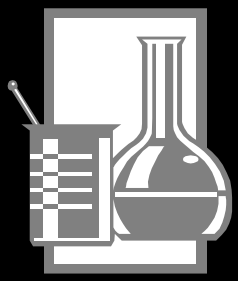
Business Pollution Prevention Program

Rehab the Lab Technical Assistance Campaign



Thurston County Hazardous Waste Program

April 2004

THURSTON COUNTY
WASHINGTON
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BUSINESS POLLUTION PREVENTION

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Abstract

The Thurston County Business Pollution Prevention Program conducted a technical assistance campaign for school chemistry labs beginning in the fall of 2002. By January 2004, Environmental Health Specialists and Hazardous Waste Specialists had inspected 26 schools and assisted in the removal of over 3,900 pounds of hazardous waste. Five schools were found to contain potentially unstable chemicals, three of which required stabilization by specially trained hazardous material technicians. Thanks to a special grant from the Department of Ecology and funding from solid waste tipping fees, this campaign offered a comprehensive review of middle and high school science laboratories and free processing and disposal of unwanted, unneeded and dangerous chemicals. This campaign was modeled after King County, Washington's successful "Rehab the Lab" Program and utilized data from the previous Thurston County school inspection campaign in 1996.

Introduction

In October 1957, the launch of the Soviet satellite "Sputnik" sparked panic in the scientific community in the United States. Fearing that the Soviet Union's science education was more advanced than in the U.S., the National Defense Education Act of 1960 funneled over four billion dollars to schools for science education improvements. Much of this money was spent to update and expand programs in biology, chemistry, and physics. Schools throughout the country purchased chemicals and laboratory supplies in order to prepare American students for the upcoming space race. Although this era may have fueled American science education, it also created a legacy of potentially dangerous, degrading chemicals that still remain in many schools today. Several times a year, new reports circulate about fires, explosions, and evacuations of schools because of chemicals or unsafe laboratory conditions.

Potentially unsafe chemicals and laboratory conditions sometimes develop in science laboratories. Teachers, administrators, and regulatory agencies deal with these problems as they occur. Factors contributing to problems may include: lack of funding, lack of comprehensive chemical knowledge by science teachers, teacher turnover, and limited oversight by school administrators and regulatory agencies. In Thurston County, Washington, efforts have been ongoing for several years to ensure laboratory safety by the school districts, the county health department, the local educational service district, the state Department of Health, and other agencies.

Thurston County Health Department has had a School Inspection Program since the mid 1960s. All schools are inspected annually for a variety of environmental health and general sanitation issues including food, sewage, water, garbage, lighting, ventilation, and playground safety. Science laboratories are also inspected as a part of the program and

the inspections tend to focus on general aspects of safety and operations. The first intensive inspection of laboratories began in 1983. That year, the Washington State Department of Health offered specific training to local health department personnel in identifying and removing degraded and potentially unsafe chemicals in school labs. Personnel from Thurston County received the training and, in subsequent years, focused the annual school inspections on laboratory chemicals. As a result, stocks of unstable metals, picric acid, ethers, and known carcinogens were removed from school laboratories in Thurston County.

The Business Pollution Prevention Program, part of Thurston County's Public Health and Social Services Department, conducted a second intensive review of school laboratories in 1996. Enough time had passed to allow some of the risk factors affecting safe labs (see above) to creep back into Thurston County schools. While the 1996 campaign focused on general hazardous waste issues throughout each entire public and private school district, special attention was paid to school laboratories. As a result, several school districts did some housekeeping by properly disposing of unwanted, unneeded, and potentially dangerous chemicals. This campaign also established contacts between the Business Pollution Prevention Program staff and school district maintenance supervisors for ongoing district hazardous waste disposal issues. This relationship was a key for future technical assistance campaigns involving schools.

The 2002-2003 technical assistance campaign focused specifically on science laboratories in public and private middle and high schools. Each laboratory received a comprehensive chemical and safety inspection, which included an evaluation of each individual chemical container. Higher-risk chemicals were removed and efforts were made to reduce the overall chemical stockpile to a five-year supply. Other topics of the inspections included proper storage, chemical compatibility, safety equipment, and spill kits. In order to encourage long-term best management practices (BMPs), Thurston County staff provided educational resources regarding less-toxic chemical alternatives, small-scale chemistry experiments, and inventory control.

In addition to chemical safety, the campaign educated school district personnel regarding compliance with Article VI of the Thurston County Sanitary Code (also known as the Nonpoint Source Pollution Ordinance, see summary in Appendix A), reduction of hazardous waste generated, and improved waste management practices. The ordinance is designed to prevent pollution of water resources by requiring proper management of hazardous materials and proper disposal of wastes.

The Nonpoint Source Pollution Ordinance is partially based on the framework of the Washington State Dangerous Waste Regulations. This regulation is found in Chapter 173-303 of the Washington Administrative Code. Section – 090 of the state regulation characterizes dangerous wastes (hazardous waste) as those solid wastes that exhibit any of the following characteristics.

a. Ignitability: a fire hazard. Generally, a material with a flash point less than 60°C (140°F).
b. Corrosivity: a solid or liquid with a pH of less than 2.0 or greater than 12.5.

c. Reactivity: a material that reacts violently with water, generates toxic gases when mixed with water, is capable of detonation or explosive reaction if heated under confinement, or is capable of detonation or explosive reaction at standard temperature and pressure.
d. Toxicity: a material that causes local or systemic detrimental effects in an organism, including asphyxiation, irritation, allergic sensitization, systemic poisoning, mutagenesis, teratogenesis, and/or carcinogenesis.

The schools included in this campaign are classified as Small Quantity Generators (SQG) of hazardous wastes. Small Quantity Generators (as defined in WAC 173-303-070) may not generate more than 220 pounds of hazardous waste per month or batch, may not accumulate or store more than 2,200 pounds at any time, and may not generate more than 2.2 pounds of extremely hazardous waste per month or batch. Thurston County regulates only those businesses and institutions with SQG status, while the Washington State Department of Ecology regulates businesses with Medium Quantity Generator and Large Quantity Generator status.

Goals

A) Project Goals:
1. Remove excess, outdated, highly toxic, and unstable chemicals.
2. Reduce overall chemical quantity to a 2-5 year total supply.
3. Ensure that all laboratories contain proper safety equipment; e.g., spill kits, protective clothing, eyewash, adequate ventilation, chemical hygiene plan, etc.
4. Verify that all chemicals are properly stored in appropriate containers and segregated according to chemical compatibility.
5. Ensure that all chemicals are stored in secure areas, with proper storage cabinets and earthquake protection.
6. Improve long-term chemical management practices: less-toxic chemical alternatives, small-scale chemistry experiments, inventory control, timely chemical disposal.

B) Regional Goals: Success of the technical assistance and compliance elements of the Business Pollution Prevention Program are measured by goals established in the 1998 *Hazardous Waste Plan for Thurston County*. The goals are:
1. Protect ground water, surface water, soils, sediments, and private property from hazardous materials and hazardous waste contamination.
2. Increase the rate of waste reduction, which conserves resources and reduces demand for disposal and recycling services.
3. Increase the percentage of hazardous waste collected (that cannot be prevented through waste reduction in the first place).
4. Reduce the amount of hazardous materials that is improperly stored, improperly disposed, and accidentally spilled into the environment.

5. Reduce damage to collection and transfer vehicles and to disposal equipment, and reduce disruption of treatment facilities by ensuring hazardous waste is kept out of these facilities or systems.
6. Reduce potential for causing publicly owned facilities such as the landfill or sewage treatment plants to exceed pollutant discharge limits.

Methods

Staff Resources and Qualifications

The Rehab the Lab campaign is unique compared to other industry campaigns in that it requires a high level of specialized knowledge in chemistry, chemical compatibility groups, chemical degradation over time, container degradation over time, proper storage, laboratory operations, classroom curriculum (past and present), reference materials available to science teachers, as well as classroom health and safety. Since the schools had the potential to contain unstable or explosive chemicals, the project team was required to have considerable hazard identification and assessment knowledge regarding these potentially dangerous items. Other required knowledge included unknown chemical identification, hazardous waste disposal regulations, hazardous material transportation, packaging requirements, and proper Occupational Safety and Health Administration (OSHA) certifications. Fortunately, Thurston County has experienced staff able to meet these requirements.

Planning and Coordination

Planning for this project began in the spring of 2002 with the fieldwork to begin in September 2002 when the new school year commenced. Initially, the team reviewed a previous technical assistance campaign of Thurston County schools conducted in 1996. The 1996 campaign was a comprehensive campaign looking at all aspects of dangerous products and waste management throughout each district. The 1996 campaign covered classrooms; science labs; vocational education activities such as welding, woodworking, photography, automotive and graphics; janitorial products and activities; and maintenance centers for buses and other district vehicles.

A discussion of the scope of the new campaign quickly led to a philosophical difference of opinion as to how the new campaign should be done. One approach would be to do the new campaign the same as the 1996 campaign – a look at all the activities throughout each school district. The other approach would limit the campaign strictly to science labs in middle and high schools. Eventually, it was decided to adopt the second approach.

The next step of the planning process was to meet and coordinate our activities with the Environmental Health personnel who conduct the School Inspection Program. The health

department inspects all schools in Thurston County annually. Typically, the School Inspection Program concentrates on one or two major aspects of schools each year such as ventilation, lighting, food sanitation, playground safety, etc. No major efforts had been conducted in science labs since 1996, so this area was a natural fit for the Business Pollution Prevention Program.

The School Inspection Program staff provided us with lists of schools, mailing lists, district and school contacts plus a wealth of background and regulatory information. In addition, they helped refine the scope of the campaign and provided valuable input regarding compliance, enforcement, and follow-up actions.

Once the initial planning steps were done, the technical assistance team began reviewing the rules, regulations, and guidelines for school science laboratories. The primary regulations governing this project are (1) Article VI, Thurston County Sanitary Code, Thurston County Nonpoint Source Pollution Ordinance, and (2) the Washington State Department of Health / Office of Superintendent of Public Instruction: "Health and Safety Guide for K-12 Schools in Washington," section K: Laboratories and Science Classrooms. From these guidelines the team selected 20 items from the list in section K as inspection items. An inspection checklist was derived from these two sources.

During the time the scope of the project was being determined and regulatory research was being done, team members met with district personnel from the North Thurston School District (the county's largest school district) to determine the best means to coordinate and conduct the campaign from the District's point of view. The North Thurston School District provided valuable advice for the project and was eager to participate. They also indicated they retain a consultant specifically for science laboratory issues. As a result of the meeting with the North Thurston School District, the project team was visited by Douglas Mandt, Science Education Consultant for several school districts in Thurston County (including North Thurston) in other counties in Washington State. Mr. Mandt was very helpful and made several suggestions that were used in the campaign. He also recommended we consult the Statewide Rehab the Lab Committee and the King County Rehab the Lab project, which is a model project for the proposed statewide project and many individual county projects.

While all these meetings were taking place, the project team developed draft Letters of Introduction and project announcements.

In June of 2002, Thurston County was afforded an opportunity to participate in the Statewide Rehab the Lab Committee. This committee consisted of persons from every possible group and agency involved with public education. The agencies include:

The Washington State Environmental Health Association
The United States Environmental Protection Agency
The Washington State Department of Health
The Washington State Department of Ecology
The Office of Superintendent of Public Instruction
King County Department of Natural Resources
Washington Schools Risk Management Pool

Washington State Department of Agriculture
Washington Science Teachers Association
Washington Association of School Administrators
Washington Education Association
The Small School Districts Association
Washington State Parent Teachers Association
Puget Sound Educational Service District
Educational Service District 101 (Spokane)
The University of Washington, Environmental Health and Safety Program
Thurston County Public Health and Social Services Department

Participation in this committee was the most helpful of all the planning activities involved in this project. All the experts were there on the committee along with people who had pioneered a Rehab the Lab project in King County, Washington. The committee shared its vision of a productive project including competency of inspectors, project pitfalls, incentives, disposal of chemicals, and a cooperative approach. In addition, the committee was sponsoring a series of Rehab the Lab Science Teacher Workshops around the state for teachers, administrators, and other interested persons. The workshops' purpose was to demonstrate proper lab safety, chemical storage, handling, and disposal of waste chemicals along with an introduction of small-scale and micro-chemistry. Fortunately, the first workshop was held here in Thurston County in October 2002. Based on the timing of the workshops, Thurston County decided to begin the fieldwork part of the project after the first workshop in October.

The lead up to the first workshop included videotaping a "typical" high school chemistry lab for the purposes of demonstrating good things and bad things usually found in a school lab. Thurston County was asked to coordinate this videotaping with a local county high school. North Thurston School District gladly provided a high school lab for this task. The Thurston County Rehab the Lab team participated in the taping session and the workshop instructor treated the session as an actual inspection. Therefore, the team was afforded a "real life" training opportunity conducted by Dave Waddell, Local Hazardous Waste Management Program of King County, who is arguably the most knowledgeable and proficient school chemistry lab expert in Washington State. This "training session" and subsequent support from Mr. Waddell made Thurston County's project a more viable and valuable service for everyone involved. After a day in the field with Dave Waddell and after attending the first workshop, the Thurston County Rehab the Lab Team was ready to inspect the middle and high school labs in Thurston County.

Initial Assumptions

As mentioned earlier, King County, Washington, conducted the first comprehensive Rehab the Lab program in the State of Washington. During the course of their work, many lessons and discoveries were uncovered regarding the general condition of school science labs. Based on King County's findings, the following assumptions were made regarding the potential condition of Thurston County school labs:

1) Schools would have large volumes of chemical stockpiles largely due to limited disposal funds. Since hazardous waste disposal may cost hundreds or thousands of dollars per shipment, it is unlikely that most schools would be able to maintain yearly disposal of waste chemicals.
2) "Sputnik Era" science funding in the 1960s provided substantial quantities of chemical supplies to schools nationwide. Since hazardous waste disposal and safety regulations were largely nonexistent during this time, there was no enforcement or monitoring of these toxic substances.
3) Due to limited funds, schools may be reluctant to dispose of old chemical items, since there may not be additional funds available to purchase new substitute products.
4) Waste disposal is typically associated with the school's maintenance department, which is commonly the first to experience funding cuts during budget shortfalls. Therefore, waste disposal may be delayed or ignored due to limited school budgets.
5) Since hazardous waste management is a highly regulated industry that requires years of training, it is unlikely that teachers would have the time or funding for such training. Due to this lack of regulatory knowledge, it was suspected that some chemicals may be improperly disposed into the sewer or septic system.
6) Most chemicals are relatively safe to use when they are new, but may degrade into unstable or explosive substances over time. Common chemicals such as ether and picric acid are relatively harmless if handled properly when new, but may degrade over time and form potentially explosive peroxide crystals. Peroxide crystals are shock sensitive and could detonate by simply removing a bottle cap or lid.
7) Due to modern health and safety research, many chemicals that were once thought to be safe in schools are now considered highly toxic or carcinogenic. Toxic substances such as mercury and formaldehyde are commonly found in almost every science lab that hasn't participated in a Rehab the Lab-type clean out. For decades instructors have handled these compounds. However, recent data indicates these substances may have long-term health consequences resulting from exposure. Since schools commonly have limited disposal budgets, it was assumed that these higher-risk chemicals could still be sitting on school shelves.
8) Because the same schools also participated in the 1996 technical assistance campaign, staff assumed that some of the schools may have taken actions to dispose of old products since that time. Therefore, the 1996 campaign was used as a baseline for comparison to current conditions found in the science labs.
9) Since 1997, several school districts have utilized HazoHouse, Thurston County's Moderate Risk Waste (MRW) Facility, for disposal of laboratory chemicals. Thus, staff expected to find fewer chemical-related safety issues in these schools.

