WASHINGTON STATE DEPARTMENT OF ECOLOGY

School Sweeps Campaign Final Report

Technical Assistance to Community and Technical Colleges

Washington State Department of Ecology
Hazardous Waste and Toxics Reduction Program

March 1998
Publication #97-438

printed on recycled paper

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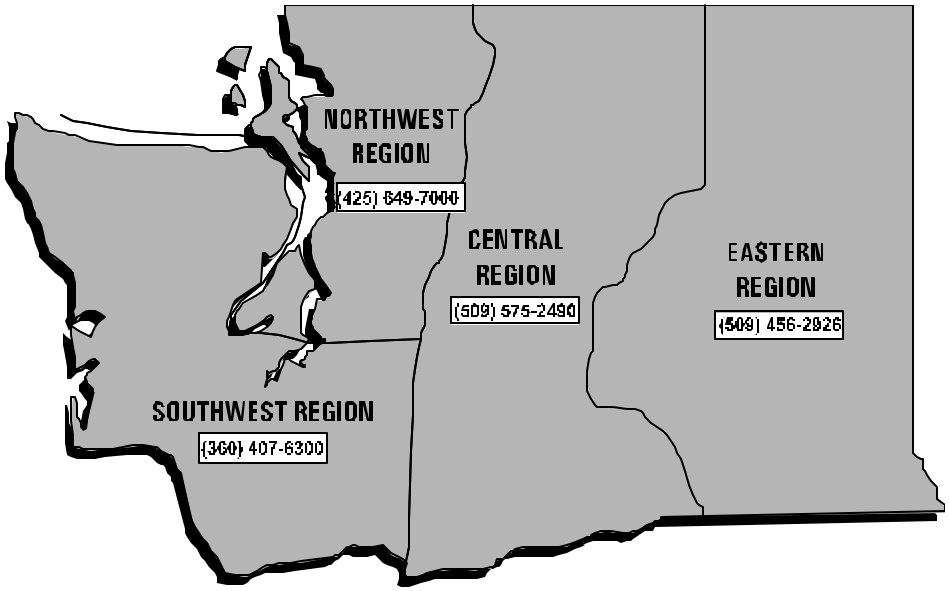

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Executive Summary

✎ Introduction to School Sweeps

The School Sweeps Project was a technical assistance campaign developed for Washington State's community and technical colleges. The Washington State Department of Ecology (Ecology) has been successfully using the "single industry campaign" approach to improve compliance and prevent pollution at businesses since 1992.

The School Sweeps Project was the third campaign of this type, running from September 1995 through September 1997. The Hazardous Waste and Toxics Reduction Program conducted the campaign, with significant contribution from King County's Local Hazardous Waste Management Program.

Community colleges were chosen because previous visits had shown that some of them were out of compliance with hazardous waste regulations and that they could benefit from some assistance. Additionally, students are being trained for occupational fields where hazardous substances are used and waste is created, and this campaign provided an opportunity to supplement current curricula with environmental management basics.

Project Goals and Major Components

The goals of the School Sweeps Project were to improve compliance with environmental laws, promote pollution prevention techniques, and provide opportunities to train vocational students in basic waste management techniques.

The three major components to accomplish these goals were to:

- Perform an environmental assessment of the campus and provide technical assistance to help the colleges make necessary improvements to comply with environmental laws and prevent pollution;
- Provide specific technical assistance to laboratory instructors to help improve chemical handling, inventory, storage, and disposal techniques; and
- Enhance current vocational program curricula with environmental management and pollution prevention concepts.

The Campus Visit

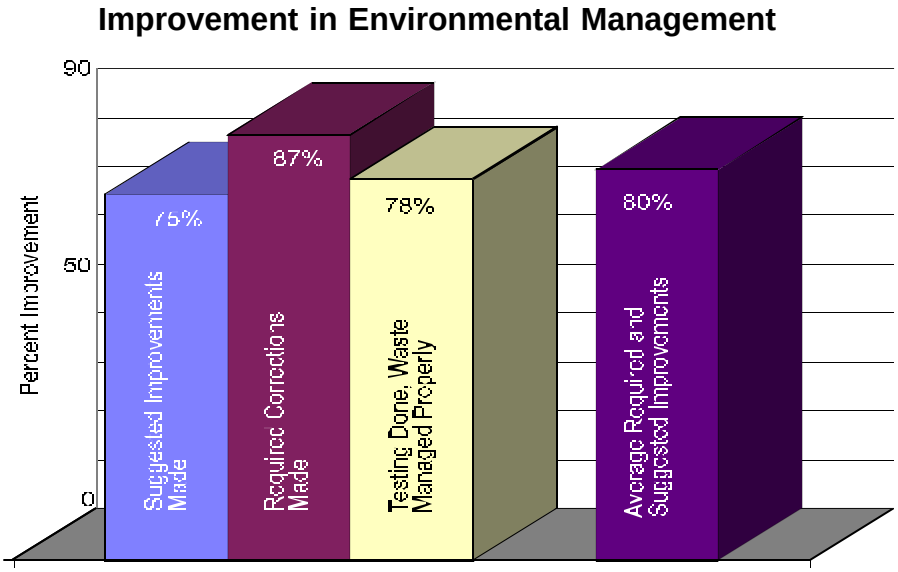
The main tool for providing assistance was the site visit. Each of the state's 32 community and technical colleges and two private colleges received a technical assistance visit, followed by a detailed Campus Report. The report described the things the college needed to do to comply with environmental regulations, provided suggested best management techniques (things that are not required by law but should be done), and good things that the colleges were already doing.

Technical assistance was provided to make necessary changes, and a follow-up visit was conducted one year later to assess progress.

Results

As a result of this campaign, the colleges achieved significant improvements. Eighty-seven percent (87%) of all of the compliance related items were corrected or in progress of being corrected by the time of the second visit.

Seventy-five percent (75%) of the suggested best management practices were implemented or in the process of being implemented by the time of the second visit. (At the time of tabulation, results data was not available for all of the colleges.)



Improvement in Disposal Practices

Of the almost 200 issues on campuses related to disposal practices, 159 (82%) showed positive corrective action taken. Eight-two percent of the incidences where wastes were being improperly disposed have now been corrected.

Six colleges complied with and implemented 100% of the suggestions in the Campus Report. Overall, the colleges showed an average rate of 80% environmental improvement.

✎ Laboratory Assistance

Because many of the schools (85%) have science laboratories and because of the chemicals and wastes on-site, special attention was given to the labs. Project members with chemistry knowledge conducted the lab site visits.

Technical Assistance Tools

A training conference for college laboratory instructors provided training on environmental regulations, proper management, microchemistry, and waste minimization. A document, "Step-by-Step Guide to Better Laboratory Management Practices" was produced. Additional on-site assistance was provided to help laboratories improve their chemical inventory and segregation systems.

✎ Vocational Education Component

To help get environmental management information into the vocational program curricula, Ecology drafted Environmental Competencies for five program areas. A competency is a set of skills that a student must master to complete the program. The Environmental Competencies, which were approved by and distributed through the State Board for Community and Technical Colleges, were written for the following programs:

- ✓ Automotive Repair
- ✓ Auto Body Repair
- ✓ Dental Programs
- ✓ Photography and X-Ray Developing
- ✓ Woodworking and Cabinetry

The purpose of the competencies was to provide a tool to teach students how to safely and effectively handle hazardous waste generated on the job, prevent pollution, and reduce waste.

✎ Evaluation of School Sweeps Technical Assistance Campaign

Two evaluations were distributed, one to the key campus contact, and one to the academic departments.

