; calibrating treatment and application equipment regularly; and using biodegradable soaps and chemicals instead of solvent-based solutions. Accumulated pit dirt should be processed to separate solids, contaminants, and wastewater. Dried pit dirt and residual liquid waste should then be hauled to waste disposal sites in accordance with federal, state, and local waste disposal regulations (USEPA, 1992).

# 7. CURRENT REGULATORY REQUIREMENTS

Several federal, state, and local programs exist that either directly manage or regulate Class V carwash wells. On the federal level, management and regulation of these wells falls primarily under the UIC program authorized by the Safe Drinking Water Act (SDWA). Some states and localities have used these authorities, as well as their own authorities, to extend the controls in their areas to address concerns associated with carwash wells.

## 7.1 Federal Programs

### 7.1.1 SDWA

Class V wells are regulated under the authority of Part C of SDWA. Congress enacted the SDWA to ensure protection of the quality of drinking water in the United States, and Part C specifically mandates the regulation of underground injection of fluids through wells. USEPA has promulgated a series of UIC regulations under this authority. USEPA directly implements these regulations for Class V wells in 19 states or territories (Alaska, American Samoa, Arizona, California, Colorado, Hawaii, Indiana, Iowa, Kentucky, Michigan, Minnesota, Montana, New York, Pennsylvania, South Dakota, Tennessee, Virginia, Virgin Islands, and Washington, DC). USEPA also directly implements all Class V UIC programs on Tribal lands. In all other states, which are called Primacy States, state agencies implement the Class V UIC program, with primary enforcement responsibility.

Carwash wells currently are not subject to any specific regulations tailored just for them, but rather are subject to the UIC regulations that exist for all Class V wells. Under 40 CFR 144.12(a), owners or operators of all injection wells, including carwash wells, are prohibited from engaging in any injection activity that allows the movement of fluids containing any contaminant into USDWs, “if the presence of that contaminant may cause a violation of any primary drinking water regulation . . . or may otherwise adversely affect the health of persons.”

Owners or operators of Class V wells are required to submit basic inventory information under 40 CFR 144.26. When the owner or operator submits inventory information and is operating the well such that a USDW is not endangered, the operation of the Class V well is authorized by rule. Moreover, under section 144.27, USEPA may require owners or operators of any Class V well, in

USEPA-administered programs, to submit additional information deemed necessary to protect USDWs. Owners or operators who fail to submit the information required under sections 144.26 and 144.27 are prohibited from using their wells.

Sections 144.12(c) and (d) prescribe mandatory and discretionary actions to be taken by the UIC Program Director if a Class V well is not in compliance with section 144.12(a). Specifically, the Director must choose between requiring the injector to apply for an individual permit, ordering such action as closure of the well to prevent endangerment, or taking an enforcement action. Because carwash wells (like other kinds of Class V wells) are authorized by rule, they do not have to obtain a permit unless required to do so by the UIC Program Director under 40 CFR 144.25. Authorization by rule terminates upon the effective date of a permit issued or upon proper closure of the well.

USEPA Region 2 requires operators of manned carwash facilities to submit additional information, including: explanations of the facility's operating practices, materials safety data sheets for chemicals used at the facility, sampling results from sludge in the well, and a site maintenance plan. Additionally, operators must post a sign in the washing bay indicating that only the top and side of a vehicle should be washed, and that only environmentally sound soaps and waxes (i.e., those that are biodegradable and nontoxic) should be used. If a carwash is unmanned, Region 2 requires the facility to apply for a Class V UIC permit (Cadmus, 1999).

Separate from the UIC program, the SDWA Amendments of 1996 establish a requirement for source water assessments. USEPA published guidance describing how the states should carry out a source water assessment program within the state's boundaries. The final guidance, entitled *Source Water Assessment and Programs Guidance* (USEPA 816-R-97-009), was released in August 1997.

State staff must conduct source water assessments that are comprised of three steps. First, state staff must delineate the boundaries of the assessment areas in the state from which one or more public drinking water systems receive supplies of drinking water. In delineating these areas, state staff must use "all reasonably available hydrogeologic information on the sources of the supply of drinking water in the state and the water flow, recharge, and discharge and any other reliable information as the state deems necessary to adequately determine such areas." Second, the state staff must identify contaminants of concern, and for those contaminants, they must inventory significant potential sources of contamination in delineated source water protection areas. Class V wells, including carwash wells, should be considered as part of this source inventory, if present in a given area. Third, the state staff must "determine the susceptibility of the public water systems in the delineated area to such contaminants." State staff should complete all of these steps by May 2003 according to the final guidance.[3]

[3] May 2003 is the deadline including an 18-month extension.

### 7.1.2 CWA

Pursuant to a 1976 settlement agreement and subsequently the 1977 Clean Water Act (CWA) Amendments, USEPA was required to develop a program and adhere to a schedule in promulgating effluent limitations guidelines and pretreatment standards for 65 toxic pollutants and classes of pollutants for 21 major industries. The "Auto and Other Laundries Point Source Category" was one of the categories mandated for study and possible effluent limitations guidelines and standards development by the 1976 Settlement Agreement. However, in 1982, the auto and other laundries category, which included carwashes, was excluded from regulation. As a result, the only federal program that address special carwash wells are those under the SDWA.

## 7.2 State and Local Programs

As discussed in Section 3 above, 99 percent of the documented and 98 percent of the estimated carwash wells in the nation exist in nine states: Alabama, California, Iowa, Maine, Maryland, Mississippi, New York, Washington, and West Virginia. Attachment B to this volume describes how each of these states, in addition to New Hampshire and Wyoming, currently control carwash wells.

The statutory and regulatory frameworks for injection wells associated with carwash facilities in the states that report having the most carwash wells fall into two major groups.

- In the three states in which the Class V UIC program is directly implemented by USEPA--California, Iowa, and New York--the states have additional requirements for Class V wells above and beyond the existing federal program. In California, Regional Water Quality Control Boards can prescribe requirements for discharges to injection wells. In Iowa, unless carwash wastewater can be shown to be sanitary waste, it is banned from disposal in onsite wastewater treatment and disposal systems. Finally, New York requires State Pollution Discharge Elimination System (SPDES) permits for discharges to ground water.

- Primacy states for Class V wells apply a range of requirements to carwash wells. Alabama, Mississippi, Maryland, Wyoming, and New Hampshire issue individual permits. Washington also issues individual permits to existing wells as long as carwash wells meet BMP requirements. However, Washington prohibits all new Class V injection wells that inject industrial, municipal, or commercial waste fluids into or above a USDW.

- New Hampshire and Maryland require sampling and testing of effluent, and New Hampshire also requires ground water sampling and testing. Carwash wells in West Virginia are authorized by rule unless the Office of Water Resources requires an individual permit. Maine requires a waste discharge license for Class V injection wells.