Communication and Coordination with the School Districts

To encourage district-wide participation in the project and to achieve long-term behavior change regarding chemical management, Thurston County chose a "top-down"

communication approach beginning with the district superintendent and ending with the individual science teacher.

For each school district, the district maintenance supervisor or safety officer was initially contacted and informed of the project. The hazardous waste section of the health department had already been working with these district personnel for disposal of district wastes since the 1996 campaign. These district people were a natural fit for this project being 1) responsible for waste disposal for the entire district, 2) long-term employees of the district, 3) familiar with past efforts to clean out science labs and 4) familiar with all the schools, principals, teachers, and laboratories. All agreed to act as a liaison between the school district and the classroom.

A letter of invitation (see Appendix B) was sent to each school district superintendent and district maintenance supervisor or safety officer. In the letter, the health department outlined the nature of the project, specified the levels of enforcement that may be used, asked for permission to conduct the project in the school district, and asked for the district maintenance supervisor or safety officer to be the liaison to the individual schools. In all county school districts, the superintendents welcomed the project and allowed the district maintenance supervisor or safety officer to be our contact with the district.

The liaisons were used for scheduling individual schools and science classrooms. Using district personnel to schedule the individual inspections eliminated the need for health department personnel to contact individual principals and teachers. It also demonstrated to principals and teachers that this project was endorsed by the district and was considered a priority.

By working directly with this level of district management, it was believed that our educational efforts were less likely to be lost in the event of employee turnover and the schools would be more likely to implement our recommendations.

Non-Regulatory Approach

Since school safety and disposal of unwanted, unneeded, and potentially dangerous chemicals were the primary goals, the project team chose a different approach for conducting the Rehab the Lab technical assistance campaign. Typically, local technical assistance campaigns combine educational and regulatory compliance elements. In addition to offering assistance to our audience, regulatory compliance issues are enforced and corrective action is required. Violations of the sanitary code are noted on a Notice of Non-Compliance form with a deadline for correction. If a violation is not corrected within the given time frame, a Notice of Violation (NOV) is issued. If a Notice of Violation is not corrected, fines, civil infractions, or court actions may be imposed.

For the Rehab the Lab campaign, schools were approached in a non-regulatory manner. Instead of issuing a Notice of Violation for school safety violations, we worked with district personnel and assisted them with their compliance efforts. All unwanted, unneeded, and potentially dangerous chemicals were removed from the schools within

weeks of a visit. Since school funding is totally allocated for a given year, schools were given ample time to correct safety violations and to make capital improvements. Thurston County personnel provided free staff consultations and were available whenever a school or district needed assistance. This non-regulatory approach may have been a significant factor in getting cooperative participation.

Press Release

A press release was prepared and released to announce the onset of the technical assistance visits to school laboratories. It was thought that this project was a good example of proactive public health service with a potentially large impact on public health and safety. The press release also highlighted the activities of the statewide Rehab the Lab workgroup as well as the statewide, if not nationwide, effort to clean out school laboratories. Staff enlisted the help of Thurston County's Public Information Officer and a health educator to prepare the press release. It was important to Thurston County to get out information regarding the project without creating unwarranted anxiety suggesting there are hidden dangers lurking in local schools waiting to injure students. The press release described the potential safety problems associated with school laboratories and showed that this was a collaborative effort supported by teachers and administrators. Sending a press release also provided local reporters balanced information about the problem and helped reduce the chance of a sensational article that painted schools in a negative light. Staff intended to be very careful and avoid creating adverse publicity. It was also felt that a press release announcing the project would, in some minor way, soften the impact of an unforeseen circumstance. The press release is contained in Appendix C.

Technical Assistance Visits and Education

Twenty-six (26) high school and middle school chemistry and/or biology labs were eligible for this campaign (Appendix D). Site visits commenced in September 2002 and continued through early 2003. In order to give the schools ample time to correct any safety issues, follow-up visits were conducted in the spring of 2003.

Most site visits were conducted with the science teacher and another person representing the district (e.g., principal, maintenance supervisor, risk manager, etc). Inspection results were recorded using a Commercial Parcel Inventory Form (CPI) found in Appendix E, which collected information about the schools drinking water source, sewage disposal system, hazardous waste details, best management practices (BMPs), and other specific laboratory health and safety topics. By conducting inspections together with the school staff, the hazardous waste specialists were able to explain their findings in detail and give the participants an opportunity to ask questions. The project team also suggested BMPs and offered other general chemical management advice.

If safety issues were discovered, an effort was made to correct the issue at that time. Otherwise, the schools were given time to correct these issues before the next follow up. Time frames for correction of items such as proper storage and spill kits were limited to

approximately 30 days. Much longer time frames were allowed for correction of expensive items such as purchasing storage cabinets or installing additional ventilation, since most schools need to allocate funds for these things within their annual budget process.

In addition to county regulatory codes, inspections focused on several other regulations from the Occupational Safety and Health Administration, Washington State Department of Labor and Industries, and the Washington State Department of Health. Although Thurston County does not have regulatory authority to enforce requirements from outside agencies, the goal was to assist in the correction of any compliance issue that may affect overall safety or public health.

The most significant and challenging aspect of each inspection was to locate and assess the condition of each chemical in the lab. During the inspection, each chemical container was visually inspected for signs of degradation. Any chemicals that were considered excessively toxic or potentially degraded were recommended for disposal. Thurston County staff also utilized this time to correct improper storage issues, conduct chemical tests to identify unknown items, and isolate potentially unstable chemicals.

After conducting the initial inspection, a follow-up letter (Appendix F) was sent to the school detailing the findings of the inspection. This letter offered advice to help correct any issues and suggested BMPs for future use. To further assist the teachers regarding laboratory safety and BMPs, the letter included an educational CD-ROM titled "Rehab the Lab." This CD-ROM was provided to Thurston County by Waddell Environmental, L.L.C. and was distributed to the schools at no charge. To encourage timely implementation, the letter mentioned that a follow-up visit would be conducted in one to three months. The letters were sent to the science teacher, district contact, and the district superintendent.

Waste Disposal Assistance

Due to the high cost of hazardous waste disposal and the limited budgets of most school districts, it was believed that most districts would continue to delay the disposal of outdated chemicals or the correction of safety issues. Because of a budget surplus resulting from a personnel vacancy, Thurston County had funds available to pay for waste disposal for each school. The project team provided assistance for waste segregation, packaging, and disposal at no charge to the schools. Due to lower cost and convenient location, wastes were disposed at HazoHouse. In order to encourage long-term, frequent disposal practices, each school district was set up with a HazoHouse account for future use.

Thanks to an unexpected Rehab the Lab grant from the Washington State Department of Ecology (Ecology), Thurston County was reimbursed for disposal costs incurred as a result of this campaign. Furthermore, the grant reimbursed three schools for the neutralization and emergency disposal of potentially unstable or explosive chemicals.

Follow-up Inspections

In order to give schools a reasonable amount of time to correct any laboratory safety issues, follow-up visits were conducted after one to three months. During the visit, the original Commercial Parcel Inventory Form (CPI) form was used to verify any corrections or changes that were made. If the recommended corrections were completed, the CPI was amended to reflect these changes. The updated forms will be used for future campaigns. Due to limited budgets, compliance issues requiring capital improvements (i.e. ventilation installation, storage cabinets, etc.) were considered long-term compliance goals. During the follow-up visit, teachers were presented with a customer survey (Appendix G) and a Pledge for Safe Classrooms (Appendix H).

Customer Survey

A customer survey, along with a self-addressed stamped envelope, was given to representatives from each school during the follow-up visit. The purpose of this document was to evaluate the effectiveness of the campaign as well as gather information about teachers' individual needs for laboratory management. The survey asked schools to describe any changes they had made in their hazardous waste management practices as a result of the campaign. It also asked how they learn about hazardous waste management, how useful they found the campaign, and their impressions of the quality of service provided by Thurston County's Business Pollution Prevention Program. A summary of this information is found in Table 4.

A Pledge for Safe Classrooms

One of the goals of the Rehab the Lab project was to prevent the use of higher risk chemicals in school labs and prevent the unsafe and long-term storage of chemicals. After removing hazardous chemicals, county staff asked for a commitment (Pledge) from the school staff to keep chemistry labs and storage areas in compliance with hazardous material regulations and Washington State Department of Health guidelines.

The pledge consists of a list of thirteen possible best management practices for school labs, some of which are legally required. The science teacher, principal, and a school district representative were asked to look over the list, check off those actions they were willing to commit to, then sign and return one page of the form. Each signer also received a copy. The science teacher's copy was in color and designed to be a poster that could be mounted in the science room. The poster provides an ongoing prompt to the teacher to store chemicals properly. It could also be used to help teach students safe chemical handling techniques.

Research studies from social learning theory show that programs incorporating social marketing techniques are much more effective than those relying on information alone. The Pledge for Safe Classrooms acts as a "prompt" or reminder of the intention to reinforce lab safety, reduce lab waste, and focus attention on BMPs. It also acts as a

public announcement of these intentions, helping to establish the actions as a laboratory "norm."

In addition, studies show that when people willingly agree to a small request (such as signing a pledge), they are more likely to follow through with the behavior and are more likely to later agree to a larger, related request. A commitment that is written or made in public is more likely to result in a long-term change. It is important that the commitment be voluntary and not coerced.

Recognition

A Certificate of Environmental Achievement (Appendix I) was presented to schools that improved their chemical management practices and who committed to the Pledge for Safe Classrooms. The certificate provides recognition from the Thurston County Board of Health for a job well done. By placing the certificate on a wall, the science teachers, students, and classroom visitors may take pride in their achievement. Science teachers were also encouraged to announce their achievement in a school newsletter.

Long-Term Follow Up

Thurston County Public Health and Social Services will continue to oversee general school safety issues through its ongoing School Inspection Program. This program annually inspects all public and private schools for environmental health and general sanitation issues and publishes a newsletter for the schools. In the coming years, the Business Pollution Prevention Program will continue to remind schools about safe laboratory practices by contributing to the newsletter and joining in periodic inspections. These joint inspections will include ideas for less-toxic chemistry experiments, information regarding safety equipment, and reminders about chemical disposal, and will measure progress toward long-term capital improvements.

Results

Compliance Summary

During each initial school visit, compliance rates were documented for a variety of different safety issues, including waste disposal, chemical storage, safety equipment, and many others. After the follow-up visit was completed, the results were compared to the initial inspection results as summarized in Table 1 on the following page.

Several of these safety issues, such as improper chemical storage and labeling, were immediately corrected during the initial visit. Other issues requiring capital improvements, such as ventilation installation or major purchases, may not be

economically feasible until some time in the future. In this situation, the schools were advised about the issue and given suggestions to minimize safety risks.

Table 1: Safety Issues for the 26 Participating Schools

Compliance Issue	At the time of the Initial Visit	After the Follow up Visit	Currently working towards compliance
Chemicals Inventoried	21 of 26	23 of 26	1
Chemical Hygiene Plan in Place	16 of 26	20 of 26	5
Proper Safety Equipment	22 of 26	23 of 26	2
Complete Spill Kit	8 of 26	21of 26	2
Locked Chemical Storage	25 of 26	26 of 26	NA
Proper Warning Signs	24 of 26	24 of 26	1
Proper Ventilation	22 of 26	23 of 26	NA
Proper Storage of Chemicals	18 of 26	26 of 26	NA
Proper Flammable Storage Cabinets	17 of 26	23 of 26	2
Proper Acid Storage Cabinets	13 of 26	23 of 26	1
Proper Reactive Storage	23 of 26	26 of 26	NA
Secured Shelves	22 of 26	23 of 26	2
Compatible Storage of Chemicals	17 of 26	24 of 26	NA
Chemicals On Lower Shelves	21of 26	25 of 26	NA
Proper Chemical Labeling	25 of 26	26 of 26	NA
All Chemicals Identified	20 of 26	26 of 26	NA
All Chemicals < 5 Years Old	9 of 26	17 of 26	NA
Appropriate Chemical Quantity	19 of 26	20 of 26	NA
No Degraded Chemicals	18 of 26	26 of 26	NA
No Potentially Unstable Chemicals	21 of 26	26 of 26	NA
No Chemicals Requiring Special Neutralization	23 of 26	26 of 26	NA
No High-Risk Chemicals Needing Disposal	4 of 26	22 of 26	NA
No Formaldehyde Solutions	14 of 26	17 of 26	1

NA = Not Applicable

Safety Issues – Initial Visit

The safety issue receiving the lowest level of initial compliance involved proper spill kits. Eighteen of 26 schools (70%) did not have complete spill supplies. Every school had some type of spill absorbent (i.e. paper towels, kitty litter, baking soda, etc.) but these absorbents were not always appropriate for the specific chemicals contained in the lab. For example, many schools had purchased absorbent pads for petroleum products (oil-only pads), but had no supplies for aqueous liquids, corrosives, or mercury. The importance of proper spill kits was explained in detail to the science teachers during the initial visit and in the follow-up letter.

Another common safety risk involved improper chemical storage. At least 13 of 26 schools (50%) did not have proper storage for corrosives or flammable liquids. Most school labs contained proper storage cabinets, but many of the cabinets were heavily corroded as a result of acid vapors. These cabinets displayed corroded hinges, locks, and shelf supports. Similar storage issues were discovered with flammable liquids. Again, most school labs contained dedicated flammable storage cabinets, but several were corroded, did not have self-closing doors, or were improperly stocked to increase capacity.

Nine of 26 schools (35%) were found to be storing incompatible chemicals together. Most schools utilized the Flinn Storage System for chemical compatibility. This system, designed by Flinn Scientific Corporation, assigns numerical and color-coded compatibility groups for various chemicals. However, many items were still found to be out of place. This appeared to be the result of individual chemicals being used and not returned to their proper storage location. Inspectors also observed incompatible acids stored together in their designated cabinets as well as similar issues in the flammable cabinets. This also suggests that many schools may not be conducting regular chemical inspections, which are recommended on an annual basis. Similarly, eigh of 26 schools (30%) did not have chemicals stored in their proper locations, which included countertops, floors, and tops of cabinets. Again, to prevent these issues in the future, teachers were advised to conduct chemical inspections annually at minimum.

