BUILDING SAFE SCHOOLS:

Invisible Threats, Visible Actions

**A Report of the
Child Proofing Our Communities Campaign
and the Center For Health, Environment & Justice**

ACKNOWLEDGEMENTS

This report is a joint effort of the Child Proofing Our Communities Campaign and the Center for Health, Environment and Justice (CHEJ). Grants from the Bauman Foundation, Beldon Fund, Cedar Tree Foundation, Groundspring.org, Mitchell Kapor Foundation, Alida R. Messinger Charitable Lead Trust No. 2, New York Community Trust, Turner Foundation, Wallace Genetic Foundation and Winslow Foundation fund the campaign.

This report is devoted to the many individuals across this country that are fighting to secure safe schools for children. Their leadership and dedication is building the base of communities across the country to take precautionary steps to help children reach their full potential.

Those who have contributed to this report and their local community actions have our deep appreciation. This report is attributed to the vision and guidance of Lois Marie Gibbs, community leader at Love Canal and the Executive Director of CHEJ, whose child suffered first hand the affects of siting a school on toxic land. Lois has provided consistent inspiration and vision for the Center for Health, Environment and Justice and its Child Proofing Our Communities Campaign. We especially want to thank Steven Fischbach, community lawyer at Rhode Island Legal Services, for his ardent effort to document the state of school siting laws in this country, the result of which is a powerful tool and call to action. His input, editing, feedback and commitment to this project are very much appreciated.

Those that contributed to this updated report have our utmost appreciation:

Alison Benjamin and Billie Hickey (Southwest Detroit Environmental Vision), Juan Parras (Unidos Contra Environmental Racism), Robin Rowan (Panther Parents Against Pollution), and Brian Wooley (Wasted Away) who contributed to the writing of the Case Studies; Arisha Ashraf, Tricia Bhatia, Ben Gerhardstein, and Molly Tsongas (Rhode Island Legal Services) who contributed to the research and compilation of the 50-state survey; Dr. Richard Clapp, Dr. Robert Harris, Ian MacFarlane, Dr. Rachel Morello-Frosch (Brown University); Dr. Frank Pine, Dr. Joseph Regna, and Dr. Ben Ross (Safety Disposal, Inc) who reviewed and contributed to the development of the model legislation, especially the Last Resort guidelines; and Stacey Gonzalez, Elizabeth Leonard, Stephen Lester, Sherman Ludwig, and Barbara Sullivan (Center for Health, Environment and Justice). We also want to thank Juan Parras for contributing 3 of the 4 cover photos.

Building Safe Schools is an update of Creating Safe Learning Zones, released in 2002 by the School Siting Committee of the Child Proofing Our Communities Campaign. We would like to thank the members of that committee as well, for their dedication to the initial report, and for their continued work to safeguard children from environmental contaminants.

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CHEJ

December 2005

TABLE OF CONTENTS

PREFACE

In March 2001, the School Siting Committee of the Child Proofing Our Communities Campaign released the first report of a series, entitled: *Poisoned Schools: Invisible Threats, Visible Actions.* This report analyzed the health risks of pesticide use in and around schools, identified many schools that were built on or near a toxic site and called for protective state and local policy action on the aforementioned issues.

The Child Proofing Our Communities Campaign (CPOC) was established by the Center for Health, Environment and Justice (CHEJ) in 2000 as part of a nationwide coalition of grassroots groups working on school-based environmental health issues. The campaign aims to connect local efforts across the country, raise awareness of toxic threats to children's health, and promote precautionary approaches most protective of children.

The second report in this series, released in January 2002, was titled *Creating Safe Learning Zone: Invisible Threats, Visible Actions.* Using GIS technology, this report mapped public schools built near hazardous waste sites in five states (California, Massachusetts, Michigan, New Jersey, and New York) and found, alarmingly, that over 1,100 public schools were constructed within a half-mile radius of a known contaminated site, affecting over six hundred thousand children attending classes in these schools. This report also provided Model School Siting Legislation, intended to be used by local grassroots groups, teachers and others to pass protective school siting policies in their regions.

Building Safe Schools: Invisible Threats, Visible Actions is the third report in this series. CHEJ and CPOC updated Creating Safe Learning Zones for this report to include a state-by-state analysis and summary of rules and regulations that apply to school siting decisions. We also further refined the model school siting guidelines to include guidance for school districts that have no available options other than to build a school on a highly contaminated site. We also provide guidance to evaluate and remediate contaminated land to the most protective standards possible.