# ATTACHMENT A
# INJECTATE QUALITY DATA FOR WELLS THAT INJECT FLUID FROM CARWASHES WITHOUT ENGINE OR UNDERCARRIAGE CLEANING

## Table A-1. Results of 16 Car Wash Samplings in New York

| Parameter | Type of Treatment | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | None | SET | SET | F | F & SET | F & SET /SS | SET | SET | SET | SET | SET | SET | SET | SET | SET | SET/SS |
| Chloride (mg/l) | 63.8 | 85.1 | 30.1 | 8.86 | 10.8 | 48.2 | 103 | 47.9 | 302 | NA | NA | 83.3 | 108 | 53.2 | 78 | 230 |
| MBAS (mg/l) | .135 | .165 | .204 | <.025 | 20.5 | 6.2 | <.025 | <.025 | 45.8 | <.025 | <.025 | <.025 | 47.8 | 2.77 | 3.44 | 2.17 |
| TKN (mg/l) | 5.6 | 3.22 | 2.8 | NA | NA | NA | NA | NA | 7.8 | .56 | .56 | NA | NA | .28 | .56 | 1.54 |
| Nitrite (mg/l) | <.05 | <.05 | <.05 | NA | NA | NA | NA | NA | NA | .106 | <.05 | NA | NA | .931 | <.05 | <.05 |
| Nitrate (mg/l) | <.05 | <.05 | <.05 | NA | NA | NA | NA | NA | NA | <.05 | ..268 | NA | NA | 3.71 | <.05 | <.05 |
| Oil&Grease (mg/l) | <.05 | 21.2 | 16.4 | 6.0 | <5.0 | 6.8 | 13.8 | 18.8 | 30.4 | 51.8 | 79.2 | 5.4 | <5.0 | 3.4 | 15.9 | 34.4 |
| TDS (mg/l) | NA | NA | NA | NA | NA | NA | NA | NA | NA | 353 | 383 | 253 | 353 | 230 | 433 | 546 |
| TSS (mg/l) | 26 | 25.0 | 44.0 | 14.0 | 21 | 39 | 31.0 | 20.0 | 126 | 42.0 | 86.0 | 44.0 | <10 | 60 | 14 | 58 |
| Chloroform (mg/l) | .057 | | | | .001 | .012 | | .0053 | | | .001 | | | | | |
| Ethylbenzene (mg/l) | | | | | | .003 | | .017 | | | .001 | | | | | |
| Methylene Chloride (mg/l) | | | .016 | .0017 | | | | | | | | | | .0052 | | |
| Tetrachloroethene (mg/l) | | | | | | .079 | | | | | | | | | | |
| Toluene (mg/l) | | .038 | | | | .002 | | | | | .0026 | .0012 | | | | |
| Xylene (mg/l) | | | | | | .017 | | | | | | | | | | |
| m+p-Xylene (mg/l) | | | | | | | | .060 | | .058 | .0045 | | | | | |
| o-Xylene (mg/l) | | | | | | | | .031 | | .013 | .002 | | | | | |
| Aluminum (mg/l) | .563 | .769 | 1.830 | NA | .365 | 8.730 | 1.65 | 2.95 | 1.350 | .421 | .480 | .310 | .559 | 13.100 | 1.010 | 2.510 |

## Table A-1. Results of 16 Car Wash Samplings in New York (Continued)

| Parameter | Type of Treatment | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | None | SET | SET | F | F & SET | F & SET /SS | SET | SET | SET | SET | SET | SET | SET | SET | SET | SET/SS |
| Antimony (mg/l) | .0197 | .0301 | .0227 | .0129 | .0122 | .0066 | .0633 | .0132 | .123 | .0090 | .0176 | | .0127 | .018 | .0094 | .0129 |
| Arsenic (mg/l) | | | | | | | | | .0032 | | | | | | | |
| Beryllium (mg/l) | | | | | .0014 | .026 | | | | | | | | | | |
| Cadmium (mg/l) | .0036 | .0034 | .0057 | .0016 | .0039 | .00095 | .0054 | .0011 | .0013 | .0021 | .0027 | .0010 | .0050 | .0012 | .0010 | .0090 |
| Chromium (mg/l) | .0095 | .0148 | .0105 | | .0107 | .0010 | .0250 | .0055 | .0227 | .0052 | .0063 | .0073 | .0192 | .0278 | .0176 | .0112 |
| Copper (mg/l) | .214 | .183 | .195 | .0234 | .0139 | .0167 | .285 | .0807 | .460 | .111 | .118 | .0492 | .0924 | .168 | .126 | .119 |
| Iron (mg/l) | 2.380 | 3.580 | 4.720 | NA | 3.240 | 2.940 | 6.540 | 2.120 | 12.20 | 2.660 | 4.350 | 3.040 | 2.910 | 19.700 | 2.190 | 4.490 |
| Lead (mg/l) | .0212 | .0305 | .0278 | .028 | .0182 | .0044 | .0382 | .0107 | .0598 | .0130 | .0140 | .0079 | .0320 | .0265 | .0174 | .0258 |
| Nickel (mg/l) | .0216 | .0203 | .0347 | .0129 | .0195 | .0682 | .0331 | .0132 | .0318 | .017 | .0155 | .0168 | .0177 | .0192 | .0118 | .0327 |
| Selenium (mg/l) | | | | | | .0026 | | | | | | | | | | |
| Silver (mg/l) | .0016 | .0011 | | | | | .0070 | | | | | | | | | |
| Thallium (mg/l) | | | | | | .0024 | | | | | | | | .0068 | .0056 | .0059 |
| Zinc (mg/l) | .253 | .295 | .435 | .0895 | .264 | .257 | .396 | .160 | .464 | .268 | .364 | .139 | .369 | .280 | .250 | .482 |

Source: NYDEC, 1999
SET: Settling Tanks
F: Filter
S/S: Self Service Facility
NA: Not Analyzed