Another important aspect of lab safety is the Chemical Hygiene Plan. This document, required for all public and private school laboratories by the Washington State Department of Health, includes information regarding chemical handling procedures, complete chemical inventories, safety information, and other recordkeeping procedures. Of the 26 schools visited, 16 (61%) had a proper chemical hygiene plan upon initial inspection. It should be noted that the majority of schools had this document on file at the district offices, but some could not locate it upon request. At the end of the campaign, 20 schools (77%) located a copy of their plan and five others were in the process of obtaining their district copy or drafting a new plan. The one remaining school did not have a complete chemistry lab and only used household chemicals such as vinegar and baking soda. Thus, a chemical hygiene plan was not required.

Since it was originally assumed that many schools would have chemicals dating back to the “Sputnik Era,” close attention was paid to the ages of various chemicals found in the

laboratories. After completing all of the inspections, it was estimated that 17 school labs (65%) contained chemicals greater than five years old. However, it is suspected that the actual number may be higher, since it was not always possible to determine exact ages. In many of the schools, chemicals were routinely discovered to date back to the 1960s. In one school, items were found that contained cork stoppers for lids as well as gum labels hand-written in fountain pen, possibly dating back to the 1930s or earlier. Many of these older chemicals did not pose any specific threat, but their presence suggested that science teachers do not review their inventory lists or do not utilize a chemical disposal protocol. Generally, chemicals that were stored in back of the cabinets were more likely to be older and forgotten.

An important focus of this campaign was to encourage schools to maintain a two to five year chemical inventory. Determining relative chemical supplies, however, was rather subjective and varied on a case-by-case basis. For example, some schools contained larger chemical stocks, but these remaining chemicals posed little or no risk. Therefore, staff considered the chemical quantity appropriate.

Flammable liquids were the most common types of waste selected for disposal. A significant portion of this waste type included formaldehyde solutions. It is important to note that formaldehyde will likely be phased out of all schools in the near future. Formaldehyde is considered a possible carcinogen, so companies that produce preserved biological specimens are now using safer alternatives. Companies such as Carolina Biological Supply now manufacture a safer glycol-based preservative (Carosafe) that is less toxic. In addition, some companies are now packaging animal specimens in vacuum-packed pouches. In other cases, biological specimens may be initially preserved in formaldehyde, and then transferred to a glycol-based solution for long-term storage. In either situation, it appears that formaldehyde use in schools has been drastically reduced and will continue to be reduced as safer alternatives become standard.

The majority of old formaldehyde solutions were removed and disposed of during this campaign. Therefore, excessive quantities of these chemicals should not pose future safety issues for schools. It should also be noted that several schools still contain animal specimens preserved in formaldehyde. These items, however, were only used for demonstration purposes and not handled by students. Demonstration specimens were not recommended for disposal due to their low exposure risk. The science teachers were encouraged to replace all formaldehyde solutions with glycol-based solutions in demonstration specimens if replacement was necessary.

Unexpectedly, large quantities of oxidizers were discovered throughout the county's school laboratories. A combined total of 220 pounds of oxidizers were removed as a result of this campaign. That is enough to fill a 55-gallon drum. Oxidizers, like the name implies, are oxygen-rich and will accelerate combustion in the event of a fire. These chemicals have the potential to react with organic material (e.g., common lab solvents) and cause them to ignite and burn furiously. Additionally, oxidizers such as ammonium nitrate and potassium nitrate can be used to make gunpowder, fireworks, and other explosives. Despite the warning labels explaining compatibility, these items were still found to be improperly stored in flammable cabinets. After examining the container

warning labels, it was discovered that both types of labels contain a picture of a flame. Perhaps this type of warning label causes confusion and leads to improper storage.

Twelve of 26 schools (46%) required capital improvements such as ventilation repair or modification, new storage cabinets for acid and flammables, or eyewash units. Four of 12 (33%) were able to make these improvements within three months, while five others (42%) had planned to make improvements within one year. The remaining three schools (25%) required more costly improvements, such as major modifications to ventilation or chemical storage. Due to the high costs involved, these improvements may require up to a year or more to be done. The districts involved are aware of County requirements and are committed to making these improvements.

The project team also focused on general lab safety equipment such as eye protection, aprons, and gloves. Twenty-two of 26 schools (85%) contained proper safety supplies for the students. The four remaining schools that did not have adequate safety equipment were lacking adequate eyewash stations. These schools did, however, have other sources available for emergency eyewash (i.e. water faucet, multiple eyewash stations). Overall, the schools did a very good job regarding safety and protective equipment.

Other safety issues receiving high levels of compliance during the initial visits included the following:

- 21 of 26 (81%) had adequate written chemical inventories.
- 25 of 26 (96%) contained locked chemical storage areas.
- 24 of 26 (92%) contained proper warning signs and labels for chemical storage areas.
- 22 of 26 (85%) contained secure shelves and cabinets with adequate earthquake protection.
- 14 of 26 (54%) utilized at least one type of less-toxic chemical alternative such as household vinegar or safer formaldehyde substitutes.

Comparison to the Previous Campaign

In 1996, the Business Pollution Prevention Program conducted a similar campaign regarding hazardous waste management in public and private schools. This effort focused on compliance issues throughout the entire school, including classrooms, science laboratories, automotive shops, photo laboratories, and maintenance areas. The purpose of the campaign was to address general hazardous waste compliance issues and provide recommendations for BMPs. Even though our current campaign focused exclusively on the science laboratories, the 1996 campaign provided baseline data regarding the general condition of all public and private school laboratories in Thurston County. A comparison of the 1996 and the 2002 campaigns is provided in Table 2.

Table 2: Comparison of Compliance Issues from Previous Campaigns

Compliance Issue	Final 1996	Initial 2002	Final 2003
Lack of proper flammable storage	7	9	1
Excess chemical inventory	6	7	6
Degraded acid storage cabinets	1	5	3
Potentially reactive/explosive chemicals	1	5	0
Unknown or unmarked chemicals	1	6	0
Inadequate ventilation	1	5	3
Improper segregation	3	10	0
Improper disposal	1	0	0
Total Issues	**21**	**47**	**13**

When comparing the data from the 1996 campaign, the schools appeared to show little improvement or a decrease in overall compliance. However, since the current campaign was specifically tailored for school laboratories, many of these issues may not have been detected in earlier inspections. Additionally, individual inspectors may have interpreted some of the issues differently. Improper ventilation, for example, was evaluated utilizing qualitative procedures, which may vary widely between inspectors. However, it is suspected that a general lack of funds in school budgets was the primary reason for compliance issues. In either situation, it appears that the number of safety issues increased overall from 1996 to 2002. Another possibility is that the schools found other chemicals that were not observed in 1996 and put them on the shelves that had freed space following the 1996 cleanout.

Best Management Practices (BMPs)

In order for schools to maintain safe and well-managed laboratories, the project team recommended several core BMPs as described in Table 3. By implementing these BMPs, schools are able to prevent future compliance problems and change their long-term management practices. By practicing them, schools will prevent chemical degradation, overstock situations, and reduce overall disposal costs. Additionally, the use of small-scale chemistry and less-toxic alternatives may significantly decrease exposure risks and overall chemical use.

Table 3: Best Management Practices for the 26 Participating Schools

Best Management Practice (BMP)	Number who are already doing	Number of schools receiving the suggestion	Total implementing after the campaign	Number who are working towards the BMP (does not include pledge totals)
Utilize small-scale/micro-chemistry	9	26	9	3
Utilize less-toxic chemicals	14	26	14	1
Recycle waste (i.e. solvents, precipitates, metals, etc.)	3	26	3	0
Do not dispose of chemicals in trash or down the drain	22	26	24	0
Neutralize waste	21	26	21	0
Maintain a 2 – 5 year chemical supply	9	26	17	0
Reduce overstock by having centralized ordering within the district	3	26	0	0
Maintain chemical stocks by practicing frequent disposal of old chemicals	18	26	24	0

After completing the follow-up inspections, it was discovered that schools were much more likely to practice disposal-related BMPs as opposed to changing their curriculums by implementing small-scale and micro-chemistry experiments. Since many compliance issues resulted from lack of disposal, schools were extra motivated to dispose of chemical items. Offering free disposal of chemicals helped in this area as well.

The BMPs that involve curriculum change (i.e. small-scale chemistry, less-toxic alternatives) will likely require further encouragement and incentives. These require initial research time and the purchase of new equipment and chemicals. Also, when curriculum changes are involved, teachers must find time to prepare the new materials to fit into the school district's standards and curriculum format. Since many curriculum changes are driven by changes at the state or federal level, individual schools and districts may be reluctant to change unless required to do so.

Waste Disposal

The major focus of this campaign dealt with disposal of excess, unused, and outdated chemicals. Since schools often lack the funds for disposal, the priority was to remove decades of accumulated products and wastes. While inspecting several schools in Thurston County, numerous items were discovered that dated back to the 1920s or earlier. Although these specific items were not dangerous or unstable, their relative age increased the likelihood that other potentially degraded items would be found. A total of

3,910 pounds of excess chemicals were removed from Thurston County schools, which are briefly summarized below by hazard class:

1)	Flammable Liquids	2334 pounds
2)	Corrosive Liquids and Solids	562 pounds
3)	Oxidizing Liquids and Solids	223 pounds
4)	Water Reactive Materials	14 pounds
5)	Poison Liquid and Solids	695 pounds
6)	Flammable Solids	9 pounds
7)	Organic Peroxide	6 pounds
8)	Explosive Materials	4 pounds
9)	Potential Reactives	13 pounds
10)	Low-level Radioactives	15 pounds
11)	Mercury	36 pounds

Since some chemicals have the potential to become degraded and unstable over time, the priority was to remove these items and advise against replacement. A total of five schools were found to contain unstable or potentially unstable items. Unstable chemicals were stabilized and disposed by Heritage Environmental, L.L.C., which specializes in reactive chemical handling. The following chemicals were degraded and potentially unstable and/or required special disposal:

1) Crystallized cyclohexene (peroxide former, potentially shock sensitive)
2) 2,4-Dinitrophenol (potentially explosive)
3) Degraded red phosphorus resulting in the formation of white phosphorus (potentially shock sensitive and pyrophoric)
4) Degraded sodium metal (peroxide former, potentially shock sensitive)

Two items found in school science laboratories had the potential to degrade and become unstable over time, but were currently safe to use. Following our recommendations, these items were disposed of at HazoHouse. The two items are:

1) Benzoyl peroxide (potential explosive)
2) Ethyl ether and 1,4-Dioxane (peroxide former, potentially shock sensitive)

Along with potentially unstable items, other items were recommended for disposal that represented elevated toxicity hazards, such as mercury and formaldehyde. The guideline for determining these “higher-risk” chemicals is the “Health and Safety Guide for K-12 Schools in Washington.” These items are deemed “unsuitable for K-12 schools due to excessive risk that exceeds educational utility.”

In addition to unstable and unsuitable items, the project team encouraged schools to dispose of any other unused or outdated chemicals. Many of these were not considered higher-risk items, but they clearly had not been used for many years or were present in excessive quantities. Several chemical containers were discovered that dated back to the 1950s and 1960s, but were still factory-sealed.

Appendix J displays the volumes of waste commonly disposed from each school site. Flammable liquid was the most common waste type. However, a significant percentage (50% or more in some cases) of the flammable liquid volume was comprised of formaldehyde solution (formalin), which is also toxic and carcinogenic. Many schools contained multiple five-gallon buckets of formalin that once contained animal specimens. Since one five-gallon bucket can weigh up to 40 pounds or more, a few schools had unusually high waste totals for flammable liquids.

Poisons were the second most common chemical class of wastes and many that were found in the schools are now deemed "higher-risk" by the Washington State Department of Health. These commonly included cyanides, heavy metal compounds, and mercury. Another significant volume of poisonous material resulted from non-formalin animal specimen preservative. This material, although much safer than formaldehyde, still contains a toxic propylene glycol-base. Again, a few schools possessed several heavy five-gallon buckets of this type of preservative, which resulted in unusually high waste totals for poison liquids.

The third most common chemical class of wastes was corrosive liquids, which included hydrochloric acid, ammonia solutions, and nitric acid. These were most commonly found in one-gallon glass bottles with plastic caps. Only two schools had excessive quantities of acids. These two high schools contained 20 or more gallons of miscellaneous acids.

Over 35 pounds of mercury, mostly in the form of liquid mercury and mercury thermometers, were disposed during this campaign. Most schools contained a jar or vial of mercury for demonstration purposes, but commonly possessed more than what was needed for educational purposes. Since liquid mercury is considered an effective visual aid for students, most schools were reluctant to dispose of their entire stock. To reduce the risk of mercury spills, county specialists recommended disposal of excess quantities and allowed schools to keep a small vial for demonstration purposes. For additional safety, mercury spill kits were recommended.

Mercury thermometers were found to be less of a safety concern than expected. Most schools had already converted to non-mercury thermometers or were planning to do so in the near future. Thus, most schools were eager to dispose of their mercury-containing thermometers. Approximately 200 mercury thermometers were removed from the schools.

Newly enacted legislation (HB1002, May 2003) prohibits school purchases of bulk elemental mercury and mercury compounds. By January 1, 2006, all primary and secondary schools in Washington State must remove and properly dispose of all bulk elemental mercury, chemical mercury, and bulk mercury compounds used as teaching aids in science classrooms. This ban does not include barometers. Staff will use HazoHouse to assist schools with mercury disposal as the deadline approaches.

One school contained low-level radioactive compounds that were once used for the physics department. These items did not contain unsafe levels of radioactivity, but disposal was recommended for the following reasons:

1) Special disposal is required for any radioactive waste byproducts. Due to strict federal regulations, disposal can be very costly, requires significant paperwork, and often requires special transportation to the disposal facility. As a result, the cost associated with purchasing and disposing of these items is prohibitive for educational purposes.
2) Even though these chemicals did not pose a significant health risk due to radioactivity, they were still considered exceptionally toxic and thus the overall risk exceeded educational utility.

Disposal of the radioactive material was coordinated by the Washington State Department of Health, Radiation Protection Division. Technicians from the Department of Health, along with personnel from the Washington State National Guard, conducted an assessment of the chemicals and provided free transportation and disposal.

Customer Survey Results

Customer surveys were hand-delivered to the science teachers during the follow-up visits. Seventeen of the 26 schools (65%) returned their completed survey. A summary of the customer survey responses is provided in Table 4 below.

Fifteen of the 17 (88%) that returned their surveys responded that the technical assistance program provided helpful information and that their school benefited from the Rehab the Lab campaign. Twelve of 17 (70%) expressed interest in attending periodic meetings with other school districts for additional learning opportunities. Similarly, another 70% expressed interest in using other Thurston County services such as HazoHouse and the Hazardous Waste Line. One school stated they did not benefit from the Rehab the Lab campaign.