Evaluation of Services by Key Contacts

Based on the results of the evaluations, the colleges were pleased with the services they received. An anonymous survey was sent, and had a sixty-two percent (625) return rate.

Of those returned, 95% now thought someone from government could actually help them; and, on a scale of "very useful" to "not useful at all":

81% found the campus walk through very useful.
71% found the written campus report very useful.
71% found discussion of regulations very useful.
71% found having a contact to ask questions very useful.
The remaining respondents ranked all of these items "some what useful."

The written comments were positive, and the respondents expressed that they received good service and were glad they had someone from Ecology they could work with.

✎ Evaluation of Services by Departments

During the one-year follow-up visit, technical assistance staff conducted a verbal evaluation survey with instructional department contacts. Sixty-three evaluations were completed. Because of our services:

- 97% are now able to comply with hazardous waste requirements.
- 54% are able to reduce routine generation of hazardous waste.
- 97% would recommend our services to other schools or businesses.
- 96% said they already have or plan to relay environmental materials to students.
- 45% of the instructors that received competencies said they are already using them, and 55% said they plan on it.

Section 1
Introduction

This report provides information on the environmental management technical assistance work conducted at Washington State community and technical colleges from 1995 to 1997. It describes the project goals, strategies, and the progress the colleges made toward attaining environmental compliance and implementing pollution prevention. It explains the techniques used to promote teaching environmental management concepts in vocational education programs. Examples of steps the colleges are taking appear in italic text throughout the report.

The Single Industry Campaign Concept

The Washington State Department of Ecology is responsible for administrating hazardous waste laws and encouraging pollution prevention. Instead of relying solely on compliance-based interactions with businesses regulated by these laws, state and local government agencies are providing education, assistance, and tools to help businesses meet environmental regulations and prevent pollution.

One successful approach Ecology uses, the "single industry campaign," involves working with a specific industry group over a period of time to help them comply with environmental laws and reduce waste.

Community colleges were identified as a group that generates hazardous waste and which could benefit from this type of assistance. A focused outreach campaign gives opportunities for technical assistance staff and businesses to work together to overcome barriers to complying with environmental laws and preventing pollution. Addi-

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Grays Harbor Community College *is prepared! They are building a Spills Response Boat that will respond to hazardous materials and oil spills in Aberdeen Harbor. Two staff have received Hazardous Materials Training and provide 16-hour on-site support. Additionally, with funding for seismic-related upgrades, they have purchased 20 flammable materials storage cabinets.*

HHHHH

Seattle Central Community College's *laboratory cleaned out 3000 containers of old laboratory chemicals, including some that were potentially explosive. The college also modified its silver recovery system for photographic waste streams so that it now meets silver discharge limits.*

tionally, waste reduction and other innovative techniques can be shared between similar businesses.

The campaign approach was first used in Washington in 1992 with the automotive repair industry. In 1994, a second campaign was launched with the photo-processing and printing industry. In both campaigns, Ecology worked closely with industry associations to design the program, and with local government environmental staff to conduct the technical assistance visits. See Appendix B for information on how to obtain reports from these campaigns.

The goal of these campaigns is to provide technical assistance to businesses to enable them to:

- Reduce waste generation
- Improve waste management practices
- Prevent pollution
- Improve health and safety conditions
- Reduce liabilities
- Comply with the hazardous waste regulations

Hazardous waste management and reduction is the primary focus, but other key environmental regulations are covered as well, including regulations on water, solid waste, and air quality. Regulations governing fire codes, sewers, and health and safety were also included.

Section 2
Description of the School Sweeps Campaign

Background

In the fall of 1995, School Sweeps was launched to address environmental concerns at Washington State community and technical colleges. Since almost one-third of the colleges are in the Seattle-King County area, the Local Hazardous Waste Management Program in King County was a partner in this campaign.

Purpose and Goals

Statement of Purpose

The purpose of the School Sweeps Project was to help Washington State's vocational education institutions become models of hazardous waste compliance and pollution prevention, and assist in training a new generation of skilled workers who recognize and practice these values.

Goals

The main goals of the project were: (1) To improve compliance with environmental laws and promote pollution prevention techniques and; (2) To provide opportunities to train vocational students in basic waste management techniques.

The three major components to accomplish those goals were to:

1) Perform an environmental assessment of the campus and provide technical assistance to help the colleges make necessary improvements to comply with environmental laws and reduce pollution.
2) Provide specific technical assistance to laboratory instructors and personnel to improve chemical handling, inventory, storage, and disposal techniques.

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Perry Technical Institute *has taken steps to protect and restore Wide Hollow Creek. They have eliminated the application of herbicides between the campus and the creek, allowing the vegetation to grow. This improves fish habitat, stabilizes the bank, and inhibits dumping of trash and appliances into the creek.*

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The Campus Maintenance Department at ***Spokane Falls Community College*** *eliminated the use of chlorinated aerosol cleaners in the shop, reducing CFC's and potential contamination of other waste streams.*

3) Enhance current vocational program curricula with environmental management and pollution prevention concepts.

The description and results of the campus assessment and laboratory work will be presented together, followed by the vocational education component.

Profile of Community and Technical Colleges

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Wenatchee Valley College's *Refrigeration Program switched from using disposable bottles of gas to refillable pressurized cylinders, eliminating a solid waste stream.*

Community and technical colleges are two-year colleges that provide a range of educational opportunities, including basic skills, academic, and vocational courses. Washington State's public community college system consists of 32 colleges. The State Board for Community and Technical Colleges is the governing body for the college system. Over three-fourths (78%) of the colleges are on the western side of the state and less than one-quarter (22%) are on the eastern side. Two private colleges on the eastern side also participated in this technical assistance project, bringing the total number of colleges involved to 34.

Why Community and Technical Colleges?

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Gonzaga University's *Science Laboratory has eliminated a dangerous situation by disposing of excessive amounts of old, unusable chemicals. Some dated from the 1950's, some were in disintegrating containers, and some had questionable contents. School officials acted quickly to remove the dry picric acid, which is an explosive hazard.*

Community colleges were chosen by Ecology to receive technical assistance for many reasons. Ecology and local government inspectors knew from previous visits that many of the colleges were not in compliance with environmental laws. In community colleges, there are many areas where hazardous waste is created and hazardous substances used, and the responsibility for waste management is shared among a number of people. This can lead to mismanagement of wastes, potentially dangerous situations for students and staff, and excessive waste management charges. Generally, hazardous waste management costs come out of the department's budget, and few have planned for it adequately.

Few colleges have dedicated staff to manage hazardous waste campus-wide. Vocational program instructors are often responsible for the management of wastes they create. Some of them felt they lacked sufficient knowledge to comply with environmental laws, and are uncomfortable teaching waste management. Students were learning improper waste management techniques by observing and mimicking the instructor's behavior. Additionally, vocational program curricula often did not include environmental concerns in the coursework.

Section 3

Campus Environmental Assessment

Introduction

The on-site visit was the primary tool used to provide technical assistance on hazardous waste management to the community colleges. All of the colleges were identified, along with the areas where hazardous waste might be generated. A key contact was assigned from each college. Technical assistance staff identified situations that needed correction and provided assistance to help the college make the necessary changes. A report was written for each college. A second visit was conducted one year later to assess the progress the college had made, and a final report written.

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Walla Walla Community College's *John Deere Services Technical Center has cleaned up contaminated soil in front of the storage building, and prevented further contamination by providing secondary containment for hazardous wastes.*

Key Project Contacts

Each campus was assigned a lead technical assistance contact person from either the Department of Ecology or King County. Each college selected someone to be the key project contact, often the facilities director or campus services personnel. They worked closely with campaign technical assistance staff on the campus assessments and in implementing the suggestions made. They helped insure access to campus departments and were the link between the instructional programs and the administration. Their support of the project, commitment, and desire to do the right thing made it a joint venture. The visits were very thorough and covered some of the same issues that an inspection would, but did not result in any penalties being issued.