## Table A-2. Data from Carwash Samplings in Montana

| Parameter | Concentrations (mg/l) | | Drinking Water Standards | | Health Advisory Levels | |
|---|---|---|---|---|---|---|
| | LibAuto | Dano | mg/l | P/S | mg/l | N/C |
| Aluminum, Total | 0.105 | 3.22 | 0.05-0.2 | S | - | |
| Aluminum, Dissolved | 0.031 | 0.289 | - | | - | |
| Antimony, Total | <0.003 | 0.004 | 0.006 | P | 0.003 | N |
| Antimony, Dissolved | <0.003 | <0.003 | - | | - | |
| Arsenic, Total | <0.025 | <0.025 | 0.05 | P | 0.002 | C |
| Arsenic, Dissolved | <0.025 | <0.025 | - | | - | |
| Barium, Total | <1 | <1 | 2 | P | 2 | N |
| Barium, Dissolved | <1 | <1 | - | | - | |
| Beryllium, Total | <0.002 | <0.002 | 0.004 | P | 0.0008 | C |
| Beryllium, Dissolved | <0.002 | <0.002 | - | | - | |
| Cadmium, Total | 0.0050 | <0.0025 | 0.005 | P | 0.005 | N |
| Cadmium, Dissolved | 0.0044 | <0.0025 | - | | - | |
| Chromium, Total | <0.05 | <0.05 | 0.1 | P | 0.1 | N |
| Chromium, Dissolved | <0.05 | <0.05 | 0.1 | P | 0.1 | N |
| Copper, Total | <0.5 | <0.5 | 1.3 | P | - | |
| Copper, Dissolved | <0.5 | <0.5 | -- | | - | |
| Iron, Total | 0.91 | 3.90 | 0.3 | S | - | |
| Iron, Dissolved | 0.44 | 0.53 | - | | - | |
| Lead, Total | 0.0096 | 0.0172 | 0.015 | P | - | |
| Lead, Dissolved | <0.0075 | <0.0075 | - | | - | |
| Manganese, Total | 0.077 | 0.243 | 0.05 | S | - | |
| Manganese, Dissolved | 0.072 | 0.202 | - | | - | |
| Mercury, Total | <0.001 | <0.001 | 0.002 | P | 0.002 | N |
| Mercury, Dissolved | <0.001 | <0.001 | - | | - | |
| Nickel, Total | <0.05 | <0.05 | 0.1 | P | 0.1 | N |
| Nickel, Dissolved | <0.05 | <0.05 | - | | - | |
| Selenium, Total | <0.025 | <0.025 | 0.05 | P | - | |

## Table A-2. Data from Carwash Samplings in Montana (Continued)

| Parameter | Concentrations (mg/l) | | Drinking Water Standards | | Health Advisory Levels | |
|---|---|---|---|---|---|---|
| | LibAuto | Dano | mg/l | P/S | mg/l | N/C |
| Selenium, Dissolved | <0.025 | <0.025 | 0.05 | P | - | |
| Silver, Total | <0.025 | <0.005 | 0.1 | S | 0.1 | |
| Silver, Dissolved | <0.025 | <0.005 | - | | - | |
| Thallium, Total | <0.001 | <0.001 | 0.002 | P | 0.0005 | N |
| Thallium, Dissolved | <0.001 | <0.001 | - | | - | |
| Zinc, Total | <2.5 | <2.5 | 5 | S | 2 | N |
| Zinc, Dissolved | <2.5 | <2.5 | - | | - | |

Source: USEPA Region 8, 1999

*J = Estimated value. Present, but less than the limit of quantitation.

**0.1 Current MCL, 0.08 is the proposed rule for Disinfectants and Disinfection By-products: Total for all THMs combined cannot exceed the 0.08.

-No standards or advisory levels available.

## Table A-3. Results of Car Wash Samplings in Maryland

| Parameter | Preston Ford* | Grimes Truck Center† | Village Volvo* | Fuller * | Gam-bacorta* | Nevi-aser* | McCoy * | Attention to Detail Auto Salon, Inc.‡ | Barrett * | Carlton Massey Inc.* | County* | Dave Wilson* | Frostrom & Sons, Inc.* | Good News Salisbury* | Hayward Baker Inc** | Preston * | Shipley Transport*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride (mg/l) | | | | | | | | | | | | | | | | | 26 |
| pH (SU) | | 7.0 | | | | | 6.3 | 5.9 | 3.5 | 9.5 | | | | | 9.3 | 6.82 | |
| TPH (mg/l) | 134 | | 1.4-186 | | | | 3.9 | 4.3 | | | ND | ND | 26.1 | 13.1-14.1 | 280 | 8 | ND |
| Ethylene Glycol (mg/l) | | ND | | ND | <.01% | .108 | | 9.6 | | -- | ND | | | | ND | ND | |
| Oil&Grease (mg/l) | | 6.4 | | | 57 | | | | 24 | 120 | | | | | | | |
| Antimony (mg/l) | ND | | | | | | | | | | | | | | | | |
| Arsenic (mg/l) | ND | | | | | | | | | | | | | | | | |
| Beryllium (mg/l) | ND | | | | | | | | | | | | | | | | |
| Cadmium (mg/l) | 0.016 | | | | | | | | | | | | | | | | |
| Chromium (mg/l) | 0.008 | | | | | | | | | | | | | | | | |
| Cyanide (mg/l) | ND | | | | | | | | | | | | | | | | |
| Copper (mg/l) | | | | | | | | | | | | | | | | | |
| Iron (mg/l) | 2.4 | | | | | | | | | | | | | | | | |
| Lead (mg/l) | 0.013 | | | | | | | | | | | | | | | | |
| Magnesium (mg/l) | 14 | | | | | | | | | | | | | | | | |
| Mercury (mg/l) | ND | | | | | | | | | | | | | | | | |
| Nickel (mg/l) | 0.055 | | | | | | | | | | | | | | | | |
| Selenium (mg/l) | ND | | | | | | | | | | | | | | | | |
| Silver (mg/l) | ND | | | | | | | | | | | | | | | | |
| Sodium (mg/l) | 36 | | | | | | | | | | | | | | | | |

## Table A-3. Results of Car Wash Samplings in Maryland (Continued)

| Parameter | Preston Ford* | Grimes Truck Center† | Village Volvo* | Fuller * | Gam-bacorta* | Nevi-aser* | McCoy * | Attention to Detail Auto Salon, Inc.‡ | Barrett * | Carlton Massey Inc.* | County* | Dave Wilson* | Frostrom & Sons, Inc.* | Good News Salisbury* | Hayward Baker Inc** | Preston * | Shipley Transport*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thallium (mg/l) | ND | | | | | | | | | | | | | | | | |
| Zinc (mg/l) | 0.24 | | | | | | | | | | | | | | | | |
| *USEPA Method 624* | | *All ND* | | | | | *All ND* | *All ND* | | | *All ND* | *All ND* | | | *All ND* | | |
| Acetone (mg/l) | | | | | | | | | 1.6 | | | | 14.000 | | | | |
| Benzene (mg/l) | | | | | 0.004 | | | | | | | | | | | | |
| 1,4-Dichlorobenzene (mg/l) | | | | | | | | | | | | | | | | 0.023 | |
| Ethylbenzene (mg/l) | | | | | 0.025 | 0.182 | | | | 0.120 | | | | | | | |
| Methylene Chloride (mg/l) | | | | | 0.004 | | | | | | | | | | | | |
| 2-Propanol (mg/l) | | | | | | | | | 1 | | | | | | | | |
| Tetrachloroethene (mg/l) | | | | | | 0.022 | | | | | | | | | | 0.002 | |
| Toluene (mg/l) | | | | 0.061 | 0.046 | 0.077 | | | 0.016 | 0.067 | | | | | | 0.027 | |
| *USEPA Method 625* | | *All ND* | | | | | | | *All ND* | | | | | | | | |
| Benzo(b)fluor-anthene (mg/l) | | | | | | | 0.0085 | | | | | | | | | | |
| Bis(2-ethylhexyl)phthalate (mg/l) | | | | 0.009 | | 0.056 | 0.025 | | | 0.141 | | | | | 0.086 | | |
| Butylbenzylphthalate (mg/l) | | | | | | | 0.019 | | | | | | | | | | |
| 1,2-Dichlorobenzene (mg/l) | | | | 0.009 | | | | | | | | | | | | | |

