Preliminary Significant Analysis

Chapter 246-366 WAC
Primary and Secondary Schools
and
Chapter 246-366A WAC
Environmental Health and Safety Standards for Primary and Secondary Schools

June 2009

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Environmental Health and Safety Standards for Primary and Secondary Schools

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Executive Summary

Approximately 1 million children attend schools in Washington State. The State Board of Health (the board) has authority to establish rules for environmental health and safety in all schools and has done so since the 1960s. The current framework in chapter 246-366 WAC, Primary and Secondary Schools, has been in place since 1971 when the last comprehensive revisions to the rules were made. These rules apply to 295 public school districts with approximately 2,300 school facilities as well as approximately 450 private schools. They are administered by schools and local health jurisdictions.

In 2003, the board asked the Department of Health (the department) to begin a rulemaking process in response to growing concerns that the rules were generally outdated and no longer adequate to address indoor air quality, drinking water, and safety in areas such as laboratories and playgrounds. The board and department have spent four years working with stakeholders representing parents, teachers, school districts and local health (See Appendix A.) This proposed chapter revision would repeal the current chapter 246-366 WAC and replace it with new chapter 246-366A WAC.

Children are more vulnerable to hazards in the environment than adults. Children spend approximately 1,300 hours a year in school which is why it is critical that schools are designed and maintained to protect children. The board has been careful not to duplicate building codes or rules of other agencies. This proposal adds requirements only for those areas where building codes and other rules do not adequately address the heath and safety needs of children.

The board proposal includes:

- **Water quality testing.** From December 2004 until June 2005, the Office of the Superintendent of Public Instruction (OSPI) and the department jointly implemented a grant program to partially reimburse Washington elementary schools for the cost of testing for lead in their drinking water. A total of 7,728 samples were submitted by 455 different schools. Of the 7,728 samples collected, 559 or 7.2 percent were at or above 20 parts per billion. In sampling by Seattle schools, copper levels were found to exceed the action level of 1.3 milligrams per liter 1 percent of the time. The proposal requires sampling drinking water fixtures for lead and copper, and when excessive levels are found, schools must address the problems**. The department estimates 30 percent of schools may have one or more drinking water fixtures that exceed 20 ppb of lead.**[1]

[1] Washington State Department of Health data from 2004-2005 initiative to sample drinking water in schools

- **Indoor air quality.** According to the "Burden of Asthma in Washington State," there are 120,000 children with asthma in Washington. Poor indoor air quality means higher levels of allergens and asthma triggers leading to increased respiratory symptoms as well as lost school days. The proposal includes several measures to help improve indoor air quality: (1) A new section on moisture and mold prevention; (2) Upgrading carpets, if used, to tightly woven, water impervious backed carpet that is easily cleanable and helps prevent mold; (3) Revised heating and ventilating standards. **Total asthma related costs for Washington school children: $252,960,000 per year.**

- **Safety on playgrounds, laboratories, and shops.** National data indicate an estimated 2.2 million children ages 14 or younger sustain school-related injuries each year with 200,000 emergency room visits for playground injuries. Further, laboratories and shops pose a risk to older children. Information from Utah indicates that approximately 7 percent of school injuries occur in shops. The proposal includes new sections to require that playgrounds, laboratories, and shops are constructed and maintained to minimize these risks. **Medical spending due to school injuries in Washington State: $43,000,000 per year.**

- **Annual inspections.** The current rule requires periodic inspections. The proposal increases this requirement to annual inspections to identify and correct health and safety issues.

The rule was reorganized to make a clear distinction between construction requirements, required for new and remodeled facilities, and operation requirements, required for all schools. The costs for construction requirements are shown as an increase in the per square foot construction costs. The operation and maintenance costs are shown as a per student increase.

Construction costs for the new requirements:

School Type	Size of Representative School (sq/ft)	Total Additional Cost	Additional Cost per Square Foot
Elementary	65,000	$317,850	$4.89
Middle/Junior	95,000	$519,650	$5.47
Senior High	225,000	$960,750	$4.27

The following table identifies operation and maintenance start-up and ongoing costs on a per school and per student basis. Start-up costs reflect the one-time costs for water quality sampling, ventilation system retrofit, and policy development; although actual implementation dates for these requirements will vary depending on school type. Ongoing costs include those related to annual inspections, playground operation and maintenance, laboratory and shop operation and maintenance, and heating and ventilation operation and maintenance.

Operation & maintenance costs for the new requirements:

School Type	Start-up Cost per School	Start-up Cost per Student	Annual Ongoing Costs per School	Annual Ongoing Costs per Student
Elementary	$13,400	$27.40	$9,042	$18.49
Middle/Junior High	$11,812	$17.17	$7,239	$10.52

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Senior High	$14,838	$10.29	$9,868	$6.84

Conclusion

The following analysis demonstrates that the qualitative and quantitative benefits of improving water quality; indoor air quality; playground, laboratory, and shop safety; and increasing the frequency of inspections to ensure compliance with these rules will help provide a healthier and safer environment for children in Washington State. These improvements translate into measurable benefits attributed to lower societal costs of illness and injury. Based on this analysis, the board and the department conclude that the benefits of the requirements proposed in chapter 246-366A WAC outweigh the costs.

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Introduction

Approximately 1 million children attend schools in Washington State. The State Board of Health (the board) is required to establish rules for environmental health and safety in all schools and has done so since the 1960s. The current framework in chapter 246-366 WAC, Primary and Secondary Schools, has been in place since 1971. These rules apply to 295 public school districts with approximately 2300 school facilities as well as approximately 450 private schools. The rules are administered by local health jurisdictions.

In 2003, the board asked the Department of Health (the department) to begin a rulemaking process in response to growing concerns that the rules were generally outdated and no longer adequate to address indoor air quality, drinking water, and safety in areas such as laboratories and playgrounds. The board and the department have spent four years working with stakeholders representing parents, teachers, school districts and local health. This proposed chapter revision would repeal the current chapter 246-366 WAC and replace it with the new chapter 246-366A WAC. (See Appendix A for a detailed description of the rulemaking process and list of stakeholders.)

As required by RCW 34.05.328, this "significant analysis" examines the probable benefits and costs, both quantitative and qualitative, to determine that the benefits of the proposed rules outweigh the costs.

Brief Description of the Rule

The current rule, chapter 246-366 WAC, establishes minimum environmental health and safety standards for schools in Washington State. The specific objectives of the proposed revisions are to protect students and users of school facilities from environmental hazards by:

- Delineating responsibilities of the school boards and officials, the local board of health and health officer, and the state department;
- Improving indoor air quality;
- Improving mold and moisture prevention and remediation
- Improving water quality;
- Improving playground safety; and
- Improving safety in laboratories and shops.

During the rulemaking process, concerns were expressed that the current chapter was outdated and vague in some areas. One identified problem was construction requirements mixed in with operation and maintenance requirements. As a result, this proposal will repeal the current chapter 246-366 WAC and replace it with chapter 246-366A WAC. The new chapter has been reorganized and rewritten to clarify those requirements that are construction related and those that are a part of ongoing operation and maintenance of facilities. Many parts of the current chapter have been reorganized and rewritten for clarity, but have not significantly changed. (Please see Appendix B for a cross-walk of the current rule compared to the proposed rule.)

Necessity of Significant Analysis

Certain proposed requirements in the following sections of chapter 246-366A WAC require significant analysis:

WAC 246-366A-005 Applicability
WAC 246-366A-020 Responsibilities – General

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WAC 246-366A-030 Site assessment, review, and approval
WAC 246-366A-040 Construction project review
WAC 246-366A-060 General construction requirements
WAC 246-366A-065 General operation and maintenance requirements
WAC 246-366A-070 Moisture control, mold prevention, and remediation
WAC 246-366A-080 Safety – Animals in school facilities
WAC 246-366A-090 Heating and ventilation – Construction requirements
WAC 246-366A-095 Heating and ventilation – Operation and maintenance requirements
WAC 246-366A-125 Restrooms and showers – Operation and maintenance requirements
WAC 246-366A-130 Water quality monitoring – Lead
WAC 246-366A-135 Water quality monitoring – Copper
WAC 246-366A-140 Water quality monitoring – Other drinking water contaminants
WAC 246-366A-150 Playgrounds – Construction and installation requirements
WAC 246-366A-155 Playgrounds – Operation and maintenance requirements
WAC 246-366A-160 Laboratories and shops – Construction requirements
WAC 246-366A-165 Laboratories and shops – Operation and maintenance requirements
WAC 246-366A-190 Complaints

However, many proposed changes are not substantive and are intended to provide clarity, eliminate redundancy, or are procedural. Many sections of the existing rules are being reordered to improve readability. Other changes are consistent with other Washington State rules and statutes. For the sections of the proposed rule listed below, no significant analysis is required:

WAC 246-366A-001 Introduction and purpose
WAC 246-366A-015 Guidance for rule implementation and compliance
WAC 246-366A-050 Preoccupancy inspection of construction projects
WAC 246-366A-100 Noise control – Construction requirements
WAC 246-366A-105 Noise control – Operation and maintenance requirements
WAC 246-366A-110 Lighting – Construction requirements
WAC 246-366A-115 Lighting – Operation and maintenance requirements
WAC 246-366A-120 Restrooms and showers – Construction requirements
WAC 246-366A-170 Variances
WAC 246-366A-175 Temporary emergency waivers for disaster situations
WAC 246-366A-180 Appeals

The proposal also adds a number of new definitions to WAC 246-366A-010, Definitions. To the extent they are significant, they are included in the analyses of the section in which they are used.

Statutory Goals and Objectives

The statute that provides the basis for the general goals and specific objectives of the proposed rules is RCW 43.20.050(2) which states: "In order to protect public health, the board shall:

(c) Adopt rules controlling public health related to environmental conditions including but not limited to heating, lighting, ventilation, sanitary facilities, cleanliness and space in all types of public facilities including but not limited to food service establishments, schools, institutions, recreational facilities and transient accommodations and in places of work…"

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The general goal of the RCW as it pertains to chapter 246-366A WAC is to protect public health in Washington State by addressing environmental conditions that pose a health or safety concern in school settings. This is particularly important as children are more susceptible to environmental hazards than adults due to their smaller size, rapid growth and development, and lack of awareness of potential hazards that comes with maturity. Washington State has a long history of regulating environmental health and safety conditions in schools. The current chapter 246-366 WAC is largely based on a board rule adopted March 11, 1960. Protecting school children from illnesses, injuries, and hazardous exposures is the responsibility of the adults that care for them. Since education is compulsory in Washington State, this responsibility lies primarily with the state.

Necessity of Rulemaking

The rule is needed to achieve these goals and objectives because they are not addressed in other state statutes or rules. The department and the board have been very careful not to duplicate the rules of other agencies with this proposal, but rather have identified areas where other codes such as, building codes, plumbing codes or Department of Labor and Industries' (L&I) rules governing workplaces, do not adequately protect children from environmental hazards.

Alternatives to Rulemaking

One alternative to rulemaking would be to place these standards in guidance. For many items considered by the School Rule Development Committee, the department and the board, guidance was determined to be appropriate. The standards contained in this proposal are considered to be minimum standards necessary for health and safety in school facilities. No alternative to placing them in rule would ensure they are implemented consistently across the state.

Consequences of Not Adopting the Rule

These proposed rules establish minimum standards to protect children's health and safety in schools. The consequences of not adopting these proposed rules would be to rely on outdated rules that do not reflect current best practice and standards to protect the health and safety of children while in school.

Probable Benefits and Costs of the Rule

Probable Benefits

Public health agencies have long faced a challenge in describing the benefits of their regulations because public health rules generally produce an indirect benefit by preventing adverse health outcomes. As such, for this analysis, the department has gathered information about various health risks facing children in schools in an effort to quantify how large the risk may be. Where possible, the costs associated with the current levels of illnesses and injuries are presented along with assumptions about what level of prevention may be achieved through the proposed regulation.

The proposal contains provisions interspersed throughout the chapter intended to reduce the risks from the major areas of concern in schools (indoor air quality, water quality, and safety). For example, in order to improve indoor air quality, the proposal establishes a new

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section on moisture and mold prevention and it makes changes to heating and ventilating standards. To avoid restating the benefits repeatedly throughout the analysis, the major benefit areas are described here in the overall benefit section.

The proposal also establishes new provisions for administrative actions such as inspections, record retention and availability, and open communication. These types of requirements also contribute to the overall benefits by providing a framework to ensure environmental health and safety issues are addressed.

In addition to these overall benefits described here, the specific benefits of individual sections are considered in the section-by-section analysis beginning on page 20.

Improved Indoor Air quality

Several sections of the proposed chapter are intended to improve indoor air quality. These sections include:

- 246-366A-020 – Responsibilities – General
- 246-366A-030 – Site assessment, review and approval
- 246-366A-040 – Construction project review
- 246-366A-050 – Preoccupancy inspection of construction projects
- 246-366A-060(5) and (6) – General Construction Requirements
- 246-366A-065(5) and (11) – General operation and maintenance requirements
- 246-366A-070 – Moisture control, mold prevention and remediation
- 246-366A-080 – Safety- Animals in school facilities
- 246-366A-090 – Heating and ventilation – Construction requirements
- 246-366A-095 – Heating and ventilation - Operation and maintenance requirements
- 246-366A-160(6), (7) and (8) – Laboratories and shops – Construction requirements
- 246-366A-165(2), (4), (5), and (8) – Laboratories and shops – Operation and maintenance requirements

The benefits of improved indoor air quality are a reduction in respiratory illness and infections, allergies, and asthma symptoms. The rules' benefits in terms of potential costs avoided for asthma are highlighted here.

Prevalence and Costs of Asthma

According to the United States Environmental Protection Agency (EPA), indoor air pollutants can "cause or contribute to health problems, including asthma, respiratory tract infection and disease, allergic reactions, headaches, nasal congestion, eye and skin irritations, coughing, sneezing, fatigue, dizziness, and nausea." Further EPA studies of human exposure to air pollutants indicate that indoor levels of pollutants are higher than outdoor levels. This is of particular concern considering students immune systems are still developing and students spend most of their school time indoors. Children face greater environmental health risks than adults because they breathe a relatively greater volume of air for their size, compared to adults.[2]

Poor indoor air quality plays a key role in the development and/or exacerbation of asthma. Asthma is a chronic inflammation of the airways with reversible episodes of obstruction, caused by an increased reaction of the airways to various stimuli. Asthma breathing problems usually happen in "episodes" or attacks, but the inflammation underlying asthma is continuous. According to the American Lung Associations' *Asthma*

[2] Mendell and Heath, *Do indoor pollutants and thermal conditions in schools influence student performance? A critical review of the literature*, Indoor Air, Vol. 15, p. 27, 2004.

and Children Fact Sheet, 2007, asthma is a widespread chronic disease among school children affecting an estimated 6.8 million children under 18 years of which 4.1 million suffered from an asthma attack or episode.

Uncontrolled, untreated or under-treated asthma may reduce quality of life and prevent a child from leading a fully active life and can be potentially life-threatening. Asthma ranks among the top 10 most prevalent health conditions causing limitation of activity. Asthma also can affect academic performance because of missed school days as well as missed sleep. Asthma is the leading cause of school absenteeism due to chronic illness. American school children missed more than 14 million school days in 2002 and 12 million school days in 2003 because of asthma exacerbated by poor indoor air quality. Many people who develop asthma also have allergies, particularly those whose asthma begins in childhood. Asthma has also been associated with depression and suicidal thoughts among young people.[3]

Asthma is the third leading cause of hospitalization among children under the age of 15. Approximately 32.6 percent of all asthma hospital discharges in 2005 were in those under 15; however, only 27.8 percent of the U.S. population was less than 15 years old.[4] In 2005, there were approximately 679,000 emergency room visits due to asthma in this age group. Asthma can be a life-threatening disease if not properly managed. In 2004, 3,816 deaths were attributed to asthma out of which 141 were children less than 15 years of age.[4] Death rates due to asthma are approximately three per million per year.

The annual direct health care cost of asthma is approximately $14.7 billion. Indirect costs (e.g. lost productivity) add another $5 billion, for a total of $19.7 billion dollars. Prescription drugs represented the largest single direct cost, at $6.2 billion.[4] According to a University of Washington analysis, it costs nearly three times more to provide health care for a child with asthma than a child without asthma.[5]

The findings of the 2004 study, *The Burden of Asthma in Washington State*, which investigates the overall impact of asthma in Washington State, suggest that an estimated 400,000 Washington adults and 120,000 youth have asthma. Between 7 percent and 10 percent of middle/junior high and senior high school -aged children have asthma.[6]

Average yearly health care costs for a child in 1987 were $468 without asthma and $1129 with asthma, for a difference of $661.[7] From 1987 to 2007, the Consumer Price Index shows a 187 percent price increase. The yearly health care costs for a child with asthma are $2,108 in 2007 dollars. These costs are not borne by the schools, but by the students and their families.

