AUTO REPAIR INDUSTRY EVALUATION REPORT

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EXECUTIVE SUMMARY

The Local Hazardous Waste Management Program (LHWMP), at Public Health – Seattle & King County, inspected 981 auto repair businesses located throughout King County, Washington between January 1, 2000 and August 31, 2001. The program's trained field investigators conducted site visits with a primary emphasis on providing technical assistance in the management and disposal of hazardous materials. Other issues related to health and worker safety were also covered as part of the inspection process. If an initial visit revealed an area of concern, follow-up visits were conducted to help track the behavior change improvements made by the business.

Four hundred and ninety-seven (497) visits revealed that many auto repair businesses complied with all items that were part of the initial inspection process and did not require a follow-up visit. Four hundred and eighty-four (484) follow-up visits to the remaining businesses revealed that many of the non-compliance issues identified on the initial inspection had been corrected and the recommended best management practices (BMP's) provided by field staff were adopted. Information was collected about the disposal practices of all dangerous wastes generated by the business, secondary containment for wastes, manifests and receipts for disposal of wastes, spill materials and procedures for accidental spills, and proper labeling of wastes. Complaint calls were investigated that dealt with the alleged illegal discharges of hazardous wastes to storm drains. Significant improvements were made by the businesses in each of these areas.

INTRODUCTION

The Washington State Hazardous Waste Management Act (RCW 70.105.220) required local governments to develop plans to address hazardous waste generated by small quantity generators and households by June 1990. Small quantity generators are those businesses that generate less than 220 pounds of hazardous waste per month or less than 2.2 pounds per month of acute hazardous waste. In addition, their total waste accumulation cannot be more than 2,200 pounds at any time (Washington State Department of Ecology, 2000).

The development of the LHWMP was a collaborative effort by Public Health - Seattle & King County, The King County Department of Natural Resources, Solid Waste and Hazardous Waste Sections, the City of Seattle and suburban cities in King County as a single cooperative program to help meet environmental protection requirements. To date, the program is the largest of its type in the United States (King County, 1997).

The LHWMP has two major goals. The first goal is to protect the public's health, and the second to protect the environment from the adverse effects by the improper handling and disposal of hazardous waste.

Within the LHWMP, the Audit Team, which is comprised of the field investigation staff, is located in the Environmental Health Division of the Public Health - Seattle & King County. The Audit Team is structured to visit all the small quantity generators within a priority industry. Appendix A lists the six priority industry types and some of the factors used to select a priority industry.

The LHWMP decided to work with the Auto Repair Industry (Priority Industry Type 3) for the following reasons (The Response Section of LHWMP had investigated a number of hazardous waste complaints related to this industry):

- Joint visits were done in 1992 and 1993 by the LHWMP and Ecology that indicated a need to do an industry wide study.
- A number of hazardous wastes associated with this industry can have potential impact to the public's health and to the environment.
- A large amount of written information is available on this industry.
- This industry has a large number of businesses to visit.
- This industry is similar in the wastes generated by the transportation and metal fabricator industries that were recently visited by members of the Audit Team.

The performance and impact objectives of visiting this industry were:

- To attempt contact with all identified auto repair businesses in King County.
- To increase the knowledge of the LHWMP about this industry.

- To improve the management and storage practices of hazardous materials and hazardous wastes as well as other issues related to worker protection and the environment for this industry.

- To inform workers and employers of potential health issues related to the auto repair industry.

METHODS

Preparations for Field Visits

Auto repair involves the repair or replacement of auto parts on motor vehicles and includes repair work on the engine, transmission, brakes, undercarriage or radiator. Field staff preparation for visits included identifying all auto repair businesses in King County, learning about their processes and wastes, determining proper disposal options for their wastes, and training field staff. A list of auto repair businesses was developed using the Standard Industrial Classification (SIC) codes (see Appendix B). The original list contained 1,155 auto repair businesses.

A number of auto repair businesses were visited before the project began to help identify industry specific waste streams and any other issues of concern regarding this industry. The Department of Ecology provided "A Guide to Automotive Repair Shops," a comprehensive review of all waste streams identified in the auto repair industry and how to properly deal with each of those wastes (Washington State Department of Ecology, 1999). Program staff developed disposal options for specific wastes generated in auto repair shops primarily through previous industry audit reviews. Also, an observations and recommendations form (see Appendix D) was designed to help track the waste disposal information. Other forms used include the data scan form used to input data into the database and a field form (see Appendix E). Field staff received intensive classroom training regarding auto repair processes and wastes, the inspection process, and how to properly document the site visit. Performance and impact objectives for the field visits were developed based on research findings. Staff were also provided with additional technical training throughout the project and as issues arose.

Conducting the Field Visits

Letters introducing the field inspection objectives were sent to the auto repair businesses approximately three weeks before the initial visits (See Appendix C). During the initial visits hazardous materials management and waste disposal issues were discussed, written materials distributed, and current waste handling practices were documented (State of Washington, Department of Labor and Industry, 2000; Local Hazardous Waste Management in King County, Washington 1999a, 2000, 2002; IMEX Material Listing Catalog, Bimonthly).

Either during or after the visit, businesses were sent written observations and recommendations for improving their hazardous waste management practices. Follow-up visits were conducted for those auto repair businesses with outstanding issues. The primary focus of the follow-up visits was to observe any improvements made by the business, and to document the implementation of the recommendations made during the initial visit. Further assistance was provided when these recommendations were not readily implemented. Follow-up visits took place throughout the project (2000 and 2001).

RESULTS AND DISCUSSION

The results are presented in terms of the objectives set for the project. Both performance and impact objectives were established before the field visits commenced. A performance objective is the completion of an activity in a given manner. An impact objective is the beneficial effect by a change in behavior that an activity is expected to produce.

One key performance objective focused on contacting and providing hazardous waste management information to all King County auto repair businesses and providing increased awareness of the LHWMP and its services. The impact objectives were set based on the anticipated need for improvements in areas specific to the auto repair industry.

Performance Objective

1. ***To conduct approximately 700 initial visits and approximately 400 follow-up visits to King County auto repair businesses.***

There were 1,155 auto repair facilities identified in King County in late 1999. These included general automotive repair, transmission repair, automobile and recreational vehicle sales with maintenance, exhaust repair, alignment and suspension repair, brake repair, carburetor repair, and radiator repair. Audit Team field staff attempted visits at all identified businesses during the period January 1, 2000 to August 31, 2001. Table 1 shows the distribution of the visits completed for this industry.

Table 1. Distribution of auto repair facilities in King County by category of visit.

Category	Number	Percent
Out of Business	139	12%
Out of King County	3	0.2%
Business not auto repair	24	2%
Residential address/no contact	4	0.3%
Refused entry	4	0.3%
Single visit only	497	43%
Multiple visits	484	42%
Total no. of businesses	1,155	100%

Four hundred and ninety-seven businesses (43%) received only one visit because they were following the industry's BMP's for handling dangerous wastes at the time of the initial visit. The fact that forty-three percent of the identified auto repair businesses were in compliance was unexpected and indicated a high level of environmental awareness by these businesses.

Four hundred and eighty-four automotive repair facilities (42%) required more than one visit thus giving the inspector and the business both a baseline and comparison visit to help track

improvements. However, some businesses required multiple visits by field staff before improvements were noted.

Impact Objectives

1. ***To ensure that 85% of all auto repair businesses visited are disposing of hazardous waste properly.***

The total number of businesses visited was 981, the numbers that were already in compliance was 497 (43%) and after follow-up visits the overall percentage was 98%.