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Instead of just disposing of unwanted chemicals and pesticides, the Horticulture Program at ***Bellevue Community College*** *listed them in the "Industrial Materials Exchange Catalog," in hopes of finding someone who could use the products and eliminate a waste.*

Participating Colleges

Thirty-four colleges (see Table 1) received a two-part environmental assessment. Each instructional and administrative department that had the potential to generate hazardous waste was visited, for a total of 66 unique departments (see Table 2).

Table 1: Participating Community and Technical Colleges

College Name	City	Number of Programs Visited[3]
Bates Technical College	Tacoma	14
Bellevue Community College	Bellevue	3
Bellingham Technical College[1]	Bellingham	10
Big Bend Community College	Moses Lake	3
Centralia College	Centralia	4
Clark College	Vancouver	6
Clover Park Technical College[1]	Tacoma	18
Columbia Basin Community College	Pasco	5
Edmonds Community College	Edmonds	4
Everett Community College	Everett	5
Gonzaga University[2]	Spokane	2
Grays Harbor College	Aberdeen	6
Green River Community College	Auburn	6
Lake Washington Technical College	Kirkland	10
Lower Columbia College	Longview	7
North Seattle Community College	Seattle	10
Olympic College	Bremerton	9
Peninsula College	Port Angeles	3
Perry Technical Institute[2]	Yakima	8
Pierce College	Tacoma	4
Renton Technical College	Renton	10
Seattle Central Community College	Seattle	11
Shoreline Community College	Seattle	14
Skagit Valley College	Mount Vernon	7
South Puget Sound Community College	Olympia	6
South Seattle Community College	Seattle	19
Spokane Community College	Spokane	6
Spokane Falls Community College	Spokane	3
Tacoma Community College	Tacoma	3
Walla Walla Community College	Walla Walla	5
Wenatchee Valley College	Wenatchee	7
Whatcom Community College	Bellingham	1
Yakima Valley Community College	Yakima	6

Table 1 Note:

[1] = No Science Lab

[2] = Private college

[3] = Number of Instructional Programs with potential to generate hazardous waste that were visited (see Table 2 for program names).

First Campus Visit

A thorough site visit was conducted in the spring of 1996 at each campus to assess how well they were currently complying with environmental regulations. The first step in planning the campus visits was to learn a little about each college and identify all of the areas where hazardous waste might be created, or where hazardous substances might be used. This included the facilities' maintenance and administrative service areas and the instructional areas, such as the laboratories and automotive repair shops. Table 2 lists the administrative and instructional departments visited in the community colleges, in broad groupings.

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Edmonds Community College *has constructed a central waste area for accumulating and shipping wastes off-site, enabling the college to properly manage dangerous waste and limit the number of locations where waste is held on campus.*

Table 2:
Administrative Departments and Instructional Programs Visited

Administrative Departments

Carpentry / Wood / Paint
Facility Maintenance / Recycling / Hazardous Waste
Grounds Maintenance
President's Office
Printing / Photo / Copy / Graphics
Records / Safety

Instructional Programs

Apprentice Program
Art
- Ceramics
- Drama & Theatre
- Jewelry
- Painting / Fine Art
- Print Making
- Graphics / Silk Screen

Autobody
Automatic Transmissions
Automotive Repair / Technology
Aviation
Boatbuilding
Cabinetry
Carpentry / Wood Construction
Cosmetology
Dental Assisting / Hygiene
Diesel
Electronics / Electrical Construction
Environmental Sciences / Technology
Forestry
Heavy Engines
Heavy Equipment
Heavy Transmission
Horology
Horticulture
HVACR
Laboratory
- Biology / Biotech / Micro / Med Tech
- Chemistry
- Geology
- Hazardous Materials
- Metal Fabrication
- Metallurgy
- Oceanography
- Optical
- Painting
- Physics
- Radiology

Machine Shop
Marine Technology
Mechanics
Media Center
Motorcycle / Marine Vehicles
Newspaper / Campus
Nursing / Orthotics / Prosthetics
Photography
Printing
Radiology
Recreational Vehicles
Repair Shop
- Appliance
- Musical Instrument
- Office Equipment
- Small Engines

Technical Skills
Telecommunications
Veterninary
Water / Wastewater Technology
Welding

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Green River Community College's *Auto Body Program and Carpentry Program are sharing resources to protect the environment. The autobody shop has an excellent, self-contained spray gun washer. The Carpentry Program's method of spray gun cleaning was not acceptable under the Clean Air Act, so now the spray guns are taken to their own auto body shop for cleaning. Now they are sharing resources and eliminating violations.*

In each program area or department, technical assistance staff observed whether or not any hazardous wastes were generated. They made observations on hazardous waste management and hazardous substance use. Fifty-seven key substances were identified, such as solvents, oil, photo-chemicals, and antifreeze. Table 3 shows the commonly found wastes (mostly hazardous, but some non-hazardous) and products with hazardous substances (ingredients) typically found on campus. "Other" was used if the substance wasn't on the list; "unknown" was used if a container of product or waste was not labeled and contents could not be determined. The category "All" is used in the analysis if general recommendations were made without a particular substance mentioned. Each substance was also classified as being a product, a waste, or both a product and a waste. Each substance had a waste management concern associated with it (see Table 4). Concerns were classified into 58 categories, such as container management, spill prevention, storage areas, etc.

The goal was to provide the college with a concise report on the waste management concerns found, and to make suggestions on how to improve regulatory compliance and reduce pollution when possible. It was then noted whether this was something that required correction or was a suggested improvement.

Table 3: List of Substances in Products and Wastes Found on Campuses

Acids	Corrosives / Caustics	Parts Washer
Aerosols	Electroplating Solutions	PCB Light Ballasts
Alcohol	Fuels	Pesticides / Herbicides
Amalgam	Gases	Petroleum / Oils
Antifreeze	Glazes	Photo-chemicals
Aqueous Solutions / Liquids	Inks	Scrap Metal
Batteries	Laboratory Chemicals	Sludge
Biomedical	Lead Foil	Soap
Blasting Media	Mercury	Solid Waste
Brake Dust	Metal Shavings	Solvents (+ Chlorinated)
Brake Fluid	Mixed Waste	Towels (cloth & paper)
CFCs	Oil	Unknown
Chemicals	Oil Filters	Vehicle Fluids
Circuit Boards	Other	Water-Cabinet Wash
Coatings	Paint	Water-Floor Wash
Coolants	Paint Filters	Water-Waste

If hazardous wastes were observed, it was noted whether the waste was handled properly, including storage, labeling of waste containers and storage areas, waste container condition, and frequency of disposal, among other things. If hazardous substances were being used, it was noted whether or not proper precautions were in place, and if an alternative product could be used instead. Table 4 lists the environmental management concerns most commonly found that were tracked or good practices noted. After the follow-up visit, it was determined whether or not the college made the suggested improvements.