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[3] Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, *Healthy Youth! Health Topics: Asthma*, December 7, 2007
[4] American Lung Association, *Asthma & Children Fact Sheet*, 2007 http://www.lungusa.org
[5] Lozano, Paul; Sullivan, Sean; Smith, David; and Weiss, Kevin; Department of Pediatrics at the University of Washington, Seattle, *The Economic Burden of Asthma in U.S. Children: Estimates from the National Medical Expenditure Survey*, Journal of Allergy, Clinical Immunology 104: 957-63, November 1999.
[6] Dilley, J.; Pizacani, B.; Macdonald, S.; and Bardin, J.; *The Burden of Asthma in Washington State;* Olympia, WA; Washington State Department of Health, 2005
[7] Wang LY, Zhong Y, Wheeler L.; Centers for Disease Control and Prevention; *Direct and indirect costs of asthma in school-age children;* Preventing Chronic Disease, Vol. 2, No. 1; January 2005

The annual cost to care for Washington school children with asthma is $252,296,000 ($2,108 X 120,000). Various studies on the expected impact of measures to improve indoor air quality suggest a reduction in symptoms ranging from 20-80 percent.[8] The department cannot be certain of the reduction in costs associated with the rule changes, though at least a modest reduction can be expected. In keeping with this assumption, the department estimates a decrease in asthma-related illness from 1 to 10 percent that could result in an avoided cost of $2,529,600 to $25,296,000 in 2007 dollars.

Asthma may be the area where school indoor air quality has the greatest impact, and it is the condition for which it is easiest to estimate cost impacts, but it is not the only area where facility improvements that increase indoor air quality can result in better health and cost savings. Various studies have also shown 20-80 percent improvements in symptoms related to colds, flu, and sick building syndrome.[8] Schools in Washington State are occasionally closed down or have to go through major repairs and renovations because of indoor air problems. In 2000, for example, Artondale Elementary in Gig Harbor was closed for two months for a thorough cleaning because of indoor air problems at a cost to the Peninsula School District of $400,000.

Increased Safety

The sections of the proposal that are intended to increase safety by reducing injuries include:

246-36A-060(4) and (7) – General construction requirements
246-366A-065 (1) and (2) – General operation and maintenance requirements
246-366A-080 – Safety –Animals in schools facilities
246-366A-150 – Playgrounds – Construction and installation requirements
246-366A-155 – Playgrounds – Operation and maintenance requirements
246-366A-160 – Laboratories and shops – Construction requirements
246-366A-165 – Laboratories and shops – Operation and maintenance requirements

The benefits of increased safety requirements are a reduction in injuries related to potentially hazardous conditions. The rules' benefits in terms of potential costs avoided for injuries associated with playgrounds, laboratories, and shops are highlighted here.

Prevalence and Costs of Injuries – Playgrounds

Play is a vital component of healthy child development and playgrounds provide an opportunity for children to develop motor, cognitive, perceptual, and social skills. Unfortunately, playgrounds are often the sites of unintentional injuries.

Public attention about school safety often focuses on school violence. However, school-age children are more likely to sustain an unintentional injury than to be the victim of an intentional injury while at school. According to an Oregon study, playground equipment-related injury is the most common school-related injury among children under 14 years of age.[9]

The leading cause of playground equipment-related fatalities is strangulation.[10] Strangulation accounts for nearly half of all playground equipment-related deaths. Nonfatal playground injuries are most often due to falls.[9] The majority of nonfatal

[8] Kats, Gregory; Braman, Jon; *Greening America's Schools: Costs and Benefits;* October 2006 www.cap-e.com
[9] Oregon State Department of Human Services; *Oregon Safe Kids, Schools and Playgrounds*; September 22, 2007
[10] National SAFE KIDS Campaign (NSKC); *Playground Injury Fact Sheet*; Washington, DC; NSKC, 2004

injuries related to playground equipment take place on public playgrounds, including schools.[11] In a 2000 survey, U.S. playgrounds received an overall grade of C when rated on the presence of physical hazards and behavioral elements, including supervision and age-appropriate design.[12]

An estimated 2.2 million children ages 14 and younger sustain school-related injuries each year in the United States.[13] Emergency departments treat more than 200,000 children ages 14 and younger for playground-related injuries.[11] Children ages 5 to 9 have higher rates of emergency department visits for playground injuries than any other age group.[13] Most of these injuries occur at school.[14]

Falls are the most common mode of playground injury and account for approximately 80 percent of all playground equipment-related injuries. [15] Falls also account for 90 percent of the most severe playground equipment-related injuries (typically head injuries and fractures) and 24 percent of playground-related fatalities.[12] Head injuries are involved in 75 percent of all fall-related deaths associated with playground equipment.[15] Falls are also the most frequent causes of school-related injuries requiring hospitalization.[16]

The cost of these school playground-related injuries is high. The total annual cost of these injuries (including medical spending, lost quality of life, and future earnings) exceeds $74 billion. Medical spending alone is estimated to be $2 billion each year.[12] Using a ratio of the 2008 projected population of Washington State children ages 5 to 14 years (863,837, OFM 2006) and the US population (39 million, US Census 2000), the $74 and $2 billion national annual estimated costs for school-related injuries translates to $1.6 billion and $43 million for Washington State.

The department assumes there will be a modest improvement in playground safety as a result of the proposed requirements related to playground equipment and fall protection that will provide a benefit to Washington families in terms of financial and societal costs avoided.

Prevalence and Costs of Injuries – Laboratories and Shops

The Utah Student Injury Report (Knight et al. 2000) found that "during the five-year period from 1992 to 1996, 7.1 percent of school injuries in Utah (1,008 of 14,133) occurred in shop class. Equipment use accounted for 88.4 percent of these injuries… Missing covers for belts of belt-driven equipment and missing blade guards are common hazards in vocational shops. Appropriate safeguards include training, close supervision, selection of safety equipment including covers and guards, and meticulous maintenance of equipment… Projectiles, falling objects, and heated objects are common hazards in physical science classes, although these dangers can also be present in other specialized classrooms. Physics assignments that may result in flying objects or debris require the use of impact-resistant (ANSI Z87.1) safety glasses by all occupants of the room. Earth

[11] Tinsworth D, McDonald J. Special Study: *Injuries and Deaths Associated with Children's Playground Equipment;* Washington DC; U.S. Consumer Product Safety Commission; 2001.
[12] Oregon State Department of Human Services Oregon; *Oregon Safe Kids, Schools and Playgrounds;* September 22, 2007
[13] Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Division of Unintentional Injury Prevention; *Playground Injuries: Fact Sheet;* July 05, 2007
[14] Phelan KJ, Khoury J, Kalkwarf HJ, Lanphear BP; *Trends and patterns of playground injuries in the United States: Children and adolescents*; Ambulatory Pediatrics; 2001; 1(4):227–33
[15] National SAFE KIDS Campaign (NSKC); *Playground Injury Fact Sheet*; Washington, DC; NSKC, 2004
[16] National SAFE KIDS Campaign (NSKC); *School Injury Fact Sheet;* Washington, DC: NSKC, 2004.

science activities that involve chipping, breaking rock, or grinding also require the use of safety glasses." [17]

"Life threatening injuries can happen in the laboratory. For that reason, students need to be informed of the correct way to act…"[18] "Improper chemical management poses health and safety risks to students and school employees. Health, learning, and behavior risks to students are of particular concern, as children are more vulnerable than adults to chemical exposures because their bodily systems are still developing; they eat more, drink more, and breathe more in proportion to their body size; and their behavior can expose them more to chemicals than adults…It only takes one chemical incident, such as a spill, explosion, or chemical exposure, to *break the trust with the community…*Despite their useful purposes, chemicals can be dangerous to students and staff when managed improperly. Some chemicals that are persistent in the environment and bioaccumulate through the food chain can make exposure during childhood and adolescence especially dangerous."[19]

New and updated requirements for emergency eye washes and showers, gas and electrical shut-offs for stationary equipment, and source collection and mechanical exhaust ventilation for air contaminants in laboratories and shops will provide an increased level of protection for students against the safety and health hazards that exist in these portions of the educational facility.

The department cannot predict the lower frequency or severity of injury due to the increased levels of safety provided by the proposed requirements for laboratories and shops and so is unable to quantify the financial benefit associated with these proposed changes. The department assumes there will be a modest improvement in safety that will provide a benefit to Washington families in terms of financial and societal costs avoided.

Improved Water Quality

The sections intended to improve water quality include:

246-366A-130 – Water quality monitoring – lead
246-366A-135 – Water quality monitoring – copper
246-366A-140 – Water quality monitoring – other drinking water contaminants

The benefits of improved water quality are a reduction in neurotoxicity in children and associated adverse health effects. The rules' benefits in terms of potential costs avoided for impaired physical and mental development related to lead in drinking water are highlighted here.

Prevalence and Costs of Exposure to Lead

From December 2004 until June 2005, the Office of the Superintendent of Public Instruction (OSPI) and the department jointly implemented a grant program to partially reimburse Washington elementary schools for the cost of testing for lead in their drinking water. A total of 7,728 samples were submitted by 455 different schools. Of

[17] Ed. Howard Frumkin, MD, DrPH; Robert J. Geller, MD; I. Leslie Rubin, MD; with Janice Nodvin; *Safe and Healthy School Environments;* Oxford University Press; 2006, p 108-109
[18] Consumer Product Safety Commission; Centers for Disease Control and Prevention; Department of Health and Human Services, National Institute for Occupational Safety and Health; *School Chemistry Laboratory Safety Guide;* October 2007; DHHS Publication No. 2007–107; p 6
[19] Environmental Protection Agency; *Chemical Management Resource Guide for School Administrators;* December 2006, EPA 747-R-06-002; p 3 and 24

the 7,728 samples collected, 559 or 7.2 percent were at or above 20 parts per billion. The EPA strongly recommends that water outlets in schools that provide water for drinking or cooking meet a standard of 20 parts per billion or less of lead. Testing water in schools is important because children spend up to 1,300 hours per year in these facilities and consume water while there.

Exposure to lead can cause adverse health effects and impair physical and mental development. It can cause hearing and learning disabilities, behavioral problems such as hyperactivity and short attention span, and, at very high levels, seizures, coma, and even death. Exposure to lead is a particularly significant health concern for young children whose growing bodies tend to absorb more lead than the average adult. Repeated exposures to small doses of lead can increase the likelihood of adverse health effects and permanent reduction in mental capacity.

While lead in paint in older housing is the most common source of lead exposure, drinking water can also serve as a source of exposure to lead. Although lead concentrations leaving a water treatment plant are generally low, corrosive water can result in lead leaching from lead pipes within a distribution system or from lead solder used to connect pipes.

Groups of children with moderate lead levels in pre-school years, who were followed to adolescence, were seven times more likely to drop out of high school. Their odds of a significant reading disability were six times higher than for children exposed to lower lead levels. Children exposed to higher lead levels were also shown to have problems with attention and fine motor skills, lower class standing, increased absenteeism, and lower vocabulary and grammatical-reading scores, even after controlling for other variables.[20] Early childhood lead exposures increase the likelihood of aggressive behaviors and arrests later in life.[21]

Blood lead level (BLL) is measured in micrograms of lead per deciliter of blood (µg/dl). In 1991, the CDC set the "level of concern" at 10 micrograms per deciliter (10 µg/dl). The adverse health effects and intellectual impairment due to BLL below 10 µg/dl had been a concern before 1991, when the CDC established 10 µg/dl as a level of concern. [22] Now, not only is there overwhelming evidence of adverse health effects at 10 µg/dl, but it is increasingly apparent that the rate of decline in intellectual impairment is greater at BLLs below 10 µg/dl than above.[23]

One study by R.L. Canfield suggests that overall, every 1 µg/dl increase in blood lead results in a decrease of 0.87 IQ points. For BLLs below 10 µg/dl, a 1 µg/dl increase results in a 1.37 IQ decrease.[23] Such a fall in average IQ is consistent with several

[20] Needleman, HL; Gatsonis, C; *A Low-level Lead Exposure and the IQ of Children: A Meta-analysis of Modern Studies;* Journal of the American Medical Association; February 1990; Vol. 263, No. 05
[21] Wright, JP; Dietrich, KN; Ris, MD; Hornung, RW; Wessel, SD; et al; *Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood;* PLoS Med. 2008: 5(5): e101 DOI: 10.1371/journal.pmed.0050101
[22] Needleman , A; Bellinger, D; *The health effects of low level exposure to lead*. Anna Rev Public Health; 1991; 12:1; 11-40.
[23] Canfield, RL; Henderson, CR Jr.; Cory-Slechta, DA; Cox, C; Lusko, TA; Lanphear, BR; *Intellectual impairment in children with blood lead concentrations below 10 Ug/dL;* N Engl 3 Med 2003; 348:1517-27

meta-analyses and reviews of other lead studies.[24] [25] Several independent investigators have also concluded that BLLs below 10 µg/dl are harmful.[26] [27]

Another study indicates that ongoing exposure to lead has a strong association with IQ deficits in older children, and that not all health effects attributable to lead exposure are a result of exposure at an early age. This study demonstrates that preventing lead exposure in children aged 4 to 7 is as important as preventing exposure during the first two years of life.[28] These studies, as well as the meta-analyses, confirm that a threshold for the adverse health effects of lead exposure cannot be calculated.

While the department cannot know how much lead a child may receive as a result of drinking water in school, there is clear evidence that as many as 30 percent of schools do have fixtures that leach lead. Lead causes a number of adverse health effects and impaired mental development and provides no benefit. Reducing children's exposure to lead will help prevent the adverse health effects associated with this toxin.

Prevalence and Costs of Exposure to Copper

Children are more susceptible to the effects of excess copper than adults because they are smaller and metabolic capacity is less developed. Ingesting copper can cause nausea, abdominal pain, vomiting, and for sensitive individuals kidney disease and liver damage. Copper is a contaminant that most commonly enters drinking water through corrosion of copper plumbing within buildings.

Schools in this country have identified drinking water with excessive levels of copper in amounts that may have caused gastric symptoms in children and that put certain susceptible persons at risk of health problems. In limited school sampling in Washington 15 of 3,300 samples were above the Safe Drinking Water Act copper action level of 1.3 mg/L. The only way to know if there are excessive levels coming from pipes and fixtures is to test for it. Once corrective actions are taken the problem is not expected to reoccur. Use of copper water pipes for electrical grounding is the most frequent cause of excessive leaching of copper into drinking water.

The benefit of the proposed rule is prevention of exposure to copper by sampling water and taking corrective action when necessary.

Benefits – Conclusions

The three major problems identified by the rule review and the School Rule Development Committee included: Indoor air quality; safety for playgrounds, laboratories and shops; and drinking water quality. The benefits related to the rule changes that address these problems are:

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[24] Lanphear, BP; Homung, R; Khouryl; Yolton, K; Baáhurst, P; Bellinger, D; et. al.; *Low-level environmental lead exposure and children's intellectual function: An international pooled analysis;* Environmental Health Perspective; 2005; 113:894—9

[25] Needleman, HL; Gatsonis, C; *A Low-level Lead Exposure and the IQ of Children: A Meta-analysis of Modern Studies;* Journal of the American Medical Association; February 1990; Vol. 263, No. 05

[26] Chiodo; Jacobson, SW; Jacobson, JE; *Neurodevelopmental effects of postnatal lead exposure at very low levels*; Neurotoxicol Tentol; 2004; 26:359—71

[27] Selevan, SO; Rice, DC; Hogan, KA; Euling, SY; Pfahles-Hutchens, A; Bethel, J; *Blood lead concentration and delayed puberty in girls;* N Engl 3 Med; 2003; 348:1527—36

[28] Aimin Chen; Kim N. Dietrich; James H. Ware; Jerilynn Radcliffe; and Walter J. Rogan; *IQ and Blood Lead from 2 to 7 Years of Age: Are the Effects in Older Children the Residual of High Blood Lead Concentrations in 2-Year-Olds?*; Environmental Health Perspectives; May 2005; Vol. 113, No. 5

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Improved indoor air quality:	$25,296,000 annually;
Increased safety:	$43,000,000 annually; and
Improved water quality:	Improved physical and mental development measured in I.Q. points.

The following section-by-section analysis further demonstrates that the qualitative and quantitative benefits of the changes discussed above, as well as other proposed rule changes, will provide a healthier and safer environment for children in Washington State. These improvements translate into benefits attributed to lower societal costs of illness and injury.

Before any further consideration of benefits is provided, a discussion of the overall costs follows.

Probable Costs

This proposal presents several challenges for determining implementation costs.

- For most rule proposals the department assumes there is general compliance with the current rule. The costs associated with current rule implementation costs are the base against which proposed changes are measured. However, the department recognizes that only nine of thirty-five local health jurisdictions have a school environmental health and safety program providing active implementation of chapter 246-366 WAC. Therefore, many requirements are perceived to be entirely new by some schools and local health jurisdictions. Therefore incremental costs identified here may appear to be under reported.

- Many of the changes proposed for this rule simply add language to the rule to reflect current practices. Other proposed changes will apply in limited situations, such as notifying parents and staff if there is a serious mold problem. Thus, the impact of the proposed changes will vary from school to school based on current practice and specific circumstance. Therefore, a simple total of all new costs identified would over report the costs to any individual school.

Throughout this document we have tried to add these issues into the discussion of the cost assumptions.

School Construction Costs:

Department staff compared the existing rule requirements with those in the proposed rule to identify new construction requirements. Department staff prepared a document that identified the changed requirements and expected impacts associated with each new requirement by rule section. The department contracted with Eric Meng, Studio Meng Strazzara, to provide likely cost estimates based on the department's assumptions about the significant changes in the proposed rule. These estimates were based on three representative schools: a 65,000 square foot elementary; 95,000 square foot middle/junior high school; and 225,000 square foot senior high school. The estimates also include 12 percent contractor markup costs and 23 percent district construction overhead costs.

Construction cost estimates prepared by The Robinson Company for the Puget Sound Schools Coalition (PSSC) were also considered in preparing this analysis. There were differences between the estimates provided by The Robinson Company and those cited in this analysis due in part to differing underlying assumptions such as representative school sizes and contractor markup and district overhead rates. Even so, the information provided

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by PSSC has been helpful and greatly appreciated in developing a complete and thorough analysis of costs.