2. ***To ensure that non-compliant auto businesses show a 75% increase in compliance.***

For each of the following hazardous waste management behavior areas, non-compliant auto businesses showed a 75% increase in compliance. This is shown on the inspector's checklist as a shift from (-) to (+) in the following categories:

- Hazardous waste disposal
- Secondary containment
- Storm water and surface discharge of hazardous wastes
- Proper documentation of hazardous waste disposal
- Availability of spill materials
- Labeling of hazardous waste containers

Figures 1 and 2 demonstrate the improvements made by auto repair facilities in various areas of hazardous waste management.

Figure 1. Number of auto repair businesses showing improvement

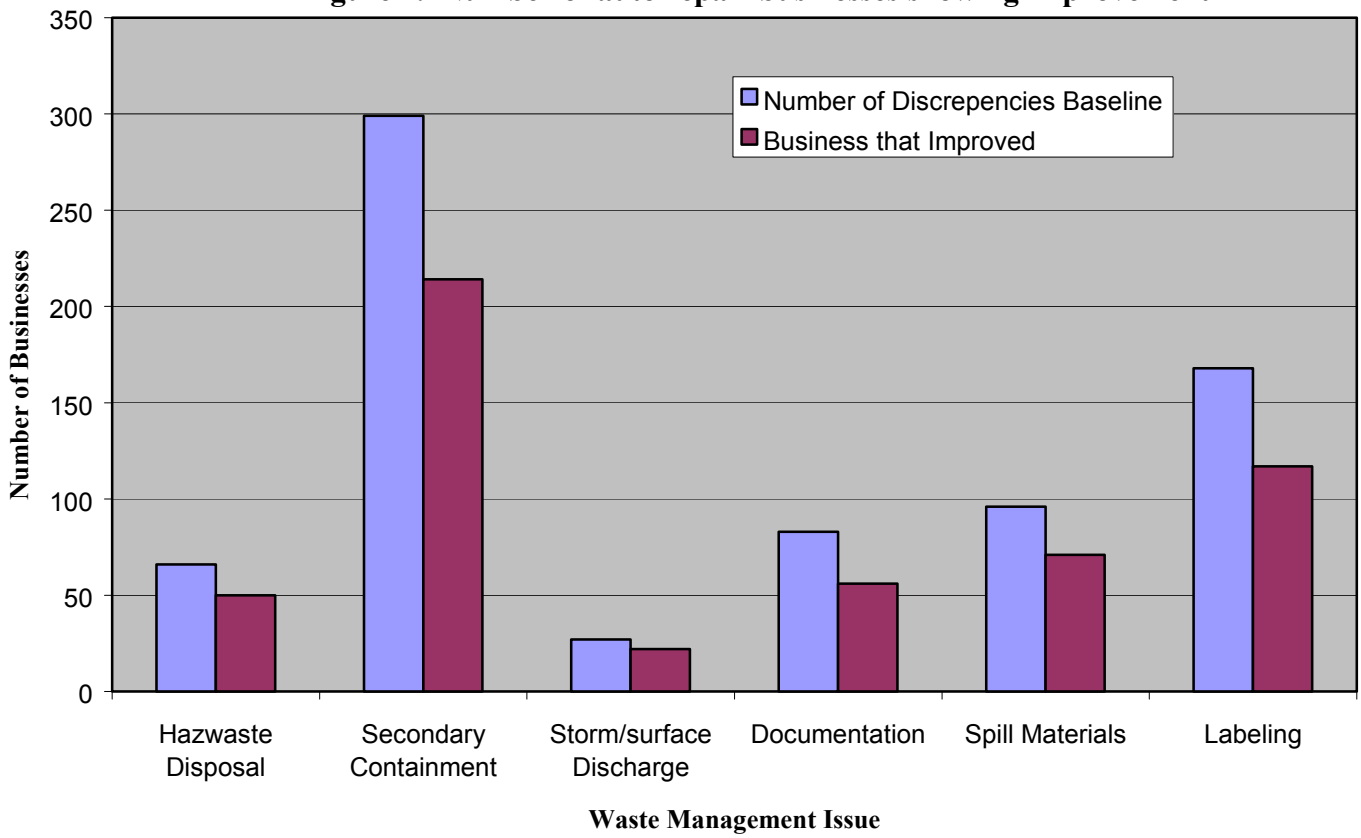
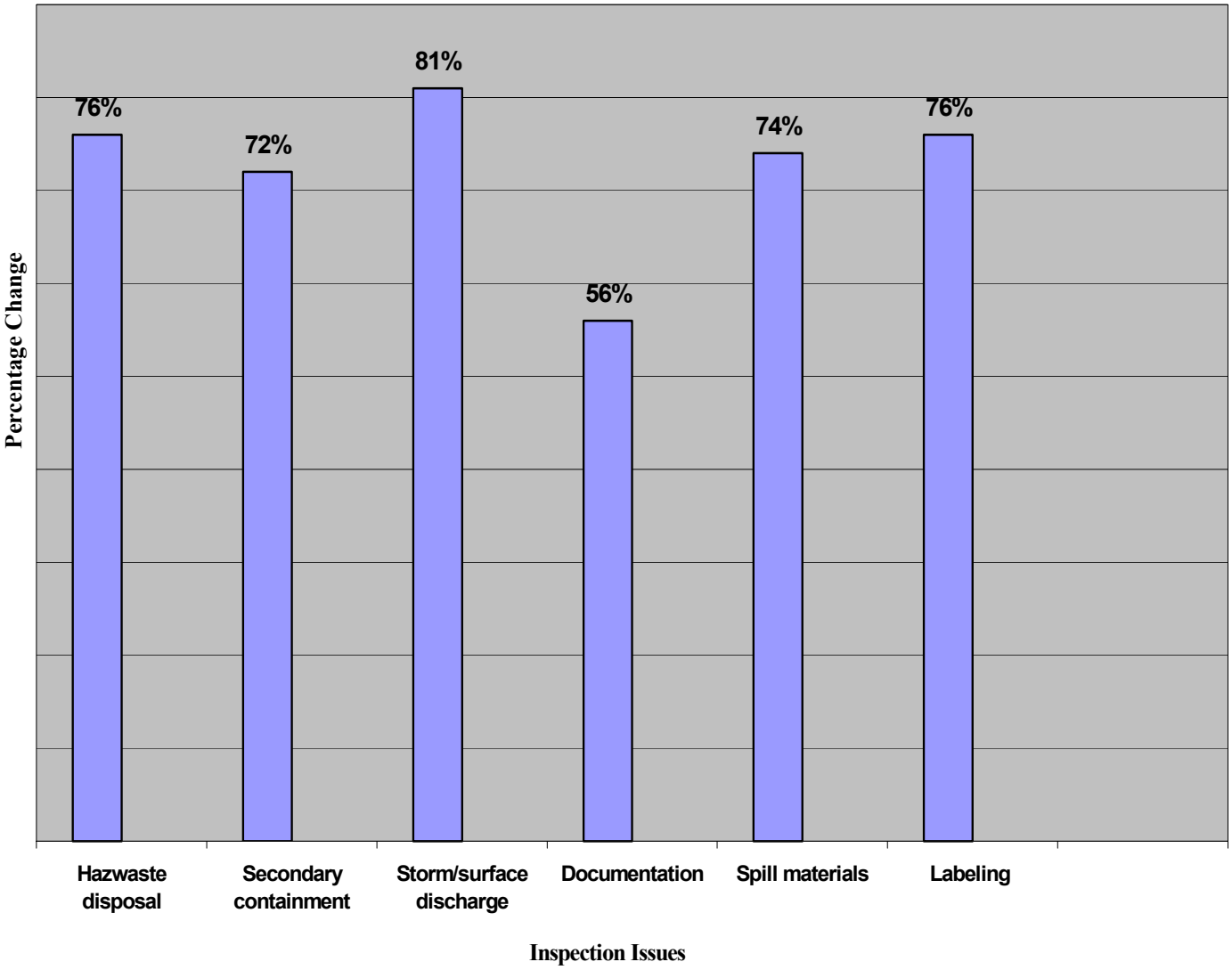


Figure 2. Percentage of auto repair businesses that made positive changes in waste management



Hazardous waste disposal. Sixty-six of the 484 auto repair facilities (7%) were improperly disposing of their hazardous wastes at the time of the initial visit. The most common issue was the shop not characterizing parts washer sludges or filters before disposal in the garbage (solid waste). The inspector left information with the business on the need for testing the sludge for heavy metals and fats, oils and grease (FOG) prior to disposal. In addition, information was given on how to obtain a waste clearance to legally dispose of the material into the solid waste stream. Finally, the businesses were given information on the use of the voucher incentive program (VIP) to pay for 100% of the cost for laboratory testing. Fifty of the sixty-six businesses (76%) improved their waste handling methods and were noted to be properly disposing of their dangerous wastes after subsequent visits from field staff.