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Renton Technical College's *Automotive Program is making improvements that will keep spills of chemicals and wastes out of the storm drain and sewer by providing secondary containment for hazardous substances.*

Table 4: Environmental Management Concerns Found on Campuses

Accumulation-Satellite	Manifests / Receipts / Records
Air Quality / dust / fumes / ventilation	Material Safety Data Sheets
Chemical Hygiene Plan	Materials Exchange
Chemical Substitution	Permits
Container, Closed	Personal Protection Equipment
Container, Condition	(goggles, masks, gloves, etc.)
Container, Labeling	Product Usage
Counting	Purchasing
Cross Contamination	Recycling
Designation	Reuse
Discharge to Air	Secondary Containment
Discharge to Dry Well	Segregation (compatibility)
Discharge to Septic System	Shop Condition / Housekeeping
Discharge to Sewer	Signs-Warnings / Reminders / BMPs
Discharge to Soil	Spill Material / Procedures
Discharge to Storm Drain	Spill Prevention
Disposal Method	Storage Area / Site Method
Disposal to Landfill	(aisle space, security labeling)
Equipment Modification / New	Training, Staff
Eye Wash / Showers	Training, Students
Fire Fighting Equipment	Treatment Log
Fire Prevention (flam. storage, etc.)	Treatment Method
Hazardous Waste Disposal	Treatment-Evaporation
Identification Number / Annual Report	Treatment-Neutralization
Improper Disposal (through local program)	Waste Management Procedures
Inspection / Inspection Log	Waste Reduction
Inventory Control	

The Campus Report

Information on waste management practices was collected at each instructional or administrative program area visited. A campus report was prepared from the findings, highlighting changes that needed to be made to comply with the regulations.

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North Seattle Community College *is working toward having one person responsible for environmental management on campus. This has helped in coordinating the distribution of required Materials Safety Data Sheets and in installing eye wash stations in areas that need them.*

The purpose of the Campus Report was to let college personnel know what waste management practices needed to be corrected and what could be improved. It grouped waste management practices into the following categories:

1) Practices that need to be corrected (required by law).
2) Suggested best management practices or recommendations.
3) Practices that should be tested or checked.
4) Good practices observed.

While few serious environmental or health and safety concerns were found, every campus had compliance issues and places where they could prevent pollution. The Campus Report became the written record of what the college needed to do to comply with environmental laws and implement suggested changes.

Second Campus Visit

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Clover Park Technical College *has reduced potential exposure to hazardous materials and improved security by constructing a fenced, roofed area for hazardous waste accumulation, as well as a storage shed for pesticides.*

Throughout the year, technical assistance staff were available to assist the colleges in improving waste management. A second, one-year follow-up visit was conducted to assess the progress that each college made in complying with regulations or implementing prevent pollution.

Action Taken

During the second campus visit, it was determined what actions the college had taken in making suggested changes in environmental management. Table 5 lists the possible responses that were assigned to each recorded waste management concern.

Table 5: Responses to Environmental Management Concerns on Campus

+	Corrected the problem
+	Implemented the suggested Best Management Practices (BMP)
+	Implemented another acceptable option
+	Testing was performed, now waste is properly managed
+	Correction or BMP in progress of being implemented
-	Testing performed, waste management still an issue
-	No action was taken

"+" means that a positive action was taken
"-" means that the situation had not been correctedat the time of the visit

Section 4
Observations Made on Campus

During the first campus visit, over 3,000 observations of environmental management practices were recorded. Of these observations, thirty-five percent (35%) were "good practices" that the college was already doing. The remaining sixty-five percent (65%) either required or suggested that action be taken to correct or improve the situation.

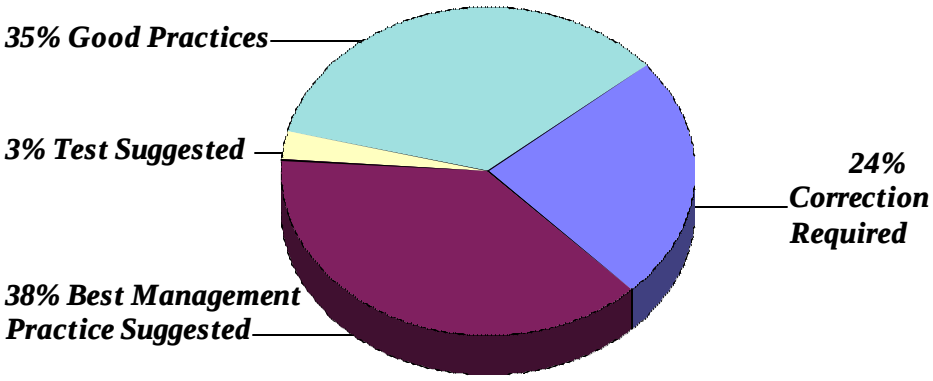

Figure 1: Observations Made on Environmental Management Practices

Sixty-five percent (65%) of the total number of observations were things that needed to be corrected, needed to be tested to determine proper management, or were the suggested best management practices. These were the "action items." The category "Good Practices" was a way to acknowledge good work the colleges were already doing. In the data analysis which follows, "Good Practices" are not considered because there is no follow-up action on these items.

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The Electronics Program at ***Peninsula College*** *has replaced a degreaser that contained 1,1,1-trichloroethane and toluene with a non-chlorinated degreaser. In the science laboratory, they disposed of old chemical products.*

Substances of Concern

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Clark College's *Automotive and Diesel Technology programs have been able to reduce the amount of waste solvent generated and money spent by changing the solvents less often.*

Figure 2 displays the top ten substances commonly found at the colleges. The amounts represent the number of times each of these items were associated with a required or suggested action to be taken. The category "All" was used when general recommendations were made regarding all types of hazardous substances and wastes. There were 685 observations under the category "All." Since it is a significant amount, it will be included in the analysis. The total of these ten chemicals and substances plus "All" represents 79% of the observations that required action be taken or suggested that action be taken to correct or improve the situation.

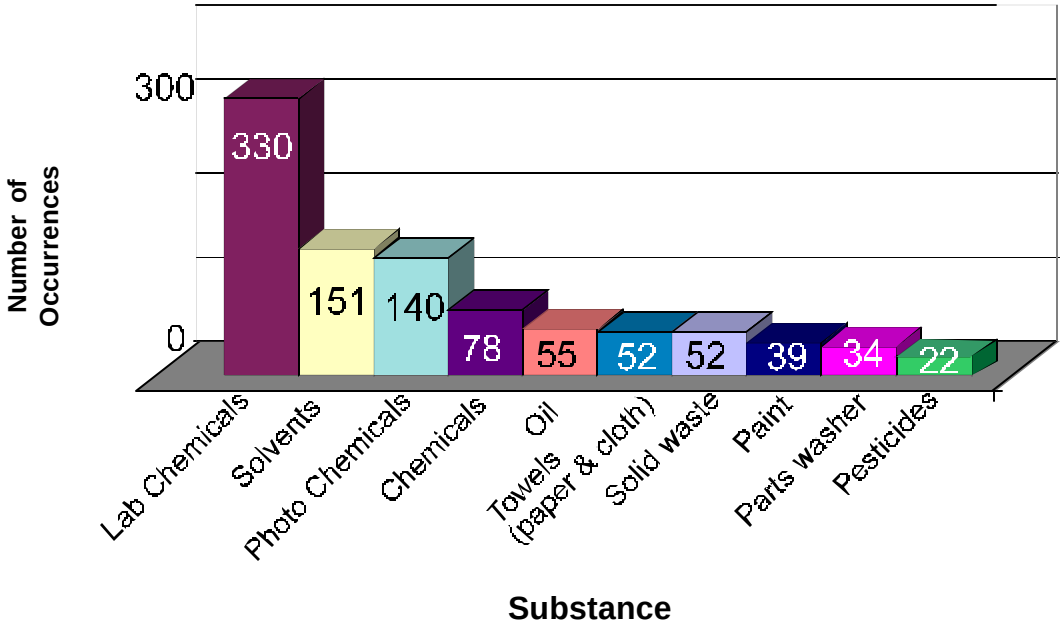

Figure 2: Number of Times an Observation was Made Per Substance (not including "Good Practices")

Figure 2 Note:
"All" (not shown on the graph) was used when general recommendations were made, such as "Keep all containers of waste closed when not adding to it." Only if a specific substance was named, such as lab chemicals, did it get listed as such.