As part of the survey, schools were asked to list their concerns about proper hazardous waste management. The top concerns (9 of 17 or 52%) were chemical management and liability. The next most common concern (7 of 17 or 41%) dealt with the understanding of hazardous waste regulations. This was followed by disposal costs and lab safety (6 of 17 or 35%).

When teachers were asked which organizations they utilize for information, six of 17 (41%) conducted their own research. For example, common responses included the internet, Flinn Scientific Catalog, material safety data sheets (MSDSs), and other catalogs. Otherwise, teachers utilized organizations such as their local Educational Service District (ESD), and Thurston County, which accounted for six of 17 (35%) responses. Six additional schools (35%) did not answer the survey question.

Schools were also asked questions regarding their plans for implementing BMPs. Fifteen of 17 (88%) noted that they plan to commit to proper waste disposal and ensure proper chemical segregation and storage. Thirteen of 17 (76%) agreed to purchase less-toxic chemicals and maintain complete spill kits.

Ten of 17 (59%) schools said that the Rehab the Lab campaign assisted them in making changes to their waste management practices. Five other schools (29%) said that no changes were needed. Two schools (12%) did not believe that the Rehab the Lab Campaign assisted them in making changes to their waste management practices.

Table 4: Customer Survey Response

Survey Question	Yes	No	Unsure	No change needed
Did the technical assistance program provide you with helpful information on hazardous waste disposal, lab safety, chemical management, and waste reduction?	**15**	**1**	**1**	
Did the visit assist you in making changes in the way you manage your chemicals and waste?	**10**	**2**		**5**
Did you have any specific questions during the site visit?	**6**	**10**		
If so, did the county specialist provide specific answers to address your questions?	**6**			
Was the specialist knowledgeable?	**16**		**1**	
In addition to technical assistance programs, Thurston County Environmental Health provides schools with the following: 1) A hazardous waste hotline 2) Hazardous waste disposal using HazoHouse 3) Assistance with regulatory questions 4) Newsletter Do you currently or will you now utilize these services?	**12**	**3**	**2**	
Are there additional services Thurston County Environmental Health can provide to schools?	**3**	**6**	**8**	
Would you be interested in attending periodic ESD 113 meetings with other school districts to learn about hazardous waste disposal, lab safety, chemical management, less toxic alternatives, and small-scale chemistry?	**12**	**2**		
Overall, did you or your school benefit from the "Rehab the Lab" campaign?	**15**	**1**		

As a school district employee, what concerns you most about proper hazardous waste management? (Circle all that apply.)

	Totals
Safety and potential liability	**9**
Chemical management & waste disposal	**9**
Understanding regulations	**7**
Lab safety	**6**
Disposal costs	**6**
Time required for proper management	**5**
Knowing where to get information	**4**
Other_____	

Did you attend any hazardous waste-related presentations or training sessions in the past year? YES: **3** NO: **10** <u>If yes, was the information useful to you?</u> Very: **5** Somewhat: **1** Not at all Who sponsored it? **ESD, Thurston County, PLU, WSTA**
What organizations do you most often turn to for information regarding hazardous waste, lab safety, and chemical management? **11 total responses (65%):** **Thurston County, Chemical Companies, Catalogs, Flinn Scientific, Internet, OSD, Tumwater School District (Jim Barr), MSDS**
What steps will you and/or you school district take to reduce lab waste disposal in the future? ☐ Purchase less-toxic chemicals. **13** ☐ Establish and/or participate in centralized lab chemical purchasing. **6** ☐ Phase in small-scale chemistry experiments. **9** ☐ Maintain a 2-5 year supply of chemicals. **7** ☐ Commit to proper disposal of hazardous waste. **15** ☐ Update and maintain a complete spill kit. **13** ☐ Ensure that all chemicals are properly segregated according to compatibility groups. **15**
Please share any additional comments or suggestions. Your suggestions help us improve our services. 4 total responses (24%). **Keep up the good work, Great and helpful program, Great Job, Are there any annual lab safety classes?**

Goals

1) Protect ground water, surface water, soils, sediments, and private property from hazardous materials and hazardous waste contamination.

As a result of the campaign:

- Thirteen schools purchased updated chemical spill kits.
- Eight schools improved chemical storage practices, such as moving chemicals from improper storage locations (i.e. countertops, floor, etc.). At the end of the campaign, all 26 schools were storing chemicals in proper storage areas.

- Thurston County learned that all 26 schools contained secure chemical storage areas, which included locking cabinets or designated chemical storage rooms.
- Since all 26 schools contained proper storage areas and cabinets, secondary containment was found to be adequate. Thus, in the event of a chemical spill, it is unlikely that any chemicals would migrate out of the storage areas and impact the outside environment.

2) Increase the rate of waste reduction, which conserves resources and reduces demand for disposal and recycling services.

- Thurston County learned that 14 schools utilized less-toxic chemical alternatives. These items, such as baking soda and household vinegar, produce non-hazardous waste byproducts and do not require special disposal by licensed hazardous waste companies.
- Twenty-one schools properly neutralize waste prior to disposal.
- Nine schools utilize small-scale or microchemistry experiments. Three additional schools are currently working towards implementing such experiments.
- Each school was provided with educational resources regarding less-toxic chemical alternatives, small-scale chemistry, and micro-chemistry experiments.
- Each school was recommended to maintain a two-to-five year supply of chemicals and conduct yearly inventories of all chemical stocks. These practices will help reduce overstock situations and allow schools to use up the chemicals before shelf-life expiration.
- The majority of schools now utilize non-toxic alcohol or digital thermometers, as opposed to mercury-containing thermometers.

3) Increase the percentage of hazardous waste collected (where it cannot be prevented through waste reduction).

- As a result of this campaign, approximately 3,900 pounds of hazardous waste were removed from local public and private schools.
- Each school was set up with a HazoHouse account, which provides lower-cost waste disposal services. County staff recommended that all schools conduct chemical inventories and dispose of any outdated items annually.
- Three schools contained potentially unstable or explosive chemicals that were ultimately disposed of by specialized hazardous material contractors. Two other schools contained chemicals that had the potential to become unstable over time, but were found to be currently safe. The project team strongly recommended that such chemicals not be purchased in the future.
- Approximately 35 pounds of mercury were disposed of, including liquid mercury and over 200 mercury thermometers.
- Thurston County disposed of numerous other toxic chemicals that are now recommended for disposal by the “Health and Safety Guide for K-12 Schools in Washington,” produced by the Washington State Department of Health. These items are deemed “unsuitable for K-12 schools due to excessive risk that exceeds educational utility.”

4) Reduce the amount of hazardous material that is improperly stored, improperly disposed, and accidentally spilled into the environment.

- Six schools obtained proper flammable storage cabinets. At the end of the campaign, 23 of 26 schools (88%) contained proper flammable storage.
- Ten schools obtained proper acid storage cabinets. All 26 schools now contain proper acid storage facilities.
- To prevent spills and accidents, 23 of 26 schools (88%) store chemicals on lower shelves, which are more easily accessible and eliminate the need for stepstools.
- Nine schools were found to be storing incompatible chemicals together. At the end of the campaign, 24 of 26 schools (92%) were storing chemicals according to proper compatibility.
- During the initial inspection, only eight schools contained adequate spill kits. At the end of the campaign, 21 out of 26 schools (80%) contained adequate spill control supplies.
- The campaign verified that 24 schools properly manage wastes and do not dispose of wastes into the trash or down the drain.
- Each school was provided educational resources regarding proper disposal practices and waste neutralization techniques. Again, each school was given authorization to utilize HazoHouse for future disposal.

5) Reduce damage to collection and transfer vehicles, and disposal equipment, and reduce disruption of treatment facilities by ensuring hazardous waste is kept out of these facilities or systems.

- At the end of the campaign, all 26 schools contained properly labeled chemicals, which helps prevent improper handling or disposal.
- All 26 schools contained MSDSs, which contain information regarding proper storage, spill clean-up, and proper disposal.
- All schools were advised to obtain, update, or create a Chemical Hygiene Plan, which is designed to establish procedures for all aspects of chemical management, including proper disposal and emergency planning.

6) Reduce potential for causing publicly owned facilities such as the landfill or sewage treatment plants to exceed pollutant discharge limits.

- Each school was encouraged to utilize HazoHouse for low-cost disposal of waste chemicals. By using HazoHouse, hazardous waste is kept out of sewers and landfills. County staff set up HazoHouse accounts with each school during the course of the campaign. These wastes are usually handled by district personnel and rarely by individual science teachers.
- Thurston County will provide ongoing technical assistance to schools regarding waste neutralization and proper disposal. This will be accomplished on an “on call” or “as needed” basis and will be an inspection item for the annual school inspections through the School Inspection Program.

Project Costs

The Rehab the Lab project spanned 20 months and cost approximately $55,000. Labor costs comprised about $42,000 and disposal costs accounted for about $13,000. Planning began in the spring of 2002 (230 hours), field work took place between the Fall of 2002 and Spring of 2003 (550 hours), data analysis and evaluation was done in the Fall of 2003, and report writing and review was carried out in the Winter and Spring of 2004 (400 hours).

Conclusions

During the Fall of 2002 and Spring of 2003, Thurston County inspected a total of 26 high school and middle school science laboratories. During that time, more than 3,900 pounds of toxic and outdated chemicals were removed from local schools and properly disposed. In general, the schools were very cooperative during the inspections. In addition to our non-regulatory approach, Thurston County was able to pay for disposal and consultation services.

In the end, only two schools refused our services; one of which was a school that recently constructed a new laboratory and had used a contractor to remove all old chemicals, and the other school did not respond to the invitation.

Throughout the campaign, the level of cooperation displayed by the teachers and district staff was impressive. After completion of the campaign, several trends were quickly identified:

1) Twenty-two of 26 school labs (85%) contained chemicals deemed by the Washington State Department of Health as being “higher-risk.”
2) Five of 26 schools (19%) contained chemicals that had the potential to become unstable or explosive over time.
3) Three of 26 schools (11%) contained unstable chemicals requiring special handling and disposal by trained hazardous material technicians.

After completing all of the inspections for both large and small school districts, several trends emerged:

1) Schools with less teacher turnover had better-managed laboratories and significantly more knowledge of their chemical stocks. When asking these teachers about specific chemicals found in their cabinets, many were able to provide detailed information about that chemical’s use in the lab. However, some newer teachers that inherited old chemicals were less likely to be aware of their inventory.

2) Large districts that had a single contact (i.e. Maintenance Supervisor, Health and Safety Coordinator) for lab maintenance and chemical ordering were less likely to have safety issues and were able to correct issues more rapidly. Smaller districts usually had only one chemistry teacher and were more likely to have similar success. Thus, having a designated person for lab management seems to be a significant factor for ongoing safety practices and controlled chemical purchasing.
3) In many schools, multiple containers of the same chemical were discovered. It is believed that some of these items were purchased in bulk quantities for a discounted price. This was most prevalent with one-gallon bottles of acids. After reviewing chemical catalogs, it was confirmed that bulk containers are sold at discounted prices. Additionally, special shipping fees for hazardous materials are the same for any size container, which may encourage schools to purchase larger containers.

The Rehab the Lab campaign also focused on a wide variety of other safety issues, such as proper chemical storage, safety equipment, and spill kits. Each laboratory was closely inspected and given a list of safety recommendations. Thurston County provided staff time to work with the district personnel and help correct some of these safety issues. The schools were given ample time to correct additional issues and follow-up inspections were conducted to observe their progress.

Conclusions Regarding Safety Issues

Many safety issues such as improper chemical segregation, unknown chemicals, and improper storage locations were corrected while conducting the initial site visit. At that time, county staff worked with teachers and assisted them in resolving such issues. Otherwise, each school was given one to three months to correct other safety issues before the follow-up visit. The following issues received a 100% compliance rate:

1) Locked and secure chemical storage.
2) Proper storage location of chemicals.
3) Proper storage of potentially reactive chemicals (i.e. sodium metal properly stored under oil for moisture protection).
4) Proper chemical labeling (no unknown or poorly marked containers).

Issues receiving high rates of compliance included the following:

1) Appropriate chemical inventories: 25 of 26 (96%)
2) Proper safety equipment: 25 of 26 (96%)
3) Complete spill kits: 25 of 26 (96%)
4) Proper flammable liquid storage: 25 of 26 (96%)
5) Proper acid storage: 24 of 26 (92%)
6) Secure shelves with earthquake protection: 25 of 26 (96%)
7) Appropriate chemical quantity: 24 of 26 (92%)

Future Considerations

Continued assistance for school laboratory management would likely benefit overall classroom safety and health. Possible future efforts could include:

1) Brief follow-up visits could be used to remind schools about BMPs, verify proper chemical management, answer any questions regarding chemical management or regulations, and offer other types of assistance. Since each school receives an annual health inspection from Thurston County School Health and Safety Program, a joint inspection could be easily coordinated with the Business Pollution Prevention Program.
2) Periodic mailings could provide helpful information to schools. Mailings could include pertinent articles, training announcements, or new curriculum materials. School district maintenance supervisors and school district safety personnel are currently receiving the hazardous waste newsletter. Keeping up with individual science teachers is a formidable task and is beyond the resources of the Business Pollution Prevention Program.
3) To encourage regular disposal of outdated chemicals, Thurston County could arrange HazoHouse appointments for individual schools at the end of each school year. By consistently removing outdated items, schools may become accustomed to regular waste disposal, thus preventing future safety issues.

Appendix A – Article VI, Thurston County Sanitary Code

Non-Point Pollution Ordinance

Compliance with the Nonpoint Source Pollution Ordinance

"The Health Department's approach to compliance assumes that the majority of hazardous waste generators want to "do the right thing" and simply need to recognize how to make it happen."

This fact sheet describes the Thurston County Health Department's approach to implementing the hazardous waste sections of the Nonpoint Source Pollution Ordinance (Article VI of the Sanitary Code) and explains the procedures that govern its enforcement. The ordinance, which took effect in May 1993, is part of the Business Pollution Prevention Program's efforts called for in the county's Hazardous Waste Plan and supported by Thurston County and its incorporated cities.

Proactive and Reactive Field Inspections

The Health Department implements the ordinance with either a proactive or reactive approach.

Proactive inspections – those in which the Health Department takes the initiative to approach businesses rather than waiting for inquiries or complaints – will be directed, within a limited time frame, at all businesses of a given type, and will be preceded by an opportunity for education about the ordinance. The process is designed to resolve all violations while avoiding inequitable or arbitrary enforcement of the ordinance among different competitors in the same field.

When the Health Department receives a complaint from the public about a violation of the ordinance, the Department reacts to the report and investigates. In these cases, enforcement action may be taken. Nonetheless, the goal is still to correct the violation rather than issue tickets, so field staff will work as constructively as possible with the violator to make necessary changes.

What the Ordinance Says

The following is an excerpt from Article VI, Section 4 of the Sanitary Code:

- 4.1 (a) Moderate risk waste and petroleum products including, but not limited to, oil and grease, shall be disposed of by recycling or use of a hazardous waste management facility operating under interim status or with a permit issued by EPA or an authorized state . . . No person shall, intentionally or negligently, dump or deposit, or permit the dumping or depositing of any such waste in any other manner, including onto or under the surface of the ground or into surface or ground water.