Secondary containment. This objective involved the proper containment of waste materials that leaked or spilled from the storage container. Secondary containment of hazardous waste containers is a BMP and is not a Washington State Department of Ecology requirement for small quantity generators (which covers the majority of auto repair facilities). This practice involves providing a means to capture and prevent spilled/leaking fluids from moving onto exposed soil or migrating into a storm drain system. Many of the businesses store hazardous waste drums

within the building. Most buildings served as adequate secondary containment. This is considered an acceptable practice, provided there is not a floor drain that could receive spilled or leaking wastes/materials from storage containers. Some businesses choose to store waste oil and/or waste antifreeze outside the building, usually adjacent to the exterior of the building. This practice is allowed but only if BMPs are properly followed. The BMP requires the placement of the waste containers on an impervious pad that is edged by a curb to prevent fluids from leaking onto the ground. Furthermore, containers stored outside should be under cover to prevent rainwater from entering the waste containers, thus creating runoff from the storage area. A storage area that doesn't have proper cover could cause the waste to overflow the secondary containment area and spill into a nearby storm water drain or onto the ground.

Two hundred and ninety-nine businesses did not have adequate secondary containment at the time of the baseline visits. This represented thirty percent (30%) of the total number of auto repair facilities. Seventy-two percent (72%) made significant changes in secondary containment practices after subsequent follow-up visits. Eighty-five businesses (28%) did not make significant changes with this recommended method. Some of their reasons included: cost, realization that it was a recommendation and not a requirement, possible future relocation of the business, or disagreement with the intent of the practice of containment.

Storm water and surface discharge of hazardous wastes. This objective involves the illegal activity of disposing of dangerous wastes to storm drain systems or directly onto the ground. Because these systems often drain directly to a nearby surface water body, the potential for environmental impact can be immediate. Twenty-seven of the businesses visited (2.7%) were found to be discharging wash water, antifreeze, waste oil, or other materials to storm drains or directly to ground surfaces. This type of behavior could jeopardize water quality of nearby surface and groundwater sources. Five businesses (1%) did not cease this type of mismanagement after subsequent visits by field staff. Field staff referred these businesses to appropriate city storm water agencies for appropriate follow-up and enforcement. Twenty-two of the businesses made significant changes to prevent any future contamination of storm drain systems.

Documentation of hazardous waste disposal. Proper completion of the manifest paperwork and documentation of waste disposal are necessary to limit liability to the business. Eighty-three businesses (8%) were inadequately maintaining receipts or manifests for hazardous waste disposal. Fifty-six businesses (67%) made improvements in this area.

Availability of spill materials. Just over ten percent (10%) of all the auto repair facilities visited lacked adequate plans and materials in the event of hazardous material spills. Seventy-seven percent (77%) of the businesses receiving follow-up visits corrected this issue.

Labeling of hazardous waste containers. All hazardous waste containers require clear and accurate labeling describing the contents. One hundred sixty eight businesses (17%) were not correctly labeling waste drums. At the time of the follow-up visits, seventy percent (70%) had improved this function.

Summary. The second impact objective was to show a seventy-five (75%) improvement in compliance, which means that 75% or more of the businesses having problem issues would come into compliance. The regulated activities analyzed during the inspections are hazardous waste disposal and surface water discharge. The activities that are covered by BMP's are secondary containment, documentation, spill clean-up material available, and container labeling. Businesses showed more incentive to comply with the regulated activities than with those with

BMP's. For the regulated activities, seventy-nine (79%) of those that were not in compliance changed their activities following the Audit Team visit. For the non-regulated activities, seventy-two (72%) changed their behavior. While not meeting the stated goal, this does show that businesses demonstrated a propensity to "do the right thing". The high compliance rate was especially significant when the businesses discovered they could save money. For all activities combined, seventy-five (75%) of the businesses did improve their waste handling activities, which resulted in the Audit Team meeting the impact objective.

Table 2. Summary of positive changes in noncompliance activities

Activity	Number with Discrepancies	Percent total	Number that made correction	Percentage of businesses that made correction	Number of businesses that made no change	Percentage of businesses that made no change	Met objective ?
Regulated:							
Hazardous waste disposal	66	7%	50	76%	16	24%	Yes
Storm water discharge	27	3%	22	81%	5	19%	Yes
Regulated Average				**79%**			**Yes**
BMPs:							
Secondary containment	299	30%	215	72%	84	28%	No
Documentation	83	8%	56	67%	27	33%	No
Spill materials	98	10%	75	77%	23	23%	Yes
Labeling	168	17%	118	70%	50	30%	No
BMP Average				**72%**			**No**
Combined Regulated and BMP Averages				**76%**			**Yes**

WASTE STREAM ANALYSIS

The audit team visited 981 automotive repair businesses between January 1, 2000 through August 21, 2001. The amounts of each waste stream were collected and reviewed. Most of the information came directly from the owners/operators and from the waste disposal receipts they maintain.

Table 3. Waste stream generation rates by the auto repair industry.

	Number of businesses generating this waste stream	Monthly average in gallons/items per business *	Monthly industry totals in gallons/items	Extrapolated annual totals for the industry in gallons/items
Antifreeze	668	41	27,388	328,656
Batteries	659	9	5,931	71172
Oil Filters	567	116	65,772	789,264
Shop Towels	759	433	328,647	3,943,764
Sludge	167	33	5,511	66,132
Aqueous Solvent	55	10	550	6,600
Halogenated Solvent	43	7	301	3,612
Non-Halogenated Solvent	419	9	3,771	45,252
Unknown Solvent	134	15	2,010	24,120
Used Oil	903	194	175,182	2,102,184
Wastewater	18	67	1,206	14,472

* = Rounded to the nearest whole number.

Waste Oil

The largest volume of waste found to be generated by the industry was used motor oil. Ninety-two percent (92%) of the industry generates this waste. The average facility generates approximately 194 gallons per month. The industry in King County generates approximately 175,000 gallons of waste oil monthly and over two million gallons annually.

Table 4 shows that ninety percent (90%) of the businesses contract with a licensed transporter to have the oil pumped and transported off-site and nine percent reported that the oil was burned on-site in approved waste oil burners. Only 84 shops were supplementing their building heat by burning used oil. Concerns that burning used oil for heat could significantly increase air pollution prompted the Audit Team to coordinate its efforts with the Puget Sound Clean Air Authority (PSCAA). PSCAA indicated that 500,000 BTU source heaters are appropriate and safe for use in these shops. The more than two million gallons of used oil generated in King County yearly has the potential of being a very significant resource for heating the shops in which it is generated. Appropriate authorities should consider promotion of this resource for heat in shops where sufficient amounts are generated. The result would be significant reduction in heating oil expenses as well as any liabilities associated with transporting and recycling or burning the waste oil off-site.