Products and Wastes

Each substance that had a concern associated with it was classified as a waste, a product, or both. Figure 3a shows the distribution when "good practices" were included. Figure 3b shows the distribution of only the items that needed correction or had a suggested best management practice.

One-third (33%) of the observations which included "good practices" (Figure 3a) were associated with product usage. Over one-half (52%) of the observations which only included action items were associated with product usage (Figure 3b). Although there are still significant waste management concerns at the colleges, they are, overall, doing better with managing wastes than finding alternatives to hazardous products. Most product use changes that were recommended are in the "suggested action" category, not "required."

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*At **Centralia Community College,** waste oil drums are now stored under cover with secondary containment, keeping rainwater off the drums and eliminating oily run-off to the storm drain. The drums now have properly covered funnels and are clearly labeled for easy identification.*

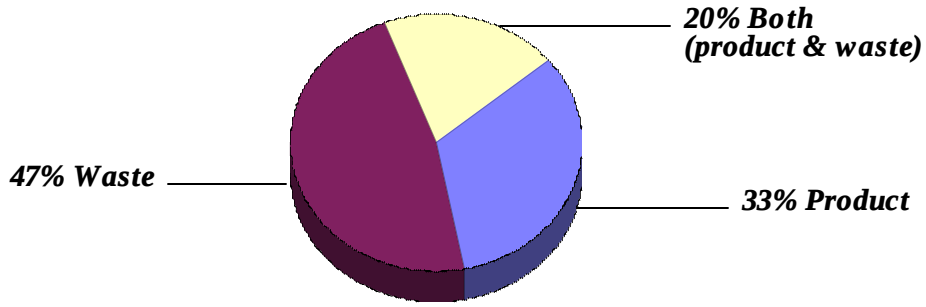

Figure 3a: Distribution of Substances by Type - Total Observations

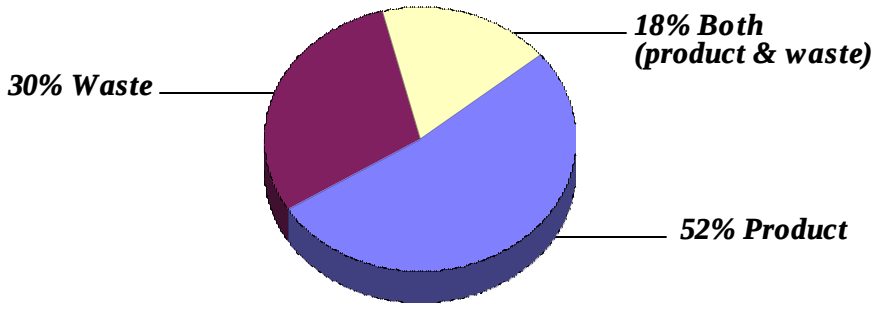

Figure 3b: Distribution of Substances by Type - Includes Observations on Corrections Needed and Suggestions (not "Good Practices")

Environmental Management Concerns

Figure 4 shows the top ten environmental management concerns found at community colleges (from the complete list in Table 4). These are the top ten issues that improvement was suggested or required. This represents over one-half (53%) of the environmental management concerns found at colleges.

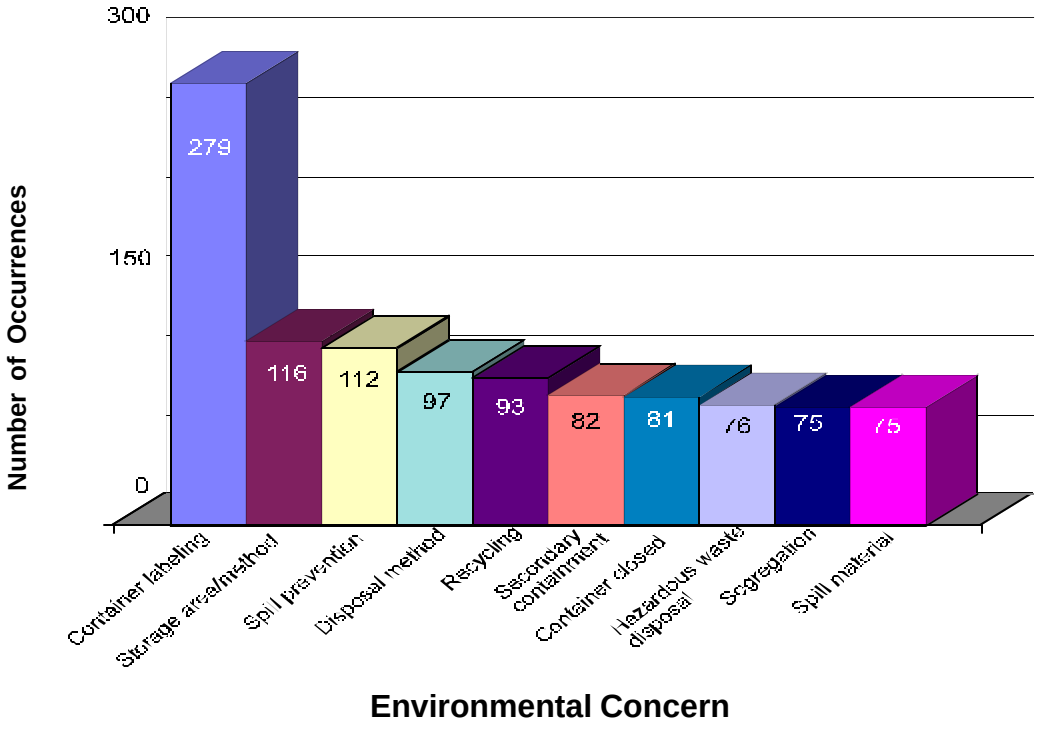

Figure 4: Most Common Environmental Concerns Found on Campuses

Section 5
The Results

As a result of the School Sweeps technical assistance campaign, the colleges achieved significant results. They improved compliance and made changes suggested as good management, but not required by law. Eighty-seven percent (87%) of the required compliance items were corrected or in progress, at the time of the follow-up visit. Seventy-five percent (75%) of the suggested best management practices were implemented or in progress, (see Figure 5).

The follow-up report was used to determine whether the suggested and required changes were made, as stated in the original Campus Report. Those results are reflected in Figure 5 below. The results include only action items that there was follow-up information for, as of the date of the follow-up visit (Spring / Summer 1997).

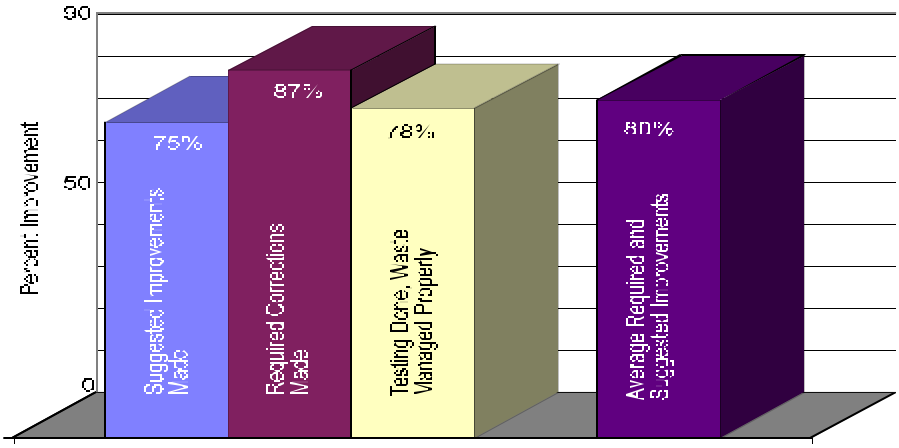

Figure 5: Improvement in Environmental Management as a Result of the Campaign

H H H H H

*The Science Laboratory at **Whatcom Community College** keeps chemical inventory under control by ordering only what is needed, keeping track of stock on hand, and labeling time-sensitive chemicals with the date purchased and opened.*

HHHHH

Everett Community College *has cleaned up chemicals and waste that have been accumulating on campus, resulting in the removal of 5500 pounds of discarded chemical products and dangerous waste. With their commitment to use less hazardous chemicals, and reduce chemical usage, they are improving the campus environment.*

Of the "action items," where positive action was taken (or is in progress), required changes were made eighty-seven percent (87%) of the time. These are the things that were written in the Campus Report that the college was required to do.