- 4.1 (b) Moderate risk waste, petroleum products, and hazardous materials shall be kept in containers and shall be stored in such a manner and location that if the container is ruptured, the contents will not discharge, flow, be washed or fall into surface water or ground water.

- 4.1 (c) Any person violating this section or owning or in possession of the premises, facility, vehicle or vessel from or on which waste is discharged or placed in violation of this section, shall notify the Department of the location and nature of the violation and shall immediately take or cause to be taken all necessary steps to prevent injury and protect waters from pollution.

If Health Department Staff Observe a Violation of Article VI . . .

Field staff have three options for response to violations. The ordinance specifies that compliance officers must respond to any violation they believe has occurred or is occurring. The three options are:

- an informal notification to the violator explaining the violation and recommended options for correcting the problem;

- a Notice of Violation, which begins formal administrative enforcement; and

- a Notice of Civil Infraction, which is similar to a traffic citation in that it carries a fine and is resolved in court.

Which option is used will depend on the type and severity of the violation and prior opportunities the violator has had to learn about and comply with the law. It is important to understand that, regardless of the initial response chosen and time frame allowed, the ordinance requires the Health Department to follow-up with increasingly stronger measures until the violation is eventually corrected.

If You Receive an Informal Notice Concerning Compliance with Article VI . . .

An informal notification offers an opportunity to comply voluntarily. The Health Department's approach to compliance assumes that the majority of hazardous waste generators want to "do the right thing" and simply need to recognize how to make it happen. The informal notification would typically consist of a letter or notice of noncompliance following a voluntary technical assistance visit during which a violation was observed. It is intended to help the business understand the reason for the violation and the options available for correcting the problem. This notification will not specify an exact time frame for compliance.

IF YOU RECEIVE A FORMAL COMPLIANCE INSPECTION . . .

A formal compliance inspection involves a visit to your business by a county hazardous waste specialist. The specialist will examine your facilities and practices with respect to two issues:

- management of hazardous wastes and petroleum products (all must be recycled or sent to a permitted disposal facility); and

- storage of hazardous wastes, petroleum products and hazardous products (all must be kept from reaching ground or surface water).

At the end of a compliance inspection, you will receive a Notice of Compliance, a Technical Assistance Notice of Noncompliance, or a Notice of Violation, described briefly here.

A Notice of Compliance documents your good-standing at the time of the inspection. If you are managing your hazardous wastes properly – either recycling them at your facility or sending them to another facility for disposal or recycling – you will receive a Notice of Compliance for you to file as a record of your status. If you are recycling the waste on site, the inspector will need to see the recycling methods and/or equipment used and may want to verify the proper operation of the equipment. If you are sending the waste off site, the inspector will need to see documentation of at least one recent pick-up that includes the name and phone number of the collection service.

Note that a Notice of Compliance documents your status only with respect to the Nonpoint Source Pollution Ordinance and only on the day of the inspection. It does not preclude a later change in status if your practices change, or if new information indicates the inspection results were inaccurate. It also does not comment on compliance with any other laws you may be subject to, such as fire, building, zoning, licensing, and worker safety regulations.

A Technical Assistance Notice of Noncompliance identifies why the site is out of compliance. A Technical Assistance Notice of Noncompliance typically is used for lack of secondary containment or lack of waste disposal documentation. It is signed by both the violator and the inspector and includes a mutually agreeable grace period for the site to come into compliance.

A Notice of Violation is the first step in the "formal" administrative enforcement process. Field staff would typically issue a Notice of Violation (NOV) in cases where the alleged violator has already had at least one opportunity to learn about, and comply with, the ordinance. It may also be issued immediately in cases of flagrant or particularly negligent violations. The NOV can be presented to the violator in person or sent by registered or certified mail. It will state the section of the ordinance that was or is being violated, a brief description of facts supporting this finding, a list of actions that must be taken to resolve the matter, and a date by which these actions must be taken. The process for responding to an NOV and your rights under this process are described on the back of the NOV. Some important elements of this process are listed below.

- **You have the right to appeal.** You may do so by submitting a written request for an administrative hearing to the Health Officer at the Thurston County Health Department, 2000 Lakeridge Dr. SW, Olympia WA 98502-6045, within ten days of the date of issuance of the Notice of Violation.

- **Corrective actions are postponed until after the hearing.** If you file a request for a hearing, you may temporarily postpone taking corrective actions pending the hearing outcome.

- **Administrative hearings allow an opportunity to present evidence that you did not violate the ordinance.** Evidence may include testimony of witnesses, affidavits and documents, and other exhibits such as photographs.

- **You may appeal the results of an administrative hearing.** If you are unsatisfied with the results of an administrative hearing, you may appeal these findings and actions to the Thurston County Board of Health.

If You Receive a Notice of Civil Infraction . . .

Violations of Article VI of the Sanitary Code are civil infractions enforceable by the court and subject to fines of up to $498 (including court costs). Once a Notice of Violation has been issued, the process of issuing and enforcing a civil infraction will not begin until and unless the administrative process described above runs its course without resolution. If you do not, in the specified time frame, take the actions required by a Notice of Violation, or those required by a subsequent administrative or Board of Health hearing, you will be issued a Notice of Civil Infraction (a "ticket"), which is handled similarly to a traffic citation. You may:

- pay the penalty;

- request a hearing to contest or explain the circumstances of the alleged violation; or

- ignore the ticket, which would automatically result in your being found guilty and responsible for the full amount of the fine.

The Notice of Civil Infraction, when issued, explains in more detail your options and rights under the civil process.

If you would like a copy of the Thurston Count Nonpoint Source Pollution Ordinance or any part of the Sanitary Code, or if you have questions on this enforcement process, please call the Business Pollution Prevention Program at (360) 786-5457 or TDD (360) 754-2933, Monday through Friday from 8:00 a.m. to 5:00 p.m or see our website, http://www.co.thurston.wa.us/health/ehrp/hwaste.html

Other Hazardous Waste Management and Disposal Fact Sheets

- *Antifreeze, Used Oil, & Oil Filters*
- *Disposal of Petroleum-Contaminated Absorbent Materials*
- *Floor Drains*
- *Hazardous Waste Disposal*
- *Oil/Water Separators*
- *Residential Heating Oil Tanks*
- *Secondary Containment*
- *Solvents and Parts Cleaners*
- *Storing and Labeling Hazardous Waste*
- *Used Shop Towels*

March 2003

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Appendix B – Letter of Invitation

THURSTON COUNTY
WASHINGTON
SINCE 1852

COUNTY COMMISSIONERS
Cathy Wolfe
District One
Diane Oberquell
District Two
Robert N. Macleod
District Three

PUBLIC HEALTH AND
SOCIAL SERVICES DEPARTMENT

Sherri McDonald, RN, MPA
Director
Diana T. Yu, MD, MSPH
Health Officer

September 26, 2002

X
X
X

Subject: Technical Assistance Visits at School Science Labs

Dear

The Thurston County Business Pollution Prevention Program will be visiting local schools to provide technical assistance in the hazardous materials management of science laboratories. Our last visits of science laboratories in Thurston County was done in 1996 so the Health Department is using this opportunity to verify proper chemical and general management practices and to provide new or additional information/assistance as needed.

Since labs commonly contain a wide variety of hazardous and potentially hazardous chemicals, our goals are to review chemical inventories and storage, review general laboratory safety, and to offer information regarding, waste disposal, and spill management.

In addition, some chemicals can become unstable over time or the school no longer needs certain types or quantities of some chemicals. Therefore, it is also the goal of this program to assist in the removal of unused or outdated hazardous or potentially hazardous chemicals. To help schools reduce disposal costs, Thurston County will offer assistance by providing staff to identify, segregate and store waste chemicals until they are shipped for proper disposal. Thurston County is also exploring options to help defray disposal costs to schools in Thurston County for this project.

During our visit, Thurston County will also survey the laboratories and offer compliance advice regarding general management practices. No formal enforcement action will be taken during these visits, however, if a violation(s) of Article VI of the Thurston County Sanitary Code is observed, Thurston County will work with the school and/or district to resolve the issue(s).

If you have any questions regarding this project, please contact Brad or myself at 360-754-4111.

Sincerely,

David W. Tipton

David W. Tipton, R.S.
Environmental Health Division

Sincerely,

Brad Zulewski

Brad Zulewski
Environmental Health Division

Environmental Health Division: 2000 Lakeridge Drive SW, Olympia, Washington 98502-6045 (360) 754-4111
Fax (360) 754-2954 • TDD (360) 754-2933
www.co.thurston.wa.us/health

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Appendix C – Press Release

News Release

For Immediate Release- December 9, 2002

Contact: Rachel Donnette, Environmental Educator, 360-754-4111 ext. 7244
Dave Tipton, Environmental Health Specialist 360-754-4111 ext. 6496
Cindy Moore, US EPA, Washington Operations Office, 360-753-9469

County Helps Clean Up School Labs

Thurston County- Most laboratories in middle and high schools in Washington state currently contain some out-of-date chemicals that are unstable, and unsafe for students and staff. Many of these chemicals are more than 30 years old and present a serious fire and life safety hazard. School districts often lack the budget, staff, and specialized expertise to remove these old, potentially hazardous chemicals. As a result, students, staff, and facilities are at risk of exposure or injury. But now they have a way to correct the situation.

A unique partnership has been formed between Thurston County and a statewide Rehab the Lab work group to help dispose of unwanted chemicals in school chemistry laboratories. The local Rehab the Lab project is part of a larger effort among health, environmental, and educational agencies and organizations to clean up school labs. Thurston County is one of three counties in the state to initiate a local Rehab the Lab project, which will officially kick off next year. The U.S. Environmental Protection Agency is facilitating this cooperative effort, and the Washington State Department of Ecology will fund local Rehab the Lab efforts around the state next year through a grant program.

"This project is creating strong relationships and understanding among several different agencies and organizations that don't get many opportunities to interact. We all believe helping schools is the right thing to do," said Cindy Moore, facilitator of the

-MORE-

Statewide Rehab the Lab Work Group at the U.S. Environmental Protection Agency. She added that this “is not enforcement, it isn’t about a big regulatory hammer” – it’s about advice, education, and assistance.

Under the local program, Thurston County hazardous waste specialists visit middle and high school labs, where they meet with school staff. Together they go through each shelf, review the types and conditions of chemicals, and check for correct storage, labeling, condition, and usefulness of the products. They sort items for disposal and provide disposal options. They also discuss safety, spill prevention, and earthquake preparedness.

To keep the labs from accumulating unneeded chemicals in the future, the hazardous waste specialists discuss keeping low inventories and conducting micro-experiments. To conclude, they provide each teacher with verbal and written recommendations on improving safety.

Thurston County met with local school districts for several months to understand the schools’ needs and design a helpful and effective approach. The technical assistance helps stretch the school maintenance budget. “We were eager to participate in this program for several reasons,” explained Tim McGillivray, Dir. of Community Relations for North Thurston Public Schools in Lacey. “One was financial, but the other really was just a desire to do the right thing, and keep our students and staff safe. We’re grateful to Thurston County for taking the lead on this.”

“We are picking up on work that began in the Seattle area. We planned to do a school lab safety campaign this year, and it worked out well to dovetail with the statewide effort,” said Dave Tipton, hazardous waste specialist with Thurston County.

On its very first visit, the project team found chemicals in cracked containers, chemicals forming crystals outside the caps, and chemicals stored together that could cause fire if mixed. In a later visit they found a chemical labeled 1955 – in fountain pen, and with a cork stopper. As chemicals sit over the years they may become unstable or begin to react with their containers, rusting or cracking and posing risks to students and staff. The cause of the problem is often high teacher turnover - science teachers leave on average every three years, which means new teachers inherit an unfamiliar chemical stock.

"Fortunately, the Thurston County Health Department staff is taking a proactive approach by working with science teachers at area schools to properly dispose of any lab chemicals that pose a potential hazard," says Moore.

Contact for field photographs:
Dave Tipton, Environmental Health Specialist, 360-754-4111 ext. 6496

-30-

South Sound

SECTION B

The Olympian

MONDAY, JANUARY 6, 2003

Schools, health officials will 'rehab' science labs

BY JOHN DODGE
THE OLYMPIAN

Thurston County environmental health officers are working with science teachers in area high schools and middle schools to make school science laboratories safer places to learn.

Many school labs contain outdated, unstable chemicals that could present serious fire and safety hazards, county health officials said.

And school districts often lack the budget and expertise to remove the old, potentially hazardous chemicals.

But beginning this year, the county health officers, school officials, the U.S. Environmental Protection Agency and state Department of Ecology are teaming up to participate in a "Rehab the Lab" project.

Proactive approach

Thurston County is one of three counties in the state to launch the project with federal technical assistance and state funding.

"Fortunately, the Thurston County Health Department staff is taking a proactive approach by working with science teachers at area schools to properly dispose of any lab chemicals that pose a potential hazard," said EPA's Cindy Moore.

She said this isn't an enforcement program based on regulations. It's all about advice, education and assistance.

The school districts are eager to participate in the program, said Tim McGillivray, director of community relations for North Thurston Public Schools.

"One was financial, but the other really was just a desire to do the right thing and keep our students and staff safe," he said.

In initial visits to school science labs, county health officials have found chemicals in cracked containers and chemicals forming crystals around their caps. Some of the supplies have been in the labs for decades and are poorly marked.

Inherited supplies

Part of the problem is a high turnover rate for science teachers, with new teachers inheriting an unfamiliar stock of supplies, school officials said.

Under the program, county hazardous waste specialists visit the school labs and go through each shelf, reviewing the types and conditions of the chemicals.

Items are sorted for disposal, and the schools are provided safe disposal options.

Also discussed with the teachers are spill-prevention tips and ways to keep the supplies stored safely in case of an earthquake.

"We all believe helping schools is the right thing to do," Moore said.

John Dodge covers the environment and energy for The Olympian. He can be reached at 360-754-5444 or jdodge@olympia.gannett.com.