Table 4. Disposal methods of used oil by auto repair industry in King County.

Method of disposal	Number of businesses	Percentage of total
Burned oil on site	84	9%
Never disposed	9	1%
Recycled off-site	805	90%
Total number of businesses generating waste oil (92% of total auto repair shops)	898	100%

Oil Filters

According to Department of Ecology recommendations, oil filters can be added to the solid waste if the filters are punctured after removal and then drained for a minimum of twenty-four hours. Five hundred and sixty seven (58%) of the auto repair shops reported generating used oil filters. These shops averaged 116 filters per month for a projected approximately 789,264 filters generated in King County annually. It is interesting that in Table 5, forty-five percent of businesses dispose of filters as a solid waste, while fifty-five percent send their filters off-site for recycling. The average oil filter contains 0.5 pounds of metal. Our calculations indicate that the oil filters generated in one year weigh a total of 394,632 pounds or 197 tons of metal (Table 6). Forty-five percent of the businesses do not recycle their used oil filters. On average, the 255 non-recycling businesses place about 14,790 pounds of used oil filters in the solid waste stream each month which is equivalent to 177,480 pounds or about 89 tons annually. While some of these filters are disposed of in King County, many more are sent to landfills in Oregon. If solid waste regulators were to require that used oil filters be recycled, approximately 89 tons of metal would be removed from the solid waste stream each year.

Table 5. Disposition of used oil filters by the auto repair industry in King County

Disposal Method	Number of Businesses	Percentage
Recycled off site	312	55%
Solid Waste	255	45%
Total number of businesses	567	100%

Table 6. Generation of used oil filters recycled by the auto repair industry in King County.

	Number of Businesses	Monthly Average	Monthly Amounts	Extrapolated Yearly Average
Oil Filters	567	116	65,772	789,264

Table 7. Generation of used oil filters not recycled by the auto repair industry in King County

	Number of Businesses	Monthly Average	Monthly Amounts	Extrapolated Yearly Average
Oil Filters	255	116	29,580	354,960

Used Shop Towels

Most businesses sent used shop towels to permitted commercial laundry facilities Table 8. Six businesses reported laundering towels at home. This practice was discouraged due to environmental concerns related to oil and grease.

Table 8. Generation of used shop towels by the auto repair industry in King County

Waste Stream	Number of businesses generating waste stream	Monthly average	Total monthly amount	Extrapolated yearly total generated by the industry
Shop Towels	759	433	328,647	3,943,764

Antifreeze

Sixty-eight percent (68%) of the auto repair shops reported generating waste antifreeze Table 9. This waste is typically generated at an average of forty-one gallons a month per business and is usually sent off-site to an approved treatment, storage and disposal facility (TSDF). Seventy-two percent of the businesses identified this as their method of disposal while twenty-five percent reported recycling the coolant on-site with commercially available recycling equipment.

Three percent (3%) of the businesses responded that they generate very small quantities of waste antifreeze and had never disposed of the material. Three businesses reported that they took waste antifreeze to a Household Hazardous Waste Collection Site and two businesses were illegally disposing of this waste stream to the sanitary sewer, see Table 10. These businesses ceased this activity after they were made aware of this illegal practice.

Table 9. Generation of waste antifreeze by the auto repair industry in King County

Waste Stream	Number of businesses generating waste stream	Monthly average in gallons	Total monthly amount in gallons	Extrapolated yearly total generated by the industry in gallons
Antifreeze	668	41	27,388	328,656

Table 10. Disposition of waste antifreeze by 668 auto repair shops in King County

Disposal method	Number of businesses	Percentage
Recycle off site	479	72%
Recycle on site	165	25%
Never Disposed	19	3%
* HHW Collection site	3	<0.4%
Sanitary Sewer	2	<0.3%

* HHW = Household hazard waste collection site

Parts Washer

Disposal for this waste can be divided into two categories, aqueous and petroleum-based solvents. Seventy-eight percent (78%) of the inspected businesses reported using one or both types. Seventy-eight percent of the businesses used petroleum solvent and only twenty-two (22%) reported using aqueous parts washers (See Table 11). Monthly generation rates of sludge and wastewater were often difficult to estimate for aqueous parts washers. Businesses using petroleum-based solvent generated on average 10.5 gallons monthly while shops using aqueous-based solvents would average almost 10 gallons per month of wastewater and approximately 32 pounds of sludge.

Table 11. Generation of used parts washer by the auto repair industry in King County

Waste Stream	Number of businesses generating waste stream	Monthly average in gallons	Total monthly Amount in gallons *	Extrapolated yearly total generated by the industry in gallons
Aqueous Solvent	55	10	550	6,600
Halogenated Solvent	43	7	301	3,612
Non-Halogenated Solvent	419	9	3,771	45,252
Unknown Solvent	134	15	2,010	24,120

* Rounded to the nearest whole number

Summarized in Table 12, the majority of auto repair shops in King County either sends waste solvent off-site or recycles the solvent on-site. Less than two percent of businesses were improperly disposing wastes from their petroleum-based parts washer. Improper disposal methods included burning the material in a waste oil burner, evaporating the material by leaving it in an open container, discharging material to the sanitary sewer, or taking the waste material to a household hazardous waste collection site.

Table 12. Disposal methods of aqueous and petroleum-based parts washing solvents

Disposal Method	Aqueous Parts Washer (%)	Petroleum-based solvent (%)	Is method acceptable? Y/N
TSD	65%	88%	Yes
Recycled on site	15%	5%	Yes
Never disposed	13%	5%	Yes
Sanitary sewer	7%	<0.1%	No
Burned on site	0%	<1%	No
Evaporated	0%	1%	No
HHW Collection Site	0%	<1%	No

Aqueous parts washers, although less common than traditional petroleum-based solvent washing systems, produce a waste that is more complex and problematic than petroleum-based solvents. Eight shops agreed to have samples of the wastewater and sludge fractions sampled. Results of this sampling study has been published as a separate report entitled "Characterization of Wastes from Aqueous Parts Washer Cabinets." The following information has been extracted from that study.

Sampling was done to determine if the aqueous parts washer sludge was hazardous (Christensen, D., 2002). The wastewater analysis included three components: total metals, volatile organic compounds (VOCs), and non-polar Fats Oils and Grease (FOG). The waste sludge analysis also included three test methods : Toxicity Characteristic Leaching Procedure (TCLP – Method 1311) including metals with copper, nickel, and zinc; for Halogenated Organic Compounds (HOCs), (EPA Method 9076); and pH (Washington State Department of Ecology, 1998). A literature search for toxicity ("book designation") was also performed on the waste using the Material Safety Data Sheets (MSDSs) representing the detergents used in the machines.

All wastewater samples exceeded the local sewer discharge limit of 100 parts per million (ppm) for fats, oils and greases (average FOG was 3,400 ppm). Fifty percent (50%) of the water samples exceeded the dangerous waste limit for lead or cadmium, based on total metals test results.

(Total metals testing is equivalent to a TCLP test on liquid waste with less than 0.5% solids). None of the samples had VOCs near regulatory levels. One water sample failed local sewer

discharge limits for arsenic, three failed for copper, and six failed for zinc.

The sludge samples' pH ranged from 7.5 to 11.3. These were within acceptable solid waste limits. TCLP results found one sludge sample designated as dangerous waste for cadmium. The EPA method 9076 results found one sludge sample that designated as a Washington State Special Dangerous Waste for HOCs.