EXECUTIVE SUMMARY

Public schools are our community anchors. They are places that house and nurture our growing children. They are meeting places for communities, sporting events and extra curricular activities. They employ public workers, and are funded by our tax dollars.

The federally mandated No Child Left Behind Act holds states accountable to improve academic achievement and heighten school safety. A specific provision, Title V, is intended to provide parents with the security of knowing that their child attends a safe school, and "to free students from those that are dangerous."

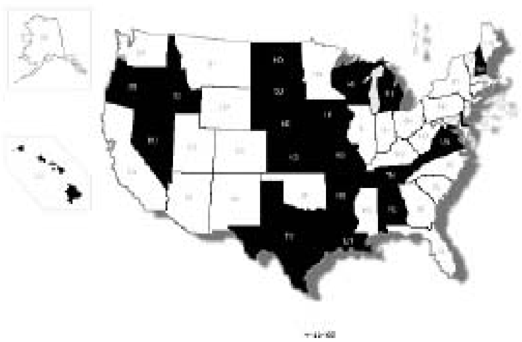
However, many schools are not free of chemicals that pose invisible threats to the health of staff and students. Increasingly, schools strapped for much needed funds are constructing schools on cheap, contaminated property. And astonishingly, building schools on contaminated land is generally legal. In this report, we found that only 5 states in this country prohibit or restrict siting schools on or near hazardous or toxic waste sites.

The community groups featured in the case studies in this report were shocked to find that their state had no laws or regulations that prohibit a school from being built on toxic soil. These groups and the multitude of concerned parents that contact the Child Proofing Our Communities Campaign (CPOC) about the safety of their child's school express the same astonishment at this brazen lack of protection for their child's welfare. To truly protect the health of our nation's children and halt this reckless trend, we are calling on local, state and federal legislators to pass laws that will prohibit future schools from being built on or near contaminated land in their communities.

In a state-by-state survey of the rules and regulations that apply to the siting of schools on contaminated property published in this report, we found:

- Only five (5) states have policies that prohibit or severely restrict siting schools on or near hazardous or toxic waste sites; nine (9) additional states have policies that prohibit outright the siting of schools on or near sources of pollution or other hazards that pose a risk to children's safety (such as proximity to heavy industry or natural environmental hazards);
- Twenty-four (24) states have no policies that require sponsors of new school projects to investigate or assess environmental hazards at potential school sites;
- Twenty-one (21) states have school siting policies that direct or suggest that school siting officials "avoid" siting schools on or near specified man-made or natural environmental hazards, or direct the school district to "consider" those hazards when selecting school sites;
- Only five (5) states have policies that specifically require sponsors of new school projects to undertake remediation or cleanup measures at contaminated school sites; and
- Twenty (20) states have no policies of any kind affecting the siting of schools in relation to environmental hazards, the investigation or assessment of potential school sites for environmental hazards, the clean up of contaminated sites, making information available to the public about potential school sites or providing some role for members of the public in the school siting process.

States With No School Siting Laws



■ - No School Siting Laws

A map showing the states that have no school siting laws that assess and regulate soil contamination is shown in the figure above.

There is a critical need for state laws that ensure that the locations for new schools are safe and that contaminated property is properly cleaned up. Natural disasters such as Hurricane Katrina in 2005, which flooded and destroyed property in four states along the Gulf Coast, underscore the critical need for school siting regulations. In the Katrina disaster, the contamination from heavy industry and hundreds of state and federal Superfund and other contaminated sites was disrupted and carried across communities. As this report details, the Gulf Coast states of Louisiana and Texas have no laws that require schools to test new sites for contamination. Unchecked reconstruction of destroyed public schools on potentially newly contaminated land will have drastic impacts on community health for generations.

The Model School Siting Legislation section of this report provides communities and legislators with a detailed guide to craft a regulation, policy or law that will guide the safe selection of candidate school sites. Drafted in consultation with engineers, public health experts, environmental experts, lawyers, and community leaders, the guidelines provide a process that will prevent schools from being built on contaminated soil. This process includes establishing a School Siting Committee, criteria for categorically excluding certain sites from use, procedures for ensuring meaningful public participation, guidance for thoroughly investigating and evaluating candidate sites that includes a step-by step assessment of potential hazards and sources of contamination that might impact a candidate site, and specific remediation guidelines for cleaning up contamination found on candidate sites.