Based on these assumptions and those specifically described in the section-by-section analysis below, the department estimates an increased construction cost for each type of school as follows:

Elementary:	$317,774 per new school or $4.89 per square foot;
Middle/Junior High:	$519,388 per new school or $5.47 per square foot; and
Senior High:	$960,692 per new school or $4.27 per square foot.

(See Appendix C, Construction Costs, for further detail.)

According to *Construction Bid Summaries from 1989 - 2007* available on the OSPI web site, the average new school construction costs in 2007 for each type of school were:

Elementary:	$16,033,725 or $274.91 per square foot (58,324 square feet average);
Middle/Junior High:	$21,278,427 or $225.94 per square foot (94,177 square feet average); and
Senior High:	$26,299,133 or $249.91 per square foot (105,235 square feet average).

Comparing the assumed cost increases of the proposed rule for new schools to the average 2007 cost results in increases for each type of school as follows:

Elementary:	1.8 percent cost increase per square foot;
Middle/Junior High:	2.4 percent cost increase per square foot; and
Senior High:	1.7 percent cost increase per square foot.

School Operation and Maintenance Costs:
Department staff compared the existing rule requirements with those in the proposed rule to identify newly required operation and maintenance activities. Department staff prepared a survey tool that identified the changed requirements and expected impacts associated with each new activity by rule section. Department staff contacted staff of 15 school districts to request assistance in gathering cost estimates for the identified activities. Eight people from school districts throughout the state agreed to participate in the survey. Department staff provided the survey tool to these volunteers and followed-up with them two days later via telephone interviews. Participants provided both cost estimates and assumptions for those estimates for most activities.

The department recognizes that schools are currently doing many activities of the proposed rule on a voluntary basis. It is important to note that school district staff provided cost information for some activities in the proposed rule they currently perform voluntarily. Schools were asked to calculate the costs of these activities because they are new requirements and there will likely be a percentage of schools in the state that do not currently do these activities and so would experience added costs due to the new requirements in the proposed rule. There are also several sections where schools indicated that they were already performing the required activities, but were unable to estimate the costs of those activities.

Cost estimates varied due to several factors such as school age and condition, hourly wage levels of staff performing activities, and type and size of school (elementary, middle/junior high, or senior high). When wage and benefit information was not provided by the respondent, the department assumed an hourly rate of $45 for custodial staff, $70 per hour

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for facility managers, and a benefits rate of 35 percent. These figures are based on the highest rates of compensation provided by respondents to the survey. To calculate a single cost estimate, the department averaged the range of costs provided by respondents. It then combined the costs of individual requirements to estimate a total for operation and maintenance costs as presented in the following table.

The following table identifies operation and maintenance start-up and ongoing costs. Start-up costs reflect the one-time costs for water quality sampling, ventilation system retrofit, and policy development; although actual implementation dates for these requirements will vary depending on school type. Ongoing costs include those related to annual inspections, playground operation and maintenance, laboratory and shop operation and maintenance, and heating and ventilation operation and maintenance.

School Type	Start-up* costs total per school	Start-up costs per student	Annual Ongoing costs per school	Annual Ongoing costs per student
Elementary	$13,400	$27.40	$9,042	$18.49
Middle/Junior High	$11,812	$17.17	$7,239	$10.52
Senior High School	$14,838	$10.29	$9,868	$6.84

See Appendix D, Operation and Maintenance Costs, for further detail.

According to *School District and ESD Financial Reporting Summary for Fiscal Year 06-07*, available on the OSPI web site, the average operation and maintenance cost in 2007 for all school types was $750.35 per student.

Comparing the assumed operation and maintenance start-up cost increases of the proposed rule to the average 2007 costs results in increases for each type of school as follows:

Elementary: 3.7 percent cost increase per student;
Middle/Junior High: 2.3 percent cost increase per student; and
Senior High: 1.4 percent cost increase per student.

Comparing the assumed operation and maintenance ongoing cost increases of the proposed rule to the average 2007 costs results in increases for each type of school as follows:

Elementary: 2.5 percent cost increase per student;
Middle/Junior High: 1.4 percent cost increase per student; and
Senior High: 0.9 percent cost increase per student.

Local Health Jurisdiction Costs

The department conducted a workshop in November 2007 to provide a forum for discussion of the rule requirements and determine the related costs to local health jurisdictions. As a result, the department received estimates associated with the increased inspection and program requirements from several local health jurisdictions that currently have active school environmental health and safety programs.

Although local health jurisdictions have the authority to recover their implementation costs through fees, the department assumes not all costs will be recovered. This is especially true for those local health jurisdictions without active school programs and for all local health jurisdictions that provide technical assistance services in their ongoing efforts to maintain a collaborative working relationship with schools. The total costs reported by local health jurisdictions ranged from $10,000 to $56,000.

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Section-by-Section Analysis

The costs provided below are derived from data collected from schools, local health jurisdictions, the PSSC, and Eric Meng. For a detailed description of costs, please see Appendix C for construction related costs and Appendix D for operation and maintenance related costs.

Section 001: Introduction and Purpose

INTENT: These rules are intended to provide for the environmental health and safety of school facilities. It is not the intent of these rules to establish protection exclusively for certain subsets of people using those facilities, nor to regulate the behaviors or qualifications of users beyond what is minimally necessary for environmental health and safety.

BACKGROUND: The board is required to establish environmental health and safety rules for school facilities. RCW 43.20.050(2) states that "to protect public health, the board shall…(c) Adopt rules controlling public health related to environmental conditions including but not limited to heating, lighting, ventilation, sanitary facilities, cleanliness and space in all types of public facilities including but not limited to … schools…[29] The rules have been on the books since the 1960s and the existing framework was established in 1971. This rulemaking is part of the continuing effort to keep these rules up to current health and safety standards. These standards are intended to protect health and therefore do not attempt to include the more stringent requirements needed to achieve optimum student learning.

PUBLIC HEALTH BENEFIT: According to the School Health Policies and Programs Study 2006:

> A child typically spends about 1300 hours in a school building each year, and teachers and other staff are there even longer…. Many school buildings are in poor condition and present environmental conditions that inhibit learning and pose unnecessary, increased health risks to students and staff…. Poor indoor air quality (IAQ), diesel exhaust emitted from school buses, hazardous materials, pesticides, contaminated drinking water, and lead are environmental hazards that sometimes are found in schools and can adversely affect the health, attendance, and academic success of students, as well as the health of teachers and other staff."[30]

SIGNIFICANT CHANGES: There are no significant changes this section, and no increased cost associated with implementing the proposed rule compared to the existing rule.

Applicability—Section 005

INTENT: This section affirms that the rules apply to schools, explicitly including pre-schools that are part of a K-12 school facility. This section clarifies that the construction sections

[29] Available at http://apps.leg.wa.gov/RCW/default.aspx?cite=43.20.050
[30] Available at http://www.ashaweb.org/journal_schoolhealth.html#shpps

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apply to existing portions of facilities only when those portions are involved in a remodel, renovation, or addition.

BACKGROUND: This is a new section. In the existing rule, applicability is determined by the definition of "schools":

> *"School" - Shall mean any publicly financed or private or parochial school or facility used for the purpose of school instruction, from the kindergarten through twelfth grade. This definition does not include a private residence in which parents teach their own natural or legally adopted children.*

The proposed rule includes preschools that are part of a K-12 school. It more clearly excludes:

1) Private residences used for home-based instruction as defined by RCW 28A.225.010(4);
2) Facilities hosting educational programs where educational instruction is not a primary purpose, including, but not limited to, detention centers, jails, hospitals, mental health units, or long-term care facilities;
3) Private facilities where tutoring is the primary purpose; and
4) Public or private post-secondary education facilities providing instruction to students primarily enrolled in secondary school.

The board and the department explicitly chose not to list all laws and regulations related to the school environment, but it did choose to cross-reference its own rules. It also wanted to make it clear the new rule was not intended to negate, compromise, or duplicate other rules. Schools would not be required to retrofit in order to meet the new construction requirements. If, however, a change to an existing facility triggers a building code requirement during the overhaul of a regulated system throughout the facility, for example, adding an addition requires a retrofit of the entire school's HVAC system rather than the installation of a new system serving only the addition—then these health and safety rules would apply to those whole systems because they would become part of the construction project.

Public health rules do not require vesting; however, there is recognition that these rules could add to the price of new construction, and need to specify when a project is far enough along that it should be grandfathered. For construction projects underway on the effective date of the new rules, the environmental health and safety rules in effect when a complete building permit application is submitted will apply.

SIGNIFICANT CHANGES: Applying these rules to pre-schools that exist in K-12 school facilities is identified as a significant rule change.

COST ASSUMPTIONS: The application of these rules to those portions of K-12 school facilities used for pre-school instruction may increase the inspection time needed for annual inspections.

PRELIMINARY COST ESTIMATES: Local health jurisdictions identified that there may be an additional hour of inspection time for pre-school instruction areas. This would most likely be passed on to schools as a fee – ranging from $100-$200/hour.

CONCLUSION: Children under the age of five are the most vulnerable to the potential environmental hazards in school facilities. Therefore, the department and the board find

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the benefits of applying these rules to pre-school instructional areas in K-12 schools to outweigh the costs.

Definitions—Section 010

INTENT: This section provides an explanation for the terms used in the rule. The definitions establish the meaning of terms as used in this rule, regardless of how they may be defined in other regulations or sources.

SIGNIFICANT CHANGES: While there are changes to this section—terms added and deleted and updated definitions—the significance of the term and definition is more accurately reflected and addressed in the sections of the rule where the term is used.

COST ASSUMPTIONS: The cost assumptions are addressed within the sections where the term is used.

Guidance for Rule Implementation and Compliance—Section 015

INTENT: This section establishes that the Health and Safety Guide for K-12 Schools in Washington (the K-12 Health and Safety Guide) is the principal source of guidance for schools and local health jurisdictions in the application of the health and safety rules. This provides both parties with an established and consistent source of additional information to be used for complying with and applying the rules.

BACKGROUND: The K-12 Health and Safety Guide was created in December 2000, updated in January 2003, and is scheduled to be updated following adoption of this rule.

PUBLIC HEALTH BENEFIT: The best crafted rules can not possibly address all of the possible health and safety hazards that may be present in a school facility. The existence of up-to-date, science-based supporting information is essential for schools to comply with the requirements and for local health jurisdictions to apply the requirements.

SIGNIFICANT CHANGES: There are no significant changes proposed for the K-12 Health and Safety Guide provisions of the existing rule, WAC 246-366-140. This section simply rearranges and restates the requirement for the department and OSPI to continue to update the K-12 Health and Safety Guide. There are no new regulatory requirements and no increased cost associated with implementing this section of the proposed rule compared to the existing rule.

Responsibilities–General—Section 020

INTENT: This section is aimed at preventing accidental injuries and reducing environmental exposures in primary and secondary schools in Washington State by requiring annual inspections and by establishing clear responsibilities for school officials, local health officials and the department. The proposed language clarifies that school officials are responsible to "Maintain conditions within the school environment that will not endanger health and safety." Local health officers are responsible for assuring that inspections are conducted annually and to consult with school officials on ways to fix existing and potential hazards.

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This section promotes openness and accountability; provides for notification when hazards exist; and encourages proactive communication.

BACKGROUND: Currently, local health officers are required to make periodic inspections of each school within the local health jurisdiction and forward a copy of the findings and recommendations for any corrections to the school board and administrator of the school. The requirement for periodic inspections has been interpreted differently throughout the state. The frequency of inspections by local health ranges from annual to only upon opening a new facility. Nine of 35 local health jurisdictions currently provide routine inspections and consultative visits of schools, covering approximately 35 percent of the children in kindergarten through twelfth grade. Complaints to the board in past years have raised concerns that school environmental health and safety issues are not receiving enough attention by local health in Washington State. Local health jurisdictions that are most active with schools have demonstrated success in helping prevent and correct safety and health hazards. Local boards of health have authority under RCW 70.05.060(7) to implement fees for providing services to the community, such as conducting school consultative and inspection programs. School inspection programs are typically fee-based.

PUBLIC HEALTH BENEFIT: Children are more vulnerable than adults to environmental hazards for several reasons, including their rapid physical development, higher metabolism, and age-related behaviors. "In recent years, scientists have increasingly realized that children are especially vulnerable to the effects of hazardous environmental exposures…"[31] "Children breathe more air, eat more food, and drink more water per pound of body weight than do adults. Certain behaviors, such as tactile exploration and hand-to-mouth contact, increase the probability of some exposures. As a result, environmental health scientists and regulators have recognized the need to exercise special caution in protecting children from potentially hazardous exposures – setting margins of safety to minimize children's exposures, avoiding the use of potentially toxic chemicals near children…"[32]

Prevention of injury and health problems through environmental controls is an established science shown to protect and improve health. Annual inspections provide an opportunity to identify and mitigate health and safety concerns before they become more dangerous and costly to address. The proposed rule would require that school inspections are more consistently conducted across the state, helping to better ensure that the health and safety requirements of these rules are met, with oversight by trained environmental health and safety specialists. *Safe and Healthy School Environments* (page 363) reports that a survey of the Los Angeles Unified School District in 2005 found nearly 40 percent of the schools were out of compliance with applicable health and safety regulations. It states that "safety inspections of the entire school campus, including all buildings and classrooms, should occur at least annually" (page 112) and that "the successful use of routine inspections to improve school health and safety involves a three-step process: (1) identify school safety standards, (2) evaluate compliance with the applicable standards, and (3) implement corrective action to achieve compliance with the standards" (page 364).

NATIONAL STANDARDS AND PRACTICES: There are currently no federal rules for school environmental health and safety inspection. However, there are federal guidelines for addressing some common school environmental health problems including mold from excessive moisture and lead from drinking water fixtures. National and international building codes and fire safety codes have been adopted in Washington by state and local agencies.

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[31] Ed. Howard Frumkin, MD, DrPH; Robert J. Geller, MD; I. Leslie Rubin, MD; with Janice Nodvin; *Safe and Healthy School Environments;* Oxford University Press; 2006; p. 5
[32] National Research Council 1993; Lanphear et al. 2005

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These are enforced primarily by local building officials. Local environmental health professionals would review schools for requirements in this proposed school rule that are not addressed by building officials, including ongoing operations and maintenance issues.

SIGNIFICANT CHANGES: The proposed rule clarifies that school officials are responsible to help identify and take actions to correct potential environmental health hazards in schools. School officials would be required to mitigate health hazards and notify the local health officer, faculty, parents and students as appropriate for the hazard. The requirement that school officials share information with the public pertaining to the condition of school facilities would help parents know when precautions are necessary to protect their child's health while attending school.

Beginning one year after the effective date of the rules, the local health officer's designee, an environmental health professional, would need to conduct an inspection of each school at least once each year, recommend actions, consult with school officials, recommend follow-up actions for violations of this rule, and re-inspect if necessary to confirm that corrections have been made. The local health officer would have authority to approve a program that designates a school official or other qualified person to conduct the required annual inspection two out of every three years. The department would be required to report every three years to the board on variances granted by local health officers and the status of the rule's implementation. The department would provide technical assistance and training to local health and school personnel.

COST ASSUMPTIONS:
Schools will likely incur expenses to implement the proposed changes for the following items:

1) Identify, assess and mitigate environmental health and safety hazards in their schools.
2) Annual inspections. Costs to have school personnel or the local health officer perform inspections and to have school staff work with inspectors during and after inspections.
3) Inform local health officer, parents and faculty about imminent health hazards and actions taken to correct. (Not including mold, lead/copper in drinking water which are specifically called out in other sections) Assume one per year per school.
4) Retain for at least 6 years records about school inspections, site assessment, school and playground plan review.
5) Preparing an annual report for the public and the school board about environmental health and safety conditions in the schools.

Local health jurisdictions will likely incur expenses to implement the proposed changes for the following items:

1) Establish or maintain a School Environmental Health and Safety program, with the capacity to provide annual inspection of school facilities, and various consultative services required in these rules. While local health jurisdictions may charge fees for program-related services, it is understood that fee structures rarely capture all program-related expenses. This requirement may not result in an additional expense, depending on a health jurisdiction's current practice for providing school-related environmental health and safety services and inspections.

PRELIMINARY COST ESTIMATES:
Schools:

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1) Annual inspections – Periodic inspections are currently required. There will be increased inspection costs to schools depending on what the current "periodic" frequency of inspections has been. Costs will be passed on as fees from local health jurisdictions. However, it should be noted that some local health jurisdictions do not currently charge a fee for inspections.
   Direct costs for school employees to work with inspectors:
   Range $350 - $1050
   (Please see cost estimates for local health jurisdictions/fees below.)
2) Address imminent health hazards and inform staff and parents; assume 1 incident per school per year.
   $225 - $675 per incident
3) Record keeping requirements**:** Time/Cost Estimates - range of costs per school per year identified:
   $ 157 – $1,100 for staff time
   (Some schools identified a need for a filing cabinet, which is reflected in this range.)
4) Prepare annual report**:** Time/Cost Estimates – range identified for staff costs per year:
   $70 to $1,500

Local Health Jurisdictions:

Cost to establish or maintain a School Environmental Health and Safety program, with the capacity to provide annual inspection of school facilities, and various consultative services required in these rules.