If combined samples of water and sludge had been tested by TCLP, it is estimated that 38% of the samples would have designated as dangerous waste for heavy metals. Combined testing may be useful to an operator trying to stay within SQG waste production limits, and "oily waste" is generally less expensive to dispose of than "dangerous" waste.

The "book designation" of the detergent chemicals found no chemicals likely to be present in the waste at dangerous concentrations. However, recognizing that these chemicals have undergone an industrial process, further studies should be made with fish bioassays before declaring any part of this waste stream non-hazardous.

COOPERATIVE EFFORTS AND COMMUNITY OUTREACH

One of the highlights of a priority industry study are the opportunities for outreach within the particular industry and the possibilities to network with other government agencies for problem solving and cooperation with communities during the field visits. A number of outreach projects and cooperative efforts with other government agencies as well as businesses were undertaken as part of the auto repair study. A brief description of some of these collaborative efforts along with the individuals involved and the impacts that these efforts had on the success of this priority industry study is presented below.

Spill Pro Field Visit

Early in the project, a visit to one of the auto repair shops revealed that the manager had a high level of knowledge of spill control measures and equipment. When he was asked about the particular products and measures he responded that a local firm known as Spill Pro had provided him with the items and had also made him aware of his responsibilities for spill control and prevention. This led to a call to the Director of Spill Pro, Jeff Pettey, from a field staff member involved with the visit to the auto repair facility. Discussions between the two revealed that a demonstration visit to the company would greatly benefit all field staff involved with the auto repair project. A technical information visit was scheduled and included field staff from LHWMP, City of Kent storm water protection inspectors, Water and Land Resource Division staff, and a grass roots environmental protection group known as Planet CPR. Mr. Pettey demonstrated several of the products that are available for spill cleanup and prevention. These included spill pallets, drum spill protectors, storm water drain inserts, absorbent products for fluid spills, and a number of other items related to spills and spill prevention. The group also had the opportunity to participate in a hands-on field exercise in which an old storm drain insert was removed and a replaced with a new insert. The drain inserts are used to capture the waste oil that may go into the storm drain from leaking vehicles and other sources. The visit also provided the opportunity for information exchange and for questions to be asked and answered when possible. The main impact from this visit was to get information on a number of products that are available to businesses such as auto repair shops that have to deal with the issue of spills and spill control.

General Motors (GM) Service Managers Meeting

A field visit to a local Chevrolet dealership (Bill Hazelett's Chevrolet) service department resulted in an opportunity for an expanded outreach effort. The manager of the service department, Roger Sidick, was so impressed with the quality of support and information we provided that he requested a field staff member to speak at an upcoming Northwest GM Service Managers Quarterly Meeting. At this meeting there were approximately 35 Service Managers from GM dealerships throughout the State of Washington. A field staff member attended the meeting along with the team lead for the auto-repair project. An hour presentation was given which included a brief description of the LHWMP, a description of auto shop visits, and the resources that were available to help the shops meet environmental compliance regulations. In addition, attendees were shown an Environmental Protection Agency (EPA) video on how to properly manage hazardous waste that is generated in auto repair shops. They were also given the opportunity to ask questions about the video. Afterwards a lengthy question and answer period was conducted, and a number of materials were made available to the service managers.

The benefit from the outreach project was to help those involved with hazardous waste decisions to make judgements that would keep them in compliance with applicable laws and regulations.

City of Kent— Stormwater Protection program

A field staff member who concentrated on auto repair shops also had the opportunity and the privilege of working with members of the Kent Stormwater Protection Program. After a few initial visits in Kent, the field staff member became aware that the City of Kent had a new program to help control contamination and manage maintenance problems involving storm drains within the city. The program would rely on storm drain inspectors to check all storm drain systems within Kent and to recommend, when necessary that the drains be cleaned, properly maintained, and repaired.

A meeting between the field staff member and the City of Kent was scheduled to exchange information and program objectives and to see how each could benefit from the others' experience. It wasn't long before the joint efforts of both groups would start paying dividends to the regulated community in the form of protecting the environment. One inspector in particular, Richard Marshall from the City of Kent, assisted on a number of storm drain related issues. Mr. Marshall in conjunction with LHWMP staff was able to assist several auto repair shops with environmental compliance issues specifically related to storm drains. In addition, the City of Kent requested LHWMP support on several environmental problems that included the remediation of contaminated soils, secondary containment, spills, and other environmental compliance issues. A brief description of these collaborative efforts follows:

Jiffy Lube

A complaint call was received regarding a Jiffy Lube. The complaint involved the alleged illegal disposal of transmission fluid into the storm drain. The LHWMP staff member who was working the Kent area contacted Richard Marshall. A joint inspection was conducted by LHWMP field personnel and Mr. Marshall. The inspection revealed that the company had been working on vehicles outside of the work bays and they were working directly over a storm drain. They were not intentionally spilling materials into the drain but occasionally a hose would break or a minor spill would occur and transmission fluid would spill into the drain. During the audit visit there was discovered a large area of stained asphalt that led directly to a storm drain. It appeared that the staining was caused by used oil filters leaking from a solid waste dumpster that was located in close proximity to the drain. Through the cooperative efforts of both agencies a temporary storm drain insert was provided by the City of Kent to mitigate any future spills. The solid waste dumpster was moved to an undercover location and the area surrounding the dumpster was bermed to prevent any waste oil from entering the storm drain. The district manager for Jiffy Lube was contacted and advised to discontinue the policy that allowed working on vehicles outside of the work bays and over a storm drain.

All European Autowerks

During an initial inspection of this auto repair facility, it was determined that a large amount of waste oil had leaked into the storm drain. This was due in large part to very poor secondary containment. A call was made and another joint visit was scheduled. After the joint inspection, Mr. Marshall, who had not previously visited this location, determined it was one of the worst situations he had seen with regards to the combined problem of drain contamination and solids accumulation. The system was failing due to these problems and poor maintenance of the structures. The corrective action initiated by the city was to have the system cleaned out and

repaired. These requirements were completed by the business and improved property's storm drain system. Secondary containment was implemented to help prevent this type of incident from reoccurring.

Automatic Transmission Specialist

An initial inspection of this transmission repair facility revealed that poor storage practices and a lack of secondary containment had caused recurring spills into the storm drain. This led to a call for a joint inspection of the facility. It was determined that over 100 transmission cores had been stored outside, on the ground and without proper containment; the fluids from the cores were leaking onto the ground and were then moving to the storm drain when it rained. The solution to this problem was to have the cores removed, which was done immediately by the business, and to have the storm drain system pumped out and repaired. This was accomplished within a few weeks of the initial visit and the business no longer stores the cores on the ground.

S & B Truck Service

The initial visit of this big truck repair facility revealed that this business, along with a neighboring rental and repair facility had both contaminated the storm drain system with fluids leaking from vehicles and equipment stored on-site. In addition, improper maintenance had led to the drainage structures failure and the drains were full of debris and silt. Joint visits discovered businesses were eager to cooperate. The practice of storing the equipment near the storm drains was stopped immediately. The drains were pumped out and repaired where necessary. Inserts were placed into the drains should any accidental spills occur.

Transmission Replacement Company

The initial visit to this two-location business revealed two major issues that would require the assistance of other government agencies. First, at both business locations, there was a practice of storing scrap parts, which often had a large amount of fluid inside them, in roll-off dumpsters outside, without a drip cover. The dumpsters had holes in the bottom to allow the rain to pass out along with the fluids from the scrap parts, which would eventually end up in the storm drain system. Large areas of stained asphalt indicated that this practice had gone on for a long time. One spill covered a nearly 20 X 30 foot stretch of pavement. Secondly, at one of the locations, an oil wastewater treatment system was discharging oily water to the storm drain system, which was a violation of their permit.