Seventy-five percent (75%) of the suggested best management practices were implemented. These are things that were suggested to the college as written in the Campus Report, but were not required by law.

Occasionally it was suggested or required that the college determine whether a material was being properly handled. These recommendations were that either the waste should be designated or that the colleges should consult local sewer, air, or solid waste utilities to determine if the college's current disposal practices were acceptable. Of these, 78% of the wastes have been tested and are now properly managed.

The "environmental improvement" that the colleges made includes implementation of both the required changes, suggested best management practices, and the determination if the waste was being handled properly.

Overall, the colleges showed an average rate of environmental improvement of 80%.

Table 6: Percent of Environmental Improvements Implemented Per College

Percent of Improvements Implemented	Number of Colleges
100	6
91-99	9
81- 90	7
71 - 80	4
61 - 70	4
51 - 60	1
under 60	1

HHHHH

Skagit Valley College *is working on a number of areas to reduce discharges to stormwater. To eliminate the need to manage some waste streams, they have implemented a new policy of no longer collecting vehicle fluids from cars brought into the shop. The vehicle owner now has this responsibility.*

Fifteen of the 32 colleges for which there is data, achieved between 91 - 100% environmental improvement. Colleges with a

100% improvement rate made all the required changes and implemented all of the suggested best management practices, or were in the process of doing so. In some cases, a college achieved 100% improvement because they only had a couple of waste management issues to handle. Some of the larger colleges with many programs had over 70 issues, so the percentage rate may be a little lower, but the number of improvements made is higher.

The science laboratories showed an environmental improvement rate of seventy-eight percent (78%).

HHHHH
South Puget Sound Community College's *Dental Program is keeping amalgam waste out of the sanitary sewers by collecting it in sink traps and storing it in a jar until it is shipped out for reclamation. The science laboratories keep chemical inventory down to what they need.*

Improvement in the Managing of the Top Ten Substances of Concern

Figure 2, (page 22) shows the ten substances that occurred most frequently as items that needed action taken, accounting for 79% of the overall total occurrences. Table 7 shows the rate of improvement on concerns about waste management or use of these substances. For these ten substances, the overall positive actions taken is 82%.

Table 7: Rate of Improvement in Management of the Most Common Substances

Substance	Rate of Positive Action Taken (%)
All Substances (not specified)	74
Laboratory Chemicals	81
Solvents (and Chlorinated Solvents)	75
Photo Chemicals	85
Chemicals - NOS	74
Oil	86
Shop Towels (paper and cloth	88
Solid Waste	83
Paints	83
Parts Washer	86

Improvement in Managing the Ten Most Common Issues of Concern

Figure 4, (page 24) lists the ten concerns that occurred most frequently that needed improvement. These ten issues represent over one-half (53%) of the issues encountered. Table 8 shows the rate of improvement on concerns about waste management.

Table 8: Rate of Improvement in Management of the Most Common Concerns

Concern	Rate of Positive Action Taken (%)
Container Labeling	88
Storage Area	87
Spill Prevention	74
Disposal Method	83
Segregation	87
Secondary Containment	87
Container Closed	96
Recycling	81
Hazardous Waste Disposal	86
Inventory Control	88
Average	**86%**

For these ten issues, the average rate of positive action taken was 86%.

Improvement in Disposal Practices

Many concerns about waste disposal practices were noted at the colleges. These concerns include the disposal method being used and discharges to the sanitary sewer, air, landfill, storm drain, soil, dry well, or to the septic system.

There are nearly 200 disposal issues for which there is follow-up data. Of those, 159 (82%) showed positive corrective action. Eighty-two percent (82%) of the incidences of waste being improperly disposed is now being properly managed or is in the process of being corrected.

HHHHH
Highline Community College *purchased a state-of-the-art silver recovery system to treat their photographic waste streams from many areas on campus. This eliminated improper disposal and was a campus-wide solution.*

Section 6
Science Laboratory Technical Assistance

Eighty-five percent (85%) of the community colleges in the state have science laboratories. Some of the hazardous waste shipments from the colleges are chemical wastes from laboratories. Laboratory chemicals ranked as the second highest occurrence of substances of concern found during this project. Because of the vast number of chemicals in use, the potential risk involved, and the pollution prevention opportunities, special attention was given to the laboratories during campus visits. Project staff with good chemistry backgrounds conducted the site visits in the laboratories.

H H H H H

Yakima Valley Community College's *Chemistry Laboratory eliminated potential spills by adding a molding strip along the edge of each shelf to keep chemicals secure.*

Some guidance existed on best management practices for laboratories, but it was not widespread. The instructors often did not know how to properly dispose of used chemicals, and had excessive amounts of chemicals on-site. Some of the colleges acquired large quantities of chemicals from industry labs that were closing or departing. With limited purchasing budgets, these "free" chemicals were welcomed, but now many of these chemicals have become waste due to non-usage or age.

H H H H H

Shoreline Community College's *Science Laboratories have improved chemical storage practices and eliminated the hazards of incompatible chemicals being stored together.*

Technical Assistance Techniques

Training of Laboratory Personnel

A training conference for college laboratory instructors was held in November 1996. Sessions were presented on environmental regulation, proper management, waste minimization, microchemistry, chemical use reduction, and inventory control. Almost 50 commu-

nity college laboratory personnel attended the training. A session was presented to the Chemistry Teachers Association (WA) as well.

Laboratory Guidance Document

HHHHH
Columbia Basin College's *Chemical Dispensing Laboratory eliminated potential chemical hazards by identifying, segregating, and disposing of accumulated hazardous chemicals and wastes.*

A document called "Step by Step Guide to Better Laboratory Management Practices" was produced for instructor's and technician's use at college science laboratories. It can be used to help organize a laboratory and as a training tool. It contains best management practices, environmental compliance information, and a chemical inventory, and is available on diskette. These were distributed to each college. (See Appendix B for information on how to obtain a copy.)

On-Site Laboratory Assistance

Many of the management issues in college laboratories have to do with incompatible chemical storage, incomplete chemical inventory systems, excessive chemical stocks, and improper disposal.

HHHHH
Through an innovative penalty settlement between the Department of Ecology and a waste management company, ***Lower Columbia Community College*** *was able to dispose of about 3,000 bottles of old chemicals from the chemistry lab, including some radioactive and shock-sensitive chemicals that had been on-site for many years. They reduced their chemical inventory by 80%. The lab has re-organized their storage areas and inventory system to prevent such backlogs in the future.*

Since these issues can be very time consuming, a technical assistance staff person was available over a four-month period to revisit college laboratories that requested assistance. This staff person physically helped the laboratory staff create a chemical inventory system, segregate chemicals, and helped them prioritize disposal to get excessive, unusable, and dangerous chemicals properly off campus. About ten colleges have received this additional assistance which takes between one to five working days.