## Table A-3. Results of Car Wash Samplings in Maryland (Continued)

| Parameter | Preston Ford* | Grimes Truck Center† | Village Volvo* | Fuller* | Gambacorta* | Neviaser* | McCoy* | Attention to Detail Auto Salon, Inc.‡ | Barrett* | Carlton Massey Inc.* | County* | Dave Wilson* | Frostrom & Sons, Inc.* | Good News Salisbury* | Hayward Baker Inc** | Preston* | Shipley Transport*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,4-Dichlorobenzene (mg/l) | | | | 0.0065 | | | | | | | | | | | | | |
| Diethylphthalate | | | | | 0.019 | 0.019 | 0.012 | | | | | | | | | | |
| Di-n-butylphthalate | | | | | 0.008 | | 0.0041 | | | | | | | | 0.021 | | |
| Di-n-octylphthalate (mg/l) | | | | | 0.140 | | | | | | | | | | | | |
| Naphthalene (mg/l) | | | | 0.0074 | 1.6 | | | | | 4.620 | | | 0.068 | | | | |
| 2-Methylnaphthalene (mg/l) | | | | | 0.072 | | | | | | | | | | | | |
| Pheneanthrene (mg/l) | | | | | | | | | | | | | | | 0.012 | | |
| 1,2,4-Trimethylbenzene (mg/l) | | | | | | | | | | | | | 0.130 | | | | |
| Total Xylenes (mg/l) | | | | | | | | | | | | | 0.057 | | | | |

Note: For most of these constituents, a blank cell indicates the sample was not analyzed for that parameter. Samples that were reported as having some USEPA Method 624 or 625 constituents present were analyzed for all constituents in that series. A blank cell under these Methods indicates a ND value for all constituents other than those with values greater than detection limits. If all parameters in the series were reported as "ND," that is indicated in the main row for each method.

ND = Not detected

*Car dealership and service facilities

**Geotechnical Construction Company

***Maintenance facility for transportation vehicles

†Truck and construction equipment repair facility

‡Vehicle repair, servicing, and cleaning facility

## Table A-4. Injectate Quality Data from A&J Suds & Scrub Libby, Montana

| Parameter | Concentrations (mg/l) | | | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|---|
| | 11/05/97 | 1/12/98 | 7/27/98 | mg/l | P/S | mg/l | N/C |
| Aluminum, Total | 13 | NA | NA | 0.05-0.2 | S | - | |
| Aluminum, Dissolved | 0.494 | NA | NA | - | | - | |
| Antimony, Total | <0.003 | NA | NA | 0.006 | P | 0.003 | N |
| Antimony, Dissolved | <0.003 | NA | NA | - | | - | |
| Arsenic, Total | <0.025 | NA | NA | 0.05 | P | 0.002 | C |
| Arsenic, Dissolved | <0.025 | NA | NA | - | | - | |
| Barium, Total | <1 | NA | NA | 2 | P | 2 | N |
| Barium, Dissolved | <1 | NA | NA | - | | - | - |
| Benzene | NA | <0.0005 | <0.0005 | 0.005 | P | 0.1 | C |
| Beryllium, Total | <0.002 | NA | NA | 0.004 | P | 0.0008 | C |
| Beryllium, Dissolved | <0.002 | NA | NA | - | | - | |
| Bromobenzene | NA | <0.0005 | <0.0005 | - | | - | |
| Bromochloromethane | NA | <0.0005 | <0.0005 | - | - | 0.01 | N |
| Bromodichloromethane | NA | <0.0005J † | <0.0005 | 0.1/0.08‡ | P | 0.06 | C |
| Bromoform | NA | <0.0005 | <0.0005 | 0.1/0.08‡ | P | 0.4 | C |
| Bromomethane | NA | <0.0005 | <0.0005 | - | | 0.01 | N |
| n-Butylbenzene | NA | <0.0005 | <0.0005 | - | | - | |
| sec-Butylbenzene | NA | <0.0005 | <0.0005 | - | | - | |
| tert-Butylbenzene | NA | <0.0005 | <0.0005 | - | | - | |
| Cadmium, Total | 0.0064 | NA | NA | 0.005 | P | 0.005 | N |
| Cadmium, Dissolved | 0.0064 | NA | NA | - | | - | |
| Carbon Tetrachloride | NA | <0.0005 | <0.0005 | 0.005 | P | 0.03 | C |
| Chlorobenzene | NA | <0.0005 | <0.0005 | - | | - | |
| Chlorodibromomethane | NA | <0.0005 | <0.0005 | 0.1/0.08** | P | 0.06 | N |
| Chloroethane | NA | <0.0005 | <0.0005 | - | | - | |
| Chloroform | NA | 0.015 | 0.009 | 0.1/0.08** | P | 0.6 | C |