This second issue involved the Industrial Waste Section of the Water and Land Resource Division (WLRD), King County's Department of Natural Resources. It was determined that the business had been operating the system in violation of the wastewater treatment permit. It was also found that the permit had expired. The business immediately stopped operating the treatment system and dismantled it. With the assistance of the LHWMP field staff, they contacted a hazardous waste vendor to properly dispose of over fifty, 55-gallon drums of oily wastewater. Again, Mr. Richard Marshall was contacted to address the issue of storm drain contamination. At one of the business locations, the practice of storing the parts in an uncovered dumpster was stopped and adequate cover was provided. In addition, the storm drain system was cleaned out and storm drain inserts were purchased to protect against any accidental future spills. At the other location, a major construction project was undertaken to repair the storm drain system. Storm drain inserts were also put in place to protect against any accidental spills. Here again the dumpster with scrap parts was placed undercover to prevent rain water from entering and leaking onto and into the ground.

Timlick's Auto Rebuild

The initial visit to this auto repair facility revealed a number of environmental compliance issues that would require further assistance. A number of 55-gallon drums of waste anti-freeze and other fluids were being stored outside on the ground and without cover. Spills or leaks from these drums were apparent. Underground waste oil tanks were being utilized and above ground spills from these tanks were going into the storm drain system. The issue of the Underground Storage Tank (UST) will be discussed in more detail in a later section of this report. In addition, the LHWMP investigator provided the business with information on proper secondary containment. The business also built a new outside storage shed with spill pallets to properly store and contain the 55-gallon drums of waste fluids while they awaited proper disposal.

Alleged Illegal Disposal Activity

A routine visit to an auto repair shop would prove to be anything but routine. While the manager of this business was doing a very good job of managing and disposing of dangerous waste, his neighbor appeared to be doing otherwise. A large stain on the interior of the wall of the auto repair facility had been caused by a spill of chemicals from an adjacent business that was involved in an x-ray image processing. When the LHWMP investigator questioned the auto repair manager about this, he made numerous allegations of illegal activities being carried out by the imaging business. The most serious allegation involved the illegal disposal of chemicals directly to the storm drain on the property. Immediately the LHWMP investigator contacted a number of other government agencies, including the City of Kent, to help investigate the allegations. A meeting was scheduled and present at this meeting were field staff from LHWMP, City of Kent, local fire officials, which included the city fire chief, and field investigators from King County Industrial Waste Section. A conference call was made to the auto repair business to ask him to explain his allegations. It was decided that a multi-agency approach would be necessary to investigate this business. The Kent Fire Department initially lead the investigation, to be backed up by Industrial Waste Section and LHWMP staff. The Fire Department went into the business under the pretense of a "routine" inspection and provided initial visual evidence of problems within the business. At the same time, investigators from Industrial Waste and field personnel from the City of Kent Stormwater program investigated the storm drain system to substantiate the claims of the illegal disposal of chemicals. The results of the investigation revealed storage issues within the business but the storm drains appeared to have received only minimal amounts of chemicals. The speed and cooperation of all parties involved led to a very successful plan to address the situation and a rapid execution of the plan.

City of Renton—Aquifer Protection Program

Within the City of Renton another opportunity for outreach between the LHWMP and another government agency occurred. Carolyn Boatsman, an Aquifer Protection Specialist with the City of Renton, heard that the LHWMP was conducting field investigations in the auto repair industry. She contacted field staff from LHWMP to discuss the possibility of doing joint visits to the auto repair shops that are contained within the "Aquifer Protection Area" or (APA). This is an area within the city limits where drinking water production wells are maintained. The protection program helps to ensure that the wells are not impacted by releases or threatened releases of dangerous chemicals from businesses within the APA. A number of joint visits occurred in which both programs advised businesses of their responsibilities for environmental protection and adherence to state, county and city regulations.

In addition, the LHWMP was able to provide a number of businesses with vouchers to help cover the costs associated with such items as secondary containment.

Washington State Department of Ecology—Underground Storage Tank (UST) Program

A number of automotive repair shops store both waste oil and useable product in tanks placed below ground. The field staff who initially inquired about USTs contacted Annette Ademasu with the Department of Ecology Toxics Cleanup Program. After talking with her, we decided many of the tanks that were discovered during field visits were unregulated and did not meet the updated UST requirements of December 1998. The auto repair shop owners had two options to come into compliance. One was to conduct a closure of the tank in place and the other was to have the tank removed permanently. Ms. Ademasu provided fact sheets regarding USTs as well as the forms necessary to do a proper closure of a UST. A number of joint visits were conducted between LHWMP and Department of Ecology inspectors for the UST Program. In many cases, the discovery of the UST by the LHWMP field staff was the first time the tank had been identified; the tank was not on the regulated tank list that Department of Ecology maintains. According to Ms. Ademasu, most of these tanks would probably not have been discovered without LHWMP assistance. To date at least eight of the tanks in question have been removed or upgraded in accordance with the December 1998 guidelines. The following case study is an example of this type.

Beacon Hill Underground Oil Tank

While conducting an automobile repair audit on a repair shop the auditor found an underground storage tank for oil. When the new proprietor was asked about it he didn't understand the issue because he didn't understand the question. The proprietor spoke very little English. The old owner (who spoke good English) had sold the business within the last year and was working at the shop as an employee. The old proprietor was asked about the tank and he stated that they had the tank placed in the ground in 1953 and it had been there ever since. In 1970, the State Department of Ecology had the station take its gas tanks out of the ground and the proprietor was also to have the oil tank removed as well. Well, that never happened and when the auditor called Ecology their representative came out and advised the old and new owner to get it removed as soon as possible. It was later found out the tank had ruptured and oil had migrated from the tank area over and into the next door neighbors yard. This case is still open by the state and will be concluded in the very near future.

EnviroStars Business Recognition Program

The EnviroStars Program is a program that publicly recognizes and promotes businesses that practice pollution prevention and proper hazardous waste management to help protect the environment. The levels (two-to-five star) reflect increasing pollution prevention and hazardous waste management standards. At the two-star entry level, a business must demonstrate that they are correctly managing hazardous wastes and must set a hazardous waste management-related goal for the upcoming year. Three-star candidates must focus on cleaning methods using less hazardous materials, product and waste storage, minimization of hazardous products, and promote employee involvement in hazardous waste reduction. Four-star level candidates must demonstrate operational efficiencies related to waste reduction or recycling and marketing of their efforts within the community. At the five-star level, businesses demonstrate their leadership qualities within their industry and undertake efforts towards comprehensive environmental protection. To be eligible at any level, businesses complete an EnviroStar application and participate in a site visit from a Local Hazardous Waste Management Program investigator.

Two-star EnviroStars receive a certificate signed by the County Executive, a window decal indicating EnviroStar status, EnviroStars logo to use in the business marketing efforts, and promotion on the EnviroStars website. Three-star EnviroStars receive the above, plus radio promotions and mention in newspaper articles. Four-star EnviroStars receive all of the above and are profiled in success stories distributed to local media. Five-star EnviroStars receive all of the above, are featured in special promotions, including phone book yellow pages advertising and community events, and are considered for environmental achievement awards. During the period covered in this report, twelve auto repair shops obtained EnviroStar status. The EnviroStar businesses and star levels are summarized in the Figure 3 and Table 13.