In cases where substantial contamination has been found on a candidate site and there is no available, uncontaminated land for a school, we have developed our Last Resort siting guidelines to guide remediation of these sites. These guidelines are intended to reduce risk to the maximum extent by cutting off all potential routes of exposure. Adopting these measures at a candidate site should only be considered as a last resort, after all other potential sites have been evaluated and eliminated (at least two other sites must be considered) and if the specific remediation guidelines are followed.

These guidelines are necessary because it is widely recognized that children have special vulnerabilities to chemical exposures and because evidence is mounting over the past two decades that many childhood illnesses are linked to exposures to toxic chemicals. Cancers, such as leukemia, learning disabilities, attention disorders, reduced IQ and rampant levels of asthma drastically affect children's development, our school systems, and our economy. We must take preventative measures now to protect children and our communities by promoting laws that prohibit schools from being built on contaminated land.

Every community can make a difference in the life of a child. Education, awareness and a commitment to make change will help make schools healthy and safe anchors for our nation's future.

INTRODUCTION

The average U.S. public school is 47 years of age. Forty percent of America's schools report needing $36 billion to repair or replace building features such as a roof or plumbing. Two-thirds of America's schools reportedly require $11 billion for repairs and renovations dealing with health and safety problems such as the removal of asbestos, lead in water or paint, materials in underground storage tanks, and radon (USDE, 2005). At the same time, schools show record enrollments (USDE, 2005). To address this problem, federal and state funding is being sought to provide billions of dollars for construction and renovation of public schools (USDE, 2000).

When constructing and renovating schools, thousands of school districts or school boards choose to build schools on available land that is cheap and often contaminated because they are not restricted from doing so. Pressed to save money, they are often enticed by donations of contaminated property, seek out the cheapest land, or hire uncertified or poorly trained contractors to evaluate environmental risks, all posing a great risk to children. In poor and often communities of color, children already suffer disproportionately from asthma, lead poisoning, and developmental disabilities. Constructing schools on contaminated land exacerbates the disproportionate injustices these communities face.

A GROWING TREND:
Siting Schools Near Contaminated Land

Parents across the country are shocked to find construction crews in their communities descending on or next to abandoned landfills, Brownfields (abandoned industrial and commercial contaminated property), or heavily polluting industries to build schools (see box below). Siting schools on or near contaminated land poses a great risk to the health and development of students; however, it is largely a legal act. And shockingly, there are no federal laws and very few state laws or regulations that prevent this from happening.

In a state-by-state analysis of the laws, regulations and policies that apply to the siting of schools, only fourteen states have any variation of a law or regulation that restricts building a school on toxic soil. Only five states have standards for remediation of contaminated soil prior to construction, and only eight states have funding available for the process (see chapter on the "50 State Survey: Existing School Siting Laws, Policies and Regulations").

Schools Continue to be Sited on Contaminated Property

In Cumberland, Maine, the school board attempted to build an elementary school next to a garbage dump. There are no laws in Maine that make building public schools near contaminated land illegal. It was the hard work and persistence of the parents that forced the school board to retract their proposal.

The school board in Quincy, Massachusetts fought hard to build a new high school on an old industrial site that included very toxic chemicals. This land was once the site of a shipyard where waste including asbestos was dumped, and later was used as a steel mill. The Quincy parents fought back and stopped this proposal as well.

Parents in Providence, Rhode Island, however, were not as successful and two of their schools were built next to a dumpsite. Parents in Houston, Texas also lost their fight and now have a middle and a high school located a chain-link fence away from five chemical plants, including Bayer and Goodyear.

99th Street School, Love Canal: Niagara Falls, NY

Twenty thousand tons of toxic chemicals were buried in a mile-long ditch, called the Love Canal, in Niagara Falls, New York. The waste was covered with soil, and a neighborhood was built around the site. The 99th Street Elementary School was built on the perimeter of the dump, and the 93rd Street School was built just two blocks away. Both schools were closed in 1978 after extensive testing revealed high levels of chemical contamination on and around them. Love Canal was the first community to close schools due to potential health risks to children.

In the absence of protective laws that guide theselection of school sites, districts across the country are choosing to build on contaminated land.

In 2005 alone, the Child Proofing Our Communities (CPOC) campaign assisted community groups in Alabama, Florida, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, and Rhode Island who are organizing to prevent new school siting disasters.

Forty to fifty years ago, when many of today's public schools were built, school boards did not understand the seriousness of the threat that chemical exposures pose to human health. Nor was there any understanding of the special vulnerabilities that children have to chemical exposures. Now, after the Love Canal dumpsite crisis in Niagara Falls, New York, and the discovery of the clusters of childhood leukemia in Woburn, Massachusetts, Toms River, New Jersey, and other similar cases across the nation, we know better.