1) Annual inspections –Increased costs will vary depending on the current inspection program of the local health jurisdiction.
2) Hourly rates for inspections range from $100 to $200 hour with time for inspections varying by size and type of school.
   Elementary: 4 hours – $693 average cost per school
   Middle/Junior High: 4-6 hours - $950 average cost per school
   Senior High: 8 hours – $1,387 average cost per school
3) Other costs not recovered through fees include staffing and training materials related to starting a school program. In addition to these other costs, the department assumes there will be unspecified ongoing costs to provide technical assistance and maintain collaborative working relationships with schools that will not be recovered through fees ranging from $10,000 to $56,000 per year depending on the needs of the schools within the local health jurisdiction.

CONCLUSION:

This section revises and expands the administrative framework established in the current chapter. The department and the board consider the increase to annual inspections to be critical for implementation of this chapter and necessary for realizing the benefits of the other sections of the rule. The record keeping and reporting requirements in the proposal allow parents and other interested parties to be aware of issues facing their children. Therefore the qualitative benefits outweigh the costs associated with this administrative framework.

Site Assessment, Review and Approval—Section 030

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INTENT: The intent of this section is that local health officers and environmental health specialists continue to review school sites so they can apply their expertise to helping schools identify and either avoid or mitigate threats to health and safety. It maintains a longstanding requirement for review and approval of sites by local health officers or their designees, while providing additional clarity about what is expected of schools during a site assessment and of local health jurisdictions during site review and approval. It is also the intent that site reviews conducted under authority of this rule be completed in a timely fashion and focus specifically on the environmental health and safety of school facilities that will occupy the site.

BACKGROUND: Since at least 1960, local health officers or their designees have been required to review and approve school sites for health and safety. Since 1973, a noise assessment has been required for proposed school sites. Most local health jurisdictions conduct site reviews currently and may charge fees to schools for these services.

PUBLIC HEALTH BENEFIT: Early identification of environmental issues reduces the risk of adverse impacts to student health and safety. Secondarily, it may avoid unnecessary remediation costs and allow for more cost-effective mitigation. Actual examples of ways that local health reviews protect health and safety and prevent unnecessary costs include:

- A local health official denied approval of a proposal to build a private school at the end of the runway serving a small airfield. The place where planes would have turned around at the end of the runway was immediately adjacent to the proposed playground.
- A school that failed to obtain a site review for an athletic facility tore up its own drainfield.
- A school district decided against purchasing land for a future school after a local health official doing a site visit informed them that the property, which could not be served by sewer, would not accommodate a septic system that could meet the school's needs.
- A school district built astride a swale on a piece of property with a high water table, and the school experienced constant problems with water intrusion.

Potential risks related to school siting also include contaminated soils and proximity to highways. The Department of Ecology Area Wide Soil Contamination Project[33] reports that soil in many areas of the state are contaminated with lead and arsenic, mostly from metal smelter emissions, arsenical pesticides, and leaded gasoline. As part of the Area Wide Soil Contamination Project, the department along with the Department of Ecology has sampled soil at 118 schools and daycares in the central region of the state. When schools are identified with contamination levels that potentially expose children are found, Department of Ecology has been assisting schools with cleanup activities. Just in the central region of the state, 18 schools will have been cleaned up by the end of summer 2008 and there are another 19 identified for cleanup. Children are at particular risk from soil contamination because they often play in the soil and are likely to put their hands in their mouths.

California has banned new school construction within 500 feet of busy roads and freeways in response to the respiratory and asthma impacts from vehicle exhaust. According to *Safe and Healthy School Environments*, "We have known for years that breathing high levels of air pollution (ozone, particles, and other pollutants) can cause acute changes in health, such

[33] Available at http://www.ecy.wa.gov/programs/tcp/area_wide/AW/toolbox_chap4.html

as nasal congestion, irritated eyes, coughing, chest tightness or congestion, wheezing, and inability to breathe deeply."[34]

The school rule development committee identified a need to consider environmental health and safety issues associated with surrounding land uses in site approval. Site approval methods vary throughout the state due to a lack of specific direction in the existing rule.

NATIONAL STANDARDS AND PRACTICES: There are currently no federal standards or guidelines for school siting. The Energy Independence and Security Act of 2007 requires the U.S. Environmental Protection Agency (EPA) to issue school site selection guidelines within 18 months of enactment. The guidelines must address hazardous substances and pollution exposures, transportation availability, energy efficiency and use as an emergency shelter. A site review under authority of this rule would not address the last three items. The EPA has developed a standard for an assessment of commercial property that has become the norm for environmental due diligence. This type of assessment is called a phase I environmental site assessment (Phase I ESA)[35] and is based on American Society for Testing Materials (ASTM) Standard #1527-05 (November 2005).[36] According to the national School Health Policies and Programs Study 2006, "More than half of states and one third of districts required phase I environmental site assessments before constructing a new school facility, although one third of districts had no new facilities planned."[37]

SIGNIFICANT CHANGES: The proposed rule gives more specificity to assessment requirements, specifies the documentation that must be provided, and requires schools to make the records available to the public. A Phase I ESA that meets the requirements of the ASTM Standard #1527-05 is required for developing school facilities on undeveloped property, or property previously used for other purposes, and for establishing a school in all or part of an existing structure previously used for other purposes. For other projects, a consultation between school officials and the local health officer is required to determine the scope of the site assessment, review, and approval process. If the site assessment procedure indicates that hazardous materials may be present, soil sampling and analysis may be required. Current requirements for site assessment for excessive noise are unchanged. Health officers would no longer be responsible for determining adequate property size. They would provide written approval or describe site deficiencies needing mitigation to obtain local health officer approval, within 60 days of receiving a complete request, unless the school officials and the local health officer agree to a different timeline.

COST ASSUMPTIONS:
Site assessment is required in the current rule. Incremental cost increases for schools will likely be incurred when implementing the proposed changes for the following items:

1) Contracting for a Phase 1 Environmental Site Assessment for new school sites and establishing schools in all or part of existing structures. For many schools this requirement will not result in an additional expense because a site assessment is currently required and current practice is the Phase 1 ESA or something very similar.
2) Soil sampling, if needed based on site assessment findings.
3) Consulting with the local health officer regarding site development, assessment, review, and approval.

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[34] Ed. Howard Frumkin, MD, DrPH; Robert J. Geller, MD; I. Leslie Rubin, MD; with Janice Nodvin; *Safe and Healthy School Environments;* Oxford University Press; 2006; p. 144
[35] Available at http://epa.gov/brownfields/aai/aai_final_rule.pdf
[36] Available at http://www.astm.org/cgi-bin/SoftCart.exe/DATABASE.CART/REDLINE_PAGES/E1527.htm
[37] Available at http://www.ashaweb.org/journal_schoolhealth.html#shpps

Local health jurisdictions will likely incur expenses to implement the proposed changes for the following items:

1) Reviewing a Phase 1 Environmental Site Assessment report and conducting a site inspection. Some or all of these expenses may be passed on to schools thru fees.
2) Consulting with schools officials regarding site development, assessment, review, and approval.

PRELIMINARY COST ESTIMATES:

Schools:

1) Contracting for Phase 1 ESA – The cost will likely vary with the size, previous use, and location of the site. Average estimates are provided:

Elementary:	$7,700
Middle/Junior High:	$9,700
Senior High:	$14,700

2) Soil sampling if the Phase 1 ESA shows it is necessary: Up to $10,000
3) Consulting with local health officers: $6,480

Local Health Jurisdictions:

Cost associated with requirement for Phase 1 ESA – Local health jurisdictions indicated a range of cost impacts from the requirement for a Phase 1 ESA. Some indicated that a Phase 1 ESA could actually reduce their time and effort in review. Others indicated a cost increase ranging from $300 to $1,500 per site assessment.

CONCLUSION:

There are potential safety/injury, air quality, and exposure concerns that need to be considered before siting a school. The current rule requires a site assessment, and some schools have indicated that they currently use the Phase 1 ESA. However, the costs currently being incurred by schools to meet the site assessment requirement are variable and indeterminate. The proposed rule specifies a Phase 1 ESA site assessment and so the full cost of the assessment rather than an incremental increase is identified here. The department and the board find that the benefits of avoiding children's exposure to the many possible hazards outlined above outweighs the incremental increase in cost presented by the Phase 1 ESA.

Construction Project Review—Section 040

INTENT: The intent of section 040 is that local health officers and environmental health specialists continue to review construction plans so they can apply their expertise to helping schools identify and either avoid or mitigate threats to health and safety. It maintains a longstanding requirement for review and approval of plans by local health officers or their designees. It is also the intent that plan reviews conducted under authority of this rule be completed in a timely fashion and focus specifically on issues addressed in rule.

BACKGROUND: Since at least 1960, local health officers or their designees have been required to review and approve school construction plans. Since the 1970s, OSPI has not released state school construction funds without written plan approval from the local health officer. Preoccupancy inspections are also required as part of the existing rule related to plan review. The proposed rule divides plan review and preoccupancy inspections into two sections. All local health jurisdictions in the state conduct school plan reviews currently, although the level of review varies. Some reviews are comprehensive; others may focus on specific aspects such as the adequacy of commercial kitchens. The basic framework for the

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rule is similar to what has been in place since 1971. The local health officer retains the same level of discretion over the scope of the review. A perception exists that there is unnecessary overlap with local building official plan review. These rules add some requirements in addition to building and mechanical codes, and emphasize some parts of those codes that might not get the full attention of building inspectors. These rules are intended to not be redundant with state building codes.

PUBLIC HEALTH BENEFIT: The purpose of the plan review and preoccupancy inspection requirements is to have local environmental health specialists review construction projects for health and safety risks. The public health benefit for this section derives from the rationale for the construction-related sections throughout the rule. Environmental health specialists report to the local health officer and are trained to assess and prevent public health risks in areas such as indoor air quality, exposure to hazardous materials, injury prevention, and control of zoonotic diseases (human diseases of animal origin). They bring a necessary and unique perspective to plan review. Early identification of environmental conditions that may adversely impact student health and safety allows more cost-effective development of necessary mitigation measures. *Safe and Healthy School Environments* states, "Appropriate architectural design of the physical plant in schools and daycare centers can decrease the risk of infections…surfaces should be nonporous and easily cleaned by disinfectants."[38] Local environmental health specialists are trained to assess facility designs that impact infection control and assist with cleaning.

SIGNIFICANT CHANGES: The proposed rule provides more specific direction to local health officers related to approval of building plans. These new provisions require the local health officer to provide written approval or describe construction plan deficiencies needing correction to obtain local health officer approval of building plans, within 60 days unless school officials and the health officer agree to a longer time period. The scope of building plan review by the local health officer is limited to environmental health and safety issues as identified in this rule and is not intended to duplicate local building official review. There is language designed to encourage consultation between schools, local public health, and building departments as early in the planning process as possible to improve coordination, limit disruption, and control costs. The proposed rule suggests a threshold that would exclude minor alterations, and possibly minor additions, from plan review unless the alterations involve a lab or shop. The current proposal would apply to projects consisting of more than 5,000 square feet of floor area or having a value of more than 10 percent of the total replacement value of the school facility. Review and approval of playground plans is handled separately in section 150.

COST ASSUMPTIONS:
Schools will likely incur expenses to implement the proposed changes for the following items:

Conducting a pre-planning conference with project planners and inviting the local health officer. The department assumes schools already have pre-development planning meetings in their existing construction process. This requirement may not result in an additional expense, depending on a school's current practice for meeting with project planners and regulatory officials.

Local health jurisdictions will likely incur expenses to implement the proposed changes for the following items:

[38] Ed. Howard Frumkin, MD, DrPH; Robert J. Geller, MD; I. Leslie Rubin, MD; with Janice Nodvin; *Safe and Healthy School Environments;* Oxford University Press; 2006; p. 428-9

1) Participating in pre-planning conferences with project planners. This requirement may not result in an additional expense, depending on a Local Health Jurisdiction's current practice for meeting with school officials and project planners.
2) Training on the new construction related requirements of the rule.

PRELIMINARY COST ESTIMATES:
Schools

Pre-planning meetings/coordination is estimated at $3,460 per project for all school types. Although the department assumes predevelopment meetings already occur and inviting the local health officer to take part in a meeting would not be an additional cost, the cost identified here reflects one meeting of the various design professionals that schools hire.

Local Health Jurisdictions

1) Pre-planning meetings/coordination: No additional costs identified.
2) Training on construction requirements: Costs range from $5,000 to $18,000

CONCLUSION: Construction review is in the current rule. The proposal directs school officials to include local health officials in pre-planning meetings. This allows health and safety issues to be identified and addressed during construction planning period, after which adjustments become much more costly. The department and the board find that the benefit of involving local health in pre-planning meetings outweighs the cost of including them.

Preoccupancy Inspections—Section 050

INTENT: The intent of section 050 is to allow local health officers to verify construction conformity with these rules.

BACKGROUND: Preoccupancy inspection by the local health officer for new schools, additions, and renovations has been in the existing rule since 1963.

PUBLIC HEALTH BENEFIT: The purpose of the preoccupancy inspection is to have local environmental health specialists review construction projects for health and safety risks. The public health benefit for this section is based on the value of limiting exposure to potential health and safety hazards that may exist in newly constructed school facilities. Inspecting prior to allowing occupancy provides school officials with the opportunity to address identified imminent health hazards before exposing staff and students.

SIGNIFICANT CHANGES: A preoccupancy inspection is required by the current rule. The proposal expands and adds specificity to the administrative process of preoccupancy permits. While primarily procedural in nature, the cumulative impact of the new requirements of the proposal could increase the time to conduct a preoccupancy inspection.

COST ASSUMPTIONS: The department assumes the new requirements of the proposed rule will increase the time for a preoccupancy inspection by up to 1 hour for an elementary, 3 hours for a middle/junior high, and 5 hours for a senior high school.

PRELIMINARY COST ESTIMATES:
Costs to Schools

The costs for preoccupancy inspections will most likely be charged to schools in the form of increased inspection fees. Local health jurisdictions have identified their hourly fees range

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from the $100-$200/hr. For purposes of this analysis, the department uses the $200/hr rate.

Elementary:	$200
Middle/Junior High:	$600
Senior High School:	$1,000

CONCLUSION: A preoccupancy inspection helps ensure students are not exposed to imminent health and safety hazards in newly constructed school facilities. The department and the board find that the benefit of inspecting schools prior to student occupation outweighs the cost of inspection.

General Construction Requirements—Section 060
General Operation and Maintenance Requirements—Section 065

INTENT: The intent of section 060 is to update existing requirements and add some new requirements to meet current best practice standards to protect student health through general construction of the school facility. The proposed rule is intended to provide clarity to construction requirements and separate construction requirements from operation and maintenance requirements. Construction requirements in the proposed rule that are not in the existing rule will not be applied retroactively – other than in a manner similar to how the building codes are applied to an alteration or addition.

The intent of section 065 is to update operation and maintenance requirements in the existing rule. Some new requirements are added to meet current best practice standards to protect student health. Health concerns addressed by these changes are asthma, allergies, and other adverse health effects associated with poor indoor air quality and exposure to chemicals and other hazardous substances.

BACKGROUND: The basic requirements in section 060 have been in place since 1960. The proposed rule provides more specific requirements related to environmental health and safety issues than the building codes and emphasizes some parts of those codes that might not get the full attention of building inspectors. The proposed rule would continue to provide requirements for construction contained in the existing rule that help provide for environmental health and safety regarding non-slip surfaces of steps, cleanable flooring, pest (vermin) control, sufficient space for safe storage of instructional equipment, and control of excessive sunlight. The proposed rule *does not* require routine installation of window screens to control insects.

The proposed rule adds a performance standard for fall protection. The L&I Core Safety Rules cover certain fall hazards, but are designed to protect only employees (WAC 296-800-260, Floor openings, floor holes, and open-sided floors). Section 410 of the International Building Code (IBC) relating to stages and platforms does not address fall protection from stages. Fall injury incidents have highlighted the need for protection from falls that can result in serious head injuries, disability, or death.

The L&I Core Safety Rules are designed to protect employees. They require a workplace free from recognized hazards that are likely to cause serious injury or death (WAC 296-800-11005). Employers are required to make workplaces safe, provide and require the use of safety devices and safeguards…and to do everything reasonably necessary to protect the life and safety of employees (WAC 296-800-11010). These proposed rules contain similar provisions that school officials keep school facilities safe for students.

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The proposed requirements in section 065 continue long standing environmental health and safety requirements for the general operation, maintenance, and safety of school facilities. The existing operation and maintenance requirements include keeping school facilities clean and in good repair; controlling pests; and storing and using toxic substances safely. There also is a provision that students have views of daylight for at least half the day.

Under the Employer Chemical Hazard Communication rule, WAC 296-800-170, schools are required to have a Material Safety Data Sheet (MSDS) for each hazardous chemical used in the school. The MSDS indicates the appropriate uses, safe procedures, and first aid for the chemicals. Indoor air quality and student health are at risk if unauthorized chemicals are brought in. The proposed rules would require school officials to ensure that only safe and appropriate chemicals are used and procedures are followed for cleaning, maintenance, pest control; and for arts, science, career, and technical instruction.

Certain insect and animal pests are of public health significance because they can transmit diseases to humans. Safe pest management involves construction measures to exclude pests; maintenance; removal of food, water, and nesting materials; and judicious use of pesticides.