Figure 3. Distribution of EnviroStar auto repair shops in King County, 2000-2001

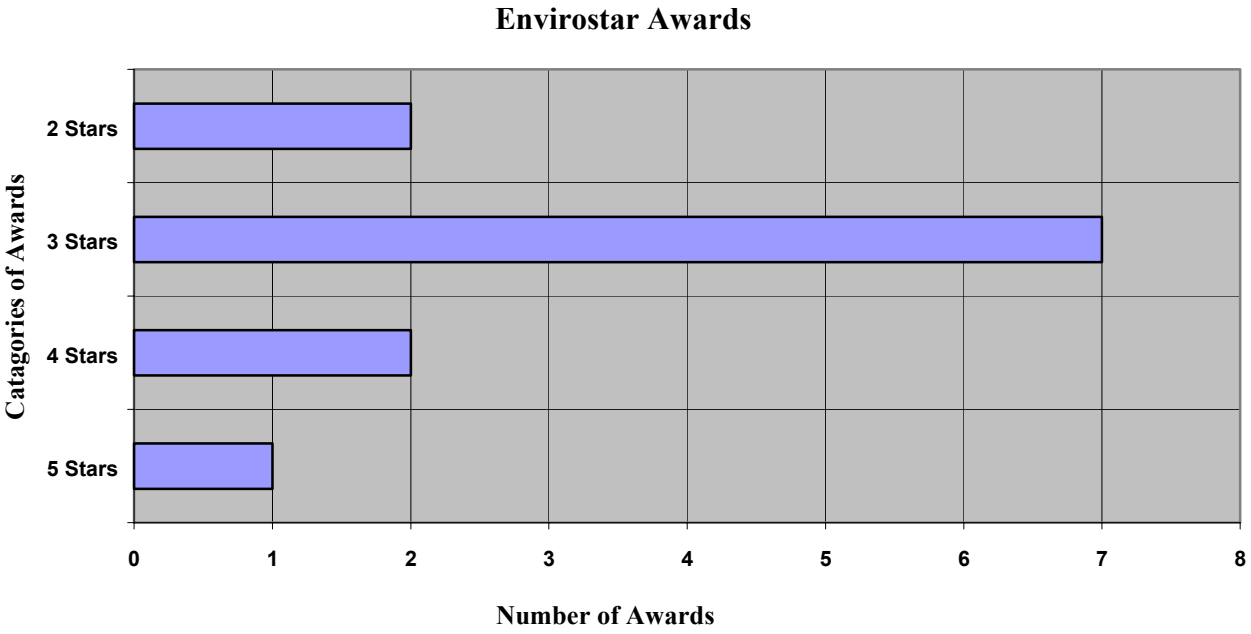


Table 13. Summary of EnviroStar auto repair businesses recognized, 2000-2001

Star Level	Auto Industry	Site Contact
Two-stars	Car Tender	Steve Malland
	Edwards Automotive Service, Inc.	Bill McFarland
Three-stars	Andy's Import Auto Repair	Andy Tilbian
	Federal Way Auto Electric	Dennis Graves
	Federal Way Firestone	Chris Inselman
	Len's Automotive Inc.	Ken Mattson
	Morgan's Mobile a.k.a. Morgan's Foreign Auto Service	Morgan Ahouse
	Pacific Coast Ford	Brian Crane
	Ring Hill Motors Inc.	Juanita Behar
Four-stars	1st Stop Muffler and Brake Shop	Chris Crounse
	Hi-Line Auto Electric Inc.	Tim Eaton
	Oval's Motorsport	Fred Noble
Five-stars	Bernard Imports	Nick Casida

Voucher Incentive Program

The Voucher Incentive Program reimburses qualified businesses up to half the costs (to a maximum of $500) for expenses related to proper management or disposal of hazardous waste. To be eligible, a business must have: a business license, be located in King County, generate only small amounts of hazardous waste (less than 220 lbs/mo), receive a consultation visit from a LHWMP representative, and follow agreed-upon recommendations for waste management, storage or pollution prevention. After a LHWMP investigator issues the voucher, businesses must contract for the services or products that are agreed on and pay the vendor or service provider. The receipts and the completed voucher form are submitted to King County. From January 2000 through September 2001, 363 businesses were issued vouchers. Ninety-seven businesses (27%) redeemed vouchers totaling $31,747.49. Vouchers were used to install secondary containment, to analytically test unknown hazardous wastes, to purchase spill materials, and to obtain other waste management and disposal services.

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APPENDIX A
PRIORITY INDUSTRY TYPES

There are six priority industry classifications:

Priority Industry 1

These are industries in which little is known about their wastes, processes and issues. It requires a comprehensive project that includes, needs assessment, research to answer questions about the industry's processes, wastes and options, establishment of an advisory board, disseminating information to these businesses, working on issues that arise such as regulatory interpretations and agency coordination, and evaluating the effectiveness of the project.

Priority Industry 2

These are industries where there is some knowledge of their processes, wastes and issues. This is a project that requires research but is not as extensive as the Priority Industry 1 projects. This industry includes answering questions for and about the industry and working with other agencies and associations.

Priority Industry 3

These are industries where no project level research is needed and most of the information for that industry is available but may need compiling and packaging.

Priority Industry 4

These are industries where no research is required since the information is available to answer most questions for the industry, but a need to disseminate additional information to the industry is identified.

Priority Industry 5

These are industries where field visits are conducted to an identified number of shops to collect process, waste or practice information. The data collected will be used for baseline, evaluation or prioritization purposes.

Priority Industry 6

These are industries where a number of shops within that industry are contacted to offer information via field visits, a workshop mailer or other means identified as appropriate.

A priority industry is selected based on the following factors:

- Small quantity generator potential,
- Priority wastes,
- Process/technology changes,

- Up to date information/available knowledge,
- Number of businesses in King County,
- Number of similar industries,
- Number of different priority wastes,
- Amount of hazardous waste,
- Management of hazardous waste, and
- Political interest.

APPENDIX B—STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODES FOR THE AUTO REPAIR INDUSTRY

SIC CODE	BUSINESS TYPE
5510-01	Car sales with repair/maintenance
5561-02	RV sales with repair/maintenance
7533-00	Exhaust systems, mufflers & catalytic converters only
7537-00	Transmission repair/replacement
7538-00	General auto repair
7538-01	Auto machine shop
7539-01	Alignment & suspension only
7539-02	Brake repair only
7539-03	Carburetor repair only
7539-04	Electrical repair only
7539-06	Radiator shop
9999-02	Unknown business type
9999-03	Out of business

APPENDIX F
DEMOGRAPHICS OF AUTO REPAIR INDUSTRY

CITY	ZIP CODES	TOTAL NUMBER OF BUSINESSES
Auburn	98001, 98002, 98071, 98092	81
Bellevue	98004, 98005, 98006, 98007, 98008	82
Black Diamond	98010	4
Bothell	98011, 98012, 98021	8
Burien	98146, 98148, 98166, 98168	54
Carnation	98014	1
Des Moines	98198	12
Duvall	98019	1
Enumclaw	98022	8
Fall City	98024	3
Federal Way	98003, 98023	37
Issaquah	98027, 98029	18
Kenmore	98028	13
Kent	98031, 98032, 98042	60
Kirkland	98033, 98034	51
Maple Valley	98038	15
Mercer Island	98040	2
North Bend	98045	4
Pacific	98047	4
Preston	98050	2
Redmond	98052, 98053	38
Renton	98055, 98056, 98058, 98059	64
SeaTac	98148, 98158, 98168, 98188, 98198	96
Seattle	98039, 98101, 98102, 98103, 98104, 98105, 98106, 98107, 98108, 98109, 98112, 98115, 98116, 98117, 98118, 98119, 98121, 98122, 98125, 98126, 98133, 98134, 98136, 98144, 98155, 98166, 98177, 98178, 98199	254
Skykomish	98288	1
Snoqualmie	98065	3
Tukwila	98168, 98188	37
Vashon	98070	7
Woodinville	98072	21
TOTAL NUMBER		**981**