Before this part of the project was underway, follow-up data on laboratories had already been collected, showing a 73% improvement rate. Laboratory chemicals was the highest ranking substance of concern (after "all"). Because this additional assistance was provided after the follow-up campus visit, many more positive changes will have occurred in the labs that are not reflected in this report.

An innovative penalty settlement between Ecology and a waste management company allowed the Department to channel some funds to one college to help them dispose of waste chemicals from the laboratory.

Section 7
Vocational Education Component

Incorporating Environmental Management Concepts into Vocational Programs

Another component of the School Sweeps Project was to provide information and guidelines to vocational program instructors on environmental management techniques. This information could then be taught to the students.

While vocational programs generally have a good health and safety introduction, they don't usually have training on hazardous waste and environmental management. The goal of this part of the project was to insure that the vocational students come out of school with a sense of environmental responsibility and the knowledge and tools to prevent pollution.

The Washington vocational education system is a "competency," or skills-based, system, and students must master a certain set of skills in order to complete the program. These skills include communication, health and safety, plus the particular skills for their field. Working with the State Board for Community and Technical colleges, and using the same system, the Department of Ecology authored "Environmental Competencies" in five program areas:

- Automotive Repair
- Auto Body Repair
- Dental Programs
- Photography and X-Ray Developing
- Woodworking / Cabinetry

H H H H H

*The Diesel Repair Shop at **Bellingham Technical College** has eliminated oily water discharges to storm sewers by removing oily engine parts and the open metal dumpster that was exposed to rainwater. They have also discontinued on-site pressure washing.*

H H H H H

***Lake Washington Technical College** has improved conditions in their central waste storage area by inspecting waste storage areas weekly and maintaining an inspection log. Additionally, all containers have secondary containment, and all wastes are labeled.*

HHHHH

*At **Olympic Community College**, campus coordination and behavioral changes are helping to reduce waste on campus. Wastes from one program have been used by other programs as useable product, such as the art department being able to use nitric acid and asphaltum that was considered waste by another area.*

The purpose of the competencies was to teach students how to safely and effectively handle hazardous waste generated on the job, prevent pollution, and reduce waste.

Competencies were chosen over curriculum because it was determined that competencies would be a longer lasting, more effective product. Many instructors felt that they already have too much to teach and would have a hard time incorporating a new curriculum, though they believed that the concepts were important to teach. Competencies can be taught as a unit, or instructors can insert the material in the appropriate class session.

Ecology staff conferred with the State Board for Community and Technical Colleges to determine priorities and content for the competencies. Instructors were asked to review the draft competencies. The draft competencies were presented at an occupational educator's conference before presenting them to the State Board for distribution to the college's Vocational Directors. Instructors will work these concepts into the curriculum, based on their needs and situation, and determine how to assess the students' mastery of them.

Contents of the Competencies

HHHHH

***Tacoma Community College**'s Science Laboratories have implemented many best management practices, including protecting hood drains from accidental discharge to the sewer, providing secondary containment for liquid hazardous wastes, and evaporating aqueous waste solutions to remove water and reduce volume instead of decanting water from precipitated contaminants.*

Each competency has two sections, one covering general topics and the other providing specific information for the occupation. First, they describe the skill or concept that the student should be able to master, followed by a performance objective that can show whether the student understands the concepts.

The first section is the same for all the competencies and includes the following topics:

Section A: Environmental Management

- Understand the importance of environmental management in the shop setting.
- Understand the basic waste management elements which are required by law for waste accumulation areas, containers, and labeling.
- Understand the requirements for spill prevention and cleanup.

Section B is specific for each program area. Each one includes information on:

- The major waste streams generated in the occupation.
- The environmental concerns associated with hazardous products and wastes.
- The preferred management method for each waste.
- Ways to eliminate pollution.
- Regulatory requirements.

It is too early to be able to evaluate the success of the competencies. Some instructors started using them right away, and their evaluations rated them quite high. During the One Year Follow-up visit to each campus, some instructors indicated that they had not received them.

A list of the competencies and supplemental materials and how to order them can be found in Appendix B.

H H H H H

*At **Bates Technical College**, twenty-four barrels full of liquid were being used for forklift training, whose labels indicated they contained hazardous materials. Since the barrels really contained water, not hazardous materials, the old labels have been removed. They are now clearly labeled "Water Only," which eliminates confusion for inspectors, fire fighters, and whoever might wander into the area.*

Section 8
Evaluation of School Sweeps Campaign

Two different evaluations were conducted to find out if the technical assistance campaign was effective and useful to the colleges. First, a written evaluation was distributed to the key campus contacts, evaluating overall campaign services. Next, a verbal survey was conducted on-site with departmental contacts. This survey asked similar questions to the survey for the key campus contact, but also asked if the instructor was planning on sharing the waste management and pollution prevention information that had provided to them with their students.

An evaluation of the Environmental Competencies was included with every copy. The evaluations received thus far have rated the competencies highly, but not enough of them have come in yet to describe the results.

H H H H H

Pierce College *has labeled and identified containers of hazardous waste. They have instituted a process of ensuring that all containers are labeled.*

Evaluation of Services by Key Campus Contact

Based on the results of the evaluations, the colleges were pleased with the services they received through the School Sweeps Project. Many of them felt it was one of the first times that they had positive interactions with the government, and appreciated the contributions of the technical assistance staff.

An anonymous questionnaire evaluating the services provided under the School Sweeps project was given to each key campus contact at the close of the one-year follow up visit. Twenty-one of 34 questionnaires were returned (62%).

H H H H H

Spokane Community College *has improved compliance with hazardous waste laws and improved campus safety by properly labeling, storing, collecting and disposing hazardous wastes.*

Of those questionnaires returned:

- Ninety-five percent (95%) of the key contacts who responded now thought someone from the government could actually help them. Five percent were undecided.

- Ninety percent (90%) said they would feel comfortable contacting Ecology for assistance, and the other 10% were not sure.

- Eighty-six percent (86%) said they would refer another school or business to Ecology, while 14% were not sure.

- On a scale of 1-5, with 1 being "excellent" and 5 being "poor", all of the colleges rated the services as either 1, 2, or 3, meaning excellent to average. Forty-three percent (43%) rated the overall service as excellent.

- Of four services offered, all were rated as either "very useful" or "somewhat useful."

Service Offered	Very Useful	Somewhat Useful	Not Useful at All
Campus Walk-through	81	19	0
Written Campus Reports	71	29	0
Discussion of Regulations	71	29	0
Having a Contact for Questions	71	29	0

When asked if our services could be improved, 52% said no, 29% said yes, and 19% were not sure. Of those that said yes, suggested improvements included: more focused training opportunities; continuation of work with grade schools and colleges; having the contact person involved in campus committees; submitting state bids for label supplies; and helping the colleges secure the necessary funds for waste management and pollution prevention.

- When asked if, because of our services, they had been able to reduce the routine costs of hazardous waste disposal, 52%

said yes or that they were working toward achieving that goal.

- When asked if, because of our services, they had been able to get adequate funding for hazardous waste disposal, 43% said yes or that they were working toward achieving that goal.

- When asked if, because of our services, they were now able to better identify hazardous waste on campus, 80% said yes. Twenty percent (20%) said no, with half of those (10%) saying that it wasn't because of our services.

The written comments were positive, and the respondents expressed that they received good service and were glad they had someone from the government that they could work with.

Evaluation of Services By Departments

During the one-year follow-up visit, technical assistance staff conducted a verbal evaluation of the School Sweeps Program with instructional department contacts. The survey was conducted only when the person at the follow-up visit was the same person present at the original visit. Sixty-three (63) evaluations were completed.