PUBLIC HEALTH BENEFIT: The requirements in proposed rule section 060 can benefit all users of school facilities by providing an environmental health perspective to school facility construction to help prevent health and safety risks. "Conventional schools are typically designed just to meet building codes—that are often incomplete. Design of schools to meet minimum code performance tends to minimize initial capital costs but delivers schools that are not designed specifically to provide comfortable, productive, and healthy work environments for students and faculty…Not surprisingly, a large number of studies have found that schools across the country are unhealthy."[39]

Insect and animal pests are potential vectors of infectious diseases that can be transmitted to humans. Rodents are carriers of hantavirus. Bats are the natural reservoir for rabies in this state. Mosquitoes carry viral diseases. Bird droppings can contain pathogenic bacteria and fungi. Mosquito breeding places can be minimized by construction that prevents pooling. This rule section would require schools be constructed to minimize exposure to such pests. This provision is not intended to require windows be screened.

Although not prohibited by the proposed rule, carpets are a significant concern for indoor air quality. Carpets can be difficult to maintain; contribute to airborne dust and other allergy/asthma triggers when dirt and dust is not removed by cleaning; and contribute to mold growth when not properly dried. Carpeting specifications should consider ease of cleaning and drying, as well as low off-gassing of volatile organic compounds from the carpet and any pads or glues used. The Environmental Protection Agency (EPA) states: "Carpet … acts as a reservoir for dust, dirt, pollen, mold spores, pesticides, and other materials which may originate indoors or be brought into the indoor environment from outside…can trap a significant amount of particles…inadequate maintenance can allow large quantities of dust and debris to build up in carpet. Some studies indicate that poorly maintained carpet can release significant quantities of particles into the air during the course of daily activity." It states that: "moisture trapped below a carpet…can result in mold growth and the release of mold spores and mold metabolic products…into indoor air." It further states that: "If carpet is specified, select a carpet that …can be easily cleaned and

[39] Gregory Kats; *Greening America's Schools;* October 2006; p. 4 www.cap-e.com

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maintained, is constructed to prevent liquids from penetrating the backing layer where moisture under the carpet can result in mold growth, and can be easily removed without the use of toxic chemicals…"[40]

The requirements in proposed rule section 065 would help ensure healthy and safe environments at school facilities. Students, staff, and school visitors could benefit from the protections provided. "Many school buildings are in poor condition and present environmental conditions that inhibit learning and pose unnecessary, increased health risks to students and staff."[41]

It is important for public health that school facilities be clean. It is particularly important to keep carpeting clean to avoid indoor air quality problems.

The control of weeds and pests using least hazardous methods would reduce the use of pesticides. Exposure of children to herbicides and other pesticides is a serious health issue. In general, least hazardous response to pest problems means sanitation, prevention of access to food sources, and structural repair to close off pest entry.[42]

SIGNIFICANT CHANGES: Some construction-related provisions in the existing rules have been removed from the proposed rule because they are adequately addressed by building codes. These include ceiling height restrictions and hand rail requirements for stairways, which are addressed in the International Building Code (IBC). Also, requirements have been modified to not require exterior measures for sun control.

Proposed new requirements include performance standards for flooring materials and fall prevention. Flooring must be appropriate for the intended use, cleanable, and able to be dried effectively to inhibit mold growth. Woven carpets with impervious backing are mentioned as allowed, when appropriate. Fall prevention measures are required for specific locations and heights such as orchestra pits; retaining walls, balconies, and similar drop-offs to a lower floor. Retaining walls, inadequate railings, half-walls, etc., have been observed in schools as potential "attractive nuisances" where children have easy access to heights from which a fall could result in serious injury or death. The rule requires appropriate construction measures that might discourage risky behavior by students. The age of children and type of risk would be considered when determining the most appropriate preventive measure.

The current rule, WAC 246-366-050(5) specifies "The premises and all buildings shall be free of insects and rodents of public health significance and conditions which attract, provide harborage and promote propagation of vermin." The proposal restates and divides this direction into the construction requirements of -060 and the operation and maintenance requirements of -065. The proposal eliminates the language "be free of" and replaces it with direction to "design school facilities to minimize conditions," and "Control conditions

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[40] Environmental Protection Agency, Indoor Air Quality Design Tools for Schools, www.epa.gov/iaq/schooldesign/controlling.html#Carpet

[41] Chaney, B; Lewis, L; *Public School Principals Report on Their School Facilities*, Fall 2005. Washington, DC: US Department of Education, National Center for Education Statistics; 2007. NCES 2007-007 In: Jones, SE, Axelrad, R, Wattigney, WA, Healthy and Safe School Environment, Part II, Physical School Environment: Results From the School Health Policies and Programs Study 2006, Journal of School Health, October 2007, vol. 77, no. 8, p. 545

[42] *Pediatric Environmental Health, 2nd Ed.*; American Academy of Pediatrics; 2003; p. 468-469

that attract…" The department does not consider this a significant change from the current rule and therefore benefits and costs are not considered.

Another provision new to this rule would specify that health rooms meet certain construction provisions, such as surfaces that can be easily cleaned and sanitized, a handwashing sink, and an adjoining restroom. However, the rule does not require schools to have health rooms.

Proposed new provisions in section -065 include requiring safe use and storage of hazardous materials; selecting supplies and procedures that reduce exposures to hazardous materials; allowing use of only cleaners, pesticides, art supplies, or hazardous materials approved by school officials; and requiring immediate clean-up and disinfection of areas contaminated by sewage.

The proposed rule adds a requirement to notify the local health officer when a sewage back up is large enough to affect more than the restroom of a building. This is to help ensure the most appropriate clean-up methods are used in all areas of the building to reduce the possibility of contamination of food and water and to reduce exposure to students and staff.

Finally, a provision is added to require that all upholstered furniture be purchased or approved by school officials.

CONSTRUCTION-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Selecting carpet that is easily cleanable and can be dried effectively to inhibit mold growth, where carpet is selected. This may not be an additional expense, depending on a school's current practice when specifying flooring materials.
2) Meeting the fall hazard reduction requirements of these rules. This may exceed the minimum building code requirements, but may not be an additional expense, depending on a school's current practice when designing safe school facilities.
3) Meeting the health room requirements of these rules, when schools opt to provide a health room in school facilities constructed after the effective date of these rules. This may not be an additional expense, depending on a school's current practice for providing and designing health rooms for new school construction, addition or alteration.

OPERATION & MAINTENANCE-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Researching manufacturer's instructions for product use and hazards resulting from use. Selection of products and establishing procedures to assure that exposure to hazardous materials is reduced and that only school official-approved products are used.
2) Notifying the local health officer when sewage backups outside of restrooms occur.
3) Allowing only upholstered furniture that school officials have purchased or approved.

PRELIMINARY COST ESTIMATES:
CONSTRUCTION RELATED COSTS

1) Potential increased costs for carpet upgrade:

Elementary:	$64,350
Middle/Junior High:	$78,375
Senior High:	$148,500

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2) Meeting the fall hazard requirements: This cost will vary widely and depend on the hazards and topography of a particular site. The costs here are estimated based on the increased railing requirements of a sample school - 1,000 linear feet of railing on exterior retaining walls at $55 per foot, warning strips on stages and open metal railings for orchestra pits in high schools.[43]

Elementary:	$48,233
Middle/Junior High:	$64,184
Senior High:	$82,350

3) Potential health room costs, if schools choose to provide a health room.

Elementary:	$56,416
Middle/Junior High:	$57,790
Senior High School:	$57,940

OPERATION & MAINTENANCE COSTS

1) Assure that school official-approved products are used: Most schools identified that they already do this activity, but identified a range of costs for compliance from $375 to $3278 per year.
2) Notify local health officer when sewage backups outside of restroom areas occur. It is estimated that this might occur 1 time a year per school. Range of staff costs identified $6-$250. This range reflects the costs associated with a 15 minute phone call up to a site visit from the local health officer.
3) Assure only school official-approved upholstered furniture is used in schools. Most schools already have this in policy, however for those schools that do not, this requirement could require up to 4 hours of custodial time to audit a building in a year. Range of costs identified:
   $73 - $1500
   (This range does not include costs to dispose of any unauthorized furniture.)

Moisture Control, Mold Prevention and Remediation—Section 070

INTENT: The intent of section 070 is to require rapid control of moisture problems in schools that can lead to mold growth as well as timely mold remediation and notification of affected individuals. Mold growth is an indicator of damaging water intrusion or condensation and can contribute to respiratory health problems. Moisture control is the key to mold prevention.

BACKGROUND: The Environmental Protection Agency (EPA) has stated: "Concern about indoor exposure to mold has been increasing as the public becomes aware that exposure to mold can cause a variety of health effects and symptoms, including allergic reactions… Mold spores waft through indoor and outdoor air continually. When mold spores land on a damp spot indoors, they begin growing… Mold can produce allergens that can trigger allergic

[43] Meng provided estimates for orchestra pit railings for schools of all three grade levels, but they are included in these figures for high schools only. Orchestra pits have become a common feature of high schools only in the past ten years. They are beginning to show up in some middle schools and junior highs, partly in response to community needs, but are not yet considered elements of a "typical" middle or junior high school. They were not included by PSSC.

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reactions or even asthma attacks in people allergic to mold. Others are known to produce potent toxins and/or irritants."[44]

The existing rule does not address mold or moisture intrusion. The board has received extensive testimony about the adverse health effects of mold. Some of this has come from teachers and from the parents of students who have been exposed to moldy conditions in schools that might be linked to adverse health outcomes.

PUBLIC HEALTH BENEFIT: Mold is a known allergen and asthma trigger. Some molds also produce toxic byproducts that are released into the air. Damp environments can allow mold growth in 24-48 hours leading to respiratory health problems. Any resulting mold growth needs to be properly remediated for the health of students, staff, and visitors. Exposure to mold can cause symptoms that include sinus congestion, sneezing, sore throat, cough, skin irritation, shortness of breath, headache, watery eyes, fatigue, and severe asthma reactions in sensitive individuals.

The Institute of Medicine's (IOM) Committee on Damp Indoor Spaces and Health[45] stated that: "Homes and other building should be designed, operated, and maintained to prevent water intrusion and excessive moisture accumulation when possible. When water intrusion or moisture accumulation is discovered, the source should be identified and eliminated as soon as practicable to reduce the possibility of problematic microbial growth and building material degradation. The most effective way to manage microbial contaminants, such as mold, that are the result of damp indoor environments is to eliminate or limit the conditions that foster its establishment and growth."

The IOM committee further stated that: "When microbial contamination is found, it should be eliminated by means that not only limit the possibility of recurrence but also limit exposure of occupants and persons conducting the remediation. Disturbance of contaminated material during remediation activities can release microbial particles and result in contamination of clean areas and exposure of occupants and remediation workers. Containment during clean-up (through the erection of barriers, application of negative air pressure, and other means) has been shown to prevent the spread of microbial particles to non-contaminated parts of a contaminated building. The amount of containment and worker personal protection and the determination of whether occupant evacuation is appropriate depend on the magnitude of the contamination."

The IOM committee concluded "that excessive indoor dampness is a public-health problem. An appropriate public health goal should thus be to prevent or reduce the incidence of potentially problematic damp indoor environments, that is, environments that may be associated with undesirable health effects, particularly in vulnerable populations."

SIGNIFICANT CHANGES: The proposed rule requires that school officials:

- Visually monitor for water intrusion and moisture accumulation;
- Begin corrective action within 24 hours of discovering water intrusion or moisture accumulation to prevent and limit mold growth; and
- Take specific actions when mold growth is suspected or observed, including
  - Eliminating the cause of moisture and drying the affected areas;
  - Investigating the extent of the mold growth;

[44] Environmental Protection Agency; *Mold Remediation in Schools and Commercial Buildings;* EPA 402-K-01-001, March 2001

[45] Institute of Medicine, Committee on Damp Indoor Spaces and Health; *Damp Indoor Spaces and Health*; 2004; p. 12-14

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- Limiting student exposure;
- Using recognized mold remediation procedures; and
- Informing staff, students, and parents of the conditions and plans and time frame for remediation if the affected surface area is greater than 10 square feet. (The 10 square feet threshold for mandatory notification is based on EPA remediation guidance.)

COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Integrating frequent visual observation of the school facility for signs of water intrusion or moisture accumulation into the routine school operations by staff and faculty.
2) Beginning corrective action within 24 hours in response to water intrusion, moisture accumulation or mold growth. Depending on the timing of the event relative to the standard work week, this could result in overtime costs.
3) Responding to water intrusion and moisture accumulation (Control water and dry facility)
4) Remediating mold growth
5) Notifying staff, students, and parents about mold remediation.

These requirements may not result in additional expenses, depending on a school's current practice for monitoring their facility for and responding to water intrusion, moisture accumulation or mold.

PRELIMINARY COST ESTIMATES:

1 – 3) Schools identified that they are already observing facilities and responding to water intrusion. The requirement to begin corrective action in 24 hours may require some increase in overtime work if problems are discovered over a weekend. Range of costs identified:
$120 - $2,583

4) Remediation of mold growth beginning within 24 hours of discovery – costs can vary widely depending on circumstances, from a phone call for technical assistance to staff receiving overtime wages for starting remediation work within the allowed timeframe. (The costs range from $17 to $1,060.) The department assumes the requirement to begin remediation quickly combined with the requirement to observe facilities and respond to water intrusion will help prevent large and costly remediation projects. The department; however, recognizes that some remediation projects can be large with schools reporting costs of up to $300,000 in some cases.
5) Notify staff, students, and parents about remediation: Costs reflect time to develop a letter and respond to questions. Assume not more than 1 event per year. Range of costs identified:
$55 - $2,000

CONCLUSION: Since the last major revision of this chapter, the understanding of the health effects of mold has grown substantially. The proposal is intended to prevent mold from growing by requiring schools to monitor for moisture intrusion and to respond as soon as possible when it does occur. By helping to prevent mold, the proposal will help prevent the allergy and asthma impacts associated with mold. Further, it will also help prevent the potentially costly remediation necessary to address mold once it has been established. This new section is central to realizing reduced respiratory symptoms through improved indoor air quality. As such, the department and the board have determined the benefits of mold prevention outweigh the costs.

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Animals in School Facilities–Section 080

INTENT: The intent of this section is to require school officials to develop written policies or procedures that specifically address the potential health and safety hazards associated with animals allowed in the school facility, including service animals that are regular visitors.

BACKGROUND: The existing rule does not specifically address animals in the school facility. School officials, staff, and parents have expressed concerns to department staff regarding the safety and health concerns related to animals in schools. The department has received requests about prohibiting animals in schools due to these concerns and also has received complaints when animals are prohibited in schools. Schools asked the board to address concerns about animals in this proposed rule and other stakeholders supported the request.

There are many areas in which animals might be found in schools; including as pets in elementary classrooms, in science classrooms, as teacher's pets, as service animals, for special education therapy, and even as school mascots that roam the facilities. Since 2000 the K12 Health and Safety Guide has provided guidance on animals in schools, based on the National Association of State Public Health Veterinarian's (NASPHV) *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings.* NASPHV "understands the positive benefits of human animal contact. Although eliminating all risk from animal contacts is not possible, [they] provide recommendations for minimizing disease and injury. NASPHV recommends that…agencies use these recommendations to establish their own guidelines or regulations for reducing the risk for disease from human-animal contact in public settings."[46]

Schools need to ensure that personnel providing animals for educational purposes are knowledgeable regarding animal handling and zoonotic disease issues.[44] Guide, hearing, or other service animals and law enforcement animals can be used when they are under the control of a person familiar with the specific animal and in accordance with recommendations from the sponsoring organizations.

PUBLIC HEALTH BENEFIT: Animals can play an important instructional role in the school setting. They can also present a risk of zoonotic disease (diseases which can be transferred from animals to humans), injuries, and allergic and asthmatic reactions. Animals require thoughtful attention to their care, including environment, climate, housing, food, exposure to other species (including humans), socialization, behavior, and appropriate clean-up of their wastes. Animals need to be kept clean and free of intestinal parasites, fleas, ticks, mites, and lice.[44]

Animal waste has the potential for disease transmission and plans for allowing animals in schools need to specify effective provisions for cleaning and sanitation. "Cleaning and disinfection of all areas where animals have been present is necessary to prevent disease transmission."[44] "Infections with enteric bacteria and parasites pose the highest risk for human disease from animals in public settings. The primary mode of transmission for enteric pathogens is fecal-oral. Because animal fur, hair, skin, and saliva can become contaminated with fecal organisms, transmission can occur when persons pet, touch, feed,

[46] National Association of State Public Health Veterinarians, Inc.; *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings*; Morbidity and Mortality Weekly Report; July 6, 2007; Vol. 56, No.; RR-5; p. 1

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or are licked by animals… Animals carrying enteric organisms pathogenic to humans (e.g., *E. coli*, *Salmonella*, and *Campylobacter*) frequently exhibit no signs of illness and can shed these pathogens intermittently. Removing ill animals (especially those with diarrhea) is necessary but not sufficient to protect animal and human health. Antimicrobial treatment of animals cannot reliably eliminate infection and shedding of enteric pathogens or prevent re-infection.

Infections from animal bites are common and frequently require extensive treatment or hospitalization. Bacterial pathogens associated with animal bites include *Pasteurella*, *Francisella tularensis*, *Staphylococcus*, *Streptococcus*, *Capnocytophaga canimorsus*, *Bartonella henselae* (cat-scratch disease), and *Streptobacillus moniliformis* (rat-bite fever). Certain monkey species (especially macaques) kept as pets or used in public exhibits can be infected with herpes B virus, either asymptomatically or with mild oral lesions. Human exposure through monkey bites or bodily fluids can result in a fatal meningoencephalitis."[47]

"Psittacosis…is a bacterial infection of humans that can cause severe pneumonia and other serious health problems. It is caused by *Chlamydophila psittaci*… From 2000 through 2006, 125 human cases of psittacosis were reported to the CDC and most resulted from exposure to infected pet birds, usually cockatiels, parakeets, parrots, and macaws…Infected birds shed the bacteria through feces and nasal discharges, and humans become infected from exposure to these materials." Infected birds can appear healthy and shed the organism intermittently.[48]

"Injuries associated with animals in public settings include bites, kicks, falls, scratches, stings, crushing of the hands or feet, and being pinned between the animal and a fixed object."[45] Animals may react strangely to classroom situations and it is important to have effective control methods.