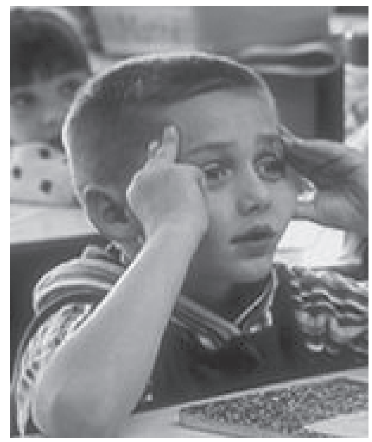
Our Poisoned Schools report in 2001 documented this growing trend of continuing to build schools on contaminated sites with case studies in Tucson, AZ, Los Angeles and Watsonville, CA, Jacksonville, FL, East Chicago, IN, New Orleans, LA, Paterson and Clifton, NJ, Athens and Elmira, NY, Marion, OH, Corry, PA, Providence, RI, and Houston, TX (CHEJ, 2001). This evidence makes it clear that school districts are not learning from past mistakes. A second CHEJ/CPOC report on School Siting further documented this trend by mapping the proximity of public schools to federal Superfund and state-identified contaminated sites in five states: California, Massachusetts, Michigan, New Jersey, and New York. This effort identified how many students were attending school within ½ mile of a known contaminated site. The findings were alarming. In just these five states, there were over 1,100 public schools within a half-mile radius of a known contaminated site, affecting over six hundred thousand children attending classes in these schools (CHEJ, 2002). This trend continues today with the at-risk student population growing even higher.

It is imperative that local communities work with their local and state leaders to pass school siting regulations to stem this growing trend. A proactive policy for assessing sites for contamination will lead to a clean bill of health for many, and avoid student and staff health problems, falling property values, and lawsuits. For sites that result in detectable levels of contamination, schools will benefit from clear guidance to either effectively remediate or abandon the site.

CHILDREN'S
Special Vulnerabilities

The construction of schools on clean soil that is free of chemical contamination is especially important because of the special vulnerabilities of children to toxic chemicals. Children spend a large part of their day at school during a critical period of their growth and development. Exposure to toxic chemicals during this critical time period results in various adverse health effects among children. To needlessly place children at risk of developing illnesses associated with exposure to toxic chemicals, such as cancer, asthma, hyperactivity, and reduced IQ, is irresponsible.

The U.S. Environmental Protection Agency (US EPA, 2003, 1998), the American Academy of Pediatrics (AAP, 2003), the National Academy of Sciences (NRC, 1993), Physicians for Social Responsibility (GBPSR, 2000), and the National Parent Teacher Association (PTA, 2005) have all publicly recognized the importance of healthy school environments for children to reach their full potential, and to stem the increasing numbers of children with serious illnesses and disabilities.



Rising Rates of Disease in Children

Children's health is a current hot topic of discussion in schools and health care facilities because of the rampant increase in childhood diseases and disabilities. In recent years, researchers have gained far better understanding of children's special vulnerabilities to chemical exposures (Bocskay, 2005; GBPSR, 2000; Landrigan, 1998; Bearer, 1995). Although scientists have not determined all of the interactions between chemical exposures and growing children, the data indicates a need to reduce children's exposures to toxins wherever possible.

- Asthma is the most common chronic disorder in childhood, affecting an estimated 6.2 million children under 18 years of age, of which 4 million suffered from an asthma attack or episode in 2003 (ALA, 2005). Asthma is the primary cause of school absenteeism, the third leading cause of hospitalizations among children under the age of 15 (ALA, 2005), and the number one childhood illness in this country (EHA, 2001).

- Asthma carries an annual economic cost to our nation in direct health care costs of $11.5 billion; indirect costs (lost productivity) add another $4.6 billion for a total of $16.1 billion. Prescription drugs represent the largest single direct medical expenditure, at $5 billion per year. The value of lost productivity due to death from asthma represented the largest single indirect cost at $1.7 billion (ALA, 2005).

- Cancer is the number one disease-related cause of death in children (ACS, 2005; NCI, 2005). According to the American Cancer Society, an estimated 9,100 new cases of cancer among U.S. children—newborns to age 14—are expected to occur in 2005 along with 1,400 tragic deaths (ACS, 2005).