Appendix D – List of Participating Schools

School Participation – Rehab the Lab

Participating Schools:	School District
1) Rochester High School	Rochester School District #401
2) Yelm High School	Yelm Community Schools
3) Yelm Middle School	Yelm Community Schools
4) Rainier High School	Rainier School District #307
5) Tenino High School	Tenino School District #402
6) Timberline High School	North Thurston Public Schools #3
7) Saint Michael Parish	Private
8) Northwest Christian High School	Private
9) Holy Family School	Private
10) Nisqually Middle School	North Thurston Public Schools #3
11) South Sound High School	North Thurston Public Schools #3
12) Chinook Middle School	North Thurston Public Schools #3
13) River Ridge High School	North Thurston Public Schools #3
14) North Thurston High School	North Thurston Public Schools #3
15) Reeves Middle School	Olympia School District #111
16) Washington Middle School	Olympia School District #111
17) Olympia High School	Olympia School District #111
18) Capital High School	Olympia School District #111
19) Jefferson Middle School	Olympia School District #111
20) Griffin School District	Griffin School District #324
21) Tumwater High School	Tumwater School District #33
22) Black Hills High School (AG West)	Tumwater School District #33
23) Bush Middle School	Tumwater School District #33
24) Tumwater Middle School	Tumwater School District #33
25) Komachin Middle School	North Thurston Public Schools #3
26) Marshall Middle School	Olympia School District #111

Schools that did not participate:

1) Nova School	Private
2) Evergreen Christian School	Private

Appendix E – Commercial Parcel Inventory Form

Rehab the Lab 2002/2003
Thurston County School Districts - ESD #113

Visit Date:	County Staff:	Time On Site: Time Off Site:
School Name:	WHPA (name & capture Zone):	
School District:	School District Address: City: State: Zip:	
District Contact for Health, Safety & Compliance issues: Title: Address & phone:		
Site Address: City: Zip: Phone:	District Mailing Address: City: State: Zip: Phone:( )	
Parcel #	EPA ID #:	
Science Teacher: Tenure of Science Teacher (time at this lab):		

1. Nature of Property: ❑ Commercial – public school ❑ Commercial – private school
2. Reserved:
3. What year was the school built? Remodeled?
4. What kind of past businesses have been conducted at the property (give years if possible)?
5. Generator Status: ❑ CESQG Number of CESQG sites in district:
6. Has there been past environmental inspections at the facility?
   ❑ Yes, Year_____ Type of inspection: ❑ No ❑Unknown
7. Reserved:
8. Does facility have **Material Safety Data Sheets** for chemicals on-site? ❑ No ❑ Yes
9. What is your facilities drinking water source? ❑ City water ❑ Community well ❑ Private well ❑ Unknown
   Name of water system (well #)
10. Is there an on-site well? ❑ Active ❑ Inactive ❑ Decommissioned
    If well was decommissioned- Method: Year:
    Was well decommissioned by a licensed driller?
11. What is facility's means of wastewater disposal? ❑ City sewer ❑ Community septic ❑ Unknown
    ❑ On-site septic **(Type: Gravity, Mound, Sand filter, Pressure dist., other_____)**

12. Reserved:

13. Reserved:

14. Does facility have floor drains? ❑ No ❑ Yes ❑ Not Applicable

If yes, how many, where?

15. Where do work area & storage area floor drains discharge?

❑ City sewer ❑ On-site septic ❑ Community septic
❑ City storm drain, ditch, stream, wetland or lake
❑ Open bottom sump or vault ❑ Unknown
❑ Sealed **(When)**_____ ❑ Other

Any treatment units as a part of the floor drains (limerock vaults, etc.)?

16. Does facility have an oil/water separator? ❑ No ❑ Yes ❑ Not Applicable

If yes, where does it discharge? ❑ City sewer ❑ On-site septic ❑ Community septic
❑ City storm drain, ditch, stream, wetland or lake
❑ Other

If yes; How often is it cleaned?_____ When was last cleaning?
By whom?_____Where is sludge disposed?

17. Reserved:

18. Which type of spill kit(s) does the facility have?

Is spill kit(s) adequate for size and scope of potential spill?

19. What types of experiments are done?

20. What are the by-products (wastes) of the experiments?

Waste Handling Items

Waste Reduction:

_____ Are small scale or microchemistry being used?

_____

_____ Are less toxic chemicals substituted?

Recycling:

_____ Are wastes recycled (list recycled items)?

Proper Disposal:

_____ Are spill clean up wastes properly disposed?

_____ Are wastes neutralized prior to disposal (list)?

_____ Are unneeded accumulated wastes sent for disposal?
_____ (list wastes needing to be shipped)

_____ Disposal receipts available?
_____ (copy of disposal receipts if not Thuston County registered CESQG)

School Lab Checklist

Do the laboratories have chemical inventories on hand? (attach list, indicate quantities) Y N Date Implemented	WAC 246-366-140 296-62-40015 296-62-40025
Does the laboratory have a chemical hygiene plan? Y N Date Implemented	WAC 246-366-140 296-62-40009
Does the laboratory contain proper eyewash, safety shower, spill plan and spill kit? Y N Date Implemented	WAC 296-62-130 Part L 246-366-140 296-62-40025 Part Q ANSI Z358.1-1998 296-62-40009
Is the chemical storeroom lockable, contain proper warning signs and properly ventilated? Y N Date Implemented	WAC 246-366-140 296-62-40009 296-62-40025 UFC
Are chemicals stored in their proper locations (i.e. not on counter tops, fume hoods, work areas, etc.)? Y N Date Implemented	WAC 296-62-40025 (3)(d)(ii)(E) 246-366-140 296-62-40025 296-62-40009 NFPA

School Lab Checklist

Are flammables stored in approved cabinets with self-closing doors? Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-24-33009 296-62-40009
Are acids stored in proper cabinets and in good condition (i.e. corroded shelf supports? Incompatible acid stored separately (i.e. nitric acid, inorganics separate from organics). Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40009 296-24-33009 296-62-40025
Are reactive chemicals (i.e. flammable metals, strong oxidizers) stored in separate cabinets? Flammable metals stored under oil. Oxidizers stored in metal cabinets away from flammable liquids. Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40009 296-62-40025
Is shelving secure? Do storage shelves contain earthquake lips? Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40009 296-62-40025
Are chemicals stored according to compatibility groups, not alphabetically? Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40009 296-62-40025 NFPA

School Lab Checklist

Are chemical stored on lower shelves, preferably at eye level. Store glassware and other equipment on higher shelves. Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40009 296-62-40025
Are all chemicals properly labeled? Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40009 296-62-40025 NFPA
Does the lab contain unknown or unmarked chemicals? Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40009 296-62-40025
Does there appear to be any chemicals five years old or more? Chemicals should be disposed after two years? Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40009
Are chemical quantities representative of the actual amount used on a yearly basis? Y ☐ N ☐ Date Implemented ☐	WAC 246-366-140 296-62-40025 296-62-40009

School Lab Checklist

Do any chemicals show signs of degradation (i.e. crystal formation, color changes, striations, moisture absorption)? Recommend disposal? Y N Date Implemented	WAC 246-366-140 296-62-40009 296-62-40025
Does the lab contain chemicals posing peroxidation hazards or any other unstable items? Recommend disposal? List compound name, # bottles, estimated quantity. Y N Date Implemented	WAC 246-366-140 296-62-40009 296-62-40025
Do any chemicals require professional stabilization or handling? If so, list steps taken to isolate and notify. Y N Date Implemented	WAC 246-366-140 296-62-40009 296-62-40025
Are there any chemicals recommended for disposal? (old chemicals, unused/unneeded chemicals, Table I & Table II chemicals from OSPI-DOH K-12 Health and Safety Guide) List chemical names, # bottles, estimate quantities. Y N Date Implemented	WAC 246-366-140 296-62-40009 296-62-40025
Does the lab contain formaldehyde solutions? Recommend disposal? Estimate quantity, list specimens if biologicals. Y N Date Implemented	WAC 246-366-140 296-62-07540 296-24-135 B-2 296-62-080 Part J

Notes & Comments:

Recommendations :

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Appendix F – Follow-up Letter (typical)

THURSTON COUNTY
WASHINGTON
SINCE 1852

COUNTY COMMISSIONERS
Cathy Wolfe
District One
Diane Oberquell
District Two
Robert N. Macleod
District Three

PUBLIC HEALTH AND
SOCIAL SERVICES DEPARTMENT

Sherri McDonald, RN, MPA
Director
Diana T. Yu, MD, MSPH
Health Officer

October 16, 2002

X
X
X

RE: Technical Assistance Visit

Dear:

Thank you for your assistance with our chemistry lab inspection on September 23, 2002. The primary purpose of our visit was to identify higher risk chemicals and offer disposal options. In addition, we also looked for other health and safety issues that are important for the overall well being of teachers and students. These issues are addressed in the *Summary of Recommendations* section of this letter.

Another important aspect of laboratory management is the Chemical Hygiene Plan. The Department of Labor and Industries requires all schools to have a Chemical Hygiene Plan in order to address spill procedures and other emergency situations. In order to assist you with this requirement, we have provided a CD-ROM with further information. Additional information may also be found at www.cheminfonet.org/hygpl1.htm.

Chemical Stockroom

While inspecting the chemical storage room, we found that the majority of chemicals were separated and stored properly. The storage room was properly locked, preventing unsupervised access and shelves contained the required earthquake lips. The recommended changes are as follows:

1) The entry door to the storage room still contained an old "Computer Room" sign. This should be removed to properly identify current use.
2) Flammable liquids were stored in an old 1-Hour Rated flammable cabinet. Although this cabinet once satisfied flammable storage requirements, the new regulation now requires a vented metal flammable cabinet with self-closing doors. In order to comply with this regulation, the old cabinet will require replacement.

Environmental Health Division: 2000 Lakeridge Drive SW, Olympia, Washington 98502-6045 (360) 754-4111
Fax (360) 754-2954 • TDD (360) 754-2933
www.co.thurston.wa.us/health

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3) The ventilation fan located on the ceiling of the storage room was not operational. However, it was quickly repaired by your maintenance staff.
4) Incompatible chemicals were stored together (i.e. flammables with oxidizers, nitrates with sulfates, acids with caustics). During our inspection, we segregated these items and placed them in their correct locations. To prevent a potential chemical reaction, incompatible chemicals must be separated during storage.
5) The majority of chemicals in the other cabinets were properly segregated, but these cabinets were overfilled. Chemicals should not be double-stacked or stored on their sides. We recommend disposing of outdated or unused chemicals in order to make room for proper storage.
6) Several chemicals appeared to be very old and contained faded/corroded labels, thus could not be identified. These items were characterized by Thurston County Staff and shipped to HazoHouse. Degraded labels should be replaced for future identification. If the item is more than five years old, disposal is recommended.
7) Several items were stored on counter tops, but were moved to their proper cabinets by Thurston County Staff. Chemicals must be stored in their proper cabinets or shelves.
8) The storage area contained high-risk chemicals, which were transported to HazoHouse. Avoid purchasing high-risk chemicals in the future. These include carcinogens, strong oxidizers, acutely toxic chemicals, and heavy metal compounds to name a few. For your convenience, we have provided a list of high-risk chemicals as defined by the Washington State Department of Health (See enclosed CD-ROM).
9) A small bottle of sodium metal was discovered that was not stored under oil. In order to prevent the formation of potentially explosive peroxides, pure sodium must always be stored under oil or solvent. Thurston County staff corrected this hazardous situation during our visit.

Biology Stockroom

After inspecting the chemistry room, we proceeded to the biology laboratory. This area contained numerous biological specimens, an acid cabinet, as well as other miscellaneous chemicals. Our findings and recommended changes are as follows:

1) The acid cabinet contained several incompatible chemicals such as nitric acid, sodium hydroxide, and glacial acetic acid. These items were moved to their proper locations by Thurston County Staff. In the future, sodium hydroxide should be stored with other caustic chemicals and glacial acetic acid should be placed in a flammable cabinet. Since nitric acid will react with other acids, it should be stored separately as well. We recommend placing the nitric acid into a plastic tub or tray, which may then be placed into the acid cabinet. The plastic tub will isolate the nitric acid from the other acids, preventing commingling in the event of a spill. In addition, nitric acid degrades plastic over time, so it is important to inspect and/or replace the container caps.
2) The acid storage cabinet contained severely corroded shelves and shelf support clips, both of which should be replaced as soon as possible.

3) Numerous chemicals were stored on tables and counter tops, but were removed and properly stored during our visit. Chemicals must be stored in their proper cabinets or shelves.
4) Numerous biological specimens and other boxes of chemicals were also stored on the floor and tables. However, it was noted that your organization is currently planning to dispose of these items in the near future. Thurston County would recommend moving these items into proper storage until they are disposed.

Potentially Reactive Chemicals

Several chemicals were also discovered that may be reactive, thus we highly recommend handling/disposal by a professional contractor. The chemicals listed below should not be handled or moved due to their potential fire/explosion hazard.

1) Red Phosphorus: This chemical may become shock-sensitive with age and must be stored in a secure, cool, dry location.
2) Ethylene Dichloride with crystals on cap: Due the presence of crystals on the cap, this material may be reactive and should be handled by a professional contractor.

Chemical Waste Disposal

During our second visit we presented a list of high-risk chemicals recommended for disposal (see enclosed inventory). Per your request, we prepared these chemicals for disposal by segregating, packaging, labeling, and completing the shipping documentation. On October 3, 2002, the chemicals were transported to HazoHouse by North Thurston District Staff and processed by Thurston County. You will receive a disposal invoice for this shipment. If you would like to use HazoHouse in the future, please contact myself or Dave Tipton and we will be happy to assist. When compared to the cost of utilizing other disposal options, HazoHouse offers a significant savings, so we encourage the use of this service. In addition, some chemicals *may* also be disposed in the normal trash or sanitary sewer, however *please contact us before doing so.* A list of certified hazardous waste contractors has been attached for your convenience.

Summary of Recommendations:

1) Complete a Chemical Hygiene Plan and obtain the supplies necessary to implement the plan.
2) Purchase a flammable cabinet that complies with current regulations.
3) Reduce chemical inventories to a five-year supply and avoid purchasing high-risk chemicals. For more information, please check www.flinnsci.com/homepage/sindex.html or the enclosed CD-ROM.
4) Be aware of chemical compatibility (i.e. acids, bases, oxidizers, etc) and do not store incompatible chemicals together.
5) Chemicals should only be stored in their designated locations, not on counter tops or floor.
6) Dispose of high-risk chemicals as well as those older than five years.

7) An effective method of reducing chemical inventories can be accomplished through small-scale chemistry. These experiments use fewer chemicals and lower concentrations, thus minimizing the potential exposure to students and staff. Aside from reducing your chemical supply costs, small-scale chemistry significantly reduces disposal costs and other risks associated with chemical handling/mishaps. If you would like more information, please visit www.smallscalechemistry.colostate.edu/ or consult the enclosed CD-ROM.

Enclosed CD-ROM

I have enclosed a CD-ROM titled "Rehab the Lab – Tools for Science Teachers" by Dave Waddell. This valuable resource was designed to assist science teachers with all aspects of laboratory management. It contains everything you need to comply with the recommendations listed above, as well as other valuable information. This CD contains the following information and more:

1) Instructions for completing a Chemical Hygiene Plan.
2) Lab Safety Checklist.
3) High-Risk Chemical Database.
4) Small-Scale Chemistry Resources.

I hope the site visit, recommendations, and enclosed information have been helpful. The Thurston County Health Department will conduct a follow-up visit in several months to observe your progress. If you have any questions or would like assistance implementing our recommendations, please do not hesitate to call Dave Tipton or myself at 754-4111. Thank you very much for your time and attention. We look forward to working with you in the future.