There are many people who are allergic to animal dander or for whom animal fur, feathers, and dander may be asthma triggers. Plans to allow animals in schools must consider the need to protect students with allergies and asthma. "Parents should be informed of the benefits and potential risks associated with animals in school classrooms. Consult with parents to determine special considerations needed for children who are immunocompromised, who have allergies, or who have asthma."[49]

SIGNIFICANT CHANGES: Section -080 would require school officials to develop a policy to prevent the spread of zoonotic disease, injuries, and allergic reactions if animals are allowed in school facilities.

COST ASSUMPTIONS: Schools will likely incur expenses to develop the required "animals in the school" policy, if such a policy does not already exist.

PRELIMINARY COST ESTIMATES:

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[47] National Association of State Public Health Veterinarians, Inc.; *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings*; Morbidity and Mortality Weekly Report; July 6, 2007; Vol. 56, No. RR-5; p. 4-5

[48] National Association of State Public Health Veterinarians (NASPHV); *Compendium of Measures to Control Clamydophila psittaci Infection Among Humans (Psittacosis) and Pet Birds (Avian Clamydiosis)*; 2008; p. 1

[49] National Association of State Public Health Veterinarians, Inc.; *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings*; Morbidity and Mortality Weekly Report; July 6, 2007; Vol. 56, No. RR-5; p. 19

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Cost to develop an animal policy. The department assumes policies will be developed on a district-wide basis with assistance and models from the department and OSPI. Range of costs identified per district $400 to $7,500. To estimate per school costs, the department assumes an average of eight schools per district (2,300 schools/295 districts).

CONCLUSION: While animals can play an important role in schools, they can also cause allergies, diseases, and injuries. The department and the board have determined the benefits associated with preventing the risks posed by animals in the classroom outweigh the costs of developing a policy.

Heating and Ventilation:
Construction Requirements—Section 090
Operation and Maintenance Requirements—Section 095

INTENT: Indoor air quality (IAQ) issues in schools are important for student and staff health, productivity, and learning. The board heard testimony over the past 15 years that indicates IAQ issues are not being adequately addressed in some schools. This was a major reason the board directed the department to update the school environmental health and safety rules. The heating and ventilation sections of the rules are intended to provide more specific standards to help prevent school IAQ problems.

BACKGROUND: The International Mechanical Code (IMC), as adopted by Washington State (WAC 51-52) and the State Ventilation Code (WAC 51-13) specify the design of heating and ventilation systems in schools. Additional requirements in this proposed rule address special school environmental health issues not fully covered by the IMC. Schools have special use areas that can produce indoor air quality (IAQ) problems not adequately addressed by the building codes, including science laboratories; art and career and technical classrooms; health rooms; and copy or laminating machine workrooms. The IMC does not adequately address the issue of recirculation of air from such spaces as science laboratories; career and technical classrooms; and restrooms. This rule would focus school design professionals' attention to assure that the ventilation systems are designed to prevent the types of indoor air quality (IAQ) problems in schools that have resulted in health issues for students and staff. Health complaints in schools have been associated with such things as glass fibers, dust, and automobile exhaust. L&I rules are not designed to address these issues in schools, which could have even greater impact on students than adults.

The local health officer's designee, who reviews school plans and conducts pre-opening inspections from a health perspective, can address these issues in light of the planned uses for the rooms. Their perspective, based on public health protection strategies, enhances the oversight by the local building officials, identifying conditions or issues that may not be observed by expertise grounded in other professions.

PUBLIC HEALTH BENEFIT: Environmental exposures play an important role in the development and management of asthma. The main factors responsible for triggering asthma attacks and persistent symptoms are exposure to allergens, irritants, and respiratory infections. Common allergens include animal dander, dust mites, cockroaches, and molds. Respiratory irritants include diesel exhaust, ozone, fine particles, cleaning products, and solvents. "About 120,000 Washington youth are currently affected by asthma." "Poor air quality at school exacerbates asthma and is also associated with decreased student attendance in the general population – air in or around schools may be

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affected by management of ventilation and filtration systems, cleaning practices, reduction of "idling" by school bus engines or other vehicles waiting to pick up students." [50]

School children spend a significant part of their growing years in school facilities. The chapter on schools in *Pediatric Environmental Health*[51] states that "Exacerbation of respiratory symptoms, academic difficulties in achievement, attention, and focus; and behavioral problems…may be linked to the school environment…" (page 459) "Many problems with IAQ in schools are common to all large buildings. There are, however, other pollutants unique to schools including those released into the air from art and craft supplies, chemistry and biological laboratories, and wood and metal shops." "The indoor air may directly influence a child's learning by affecting alertness, attentiveness, and absenteeism…Indoor air pollutants can originate within the building or be drawn in from outdoors and may consist of particles, fibers, mists, molds, bacteria, and gases."(page 461) "Prevention [of IAQ problems] provides the greatest overall health benefit [to children.]"(page 466)

SIGNIFICANT CHANGES: The proposed rule requires schools to situate fresh air intakes away from building exhaust vents and other sources of air contaminants of public health importance in a manner that meets or exceeds the requirements in chapter 51-52 WAC. Sources of air contaminants include, but are not limited to, bus and vehicle loading zones, parking areas, and areas where pesticides or herbicides are commonly applied.

The proposal requires ducted air returns and using non-friable material when lining ducts. The requirement for ducted air returns applies only when constructing a new school or adding to an existing school where ventilation systems are independent of existing systems.

The existing rule requires mechanical exhaust ventilation for sources of air contaminants of public health importance. In an effort to provide more clarity and specificity, the proposed rule requires schools to provide locations with mechanical exhaust ventilation that meets or exceeds the requirements in chapter 51-52 WAC for equipment or activities that produce air contaminants of public health importance. Equipment that may produce air contaminants of public health importance includes laminators, very high volume copiers and older copying technologies. The phrase "air contaminants of public health importance" is newly defined in the proposed rule. It is understood that with the greater specificity and the new definition, meeting the proposed rule may require some schools to provide mechanical ventilation in more situations than under the existing rule.

The proposed rule continues existing requirements that the minimum temperature in facilities occupied by students be maintained at 65°F, with the exception of gymnasiums, which must be maintained at a minimum of 60°F. School facilities constructed before the effective date of this proposed rule would be required to ventilate occupied areas of school buildings during school hours and school-sponsored events and strive to provide outdoor air ventilation according to chapter 51-52 WAC through proper maintenance of existing systems. School facilities constructed after the effective date of this proposed rule would be required to ventilate occupied areas of school buildings during school hours and school-sponsored events to provide outdoor air ventilation according to chapter 51-52 WAC.

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[50] Washington State Department of Health; *The Burden of Asthma in Washington State: Executive* Summary; June 2005

[51] *Pediatric Environmental Health*, American Academy of Pediatrics, 2nd Edition, 2003

Schools would be required to limit student exposure to air contaminants of public health importance from office equipment by placing equipment in appropriately ventilated spaces and providing instruction to users on how to operate and maintain equipment as recommended by the manufacturer. They would also be required to take corrective action when air contaminants of public health importance, such as vehicle exhaust, are drawn into the building or ventilation system.

CONSTRUCTION-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Situate air intakes to meet or exceed chapter 51-52 WAC so that air contaminants of public health importance are not drawn into the building.
2) For new construction, use only ducted supply and return air systems when mechanical ventilation systems are selected. Natural ventilation systems may be used.
3) Use only materials that will not deteriorate and contribute particulates or other air contaminants to the air steam when insulating the interior of air handling ducts.

OPERATION & MAINTENANCE-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Provide heat and ventilation during school sponsored events and strive to provide outdoor air ventilation meeting the standards of chapter 51-52 WAC.
2) Limit student exposure to air contaminants of public health importance produced by heat laminators, laser printers photocopiers and other office equipment by placing such equipment in appropriately ventilated spaces and providing instruction to users on how to operate and maintain equipment as recommended by the manufacturer. Providing mechanical exhaust ventilation for sources of air contaminants of public health importance is an existing rule requirement. On October 8, 2008 the SBOH eliminated proposed subsection 095(4) which would have restricted the use of laminators to locations with mechanical exhaust ventilation. Therefore the department no longer assumes a need for one ventilated workroom. The department assumes the remaining requirement can be met through no cost alternatives.
3) Preventative or corrective action when air contaminants of public health importance are likely to be drawn into the building.

PRELIMINARY COST ESTIMATES:
CONSTRUCTION RELATED COSTS

1) Cost estimates to situate air intakes to meet or exceed chapter 51-52 WAC so that air contaminants of public health importance are not drawn into the building are the same for all three types of schools: $1,940.
2) For new construction, use only ducted air supply and returns; open plenum returns may not be used:
   Elementary Schools – $98,280
   Middle/Junior High Schools – $143,640
   Senior High Schools - $340,200
3) Use materials that will not deteriorate when insulating the interior of air handling ducts. Two options for compliance were identified: 1) Upgrade to Amtex no particulate liner; or 2) Add two duct sound chambers at each teaching station, restroom and private office.
   Option 1) Upgrade insulation duct lining:
      Elementary Schools - $49,140

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Middle/Junior High Schools – $73,510
Senior High Schools - $170,100

Option 2) Sound chambers
Elementary Schools – $63,504
Middle/Junior High Schools - $88,906
Senior High Schools – $165,110

OPERATION & MAINTENANCE COSTS

1) Strive to meet chapter 51-52 WAC through proper maintenance including repairs and replacing filters. The department assumes no new additional costs for this activity.
2) Language restricting the use of laminators to locations with mechanical exhaust ventilation has been deleted by the SBOH. Therefore, the department no longer assumes a need to retro-fit older schools with mechanical exhaust ventilation systems and has eliminated the previously identified cost of approximately $10,000.
3) Preventative or corrective action when air contaminants of public health importance are likely to be or are drawn into the building. There are a number of actions that will meet this requirement ranging from closing the windows for no new costs, to upgrading to a higher grade of filter and making sure they are replaced regularly. The proposal would not require schools to retrofit to provide an emergency air evacuation system. The costs for upgrading filters and changing them more regularly are provided here.
   Upgraded filters: $30.00 each
   Additional maintenance labor to change the filters 5 times each year.
   Elementary: $600 (assumes 4 filters)
   Middle/Junior High: $1,200 (assumes 8 filters)
   Senior High: $2,400 (assumes 16 filters)

CONCLUSION: Addressing indoor air quality problems was identified as a primary need when the department and the board reviewed the rule in 2003. Poor indoor air quality causes increased asthma and allergy symptoms and other respiratory illness. Appropriately designed and maintained heating and ventilating systems are a key component to improving indoor air quality and can result in a 20 – 80 percent decrease in respiratory illness. The department and the board have determined the benefits associated with improving air quality outweigh the costs imposed by the construction, and operation and maintenance requirements of these sections.

Noise—Construction Requirements—Section 100
Noise—Operation and Maintenance—Section 105

INTENT: The intent of these two sections is to present noise control-related requirements when constructing school facilities, and for operating and maintaining existing school facilities.

BACKGROUND: The current rule requires that ventilation and mechanical noise sources be designed to not exceed the Noise Criterion-35 (NC-35) standard, and that the ambient noise in an unoccupied classroom with the mechanical systems operating not exceed 45 dBA (decibel measure, with the "A" weighted scale adjustment).

PUBLIC HEALTH BENEFIT: Control of ambient noise reduces stress and related health effects and ensures that staff will not disable ventilation systems to reduce noise and

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therefore contribute to poor IAQ. *Safe and Healthy School Environments* identifies health impacts of noise in the school setting:

> "Teachers and teacher assistants (paraprofessionals) suffer a higher rate of voice disorders than other working people. Smith et al. (1997) compared the frequency and effects of voice symptoms in teachers to a group of people employed in other occupations."
>
> " …the noise created by heating, ventilating, and air-conditioning (HVAC) systems, poor acoustic design in classrooms, and crowded classrooms may also contribute to teacher's straining their voices to be heard (American National Standards Institute and Acoustical Society of America 2002.)

The impact of mechanical equipment noise on the classroom environment has been highlighted in *Classroom Acoustics*, published by the Technical Committee on Architectural Acoustics of the Acoustical Society of America, August 2000:

> "High ambient noise from mechanical equipment such as noisy heating, ventilation and air conditioning (HVAC) systems is all too common in existing schools. This is a serious problem for teachers and students alike. Teachers must raise their voices to maintain the +10 cB signal-to-noise ratio necessary for good speech intelligibility. That results in many teachers taking several sick days each year as a result of vocal strain, costing taxpayers' money that would have been better spent on quiet mechanical equipment. At the same time, students must either struggle to hear or else become distracted and stop paying attention. Mechanical noise is primarily the result of poor planning and can be difficult and expensive to fix in existing classrooms. However, excessive mechanical noise can be eliminated at little or no extra cost if the system is designed properly in the first place."

SIGNIFICANT CHANGES: There are no significant changes proposed for the noise-related requirements of the current rule as presented in WAC 246-366, sections 100 and 105, and no increased cost associated with implementing the proposed rule compared to the existing rule.

Lighting—Construction Requirements—Section 110
Lighting—Operation and Maintenance Requirements—Section 115

INTENT: The intent of these two sections is to present lighting-related requirements when constructing school facilities, and for operating and maintaining existing school facilities.

BACKGROUND: Lighting intensity requirements, a part of the 1960 school health and safety rules, have been revised over the years, with the current lighting levels established in 1982.

PUBLIC HEALTH BENEFIT: Minimum lighting intensity, and the absence of glare and other lighting deficiencies, contribute to a healthy and safe school environment. Existing requirements recognize different lighting levels are needed throughout the school facility based of activity to assure a safe educational setting. Insufficient lighting, glare, and other lighting deficiencies can contribute to accidents, eye-strain and headaches.

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SIGNIFICANT CHANGES: There are no significant changes proposed for the lighting-related requirements of the current rule as presented in WAC 246-366A-110 or 246-366A-115. The only proposed change to the current text is to update "special instructional areas" to include currently used terms.

Restrooms and Showers—Construction Requirements—Section 120
Restrooms and Showers—Operation and Maintenance Requirements—Section 125

INTENT: The intent of these two sections is to present plumbing-related requirements when constructing school facilities, and for operating and maintaining existing school facilities.

BACKGROUND: Plumbing-related requirements, a part of the 1960 school health and safety rules, have been revised over the years, with the current requirements established in 1982. Early requirements addressed many items currently addressed in building and plumbing codes. The remaining requirements in the proposed rule address items not covered in the plumbing code. The current rule already establishes when showers must be provided, when restrooms must be accessible, what restroom supplies must be provided and the maximum hot water temperature for showers and handwashing.

PUBLIC HEALTH BENEFIT: Providing for conditions in restrooms and showers that contribute to keeping facilities clean and dry is important to maintaining healthy spaces in schools. Ventilation helps control moisture accumulation and odors. Restrooms must be available for use of building occupants, and a maximum hot water temperature guards against scalding. Tempered water encourages hand washing by providing water that is warm enough to allow for a thorough washing while at the same time preventing scalding. Hand washing is the most basic public health measure to prevent the spread of communicable disease.

SIGNIFICANT CHANGES: There are no significant changes in the construction requirements of section -120. Proposed section -125 requires tempered water (between 85 and 110 degrees Fahrenheit) for those handwashing plumbing fixtures that do not allow the user to select water temperature. The proposal does not require schools to change to fixtures that mix water, but where they are already used, the temperature needs to be within the required range.

OPERATION & MAINTENANCE-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

Adjusting handwashing plumbing fixtures that do not allow the user to select water temperature to provide tempered water. This requirement may not result in an additional expense, depending on the type of plumbing fixtures used in a school or a school's current practice for setting water temperature at this type of plumbing fixture.

PRELIMINARY COST ESTIMATES:

OPERATION AND MAINTENANCE COSTS:

Assure tempered water in sinks that do not allow users to select temperature. The department assumes no additional costs because these units must be adjusted for temperature when they are installed. Respondents also indicated ongoing adjustments are needed and this activity is already common practice.

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CONCLUSION: Tempered water encourages adequate hand washing because the water is warm enough to allow effective washing time. The department and the board consider hand washing to be a critical measure in preventing communicable diseases and determine the benefits of adjusting the fixtures to outweigh the costs.

Water Quality Monitoring for Lead—Section 130

INTENT: The intent of this section is to present the requirements for sampling drinking water for lead content. This section describes the frequency, timeline, and protocol for sampling water from plumbing fixtures used for drinking or cooking.

BACKGROUND: The current rule requires schools to provide drinking water from an approved source. Schools that receive their drinking water from a municipal or privately owned water supply are considered a customer of that water system and are not required by other rules to conduct water quality testing. Water systems that provide drinking water to schools test for lead and other contaminants in select locations throughout their distribution system. Schools on their system may or may not be part of the sampling sites. Because water quality problems at schools are often caused by plumbing conditions rather than the quality of the water being delivered, problems could go unnoticed.