## Table A-4. Injectate Quality Data from A&J Suds & Scrub Libby, Montana (Continued)

| Parameter | Concentrations (mg/l) | | | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|---|
| | 11/05/97 | 1/12/98 | 7/27/98 | mg/l | P/S | mg/l | N/C |
| Chloromethane | NA | <0.0005 | <0.0005 | - | | 0.003 | N |
| 2-Chlorotoluene | NA | <0.0005 | <0.0005 | - | | 0.1 | N |
| 4-Chlorotoluene | NA | <0.0005 | <0.0005 | - | | 0.1 | N |
| Chromium, Total | <0.05 | NA | NA | 0.1 | P | 0.1 | N |
| Chromium, Dissolved | <0.05 | NA | NA | - | | - | |
| Copper, Total | <0.5 | NA | NA | 1.3 | P | - | |
| Copper, Dissolved | <0.5 | NA | NA | - | | - | |
| 1,2-Dibromo-3-chloropropane | NA | <0.001 | <0.001 | - | | - | |
| 1,2-Dibromoethane | NA | <0.0005 | <0.0005 | - | | - | |
| Dibromomethane | NA | <0.0005 | <0.0005 | - | | - | |
| 1,2-Dichlorobenzene | NA | <0.0005 | <0.0005 | 0.6 | P | 0.6 | N |
| 1,3-Dichlorobenzene | NA | <0.0005 | <0.0005 | - | | 0.6 | N |
| 1,4-Dichlorobenzene | NA | <0.0005 | <0.0005 | 0.075 | P | 0.075 | N |
| Dichlorodifluoromethane | NA | <0.0005 | <0.0005 | - | | 1.0 | N |
| 1,1-Dichloroethane | NA | <0.0005 | <0.0005 | - | | - | |
| 1,2-Dicholoroethane | NA | <0.0005 | <0.0005 | 0.005 | P | 0.04 | C |
| 1,1-Dichloroethene | NA | <0.0005 | <0.0005 | 0.007 | P | 0.007 | N |
| cis-1,2-Dichloroethene | NA | <0.0005 | <0.0005 | 0.07 | P | 0.07 | N |
| trans-1,2-Dichloroethene | NA | <0.0005 | <0.0005 | 0.1 | P | 0.1 | N |
| 1,1-Dichloropropene | NA | <0.0005 | <0.0005 | - | | - | |
| 1,2-Dichloropropane | NA | <0.0005 | <0.0005 | 0.005 | P | 0.06 | C |
| 1,3-Dichloropropane | NA | <0.0005 | <0.0005 | - | | - | |
| cis-1,3-Dichloropropene | NA | <0.0005 | <0.0005 | - | | - | |
| trans-1,3-Dichloropropene | NA | <0.0005 | <0.0005 | - | | - | |
| 2,2-Dichloropropane | NA | <0.0005 | <0.0005 | - | | - | |

## Table A-4. Injectate Quality Data from A&J Suds & Scrub Libby, Montana (Continued)

| Parameter | Concentrations (mg/l) | | | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|---|
| | 11/05/97 | 1/12/98 | 7/27/98 | mg/l | P/S | mg/l | N/C |
| Ethylbenzene | NA | <0.0005 | <0.0005 | 0.7 | P | 0.7 | N |
| Fluorotrichloromethane | NA | <0.0005 | <0.0005 | - | | 2 | N |
| Hexachlorobutadiene | NA | <0.0005 | <0.0005 | - | | 0.001 | N |
| Iron, Total | 12.5 | NA | NA | 0.3 | S | - | |
| Iron, Dissolved | 0.44 | NA | NA | - | | - | |
| Isopropylbenzene | NA | <0.0005 | <0.0005 | - | | - | |
| p-Isopropyltoluene | NA | 0.0012 | <0.0005J † | - | | - | |
| Lead, Total | 0.0453 | NA | NA | 0.015 | P | - | |
| Lead, Dissolved | 0.0084 | NA | NA | - | | - | |
| Manganese, Total | 0.474 | NA | NA | 0.05 | S | - | |
| Manganese, Dissolved | 0.216 | NA | NA | - | | - | |
| Mercury, Total | <0.001 | NA | NA | 0.002 | P | 0.002 | N |
| Mercury, Dissolved | <0.001 | NA | NA | - | | - | |
| Methylene chloride | NA | <.0005 | 0.00081 | .005 | P | - | |
| Naphthalene | NA | <0.0005J † | 0.00056 | - | | 0.02 | N |
| Nickel, Total | <0.05 | NA | NA | 0.1 | P | 0.1 | N |
| Nickel, Dissolved | <0.05 | NA | NA | - | | - | |
| n-Propylbenzene | NA | <0.0005 | <0.0005 | - | | - | |
| Selenium, Total | <0.025 | NA | NA | 0.05 | P | - | |
| Selenium, Dissolved | <0.025 | NA | NA | - | | - | |
| Silver, Total | <0.005 | NA | NA | 0.1 | S | 0.1 | N |
| Silver, Dissolved | <0.005 | NA | NA | - | | - | |
| Styrene | NA | <0.0005 | <0.0005 | 0.1 | P | 0.1 | N |
| 1,1,1,2-Tetrachloroethane | NA | <0.0005 | <0.0005 | - | | 0.07 | N |
| 1,1,2,2-Tetrachloroethane | NA | <0.0005 | <0.0005 | - | | - | |
| 1,2,3-Tetrachlorobenzene | NA | <0.0005 | <0.0005 | - | | - | |

## Table A-4. Injectate Quality Data from A&J Suds & Scrub Libby, Montana (Continued)

| Parameter | Concentrations (mg/l) | | | Drinking Water Standards* | | Health Advisory Levels** | |
|---|---|---|---|---|---|---|---|
| | 11/05/97 | 1/12/98 | 7/27/98 | mg/l | P/S | mg/l | N/C |
| 1,2,3-Trichloropropane | NA | <0.0005 | <0.0005 | - | | 0.04/0.5 | N/C |
| 1,2,4-Trimethylbenzene | NA | <0.0005J † | <0.0005 | - | | - | |
| 1,3,5-Trimethylbenzene | NA | <0.0005 | <0.0005 | - | | - | |
| Tetrachloroethene | NA | 0.00085 | 0.00085 | .005 | P | - | |
| Thallium, Total | <0.001 | NA | NA | 0.002 | P | 0.0005 | N |
| Thallium, Dissolved | <0.001 | NA | NA | - | | - | |
| Toluene | NA | <0.0005J † | 0.0021 | 1 | P | 1 | N |
| 1,2,4-Trichlorobenzene | NA | <0.0005 | <0.0005 | 0.07 | P | 0.07 | N |
| 1,1,1-Trichloroethane | NA | <0.0005 | <0.0005 | 0.2 | P | 0.2 | N |
| 1,1,2-Trichloroethane | NA | <0.0005 | <0.0005 | 0.005 | P | 0.003 | N |
| Trichloroethene | NA | <0.0005 | <0.0005 | - | | - | |
| Vinyl Chloride | NA | <0.0005 | <0.0005 | 0.002 | P | 0.0015 | C |
| Xylenes | NA | <0.0005J † | 0.00059 | 10 | P | 10 | N |
| m+p Xylene | NA | 0.0005J † | 0.00059 | 10 | P | 10 | N |
| o Xylene | NA | <0.0005 | <0.0005 | 10 | P | 10 | N |
| Zinc, Total | <2.5 | NA | NA | 5 | S | 2 | N |
| Zinc, Dissolved | <2.5 | NA | NA | - | | - | |

Source: USEPA Region 8, 1999

* Drinking Water Standards: P= Primary; S= Secondary.

** Health Advisory Levels: N= Noncancer Lifetime; C= Cancer Risk.

NA = Not anlayzed.

-No standards or advisory levels available.

†J = Estimated value. Present, but less than the limit of quantitation.

‡0.1 Current MCL, 0.08 is the proposed rule for Disinfectants and Disinfection By-products: Total for all THMs combined cannot exceed the 0.08.