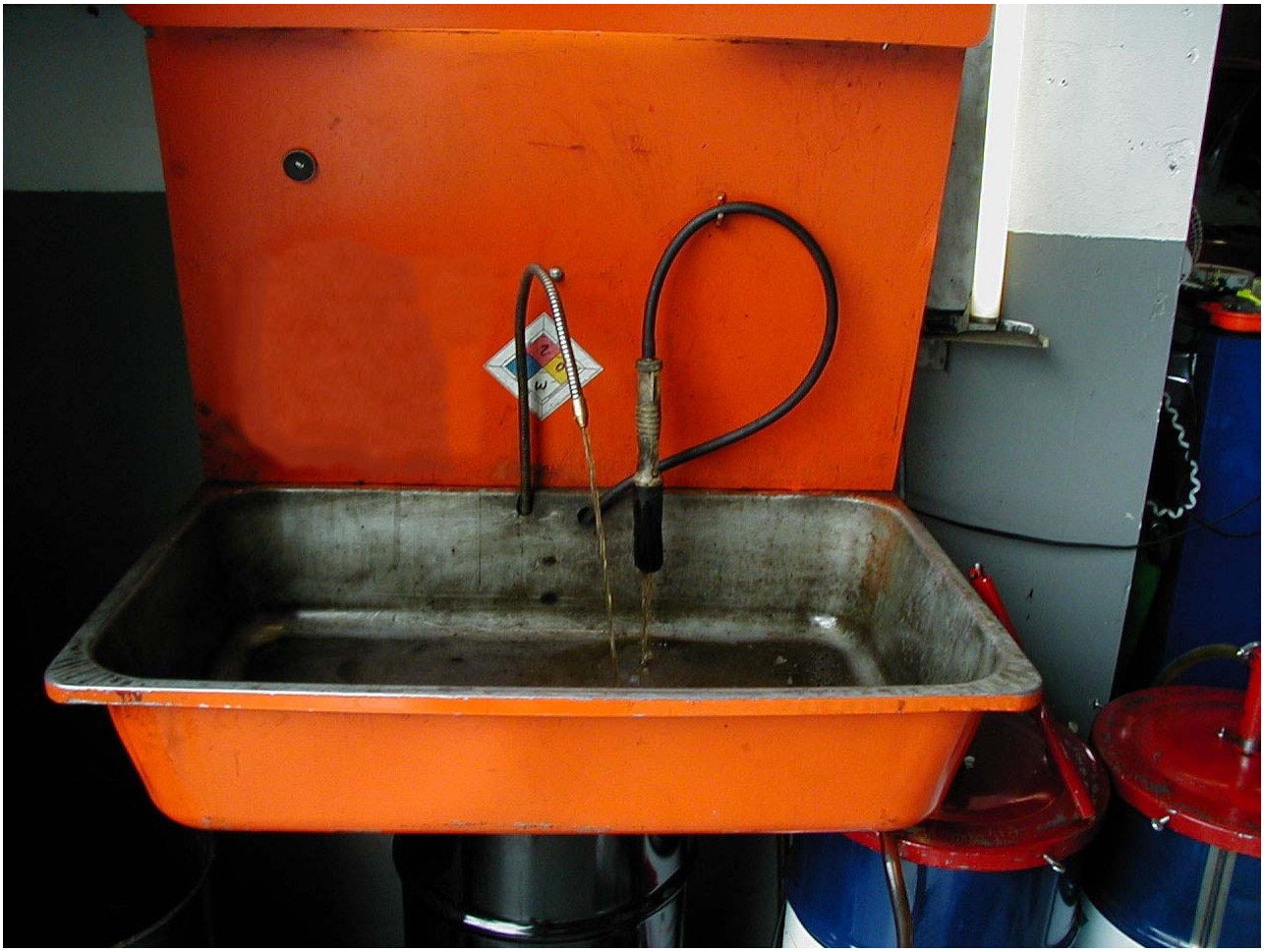
APPENDIX G
COMPLAINTS INVESTIGATED

NO.	DATE	TYPE OF COMPLAINT
1.	1/18/00	Business washes its floor with soapy water then throws water onto ground (Auburn).
2.	12/15/00	Visited as part of Federal Way mini sweep in Spectrum Business Park.
3.	12/15/00	Visited as part of Federal Way mini sweep in Spectrum Business Park.
4.	12/15/00	Dumping antifreeze into storm drains. Containers with liquid in them left open (Federal Way).
5.	12/15/00	Using parts washer evaporator to "cooked down" wastewater and solvents (Federal Way).
6.	12/15/00	Visited as part of Federal Way mini sweep in Spectrum Business Park.
7.	1/13/00	Oil and auto fluids being spilled onto ground (Auburn).
8.	1/12/00	Oil pollution around shop as a result of poor housekeeping practices. Hosing out bay floor to storm drain (Kent).
9.	1/18/00	Large portion of work done outside in parking lot letting fluids run down street. Unknown if storm drain nearby (Auburn).
10.	5/4/00	Business employees seen pouring green liquid into drain followed by hot water and using a squeegee to scrap up spills into the drain (Renton).
11.	5/10/00	Business has oil and grease on ground with some that ends up in storm drain (Seattle).
12.	5/25/00	Pouring automotive liquids down outside drain Seattle).
13.	5/31/00	Radiator shop washes green fluid into storm drain emitting a toxic smelling white cloud.

APPENDIX H
AUTO REPAIR INDUSTRY PHOTOGRAPHS

Typical Auto Repair Shop Outside

Typical Auto Repair Shop Inside



Solvent Parts Washer

Petroleum solvent is the most common cleaner used for cleaning auto parts. Off the 981 shops inspected, 596 used solvent. Solvent is the most significant and expensive hazardous waste disposed of by auto repair shops. It usually requires a monthly pick-up by an authorized handler of hazardous waste.

Aqueous Parts Washer

This is an aqueous parts washer. They range in size from small units for parts cleaning to large units for cleaning engine blocks. They are similar to automatic dishwashers in function, plumbing and use of cleaning agents. The rinse cycle is filtered and in most shops laboratory tests indicated that some of the wastewater was not safe to discharge to the public sewerage system. If the sludge in the bottom of the wash tank designated as a hazardous waste it should have been sent to hazardous waste company for proper disposal. Auto repair shops are switching to these washers because the cleaners used are not toxic as solvents, and hazardous waste disposal fees are lower.

A Double Walled and Three Hundred Gallon Waste Oil Tanks

Tanks of this size are used in auto repair shops for storing new and used oil. Labeling of contents is required. These tanks should be leak proof made of solid steel and located on steady foundations. A building without floor drains also provides containment for liquid leaks and spills.

Secondary Containment

The yellow pallet under the used oil barrels and used antifreeze container is a common type of portable secondary containment. The white container on the floor is used to drain oil filters. The oil from the filters can also be drained into the used oil barrel from the white container, which has a drain hole in the bottom fitted to the barrel's cap. Secondary containment is not required for new product storage or liquid wastes from small quantity generators, making most auto repair shops exempt from construction of secondary containment. Although not required, a majority of shops built secondary containment to prevent leaks or spills from entering storm drains and surface water. Most of the vouchers issued to auto repair shops were for construction or purchasing of secondary containment.

Storm Drain

Floor Drain

Both of the above can be reached by leaks or spills of hazardous contents in the barrels on the preceding page.

Spill Kit (Blue bag on shelf)

Spill response kits contain absorbents and squeegees so that leaks or spills of hazardous waste can be quickly and safely contained. The used absorbents are stored in barrels for hazardous waste pick-up. Business managers are required to have a spill kit handy and to brief workers on their location and use. Almost all of the shops had an active interest in spill control and properly maintained these kits.