From December 2004 until June 2005, OSPI and the department jointly implemented a grant program to partially reimburse Washington elementary schools for the cost of testing for lead in their drinking water. A total of 7,728 samples were submitted by 455 different schools. Of the 7,728 samples collected, 559 or 7.2 percent were at or above 20 parts per billion.

PUBLIC HEALTH BENEFIT: Exposure to lead is a significant health concern, especially for young children whose growing bodies tend to absorb more lead than the average adult. Excess amounts of lead in the body can damage the brain, kidneys, nervous system, and red blood cells. In children, lead has been associated with impaired mental and physical development as well as hearing problems. The harmful effects of lead in the body can be subtle and may occur without any obvious signs of lead poisoning.

Lead is a toxic substance with no acceptable safe exposure level. Reducing the amount of lead in drinking water is an important part of reducing a child's overall exposure to lead in the environment. The on-again, off-again water use patterns of most schools can result in elevated lead levels in drinking water. Water that remains stagnant in plumbing overnight, over a weekend, or during a vacation is in longer contact with lead–containing pipes, solders, and fixtures and may therefore contain higher levels of lead.

The benefit of the proposed rule is prevention of exposure to lead by sampling water and taking corrective action when necessary.

SIGNIFICANT CHANGES: The proposed rule requires sampling and testing water for lead levels at plumbing fixtures regularly used for drinking or cooking. For elementary schools, 100 percent of the fixtures will need to be sampled within the first two years, fifty percent each year.

For middle/junior high and senior high schools, a representative sample is required by identifying different types and ages of fixtures used in the building and sampling 25 percent of each type and age of fixture. For fixture types, at least these three types must be

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sampled: drinking fountains, water coolers and faucets. For fixture age, at least these two ages must be sampled: fixtures manufactured before 1999, and those fixtures manufactured since January 1, 1999. Junior highs will need to be tested within three years of the effective date of the rule and high schools within four years.

The sampling procedure is repeated every five years, sampling 10 percent of each type and age that are a "very low lead" plumbing fixture and 25 percent of all other fixtures, by type and age.

If the sample results exceed 20.0 parts per billion, corrective action is required for all fixtures of the type and age generating an unacceptable sample. Corrective actions include: removing the fixture from service, providing bottled water, daily system flushing as only a temporary measure, and fixture replacement. The proposal further requires school officials to use a state-accredited laboratory to analyze all samples. Samples collected after September 1, 2003 may be used to meet the first round monitoring requirement under certain conditions.

School officials must notify staff, students, parents, and the local health officer within 5 business days of receiving lead sampling results exceeding 20.0 parts per billion. They must also retain records of water sampling activities and sample results, available for public review.

The requirements in this section apply to all school facilities.

COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Sampling and analyzing fixtures regularly used for cooking and drinking according to requirements. This will mean 100 percent of such fixtures in elementary schools and 25 percent of such fixtures for junior high and high schools. The department assumes it will provide technical assistance to school districts in developing sampling plans so that hiring consultants will not be necessary. However, the sampling will require some planning time and probable overtime expenses because the samples must be done early in the morning before the water has been used. This expense will repeat on a five-year cycle.
2) Implementing corrective actions when sample results exceed 20.0 parts per billion. This could include expenses for bottled water as an interim measure before replacing the fixtures, and the cost of replacement fixtures and labor for removal of old fixtures and installation of new ones.
3) Notifying staff, students, parents, and the local health officer within 5 business days of receiving sampling results above 20.0 parts per billion lead.

PRELIMINARY COST ESTIMATES:

1) Sample collection and analysis:

   Elementary Schools – Based on staff surveys and information from schools, the department assumes a large elementary school will have up to 50 fixtures regularly used for drinking and cooking. This does not include restroom sinks. All the fixtures will need to be tested at a cost of around $30 per test. The sampling process may take up to 16 hours over several days to develop a sample plan, collect samples, and deliver or ship samples for testing. 16 hours @ $45/hr.

   50 x $30/test = $1500 lab costs
   16 x $45/hr = $720 labor costs

Shipping/deliver costs will be variable and indeterminate depending on a school's distance to a particular lab. For purposes of this analysis the department assumes a cost of $50.

Total costs for an elementary school: $2,270

Middle/junior and senior high schools – Although middle/junior high and senior high schools are double and sometime triple the size and number of students of an elementary, the department's analysis does not show that drinking and cooking taps increase proportionately because elementary schools have a larger number of drinking fountains per student. A large high school might also have 50 drinking and cooking taps. For purposes of providing an example we have chosen a school with 48 drinking and cooking fixtures. The proposal will require 25 percent of the fixtures to be tested - 48 fixtures per school X 25 percent = 12 fixtures to be tested. Lead tests are approximately $30 per test. The department assumes it will take about 1 day to develop a sample plan, collect samples and deliver or ship samples for testing – 8 hours @ $45/hr = $360.

Sampling - $30 x 12 fixtures = $360
Labor - $360
Shipping/deliver costs will be variable and indeterminate depending on a school's distance to a particular lab. For purposed of this analysis the department assumes a cost of $25.

Total per school - $745

2) Costs for Corrective Action – Based on the results of the Governor's 2003 initiative to sample lead in school drinking water and the Seattle School District monitoring program, the department assumes up to 30 percent of schools will have problems with lead. Department staff further assume for the purposes of this analysis that schools will choose to replace fixtures if testing results are above 20.0 parts per billion. The department also estimates that as many as 10 percent of fixtures may need to be replaced. The costs for typical fixtures are:

   Drinking fountain - $150
   Water cooler - $470
   Faucet - $70

   Assuming a worst case scenario that a school would need to replace 5 (10 percent x 50 fixtures) water cooler units, the cost would be 5 x $470 = $2,350. Additional labor costs would be in the range of 12 hours @ $75/hr = $900. However, the department assumes discounts would be available if fixtures were being replaced on a district wide basis and purchased in bulk. $2350 + $900 = $3,250.

   The replaced fixtures would need to be preconditioned and retested for a cost of $500 (labor, sampling and shipping).

   Total possible corrective action costs – $3250 + $500 = $3,750.

3) Costs to notify staff, students, parents, and the local health officer within 5 business days of receiving lead sampling results above 20.0 parts per billion lead. Costs reflect time to develop a letter and respond to questions. Assume not more than 1 event per sampling cycle (every 5 years).

   Range of costs identified: $75 - $2000.

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CONCLUSION: This proposal was a major part of the rulemaking process. Of 7,728 samples submitted by 455 different Washington state schools, 559 or 7.2 percent were at or above 20 parts per billion. In addition, young children are most vulnerable to effects of lead (See above and Overview of Benefits). As a result, the department and the board have determined the benefits of testing fixtures and correcting identified problems outweigh the costs.

Water Quality Monitoring for Copper—Section 135

INTENT: The intent of this section is to present the requirements for sampling drinking water for copper content. This section describes the frequency, timeline, and protocol for sampling water from plumbing fixtures regularly used for drinking or cooking.

BACKGROUND: Schools that receive their water from a municipal or private water supply are not required by other rules to test regularly for copper. Unless a school is its own water system, there are no specific requirements that water coming out of the pipes of individual schools be tested for copper. Depending on the age of a school and the kind of pipes and fixtures used, there is a possibility that copper levels in drinking water could contain copper. The EPA has established the action level for copper at 1.3 milligrams per liter (mg/L) for copper.

PUBLIC HEALTH BENEFIT: Children are more susceptible to the effects of excess copper than adults because they are smaller and metabolic capacity is less developed. Ingesting copper can cause nausea, abdominal pain, vomiting, and for sensitive individuals kidney disease and liver damage. Copper is a contaminant that most commonly enters drinking water through corrosion of copper plumbing within buildings.

Schools in this country have identified drinking water with excessive levels of copper in amounts that may have caused gastric symptoms in children and that put certain susceptible persons at risk of health problems. In limited school sampling in Washington 15 of 3,300 samples were above the Safe Drinking Water Act copper action level of 1.3 mg/L. The only way to know if there are excessive levels coming from pipes and fixtures is to test for it. Once corrective actions are taken the problem is not expected to reoccur. Use of copper water pipes for electrical grounding is the most frequent cause of excessive leaching of copper into drinking water.

The benefit of the proposed rule is prevention of exposure to copper by sampling water and taking corrective action when necessary.

SIGNIFICANT CHANGES: The proposed rule requires that school officials must sample 25 percent of plumbing fixtures regularly used for drinking and cooking in all schools for copper content, following the same protocol as that for lead sampling. Repeat sampling for copper is not required.

School officials must notify staff, students, parents, and the local health officer within 5 business days of receiving copper sampling results above 1.3 mg/l copper. They must also contact the state Office of Drinking Water within this timeframe to consult about a corrective action plan. School officials must develop and implement an action plan in response to copper levels exceeding 1.3 mg/l.

The requirements in this section apply to all school facilities.

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COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Collecting and analyzing water samples is required for 25 percent of each type and age of fixture used regularly for drinking or cooking. School officials are encouraged to coordinate sampling for lead and copper so that analysis for both contaminants can be performed from a single sample.
2) Implementing corrective actions when sample results exceed 1.3 mg/l, based on a corrective action plan developed in consultation with the state Office of Drinking Water. Corrective action-related expenses could include the cost of bottled water as an interim measure, an automated flushing system or daily manual flushing.
3) Notifying staff, students, parents, and the local health officer within 5 business days of receiving copper sampling results above 1.3 mg/l copper.

PRELIMINARY COST ESTIMATES:

1) Sample collection and analysis of 25 percent of fixtures – Assuming a school coordinates their copper testing with the lead testing, the copper requirement will add an additional one time cost ranging from $10 - $20 per test.

   Using the numbers developed for section -130 that assumes approximately 50 drinking water taps for elementary, middle/junior high and senior high schools, this would mean additional costs of up to:

   50 fixtures x 25 percent = 12.5 (assume 12)
   12 X $20 = $240 per school.
2) Corrective action. While bottled water or treatment would be options for corrective action, for copper issues, flushing can be effective. Based on the results of the Seattle School District's copper monitoring program, less than 1 percent of schools will have copper problems. For that 1 percent of schools, a flushing program could require 1 hour of custodial staff time per day. 25/hr x 180 school days per year = $4,500.
3) Costs to notify staff students and parents. Costs reflect time to develop a letter and respond to questions. Assume not more than 1 event per year. Range of costs identified: $75 - $2,000.

CONCLUSION: The results of limited school testing show that copper issues occur less frequently than lead issues. However, the additional cost to add a copper test to samples already being collected for lead is relatively low. Therefore, the department and the board have determined that the benefits of sampling for copper and correcting problems when found outweigh the costs.

Water Quality Monitoring for Other Contaminants—Section 140

INTENT: The intent of this section is to establish the framework by which the local health officer may require sampling of drinking water when public health concerns exist about water contaminants other than lead or copper.

BACKGROUND: As with lead and copper, the current rule requires schools to provide drinking water from an approved source. Approval includes testing the system as a whole for a variety of contaminants. Not all contaminants can be detected at the source or in the system. For this reason, the proposed rule requires school officials to conduct sampling for

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drinking water contaminants, corrective actions, and notification when directed by the local health officer to address public health concerns.

PUBLIC HEALTH BENEFIT: There may be other potential drinking water contaminants that could affect the health of children identified by the local health officer, such as the potential for excessive levels of cadmium from galvanized pipe. When the potential for these contaminants is identified, the local health officer would be able to require testing and appropriate remediation to protect children's health.

SIGNIFICANT CHANGES: School officials shall perform sampling for drinking water contaminants other than lead and copper, take corrective actions and provide notification when directed by the local health officer.

The requirements in this section apply to all school facilities.

COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Sampling plumbing fixtures regularly used for drinking or cooking for drinking water contaminants other than lead or copper, when public health concerns exist and directed by the local health officer.

PRELIMINARY COST ESTIMATES:
The costs in this section are indeterminate but presumed to be low because they will apply only in cases where the local health officer has identified a problem. The department assumes the local health officer would very rarely require this testing.

CONCLUSION: There are other drinking water contaminants that may cause health problems in schools. This proposed section gives local health officers authority to require testing if there are public health concerns. The department and the board assume this will be infrequent, but that the benefits would outweigh the costs in those circumstances when public health concerns exist.

Playgrounds—Construction and Installation Requirements—Section 150
Playgrounds—Operation and Maintenance Requirements—Section 155

INTENT: The intent of these rules is to protect students from hazardous or unsafe conditions that can exist with playgrounds, playground equipment, and surfacing material under playground equipment. The existing rules contain no specific requirements for playground safety. This was identified by the School Rule Development Committee as a serious gap in the school environmental health and safety rules. The intent of these new sections is to increase safety protection for students and prevent accidental injury or death

BACKGROUND: The existing rule states that the existence of unsafe conditions that present a potential hazard are a violation of these regulations. The existing rules have required the department and OSPI to jointly prepare a guide for use in identifying violations of good safety practices. Section N of the K-12 Health and Safety Guide directs school personnel and local health officials to the Consumer Product Safety Commission (CPSC) and American Society for Testing and Materials (ASTM) for voluntary standards for playgrounds. The K-12 Health and Safety Guide recommends that local health agencies conduct plan review and routine inspections of playgrounds. CPSC first issued national standards for reducing the risk of serious life-threatening injuries at public playgrounds in 1981. Although

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there are many schools voluntarily complying with the national standards, there is no regulation in Washington State requiring compliance.

In 1997, Spokane Regional Health District conducted comprehensive playground audits. Of the 18 participating elementary schools, 699 serious playground hazards were identified during the audit – such as lack of appropriate surfacing, head entrapments, and protrusions. By 2004, the schools had a correction rate of 90 percent. One of these school districts tracks injury data and reported that the number of elementary school equipment-related playground and school ground injuries, from 2002-2005, averaged less than one per school year. This school district participates in the Spokane Regional Health District self-inspection program. Three of its elementary schools participated in the 1997 audit when 178 serious playground hazards were identified. In 2004, only three serious hazards were identified, demonstrating a 98 percent correction.[52]

PUBLIC HEALTH BENEFIT: There are identified national standards for reducing the risk of serious life-threatening injuries that, if applied, could help prevent injuries. Properly installed equipment, that is not adequately maintained, becomes a safety risk. "Approximately 10-25 percent of child and adolescent injuries occur at school…Most injuries (90 percent) to children and adolescents at school that result in hospitalization are unintentional, not the result of violence, and are most likely to occur on playgrounds, on athletic fields, or in gymnasiums. Such injuries are most frequently caused by falls and sports activities."[53]

Playgrounds are a high risk area for student injuries. Potential hazards include entanglement, punctures, entrapment, strangulation, and falls that can result in death or disability. "Tinsworth and McDonald (2001) analyzed the U.S. CPSC data files related to 147 deaths associated with playground equipment…that occurred between 1990 and 2000…Three causes of death predominate: strangulation (54 percent), falls to non-resilient surfaces such as asphalt (21 percent), and tip-over or collapse of equipment (16 percent). Strangulation usually results from clothing or cords becoming entangled or caught on the equipment, especially slides. Given these fatality statistics, efforts at reducing death on playgrounds should focus on three areas: appropriate clothing (no protruding cords), adherence to the CPSC guidelines, and good maintenance of equipment."[54]

CPSC addresses the importance of inspecting and maintaining playground equipment in its Handbook for Public Playground Safety, 1997, Section 7.2: "Inadequate maintenance of equipment has resulted in injuries on playgrounds. Because the safety of playground equipment and its suitability for use depend on good inspection and maintenance, the manufacturer's maintenance instructions and recommended inspection schedules should be strictly followed."

SIGNIFICANT CHANGES: The playground construction and installation requirements section 150 specifies that school officials must consult with the local health officer regarding installation, modification, or addition of playground equipment and fall protection surfaces. The local health officer could require review and approval of playground plans and equipment specifications and inspect playgrounds to verify that installation complies with

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[52] Reported by Julie Awbrey, Spokane Regional Health District
[53] Barrios, LC; Jones, SE; Gallagher, SS; *Legal Liability: The Consequences of School Injury;* Journal of School Health; May 2007; Vol. 77, No. 5; p. 274
[54] Ed. Howard Frumkin, MD; DrPH, Robert J. Geller, MD; I. Leslie Rubin, MD; with Janice Nodvin; *Safe and Healthy School Environments;* Oxford University Press; 2006; p. 90-93

requirements of this section. The proposed rule would require installation of playground equipment and fall protection surfaces that meet ASTM F 1487-01: Standard Consumer Safety Performance Specification for Playground Equipment for Public Use, and that are installed in a manner that is consistent with the manufacturer's instructions and CPSC's Handbook for Public Playground Safety, 2008. Implementing the ASTM and CPSC standards will improve the safety of newly installed equipment and help assure safe play, resulting in fewer and less severe playground injuries. The proposed rule also prohibits the use of chromated copper arsenate or creosote treated wood to construct or install playground equipment. The manufacture of chromated copper arsenate or creosote treated wood products for use around children has been banned by EPA in this country; but supplies may still exist.

The playground operation and maintenance requirements section 155 specifies that school officials must monitor and operate playgrounds so that surfacing and use zones are maintained and so that equipment is properly anchored and free of puncture, crushing, shearing, entanglement, and entrapment hazards. Chromated copper arsenate or creosote treated wood to repair or maintain playground equipment would be prohibited.