## ATTACHMENT B
## STATE AND LOCAL PROGRAM DESCRIPTIONS

This section describes the programs of the following nine states that report having 99 percent of documented wells and 98 percent of estimated wells associated with carwash facilities: Alabama, California, Iowa, Maine, Maryland, Mississippi, New York, Washington, and West Virginia. In addition, the New Hampshire and Wyoming programs are described to provide additional examples of how states control these wells. These 11 states, which have substantially different regulatory structures, provide a sample of the ways in which carwash wells are controlled. Several are Direct Implementation states or have incorporated the federal UIC rules by reference. California, New York, and Iowa, all Direct Implementation states, have state requirements that may supplement USEPA's implementation of the UIC program with requirements arising from the states' wastewater management program or pollution discharge elimination program. In addition, Washington has a strong antidegradation policy that stringently limits injection wells.

### Alabama

Alabama is a UIC Primacy state for Class V wells. The Alabama Department of Environmental Management (ADEM) has promulgated requirements for Class V UIC wells under Chapter 335 of the Alabama Administrative Code (AAC).

*Permitting*

The operator of an existing or proposed Class V well must submit a permit application to ADEM including the following information (335-6-8-.14(a) through (e) AAC):

- Facility name and location;
- Name of owner and operator;
- Legal contact;
- Depth, general description, and use of the injection well; and
- Description of pollutant injected, including physical and chemical characteristics.

ADEM is required by the AAC to assess the possibility of adverse impact on a USDW posed by the well, and to determine any special construction and operation requirements which may be required to protect a USDW (335-6-8-.15(1) AAC). If the ADEM determines that the proposed action may have an adverse impact on a USDW, the applicant may be required to submit a permit application in the manner prescribed for Class I and Class III wells. The state requires such applications to be made on USEPA's Consolidated Permit Application Form 1 and Form 4, which require the submission of extensive and detailed information. ADEM also has specified the information required to be submitted in its UIC regulations (335-6-8-.09 (1) through (7) AAC). When those permit application requirements are applied, as they apparently have been in at least two situations involving lead contamination from a car wash facility and lead and chromium contamination from an external truck wash facility, the permit application processing and issuance procedures follow the rules

for Class I and III wells (335-6-8-.15(2) AAC). The AAC specifies that "Class V wells may be allowed insofar as they do not cause a violation of primary drinking water regulations under 40 CFR Part 142" (335-6-8-.07 AAC). At present, an unknown number of wells, including car wash wells, in the state are not permitted.

*Siting and Construction Requirements*

Class V wells are specifically exempted from the siting and construction requirements (found in 335-6-8-.20 through 335-6-8-.24) pertaining to Class I and III wells (335-6-8-.25 AAC). The wells are required to be constructed in such a manner that they may not cause a violation in USDWS of primary drinking water regulations (defined as 40 CFR Part 142). When required by ADEM, new Class V wells must be constructed by a well driller licensed by ADEM (335-6-8-.25 AAC). The state requires facilities seeking permits for industrial wells to submit construction plans and well specifications prior to permit approval, but construction requirements may differ depending on the proposed injectate.

*Operating Requirements*

Class V wells must be operated in a manner that may not cause violation of primary drinking water regulations under 40 CFR 142. ADEM may order the operator to take necessary actions to prevent violation, including closure of the well (335-6-8-.16 AAC).

A method of obtaining grab and composite samples of pollutants after all pretreatment and prior to injection must be provided at all sites. Spill prevention and control measures sufficient to protect surface and ground water from pollution must be taken at all sites (335-6-8-.22 AAC).

Monitoring requirements may be specified in the permit, by administrative order, by directive, or included in the plugging and abandonment plan (335-6-8-.28 AAC). Two car wash wells that have had known contamination incidents are required to conduct monthly monitoring.

*Plugging and Abandonment*

A plugging and abandonment plan may be required by permit or administrative order. If necessary it may be required to include aquifer cleanup procedures. If pollution of a USDW is suspected, ground water monitoring may be required after well abandonment (335-6-8-.27 AAC).

**California**

USEPA Region 9 directly implements the UIC program for Class V injection wells in California. The California Water Quality Control Act (WQCA), however, establishes broad requirements for the coordination and control of water quality in the state, sets up a State Water Quality Control Board, and divides the state into nine regions, with a Regional Water Quality Control Board that is delegated responsibilities and authorities to coordinate and advance water quality in each region (Chapter 4 Article 2 WQCA). A Regional Water Quality Control Board can prescribe requirements

for discharges (waste discharge requirements or WDRs) into the waters of the state (13263 WQCA). These WDRs can apply to injection wells (13263.5 and 13264(b)(3) WQCA). In addition, the WQCA specifies that no provision of the Act or ruling of the state board or a regional board is a limitation on the power of a city or county to adopt and enforce additional regulations imposing further conditions, restrictions, or limitations with respect to the disposal of waste or any other activity which might degrade the quality of the waters of the state (13002 WQCA).

*Permitting*

Although the Regional Water Quality Control Boards do not permit injection wells, the WQCA provides that any person operating, or proposing to operate an injection well (as defined in §13051 WQCA) must file a report of the discharge, containing the information required by the regional board, with the appropriate regional board (13260(a)(3) WQCA). Furthermore, the regional board, after any necessary hearing, may prescribe requirements concerning the nature of any proposed discharge, existing discharge, or material change in an existing discharge to implement any relevant regional water quality control plans. The requirements also must take into account the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, and the factors that the WQCA requires the regional boards to take into account in developing water quality objectives, which are specified in §13241 of the WQCA ((13263(a) WQCA). However, a regional board may waive the requirements in 13260(a) and 13253(a) as to a specific discharge or a specific type of discharge where the waiver is not against the public interest (13269(a) WQCA).

California counties take a variety of approaches to regulation of carwash and similar types of wells. Some counties prohibit these wells. For example, Merced County prohibits the construction of "dry/drainage" wells, defined as a well constructed for the purpose of disposing of waste water, hazardous material, or drainage water unless it can be shown that the quality of the water being introduced into the well will not have an undesirable impact on ground water and/or the well's construction will not permit the intermixing of aquifers or provide a conduit for the vertical movement of known or potential contaminants (Merced County Code, 9.28.060B.1). This authority has generally prohibited such wells in Merced County. Santa Clara County prohibits "sewer wells, cesspools, seepage pits, and similar excavations" as a public nuisance (Santa Clara County Health and Safety Code B11-20). Other counties regulate such wells under their County Water Quality Ordinances. Yolo County, for example, defines industrial liquid waste treatment system as wastes, excluding human wastes, from any producing, manufacturing, or processing operation of whatever nature (Yolo County Code 6-8.409) and provides that all industrial waste discharges must be carried out according to standards and conditions established by the County Board of Supervisors (Code 6-8.604). Riverside County addresses the topic in its Plumbing Code.