Sincerely

Brad Zulewski

Brad Zulewski
Environmental Health Division

Sincerely,

David W. Tipton

David W. Tipton, R.S.
Environmental Health Division

cc: XXXXXX, Superintendent
XXXXXX, Chemistry Instructor
XXXXXX, Biology Instructor
file

enclosures:
List of Chemicals
CD-ROM: Rehab the Lab; Instructors only
List of Certified Contractors
Small Quantity Generator Disposal Receipts

"XXXXXX" High School – Inventory of High-Risk Chemicals
Delivered to HazoHouse October 2002

1) Acetylcholine, 250ml.
2) Thioacetamide, 100g.
3) Dichlorobenzene, 2 lbs.
4) Elemental mercury, 5 lbs.
5) Butyric acid, 1lb.
6) Unknown oxide, ½ lb.
7) Unknown red liquid (identified as toxic liquid), 6 oz.
8) Mercury thermometers, Qty. 48
9) Ammonium bifluoride, 1 lb.
10) Potassium fluoride, 1 lb.
11) Stannic chloride, 1 lb.
12) Hydrazine sulfate, 1 lb.
13) Lead nitrate, 2 lbs.
14) Mercurous nitrate, ¼ lb.
15) Ammonium nitrate, 5 lbs.
16) Potassium chlorate, 6 lbs.
17) Potassium ferricyanide, 1 lb.
18) Potassium dichromate, 3 lbs.
19) Broken mercury thermometer, 2 oz.
20) Chlorine water, 2x16 oz.
21) Carbon disulfide, 1 lb.
22) Anthracene, 1 lb.
23) Phenol, 2 lbs.
24) Potassium bromate, 1 lb.
25) Hydrogen peroxide 30%, 1 lb.
26) Glycerine, 1 lb.
27) Naphthalene flakes, 1 lb.
28) Ammonium dichromate, 1 lb.

Hazardous Waste Disposal Contractors

Company Name	Address	Phone
Heritage Environmental Services – ETS *(High Hazard Chemical Stabilization)*	9730 Lathrop Industrial Drive, Suite E1 Olympia, WA 98512	360-705-9004
Emerald Services	9010 E. Marginal Way S, Suite 200 Seattle, WA 98108	206-786-4275
Envirotech Systems, Inc.	3601 121st. St. SW Lynwood, WA 98037	800-922-9395
Kleen Environmental Technologies	754 Garfield St. Seattle, WA 98109	206-285-8010
Onyx Environmental Services	14240 Interurban Ave. South, Suite 244 Tukwila, WA 98168	206-241-3900
Philip Services	955 Powell Ave. SW Renton, WA 98055	800-327-7759
Safety Kleen	3210 C St. NE Auburn, WA 98002	800-248-0311
Teris LLC *(State of Wash. Hazardous Waste Contractor)* Contract#: 07198, commodity code:9768	9520 10th Ave. S, Suite 150 Seattle, WA 98108	360-527-2222
Van Waters and Rogers	8201 S. 212th St. Kent, WA 98032	800-562-4860

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Appendix G – Customer Survey Form

School Survey

Rehab the Lab Technical Assistance Program

1. **As a school district employee, what concerns you most about proper hazardous waste management?**
   (Circle all that apply.)

   a) Disposal costs
   b) Chemical management & waste disposal
   c) Lab safety
   d) Time required for proper management
   e) Understanding regulations
   f) Knowing where to get information
   g) Safety and potential liability
   h) Other_____

2. **Did the technical assistance program provide you with helpful information on hazardous waste disposal, lab safety, chemical management, and waste reduction?**

   YES NO Unsure

   Comments:

3. **Did the visit assist you in making changes in the way you manage your chemicals and waste?**

   YES NO No changes needed

   If yes, what specifically did you change?

4. **Did you have any specific questions during the site visit?**

   YES NO

   Please describe:

5. **If so, did the county specialist provide specific answers to address your questions?**

YES NO Unsure

Comments:

6. **Was the specialist knowledgeable?**

YES NO Unsure

Comments:

7. **In addition to technical assistance programs, Thurston County Environmental Health provides schools with the following:**

- A hazardous waste hotline
- Hazardous waste disposal using HazoHouse
- Assistance with regulatory questions
- Newsletter

Do you currently or will you now utilize these services?

YES NO Unsure

Which services?

8. **Are there additional services Thurston County Environmental Health can provide to schools?**

YES NO Unsure

Please list examples of school related services and topics you would like to see.

9. **Did you attend any hazardous waste-related presentations or training sessions in the past year?**

YES NO

If yes, was the information useful to you?

VERY SOMEWHAT NOT AT ALL

Who sponsored it?_____

10. **Would you be interested in attending periodic ESD 113 meetings with other school districts to learn about hazardous waste disposal, lab safety, chemical management, less toxic alternatives, and small-scale chemistry?**

YES NO

If so, when is the best time of year and time of day to hold this kind of meeting?

11. **What organizations do you most often turn to for information regarding hazardous waste, lab safety, and chemical management?**

12. **What steps will you and/or you school district take to reduce lab waste disposal in the future?**

- ☐ Purchase less-toxic chemicals.
- ☐ Establish and/or participate in centralized lab chemical purchasing.
- ☐ Phase in small-scale chemistry experiments.
- ☐ Maintain a 2-5 year supply of chemicals.
- ☐ Commit to proper disposal of hazardous waste.
- ☐ Update and maintain a complete spill kit.
- ☐ Ensure that all chemicals are properly segregated according to compatibility groups.

13. Overall, did you or your school benefit from the "Rehab the Lab" campaign?

YES NO Unsure

Why or why not:

14. Please share any additional comments or suggestions. Your suggestions help us improve our services.

Please return completed survey to:
Thurston County Environmental Health
Resource Protection Section
2000 Lakeridge Drive SW, Bldg 4
Olympia, WA 98502

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Appendix H – The Pledge

THURSTON COUNTY
WASHINGTON
SINCE 1852

COUNTY COMMISSIONERS
Cathy Wolfe
District One
Diane Oberquell
District Two
Robert N. Macleod
District Three

PUBLIC HEALTH AND
SOCIAL SERVICES DEPARTMENT

Sherri McDonald, RN, MPA
Director
Diana T. Yu, MD, MSPH
Health Officer

May 14, 2003

X
X
X

RE: Technical Assistance Visit– Chemistry Lab Inspection

Dear:

We would like to seize this opportunity to thank you for all of your help during the course of our *Rehab the Lab* Technical Assistance Campaign. The purpose of this campaign was to assist with hazardous waste disposal, offer safety recommendations, and suggest waste prevention methods. Our ultimate goal was to provide resources that support and improve your school's long-term laboratory management practices. Shortly after our science lab inspection, we sent you a letter containing safety and waste minimization recommendations as well as an educational CD-ROM.

Enclosed is a *Pledge for Safe Classrooms*. Thurston County is asking every school to sign this pledge as the final step for the 2002-2003 *Rehab the Lab* campaign. Please review the pledge with your principal and district contact and check off the activities your school is committed to doing. Please send me a copy of the signed pledge within one week or provide a copy at the time of my follow up visit. After the signed pledge is returned, you will receive a *Certificate of Environmental Achievement* from the Thurston County Board of Commissioners. By making this pledge a part of your everyday activities, you will create a safe and environmentally friendly atmosphere for you and your students. Most importantly, you can take pride in knowing that you helped create a legacy of safety, waste prevention, and cost efficiency for future students and science teachers.

If you have any questions or would like additional assistance, feel free to call us at 754-4111 during regular business hours. We look forward to working with you in the future.

Sincerely,

Bradley A. Zulewski, R.S.

Brad Zulewski, R.S.
Environmental Health Division

Enclosure: Pledge for Safe Classrooms

Environmental Health Division: 2000 Lakeridge Drive SW, Olympia, Washington 98502-6045 (360) 754-4111
Fax (360) 754-2954 • TDD (360) 754-2933
www.co.thurston.wa.us/health

Recycled Paper

For Safe Classrooms We Pledge to:

PLEDGE	GOAL
❑ Commit to ongoing proper disposal of hazardous waste.	School meets legal requirements to properly dispose of hazardous waste.
❑ Maintain serviceable, separate acid, base and flammable cabinets.	Safe storage of chemicals and reduced earthquake risks.
❑ Maintain documentation of hazardous waste activities (neutralization logs, waste disposal manifests).	Improve knowledge of the wastes that are being generated and where they're going.
❑ Maintain functional eye washes in areas of chemical use.	Increase safety. Reduce liability.
❑ Maintain functional and tested fume hoods.	Increase safety. Reduce liability.
❑ Purchase no high risk chemicals (see list).	Reduce earthquake and accident risks and reduce liability.
❑ Link purchase to use. Purchase containers so contents will be used up within 5 years.	Reduce waste and save money.
❑ Build the concepts of least-necessary amount and least-hazardous chemical option into the chemical purchasing contract.	Reduce waste and save money.
❑ Accept no donated chemicals unless you can demonstrate they will be used up within 1 year.	Reduce waste and save money.
❑ Adopt at least one microscale lab.	Reduce waste and save money.
❑ Complete earthquake preparedness: Lips on shelves, shelves anchored, secondary containment.	Reduce earthquake and accident risks.
❑ Put spill supplies and procedures in place for major hazard classes of chemicals.	Reduce risk of injury and accidental contact with spilled chemicals.
❑ Label all containers with chemical names and major hazard classes of chemicals.	Increase safety and reduce disposal costs.

Name of school: _____

Principal signature: _____ **Date:** _____

Science teacher signature: _____ **Date:** _____

District representative signature: _____ **Date:** _____

Thurston County Hazardous Waste Program (360) 754-4111

Science Teacher Copy

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Appendix I – Certificate of Achievement

Certificate of Environmental Achievement

Thurston County jurisdictions thank and recognize

for its contribution to the community by protecting the environment
in accordance with the
Thurston County Nonpoint Source Pollution Ordinance

Board of Health

_____

_____

_____

Date: _____

BUSINESS POLLUTION PREVENTION

BUCODA • LACEY • OLYMPIA • RAINIER • TENINO • THURSTON COUNTY • TUMWATER • YELM

printed on recycled paper

Appendix J – Volumes of Wastes Commonly Disposed

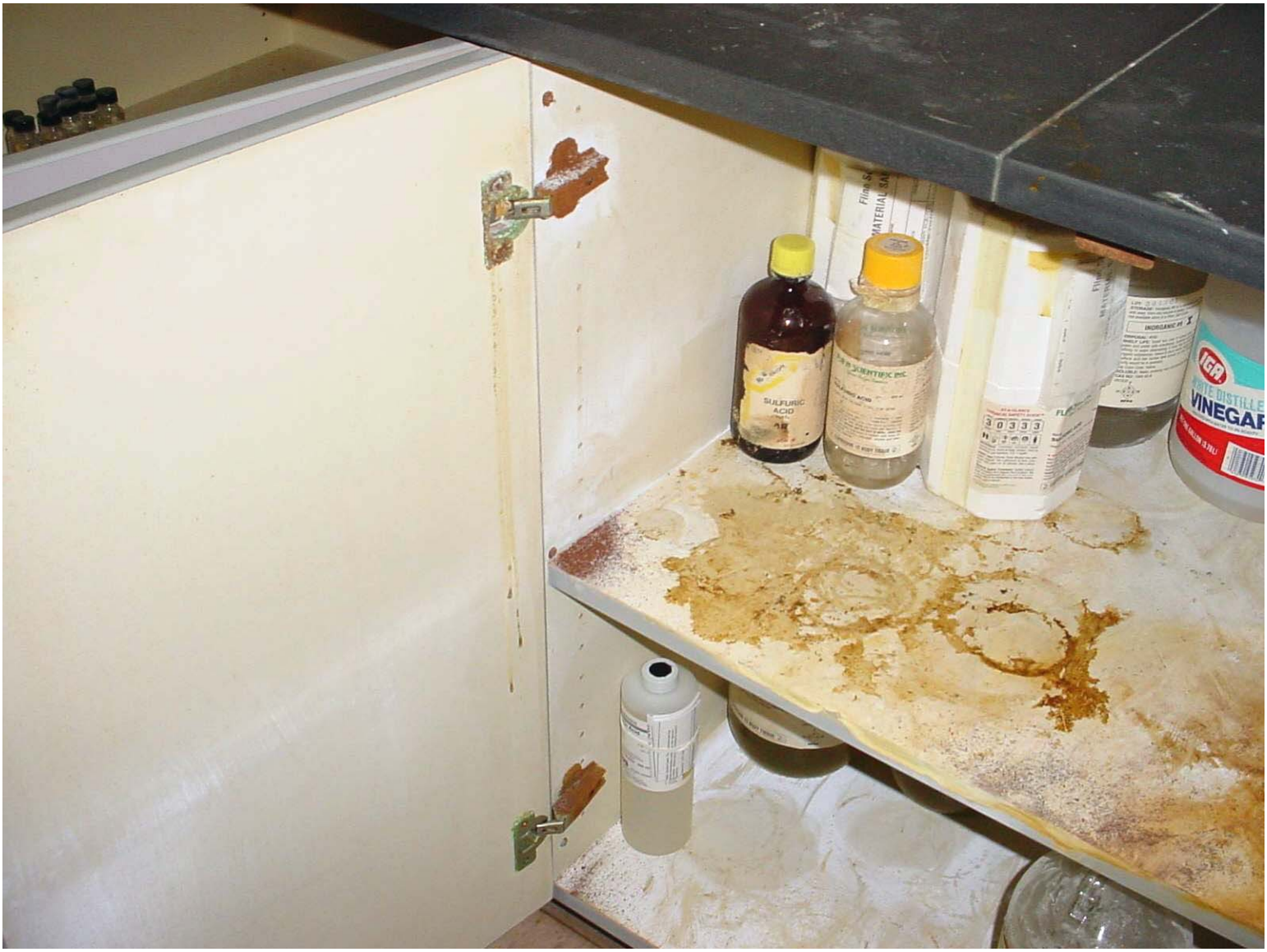
School Name	District Name	Total	Flammable	Corrosive	Oxidizer	Water RX	Poison	Flam Solid	Organic P	Explosive	Reactives	Radioactive	Mercury
Komachin Middle School	N. Thurston	0	0	0	0	0	0	0	0	0	0	0	0
Nisqually Middle School	N. Thurston	47	0	15.3	24.8	1.2	5.6	0	0	0	0	0	0.1
Chinook Middle School	N. Thurston	77.7	16.6	14.8	34.4	0.4	11.4	0	0	0	0	0	0.1
South Sound High School	N. Thurston	794.4	719	17.8	0	0	57.6	0	0	0	0	0	0
North Thurston High School	N. Thurston	119	12	40	48.6	3.2	13.2	0	0	0	2	0	0
River Ridge High School	N. Thurston	390.8	0	209.8	0	0	181	0	0	0	0	0	0
Timberline High School	N. Thurston	254	6.6	160.2	49.8	0	21.6	0	0	2	5	0	8.8
Capital High School	Olympia	179.1	40	38.6	0	0	65.7	0	0	0	2	15	17.8
Olympia High School	Olympia	360.2	273	3.2	13.6	0	67.4	0	0	1	2	0	0
Jefferson Middle School	Olympia	114	42.8	8.8	0.4	0.2	61.8	0	0	0	0	0	0
Marshall Middle School	Olympia	2.8	0	0	1.8	0	1	0	0	0	0	0	0
Reeves Middle School	Olympia	27.4	21.8	5.4	0.2	0	0	0	0	0	0	0	0
Washington Middle School	Olympia	0	0	0	0	0	0	0	0	0	0	0	0
Tumwater Middle School	Tumwater	29.6	0	1.4	0.2	2	26	0	0	0	0	0	0
Bush Middle School	Tumwater	6.4	0.6	0.4	4.4	0	1	0	0	0	0	0	0
Black Hills High School	Tumwater	4	0	0	1.6	0	1.2	1.2	0	0	0	0	0
Tumwater High School	Tumwater	26.8	1	2.2	0	3.4	12.2	1.8	0	0	0	0	6.2
Holy Family School	Holy Family	0	0	0	0	0	0	0	0	0	0	0	0
Yelm Middle School	Yelm	24	0	0	0	0	24	0	0	0	0	0	0
Yelm High School	Yelm	0	0	0	0	0	0	0	0	0	0	0	0
Tenino High School	Tenino	100.9	36.4	6.2	14.4	2.6	34.4	0	5.8	0	1	0	0.1
Rochester High School	Rochester	107.75	0.5	11.4	22	0	65.45	6.4	0	1	1	0	0
Rainier High School	Rainier	635.5	611.5	5.2	2.8	0.8	15.2	0	0	0	0	0	0
St. Michael School	St. Michael	0	0	0	0	0	0	0	0	0	0	0	0
Northwest Christian High School	NW Christian	0	0	0	0	0	0	0	0	0	0	0	0
Griffin		609.2	552.8	20.8	3.8	0	29.4	0	0	0	0	0	2.4
	TOTALS:	**3910.5**	2334.6	561.5	222.8	13.8	695.15	9.4	5.8	4	13	15	35.5

Appendix K – Photos; the Good, the Bad, and the Ugly

The Good: Example of proper storage cabinets and labeling.