- When asked if they were now better able to comply with hazardous waste requirements because of our services, 97% of the responders said yes. Three percent weren't sure.
- Fifty-four percent (54%) said they were able to reduce the routine generation of hazardous waste because of our services. Nineteen percent (19%) said that they were not able to reduce routine waste generation. The remainder (27%) were unsure.

- When asked if they were able to reduce the routine use of hazardous products because of our services, 54% said yes, 36% said no, and 10% weren't sure.

H H H H H

South Seattle Community College's *satellite campus is now managing their own hazardous waste instead of taking it to the main campus for disposal. They have improved their waste management techniques, and are working on improving compliance with air quality regulations in the spray paint booth.*

- Almost all (97%) of the respondents said that they would recommend our services to other schools or businesses. Three percent weren't sure.

- Fifty-four people responded to the question that asked if they planned on relaying the information they received to their students. Ninety-six percent (96%) said they already had or plan to. Four percent (4%) said they didn't plan to.

Teachers in instructional areas that had Environmental Competencies written for them were asked if they planned on using the competency in their curriculum. Out of seventeen possible respondents, six had not received a competency at that time so didn't answer the question. Out of the eleven that answered, all said they already did (45%) or that they plan to (55%).

Section 9
Conclusion - Suggestions for Community Colleges

Through this work at the community and technical colleges, the technical assistance staff found many areas that need improvement, and many areas where the colleges are doing well. Following are five broad areas of recommendations that the colleges should consider:

1) Hazardous Waste Coordinator/Environmental Manager

Many of the colleges could benefit from a qualified hazardous waste coordinator position. There are only a few such positions in the community college system. The schools with coordinators tend to comply more consistently with regulations, act more quickly on problem areas, and have a greater ability to try pollution prevention ideas. Additionally, they are often good links between the administration and the instructional departments.

It is preferable to have one person coordinate all hazardous waste activities on campus instead of several people with differing knowledge, interest, time, and budget. Since most departments have to pay for hazardous waste disposal and hazardous substance purchases, there is a built-in reduction incentive which could be emphasized more. College administrators often assume that key people in programs where waste is generated know how to comply with environmental regulations, but that is not always the case.

Many colleges had someone assigned to take care of disposal contracts or annual dangerous waste reporting. However, there is little coordination of waste removal, and as a result, colleges may be paying more than necessary to

manage dangerous waste. Completing Annual Dangerous Waste Reports can be difficult if the necessary records and paper work are not located in a central area. A coordinator could make sure the reports were filed on time and correctly.

2) Budget for Hazardous Waste/Environmental Management
Some of the colleges do not budget annual hazardous waste management costs, so wastes tend to accumulate. Many schools cleaned out their hazardous waste during the School Sweeps Project. Even if a college typically only generates small quantities of wastes, waste disposal situations will periodically arise, such as the large laboratory chemical clean-outs many colleges performed.

3) Environmental Management Training
At a number of colleges, students are handling hazardous materials. This can be appropriate, if they have proper training, since these students may have to perform similar duties in jobs after graduation. The instructors don't often have the necessary information to manage wastes properly, so the students may not learn proper hazardous materials handling practices.

Ecology wrote "Environmental Competencies" for selected vocational programs to provide basic waste management and reduction information in a format that the instructors can present to the students, so that they can both learn the key concepts.

In some cases, students have been transporting hazardous waste to a central collection area, with limited guidance on proper storage and safety precautions. Students often do not know which wastes are compatible and which are incompatible. In one college's waste storage area, acids, bases, organics, and oxidizers were stacked on top of each other, creating a potentially dangerous situation. In another school, numerous keys to the storage area were in circulation, compromising the security of the storage area, while increasing exposure to chemical wastes, and the college's potential liability.

4) Purchasing practices can promote the use of less hazardous substances

When possible, purchasing products with hazardous ingredients should be handled centrally, so there is review of ingredients and Material Safety Data Sheets for requested products. Often, instructors have been purchasing the same thing for years and don't know about alternatives. They rely on their vendors who encourage them to use their product. Central purchasing staff could ensure that the least toxic but effective substances are purchased.

5) Liability considerations accompany hazardous product use and hazardous waste handling

Technical assistance visits to the colleges identified several situations where immediate compliance was required. There were a couple of situations where improper chemical storage could have caused an explosion with a high probability of loss of life, injuries, and property damage. Liability for such injuries and damage would rest with the college because of improper storage and waste handling. In one case, a college did not follow the recommendations in their Campus Report to separate incompatible chemicals. This led to an accident, which caused bodily injuries.

Many colleges took advantage of the technical assistance offered and cleaned out stockpiles of chemicals and wastes. This helped reduce liability because there are fewer things on-site which could cause potential problems.

The colleges realize that there are many reasons to change their environmental practices, including:

- Complying with state regulations
- Keeping contaminants out of the environment
- Reducing the hazards to students and staff on campus
- Modeling proper behavior for the students
- Decreasing the college's environmental liability

The colleges have taken positive action to comply with regulations, reduce waste, eliminate hazardous substances, educate students on environmental management, and reduce their liabilities. Many campuses used the School Sweeps technical assistance

project as an opportunity to clean out stockpiled wastes and to get the school in shape. The amount of waste sent off-site for disposal or recycling rose for that one year, but most colleges are motivated now to minimize the generation of waste and look for alternatives to hazardous products when possible.

APPENDIX A
Participating Agencies and Associations

All Washington State Community and Technical Colleges
Washington State Department of Ecology
King CountyLocal Hazardous Waste Management Program
Local government: Kitsap, Spokane, Lewis, Walla Walla counties
State Board for Community and Technical Colleges
Community College Presidents' Council
Operations and Facilities Council
Vocational Directors' Association
Washington Association of Occupational Educators

APPENDIX B

Publications List

Number	Title	Comments
94 - 15	Automotive "Shop Sweep" Campaign Summary Report	Description of Shop Sweep Campaign
96 - 410	Snapshots Campaign Summary Report	Report on the technical assistance campaign for lithographers in Washington State.
97 - 408	Automotive Repair Environmental Competency	For automotive and related programs. Geared for vocational level.
97 - 409	Autobody Repair Environmental Competency	For autobody and related programs. Geared for vocational level.
97 - 410	Woodworking/Cabinetry Environmental Competency	For cabinetry, carpentry, and woodworking programs.
97 - 411	Photo/X-Ray Processing Environmental Competency	For photograph and x-ray developing areas, plus anywhere film is developed.
97 - 412	Dental Programs Environmental Competency	For dental and dental hygiene programs. Geared for vocational level.
97 - 413	Environmental Management and Pollution Prevention: A Guide for Dental Programs	Adapted from King County materials. (Goes with 97-412)

APPENDIX B, Continued

Number	Title	Comments
97-418	A Guide for Automotive Repair Shops	Supplement to 97-408
97-419	A Guide for Automotive Repair Shops	Supplement to 97-409
97-434	Environmental Management and Pollution Prevention: A Guide for photography labs.	Slight change and reformat of photo booklet. Supplement to 97-411
97-431	Step-by-Step Guide to Better Laboratory Waste Management	Guidance document with chemical inventory diskette.
97-438	School Sweeps Final Report	Description and results of School Sweeps Project.
97-440	Success Story Highline Community College	One page story of the college's accomplishments.
97-441	Success Story Big Bend Community College	One page story of the college's accomplishments.
97-442	Success Story Olympic College	One page story of the college's accomplishments.

The Department of Ecology has a wide range of publications available on managing and reducing hazardous waste. Please call the pubications office to order these publications at (360)407-7472 or call 1-800-633-7585. Or, if you need additional information, call 1-800-633-7585.