**Iowa**

USEPA Region 7 directly implements the UIC program for Class V injection wells in Iowa. In addition, the state has enacted regulations addressing on-site wastewater treatment and disposal systems that collect, store, treat, and dispose of wastewater from four or fewer dwelling units or other

facilities (e.g., commercial facilities) serving the equivalent of 15 persons (1,500 gallons per day (gpd) or less) (Chapter 567-69 Iowa Administrative Code (IAC)). An on-site wastewater treatment and disposal system is defined in these rules as a system that includes domestic waste whether residential or nonresidential, "but does not include industrial waste of any flow rate" (567-69.1(2) IAC). Generally, therefore, unless it can be shown clearly to be only sanitary waste, car wash wastewater would be banned from disposal in these systems.

**Mississippi**

Mississippi is a UIC Primacy state for Class V wells. The state's wastewater permit regulations provide that unless otherwise required, owners or operators of Class V wells and all applicants for UIC permits shall comply with 40 CFR 144, 146, 147.1250 subpart Z, and 148, which are incorporated and adopted by reference (Wastewater Permit Regulations IV.K.2.e. and IV.K.3). For Class V wells associated with carwashes, no additional requirements or exceptions have been enacted. Therefore, the requirements in 40 CFR apply.

**New York**

USEPA Region 2 directly implements the UIC program for Class V injection wells in New York. However, under the state's Environmental Conservation Law, the Department of Environmental Conservation, Division of Water Resources (DWR) has promulgated regulations in the State Code Rules and Regulations, Title 6, Chapter X, Parts 703, 750, 754, and 756. These regulations establish water quality standards and effluent limitations, create a state pollutant discharge elimination system requiring permits for discharges into the waters of the state (including ground water), specify that such discharges must comply with the standards in Part 703, and provide for monitoring in Part 756.

*Permitting*

Applications for a SPDES permit, which are required for discharges to ground water, must describe the proposed discharge, supply other requested information, and are subject to public notice. SPDES permits must ensure compliance with effluent limitations and standards, and will include schedules of compliance, monitoring requirements, and records and reports of activities (Parts 751 - 756).

*Operating Requirements*

Effluent limits (Part 703) in the SPDES permit must be met. Monitoring and reporting requirements in the SPDES permit must be met.

**Washington**

Washington is a UIC Primacy state for Class V UIC wells. Chapter 173-218 of the Washington Administrative Code (WAC) establishes the underground injection control program.

Under the program, the policy of the Department of Ecology is to maintain the highest possible standards to prevent the injection of fluids that may endanger ground waters which are available for beneficial uses or which may contain fewer than 10,000 mg/l TDS. Consistent with that policy, all new Class V injection wells that inject industrial, municipal, or commercial waste fluids into or above a USDW are prohibited (172-218-090(1) WAC ). Existing wells must obtain a permit to operate.

*Permitting*

A permit must specify conditions necessary to prevent and control injection of fluids into the waters of the state, including all known, available, and reasonable methods of prevention, control, and treatment. It also must specify conditions to satisfy applicable requirements in 40 CFR Parts 124, 144, 146 and any other conditions necessary to preserve and protect USDWS. Any injection well that causes or allows the movement of fluid into a USDW that may result in a violation of any primary drinking water standard under 40 CFR Part 141 or that may otherwise adversely affect the beneficial use of a USDW is prohibited (173-218-100 WAC).

*Siting and Construction*

The state has promulgated minimum standards for construction and maintenance of wells (173-160-010 through -560 WAC). However, injection wells regulated under Chapter 173-218 are specifically exempted from these constructions standards (173-160-010(3)(e) WAC).

*Operating Requirements*

The water quality standards for ground waters establish an antidegradation policy. The injectate must meet the state ground water standards at the point of compliance (173-200-030 WAC).

*Plugging and Abandonment*

All wells not in use must be securely capped so that no contamination can enter the well (173-160-085 WAC).

**West Virginia**

West Virginia is a UIC Primacy state for Class V wells. Regulations establishing the UIC program are found in Title 47-13 West Virginia Code of state Regulations. The state does not identify a separate category of Class V industrial wells, but does specify that Class V includes injection wells not included in Classes I, II, III, or IV (47-13-3.4.5. WVAC).

*Permitting*

Class V injection wells are authorized by rule unless the Office of Water Resources of the Division of Environmental Protection requires an individual permit (47-13-12.4.a. and 47-13-13.2 WVAC). Injection is authorized initially for five years under the permit by rule provisions.

*Operating Requirements*

Owners or operators of Class V wells are required to submit inventory information describing the well, including its construction features, the nature and volume of injected fluids, alternative means of disposal, the environmental and economic consequences of well disposal and its alternatives, operation status, and location and ownership information (47-13-12.2 WVAC).

Rule-authorized wells must meet the requirements for monitoring and records (requiring retention of records pursuant to 47-13-13.6.b. WVAC concerning the nature and composition of injected fluids until 3 years after completion of plugging and abandonment); immediate reporting of information indicating that any contaminant may cause an endangerment to USDWS or any malfunction of the injection system that might cause fluid migration into or between USDWS; and prior notice of abandonment.

The rules enact a general prohibition against any underground injection activity that causes or allows the movement of fluid containing any contaminant into a USDW, if the presence of that contaminant may cause a violation of any primary drinking water regulations under 40 CFR Part 142 or promulgated under the West Virginia Code, or may adversely affect the health of persons. If at any time a Class V well may cause a violation of the primary drinking water rules the well may be required to obtain a permit or take such other action, including closure, that will prevent the violation (47-13-13.1 WVAC). Inventory requirements for Class V wells include information regarding pollutant loads and schedules for attaining compliance with water quality standards (47-13-13.2.d.1 WVAC).

For protection of a USDW, the injection operation may be required to satisfy requirements, such as for corrective action, monitoring and reporting, or operation, that are not contained in the UIC rules (47-13-13.2.c.1.C. WVAC).

*Mechanical Integrity*

Only a Class V well required to obtain an individual permit will be required to demonstrate that the well exhibits mechanical integrity.

*Plugging and Abandonment*

A Class V well required to obtain an individual permit will be subject to permit conditions pertaining to plugging and abandonment to ensure that the plugging and abandonment of the well will

not allow the movement of fluids either into a USDW or from one USDW to another. A plan for plugging and abandonment will be required.

**Maryland**

Maryland is a UIC Primacy state for Class V wells. Business inquiries to discharge vehicle wash water to surface waters are often referred to the Maryland Department of Environment's Ground Water Permits Division by the National Pollutant Discharge Elimination System (NPDES) program. This action is taken because vehicle wash water has historically failed the biomonitoring testing required by the NPDES program. The failure is thought to be caused by surfactants in the wash water (Eisner, 1999).