CONSTRUCTION-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Consulting with the local health officer regarding the need for and the scope of playground design and installation plan review and approval.
2) Preparing documents for plan review and payment of review fees, if required by the local health officer.
3) Selecting and installing playground equipment and fall-protection surfaces that meet the required standards. This may not be an additional expense, depending on a school's current practice when specifying playground equipment and fall-protection surfaces.

OPERATION & MAINTENANCE-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Monitoring and maintaining playground equipment and fall-protection surfaces to reduce injury risk. This may not be an additional expense, depending on a school's current practice for monitoring and maintaining playground equipment and fall-protection surfaces.
2) Local health may have increased costs for training and inspection kits to inspect playgrounds.

The department assumes these costs apply only to elementary schools. One respondent identified that some high schools may include playgrounds for associated daycare facilities. These costs are not included in the overall costs for all high schools.

PRELIMINARY COST ESTIMATES:
CONSTRUCTION RELATED COSTS

1) Consult with local health officer – If a new playground is being built along with a school, no additional costs for construction review. If playground is an addition to an existing school facility - $800 meeting time.
2) Prepare documents for plan review $500 - $1,000
3) Increased costs for playground equipment that meets requirements compared to home-built kit equipment - $20,866

OPERATION AND MAINTENANCE COSTS

Schools

Monitor and maintain playgrounds: Time/Cost Estimate per school per year. Most schools identified that they are already doing this activity. The range of costs per year identified for regular inspections:

$360 – $8,820 daily inspections Monday – Friday. This may take more time on Mondays as a result of weekend use.

Local Health Jurisdictions

Local health jurisdictions identified increased costs for training and inspection kits ranging from $200 – $5,000.

CONCLUSION: Playgrounds pose a significant risk of injury to children. In order to prevent injuries, playgrounds must be installed correctly and maintained. The proposal provides a standard for playground installation and helps assure maintenance by requiring schools to monitor playgrounds for hazards. The department and the board considered the additional costs posed by these two new sections and determined the benefits in terms of injury prevention outweigh the costs.

Laboratories and Shops—Construction Requirements—Section 160
Laboratories and Shops—Operation and Maintenance Requirements—Section 165

INTENT: The provisions in sections 160 and 165 of the proposed rule are intended to help prevent injuries and other adverse health impacts from hazards common to school instructional laboratories and shops. Laboratories include science laboratories for chemistry, physics, material science, and biology instruction, as well as art laboratories for print-making, photography, and ceramics instruction. Shops include metal-working, wood-working, construction, automotive, agricultural, and horticultural. Requirements that would apply only to "new construction" are separated from requirements that are operational and that would apply to all schools. These sections are intended to provide protections to students that are not provided by L&I rules.

BACKGROUND: Safety issues in school laboratories and shops have been identified by numerous risk managers and environmental health specialists. The existing school rules require chemistry laboratories to have an eyewash fountain and a shower head for flushing in case of chemical spills and clothing fires. However, the existing rules are insufficient to protect student health and safety. They relegate to guidance necessary safety practices for student laboratories and shops. They have provisions that if more than one laboratory is provided, one of each fixture will be adequate if the laboratories are in close proximity. "Close proximity" is not defined and "shower heads" is not adequately descriptive and allows for emergency showers that do not meet the standards established for employees in L&I rules. Students would be better protected by requirements that are similar to those that L&I has for employees. Chemical laboratories are not the only laboratories in schools where hazardous materials are used and where emergency showers and eyewashes should be installed. Schools use a large variety of hazardous chemicals in various instructional areas.

The 2006 International Mechanical Code (IMC, Section 3503.1.3, Flammable Gases – Emergency Shutoff) has new requirements for "manual or automatic emergency shutoff valves that can be activated at each point of use and at each source." However, the IMC does not address the teaching situation where one teacher is responsible for supervising a classroom and needs to be able to act quickly to protect students from injury. In regards to electrical shut-offs, L&I Core Safety Rules require employers to "identify disconnecting

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means…marked to show when it is open and closed and what equipment it controls, unless located and arranged so the purpose is obvious." This does not adequately address the need for the teacher to be able to quickly shut down all stationary power equipment.

The International Mechanical Code (IMC), as adopted by Washington State (WAC 51-52) specifies the general design of ventilation systems in schools. These proposed school rule sections would focus school design professionals' attention to assure added protections are provided to students in laboratories and shops. The local health officer's designee, who reviews school plans and conducts pre-opening inspections from a health perspective, can address these issues in light of the planned uses for the rooms. This perspective, based on public health protection strategies, enhances the oversight by the local building officials.

PUBLIC HEALTH BENEFIT: The Utah Student Injury Report (Knight et al. 2000) found that "during the five-year period from 1992 to 1996, 7.1 percent of school injuries in Utah (1,008 of 14,133) occurred in shop class. Equipment use accounted for 88.4 percent of these injuries…Missing covers for belts of belt-driven equipment and missing blade guards are common hazards in vocational shops. Appropriate safeguards include training, close supervision, selection of safety equipment including covers and guards, and meticulous maintenance of equipment…Projectiles, falling objects, and heated objects are common hazards in physical science classes, although these dangers can also be present in other specialized classrooms. Physics assignments that may result in flying objects or debris require the use of impact-resistant (ANSI Z87.1) safety glasses by all occupants of the room. Earth science activities that involve chipping, breaking rock, or grinding also require the use of safety glasses." [55]

"Life threatening injuries can happen in the laboratory. For that reason, students need to be informed of the correct way to act…"[56] "Improper chemical management poses health and safety risks to students and school employees. Health, learning, and behavior risks to students are of particular concern, as children are more vulnerable than adults to chemical exposures because their bodily systems are still developing; they eat more, drink more, and breathe more in proportion to their body size; and their behavior can expose them more to chemicals than adults…It only takes one chemical incident, such as a spill, explosion, or chemical exposure, to break the trust with the community…Despite their useful purposes, chemicals can be dangerous to students and staff when managed improperly. Some chemicals that are persistent in the environment and bioaccumulate through the food chain can make exposure during childhood and adolescence especially dangerous."[57]

SIGNIFICANT CHANGES: The current rules require chemical laboratories in new construction to be provided with an eyewash fountain and a shower head. The proposed section -160 would require in the construction of new schools and new laboratories an emergency eyewash fountain and an emergency shower for each laboratory and shop where hazardous materials are used and the potential for chemical spills exists. The proposal also requires handwashing and drying facilities in each laboratory and shop, and emergency shut-offs for gas and electricity. All stationary machinery in laboratories and shops would be

[55] Ed. Howard Frumkin; MD, DrPH, Robert J. Geller, MD; I. Leslie Rubin, MD; with Janice Nodvin; *Safe and Healthy School Environments;* Oxford University Press; 2006; p 108-109
[56] Consumer Product Safety Commission; Centers for Disease Control and Prevention; Department of Health and Human Services, National Institute for Occupational Safety and Health; *School Chemistry Laboratory Safety Guide*; October 2007, DHHS Publication No. 2007–107; p 6
[57] *Chemical Management Resource Guide for School Administrators;* December 2006; EPA 747-R-06-002; p 3 and 24

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required to have magnetic-type switches to prevent machines from automatically restarting upon restoration of power after an electrical failure or activation of the emergency shut-off. Mechanical exhaust ventilation would be required in hazardous material storerooms and in laboratories and shops where equipment or activities may produce air contaminants of public health importance. The requirement in proposed WAC 246-366A-160(7) to provide appropriate source capture systems is not considered to be a significant change because it is already required under current WAC 246-366-080.

Operation and maintenance requirements in section -165 would require school officials to select supplies and procedures that reduce exposure to hazardous materials. Use and storage of compounds that are considered shock-sensitive explosives and those that are lethal at low concentrations when inhaled or in contact with skin, would be prohibited. Additionally, school officials would be required to adopt safety procedures and ensure that students are instructed in the proper use of hazardous materials and equipment; to provide and require students to use appropriate personal protective equipment when exposed to potential hazards; and to provide situation-specific emergency and protective equipment during demonstrations with hazardous materials and with hazardous procedures. Mechanical exhaust ventilation for laboratory and shop equipment would be required to be used and maintained in accordance with manufacturer's recommendations.

CONSTRUCTION-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Installing emergency eyewashes in all laboratories and shops where hazardous materials are used or eye irritants are produced. Plumbing emergency eyewashes with warm (tepid) water.
2) Installing emergency showers in all laboratories where hazardous materials are used and the potential for chemical spills exist. Plumbing emergency showers with warm (tepid) water.
3) Installing hand-washing and drying facilities in each laboratory and shop.
4) Installing emergency shut-offs for gas and electricity provided to stationary machinery in each laboratory and shop.
5) Providing electro-magnetic power switches for stationary machinery to prevent machines from re-starting after an electrical failure or activation of an emergency shut-off switch.
6) Designing and installing air ventilation systems that do not recirculate air from a laboratory or shop to other parts of the school facility.

These requirements may not result in an additional expense, depending on a school's current practice for placement, design, and specifications for the required plumbing fixtures (emergency eyewash and emergency showers are required for new construction under the existing rules), utility shut-offs, machinery safety equipment, and ventilation systems.

OPERATION & MAINTENANCE-RELATED COST ASSUMPTIONS: Schools will likely incur expenses to implement the proposed changes for the following items:

1) Researching product hazard resulting from product use as described by manufacture's instructions. Selection of products and establishing procedures to assure exposure to hazardous materials is reduced and that only school official-approved products are used.
2) Adopting safety procedures and ensuring that students are instructed in the proper use of hazardous materials and equipment and provide and require students to use appropriate personal protective equipment when exposed to potential hazards.

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3) Providing situation-specific emergency and protective equipment during demonstrations with hazardous materials and with hazardous procedures.

These requirements may not result in an additional expense, depending on a school's current practice for selecting, handling, and storing hazardous materials and for adopting and using safety procedures for the use of hazardous materials, including the provision and use of personal safety equipment for students

PRELIMINARY COST ESTIMATES:
CONSTRUCTION COSTS

1) Installing and plumbing eye washes: [58]
   Elementary: 2 eyewashes = $6,384 (not included in construction cost totals)[59]
   Middle/Junior High: 7 eyewashes = $22,344
   Senior High: 11 eyewashes = $35,112
2) Increased costs for installing and plumbing additional emergency showers:[57]
   Elementary: 2 showers = $11,352 (not included in construction cost totals)[58]
   Middle/Junior High: 7 showers = $39,732
   Senior High: 11 showers $62,436
3) Installing hand washing facilities:
   Elementary: 2 sinks/towel dispensers = $5,443
   Middle/Junior High: 7 sinks/towel dispensers = $19,051
   Senior High: $29,937
4) Installing emergency shut-offs for equipment – no new costs for gas.
   Elementary: $0
   Middle/Junior High: 14 shut-offs = $28,340
   Senior High: 22 shut-offs = $44,550
5) Providing electro-magnetic power switches for stationary machinery to prevent machines from re-starting after an electrical failure or activation of an emergency shut-off switch.
   Elementary: $0
   Middle/Junior High: 30 switches = $2,430
   Senior High: 40 switches = $3,240
6) The costs of designing and installing air ventilation systems that do not recirculate air from a laboratory or shop to other parts of the school facility are the same for all types of schools – $4,536.

The total costs for this section including professional and district process review costs are:
Elementary: $27,715
Middle/Junior High: $116,433
Senior High: $179,811

OPERATION & MAINTENANCE COSTS

1) Selecting products and establishing procedures to assure exposure to hazardous materials is reduced and that only school official-approved products are used.

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[58] Meng provided initial estimates based on working rule draft that would have required plumbing of adequately sized drains. He later provided estimates for the drains themselves of $1,128, which includes contractor markup and overhead. This amount, multiplied by the number of fixtures, has been subtracted from the estimates for eyewashes and emergency showers.
[59] Meng provided estimates for two emergency showers and two eyewashes per elementary school. PSSC, however, did not estimate a new cost for this item for elementary schools. The board and the department are not aware of any elementary school curricula that would necessitate these features, so their costs are not included in the total construction costs for an elementary school.

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No additional costs beyond those identified for section -065.

2) Adopting safety procedures and ensuring that students are instructed in the proper use of hazardous materials and equipment and provide and require students to use appropriate personal protective equipment when exposed to potential hazards. Range of costs identified:
   $1,100 – $1,500 for Middle/Junior High and Senior High Schools only.
3) Providing situation-specific emergency and protective equipment during demonstrations with hazardous materials and with hazardous procedures**.** Respondents indicated that they already provide this equipment for the students in laboratories and shops. Therefore, the department assumes no additional costs.

CONCLUSION: Laboratories and shops pose health risks to children through use of equipment and exposure to chemicals which can cause injuries and respiratory issues. The department and the board considered the additional costs posed by these two new sections and determined that the benefits of additional protective measures related to physical safety and indoor air quality in laboratories and shops outweigh the costs of these measures.

Variances—Section 170

INTENT: This section replaces WAC 246-366-020- Substitutions and WAC 246-366-150 – Exemptions, which are being repealed. It creates a process to allow alternative methods of meeting the requirements of these rules.

SIGNIFICANT CHANGES: This is not a significant change because it does not establish a new requirement; rather it allows for alternative ways to meet the requirements of the rules.

Temporary Emergency Waivers for Disaster Situations—Section 175

INTENT: If a natural or man-made disaster occurs and leaves a school facility unusable, an emergency waiver will allow schools to relocate temporarily into another facility that may not meet some of all of the requirements established in these rules.

SIGNIFICANT CHANGES: This is not a significant change because it does not create a new requirement for schools; rather it allows for a temporary relaxation of the rule requirements in an emergency situation.

COST ASSUMPTIONS: The department assumes this section will not increase costs. If needed, the section will most likely represent a cost savings to schools.

Appeals—Section 180

INTENT: This section restates the appeal rights related to decisions or actions of local health officers. It does not create new appeal rights.

SIGNIFICANT CHANGES: This is not a significant change because this section does not create a new requirement for schools or local health jurisdictions. It states in rule, a statutory right that currently exists.

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Complaints—Section 190

INTENT: Schools currently handle complaints of many kinds. The intent of this section is to assure that schools develop a written procedure to respond to complaints regarding these health and safety requirements that is clearly articulated for students and parents.

SIGNIFICANT CHANGES: The requirement to develop procedures around complaints is a significant change and schools that do not already have a process will need to develop one. OSPI has a website describing processes for handling complaints to assist schools. The proposed rule closely follows that advice.

COST ASSUMPTIONS: Schools may incur a cost to develop a written description of their complaint process. The department assumes policies will be developed on a district-wide basis with assistance and models from the department and OSPI. To estimate per school costs, the department assumes an average of eight schools per district (2300 schools/295 districts). The department also assumes the addition of new requirements in other sections of the proposal may increase the kinds of complaints schools receive, however increased costs would be indeterminate.

PRELIMINARY COST ESTIMATES:
Cost to develop a complaint policy: Range of costs identified: $516 - $4,000.

CONCLUSION: A clearly articulated complaint process was a priority for many stakeholders involved in the rulemaking process. The process allows parents, teachers and others to identify children's health and safety issues that might otherwise go unobserved. The department and the board believe the benefits of having a process to describe how complaints will be addressed outweigh the costs of writing the procedures and addressing health issues.

Alternatives Considered

Department staff worked closely with the board and the public to minimize the burden of this rule. Throughout the course of the rule development many ideas were discussed. In addition to the consideration given to alternative rule frameworks, the following alternatives were considered but rejected as being more burdensome on the regulated community:

- Walk-off mats. Although they are considered to be an effective way to improve indoor air quality, walk-off mats were identified as a very high cost requirement when considering the costs state-wide and so the proposed rule does not include walk-off mats as seen in earlier versions of the proposal.
- Drains for emergency showers and eyewashes: The department has received anecdotal reports about schools not having proper drainage for emergency showers. This could results in showers not being properly tested, or even being disabled, in order to prevent flooding. In response to these reports, earlier versions of the proposal included a requirement that emergency showers and eyewashes be plumbed with drains adequate for the flow. Plumbing a waste drain adds about $1,118 to the cost of installing an emergency shower or eyewash. As such, the board and department decided to rely on rule provisions requiring cleanup whenever there is water damage and annual inspections to promote testing instead of the requirement to have plumbed waste drains.

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Other sections have been phased in to allow time for schools and local health jurisdictions to prepare and reduce their upfront costs by allowing them to spread the costs over several years.

- Inspections. The requirement for annual inspections has been delayed to September 2011 (one year from the effective date.)
- Duct lining upgrades and ducted air return requirements. The requirements in 246-366A-090(3) and (4) have been delayed until September 2013 to allow those school districts with bonds that pass before adoption of these rules to complete their projects before the requirements take effect.
- Water quality monitoring requirements. The water quality testing in sections 245-366A-130 and -135 are spread out over four years. Elementary schools and preschools located in public schools with the youngest and most susceptible children are to be tested in the first two years, middle/junior high schools by the end of the third year, and senior high schools are to be completed after four years.

Requirements for Private versus Public Entities

The rule does not impose more stringent performance requirements on private entities than on public entities.

Other Federal or State Law – Violations

The rule does not require those to whom it applies to take an action that violates requirements of federal or state law.

Other Federal, State, or Local Law - Differences

The rule does not differ from any applicable federal regulation or statute.

Other Federal, State, or Local Law - Coordination

Yes, the department conducted extensive research to be certain that the proposed rules are coordinated to the maximum extent practicable with applicable laws including those administered by the State Building Code Council, Office of the Superintendent of Public Instruction, and L&I. See Appendix E for a complete listing of agency laws and rules that the department reviewed to help ensure the proposed rules are coordinated with other federal, state, and local laws.

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