The Good: Appropriate storage cabinets with earthquake latches.

The Good: Cabinet containing properly stored chemicals and earthquake latch protection.

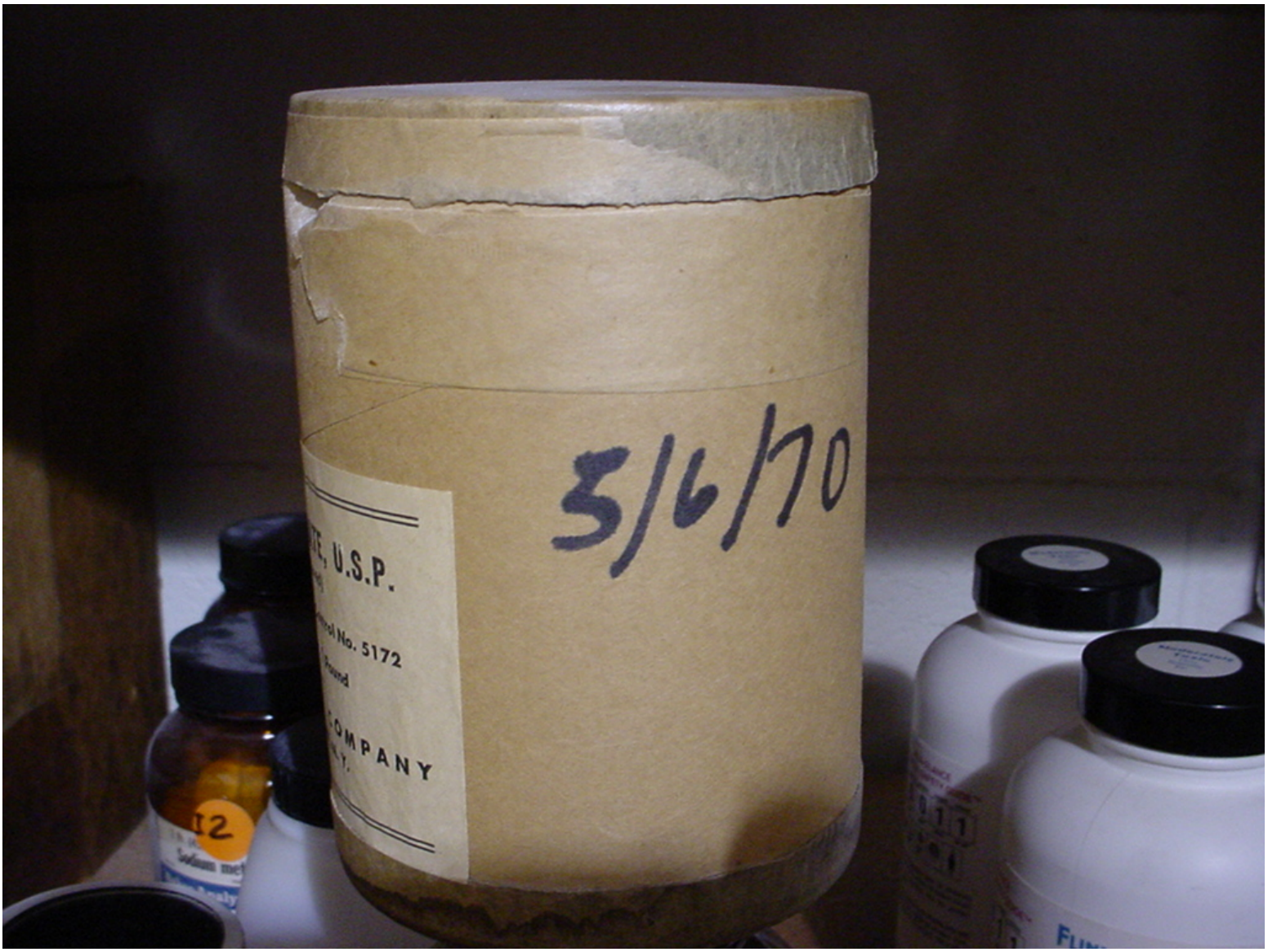


The Bad: Corroded hinges caused by acid vapors.

The Ugly: A corroded gas pipe caused by improper gas storage.

The Bad: An example of higher-risk chemicals that were removed from local schools.

The Ugly: This chemical was safe to handle when originally purchased. After sitting on the shelf for years, it has degraded to the point where it has become shock-sensitive and potentially explosive. Note the address on the label. There is no zip code, indicating the chemical probably was purchased in the early 1960's before zip codes were used. Neutralization was required prior to disposal.

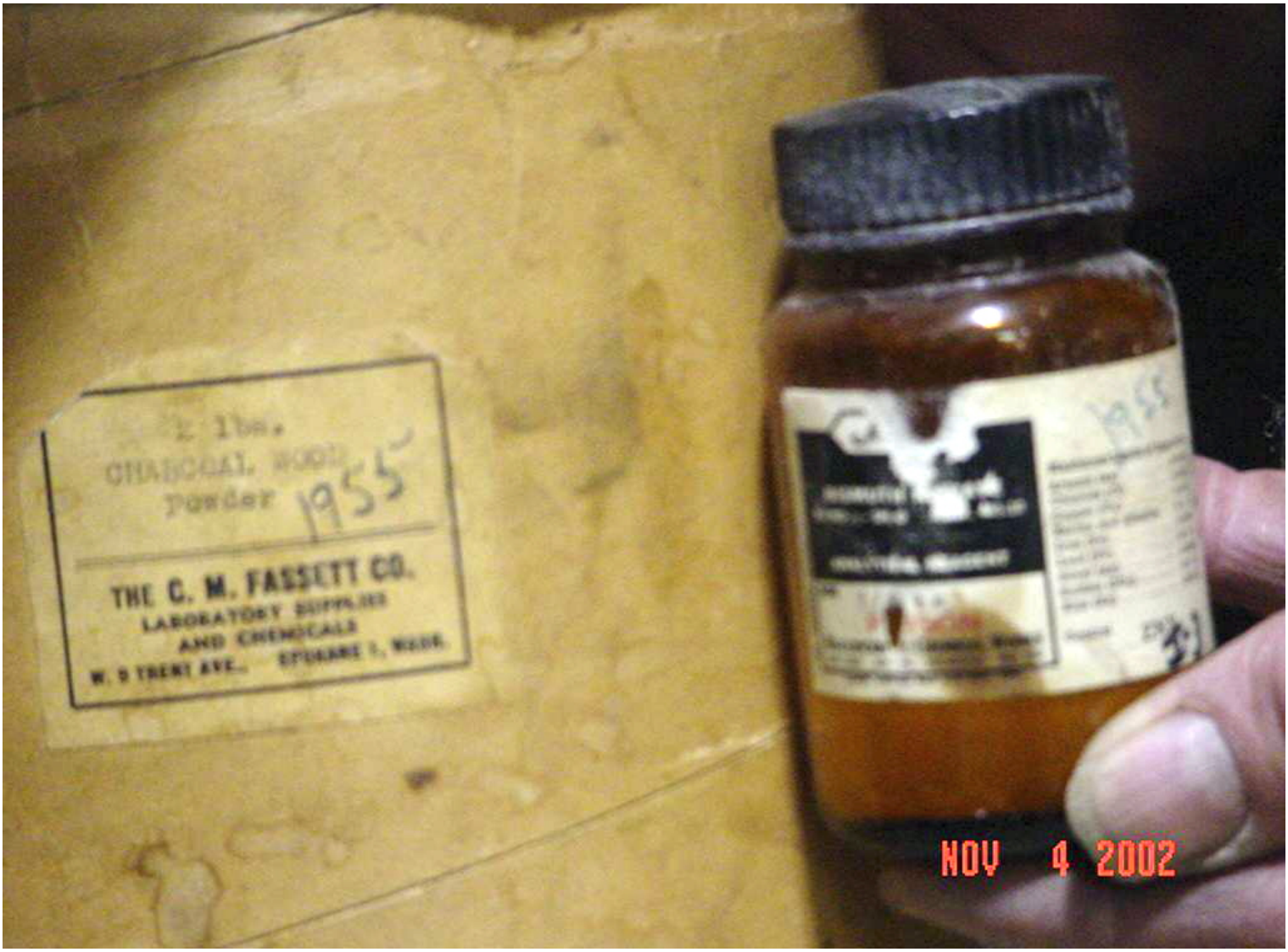


The Bad: Decades of unused chemicals.

The Ugly: Crystallized cap resulting from years of storage.

The Ugly: Crystal formation caused by improper storage.

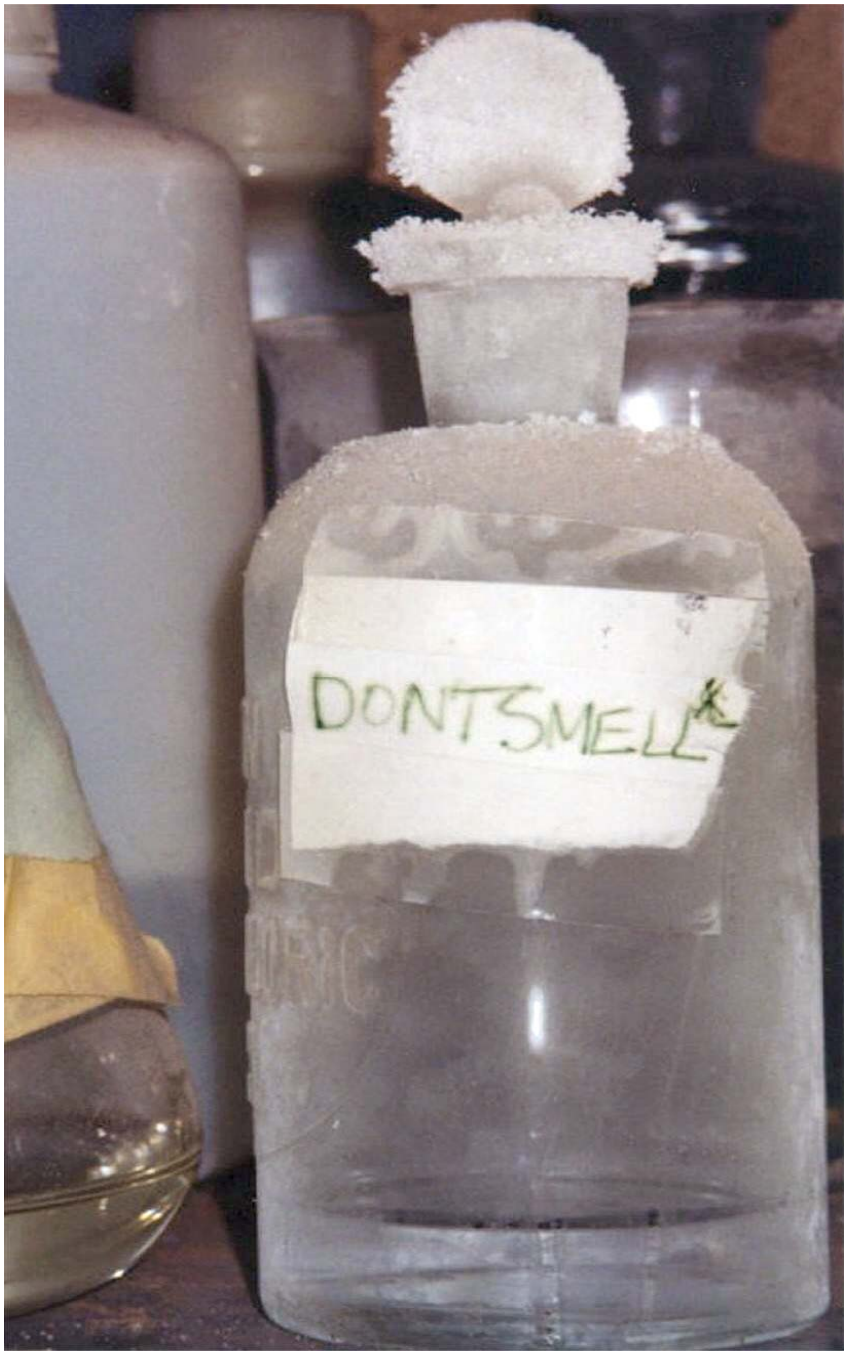
The Ugly: Corroded pipes resulting from a lack of corrosion-resistant storage cabinets.



The Ugly: Chemicals purchased during the "Eisenhower Era."

The Ugly: A collection of chemicals dating back to the early 1900's.

The Really Ugly: Dangerously degraded Sodium metal. This Sodium has lived for years in this peanut butter jar. Neutralization was required prior to disposal.



The Really Ugly: Improper chemical labeling.

The Really Ugly: Some chemicals can degrade their own containers. This is 30% Hydrogen Peroxide that has been kept in the inventory far too long.