*Permitting*

Under the Code of Maryland Regulations (COMAR 26.08.02) any discharge or disposal of waters or wastewaters into the underground waters of the state requires a discharge permit (COMAR 26.08.02.09A.(1)). The Code also provides that dischargers or potential dischargers to ground waters may be required to monitor ground or surface waters in a manner and frequency and at locations specified by the Maryland Department of the Environment (COMAR 26.08.02.09.D(4)). The Code defines three aquifer types, and specifies discharge quality criteria for each type (COMAR 26.08.02.09C). Discharges to ground water may not result in degradation of ground waters below the criteria established, nor may discharges to an aquifer of specific classification result in pollution of an aquifer possessing higher quality criteria. For Type I aquifers, discharges may not exceed Maryland's primary or secondary standards for drinking water, and for Type II aquifers the constituents may not, after treatment, exceed primary or secondary drinking water standards, except for TDS (COMAR 26.08.02.09C). The underground injection of hazardous wastes is prohibited (COMAR 26.13.05.18). A separate ground water discharge permit is not required if an underground injection permit has been issued under COMAR 26.08.07 or if the subsurface disposal system is covered by a general permit under COMAR 26.08.04.07 (COMAR 26.08.02.09A(3)(d) and (4)). Maryland has adopted by reference the federal UIC regulations (COMAR 26.08.07.01), and does not require a UIC permit for Class V wells (COMAR 26.08.07.01B).

Under these authorities, the Maryland Department of the Environment's Wastewater Permits Program issues Ground Water Discharge Permits for exterior vehicle washing if the wastewater is discharged to the ground surface or to the subsurface via disposal systems such as drainfields or drywells. Effluent testing is required to support the permit application and is required throughout the life of the permit. Testing for total petroleum hydrocarbons (TPH) is required, typically on a monthly or quarterly basis. The sampling point is typically located at the point of discharge, after treatment and prior to discharge to a drainfield or dry well. In some cases, vehicle wash water may mix with domestic wastewater in the facility's septic tank prior to discharge. Permits issued for self-service washing facilities have historically required quarterly VOC testing and posting of signs in the wash bays to educate the public (Eisner, 1999).

*Operating Requirements*

Monthly or quarterly testing for TPH is required, with a technology-based effluent limit of 15 mg/l. Treatment is typically an oil/water separator, for which there are maintenance requirements in the facility's permit. Engine and undercarriage cleaning and the use of solvents are strictly prohibited. The permits encourage pollution prevention by using hot water without detergents for washing. Finally, all material safety data sheets are reviewed for any detergents or additives used (Eisner, 1999).

**Maine**

Maine is a UIC Primacy state for Class V wells. The Maine Department of Environmental Protection administers the UIC program, with support from USEPA Region 1. Title 38 of the Maine Revised Statutes Annotated (MRSA) establishes, among other programs, the state's ground water protection program (38 MRSA §§ 401-404), pollution control program, including waste discharge licensing provisions (38 MRSA §413), and ground water classification standards (38 MRSA §465-C). Rules controlling the subsurface discharge of pollutants by well injection implemented by the Department of Environmental Protection are found in 06 Code of Maine Regulations (CMR) Chapter 543.

*Licensing*

The rules controlling subsurface discharge of pollutants by well injection provide that all subsurface discharges of fluids into or through a well are prohibited except as authorized in accordance with the rules. The state recognizes five classes of wells, reflecting the definitions adopted by the federal UIC program. Any subsurface discharge into or through a Class V well that would cause or allow the movement of fluid into a USDW that may result in a violation of any Maine Primary Drinking Water Standard, or which could otherwise adversely affect human health, is prohibited (06-096.543.3.D CMR). The state designates ground water as either Class GW-A (for use as public drinking water supplies) or Class GW-B (for uses other than drinking water supplies). However, no ground water to date has been classified as GW-B. The Primary Drinking Water Standards are set forth in Department of Human Services rules in 10-144A CMR 231. Class V wells must obtain a waste discharge license issued under 38 MRSA §413 (1-B) prior to the commencement of the discharge. Wells that are already discharging may be permitted, depending on the characteristics of the injectate.

Class V wells also can be redesignated or subject to additional regulatory requirements. Any Class V well receiving toxic or hazardous compounds is redesignated as a Class IV well and, as such, is prohibited. The rules controlling the subsurface discharge of pollutants also note that the Maine Hazardous Waste, Septage, and Solid Waste Management Act (38 MRSA § 1301 et seq.) or the Site Location of Development Act (38 MRSA § 481 et seq.) could apply to certain Class V wells.

**New Hampshire**

New Hampshire is a UIC Primacy state for Class V wells.

*Operating Requirements*

New Hampshire requires that Ambient Ground Water Quality Standards be met and maintained. Facilities are required to comply with the state's Best Management Rule (Env-Ws 421). Owners and operators may register or permit their wells and are required to sample and test effluent and ground water (Locker, 1999).

Carwashes in New Hampshire have four options to assist in protecting ground water:

- Operate a closed-loop system with wastewater recycling. Discharges must be disposed of at an approved disposal facility (i.e., a wastewater treatment plant or hazardous waste facility, depending upon the nature of the recycled water).
- Discharge wastewater to a sanitary sewer. The owner of the facility must contact the local sewer authority to obtain approval.
- Obtain a ground water discharge permit. The ground water discharge well must be permitted in accordance with Env-Ws 1504, and wastewater is treated to ambient ground water standards.
- If the facility washes fewer than 30 cars per week, the facility can indirectly discharge water to ground water through surface discharge. Facilities can only dispose of wastewater in this manner if their wastewater meets very strict criteria (e.g., does not contain hazardous contaminants; has been treated with an oil-water separator; is not from power washing, steam cleaning, engine cleaning or undercarriage cleaning; etc.).

**Wyoming**

Wyoming is a UIC Primacy state for Class V wells. Chapter 16, Wyoming Water Quality Rules and Regulations, requires an individual UIC permit for all carwash wells (WYDEQ/WQD).

*Permitting*

Carwash permits issued in Wyoming include the following sections:

- Discharge zone and area of review, specifying the aquifer into which injection is allowed to take place.
- Ground water classification, describing the classification, under state regulations, of the receiving aquifer and nondegradation requirements.
- Authorized operations, describing the volume and pressure of the injection activities.
- Environmental monitoring program for ground waters of the state, describing the monitoring activities that the UIC well owner/operator must perform.
- Requirements for monitoring the discharge, describing the monitoring and reporting schedule.

- Records and reports, describing the timeframe for keeping records and annual reporting requirements.
- General permit conditions, describing the review period for permits and specifying what actions constitute permit violations.
- Duties of the permittee, describing actions the owner or operator should take to comply with the permit conditions.
- Signatories requirement, describing who must sign the permit.

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