- Childhood learning disabilities, hyperactive behavior, and the inability to maintain attention have also soared nationwide. The number of children in special education programs increased 191% from 1977 to 1994 (GBPSR, 2000), and federal Special Education grants increase each year (USDE, 2004).

- Conservative estimates of children suffering from attention deficit hyperactivity disorder (ADHD) range from 3–6% of school-age children. Some researchers suggest a much higher rate, near 17% (Goldman, 1998).

- Autism appears to be skyrocketing. In California, childhood autism rose over 200% between 1987 and 1998 (CHHS, 1999).

- Children are exposed to more chemicals now than in the past. A recent British study found that 9 year old children had an average of 25% more manufactured chemicals in their blood than their living grandparents, and that the concentration of some of these chemicals was also higher (WWF, 2004).

- Scientists believe many of these diseases and learning problems may be related to children's exposure to environmental chemicals in the womb or their everyday environment, including their school (GBPSR, 2000; Needleman, 1994).

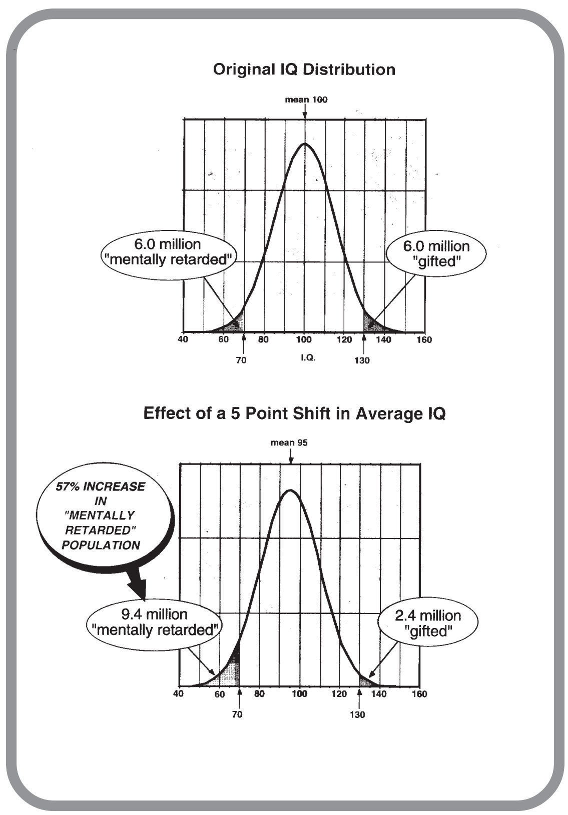
These increases in disease and disability critically impact the present and future of our nation. Making our children sick or unable to develop their full intellectual potential could devastate future generations, the economy, and our quality of life.

The U.S. mandates its schools to educate our children so that they can become vital contributors to society. Most definitely they are not commissioned to hamper children's intellectual development and health. Moreover, education not only is the foundation of a stable, just society but critical to national economic competitiveness. Continued increases in rates of learning disabilities, lower IQ scores, hyperactive behaviors, and more could imperil our nation's future economic base.

We live in a global world economy in which information increasingly figures as the currency of national wealth. Our nation's ultimate competitive resource is the intellect, training, and creative capacity of our citizens. Lacking these, we will be left behind.

Timothy Wirth of the United Nations Foundation analyzed IQ trends and found, "In a society of 260 million people with an average IQ of 100, 2.3% of the population would have an IQ of less than 70. That translates to 6 million people with IQ scores that define mental retardation. On the other end of the curve, 2.3% of the population would have IQ scores above 130. In other words, 6 million people would be categorized as "gifted" (Wirth, 2000).

Figure 1:



A lowered average IQ of just 5 points—from 100 to 95—would shift the number of people with low IQs dramatically. As Figure 1 shows, the number of people with IQ scores in the range of mental retardation would increase 57%—from 6 to 9.4 million. Conversely, the number deemed "gifted" would drop 60%, from 6 to only 2.4 million (GBPSR, 2000).

The economics of this data are clear. The social costs of caring for a larger fraction of the population classified as mentally retarded far exceed those of environmental protection. Using this same analysis, society loses the creativity and intellectual leadership of 60% of potentially "gifted" individuals such as Bill Gates, Steven Spielberg, or Tiger Woods (Wirth, 2000).

The elimination of lead from products such as gasoline and paint was perhaps the most significant educational advance of the twentieth century. Current research shows a 10-point drop in blood lead level means an average 2.8-point IQ gain. Blood lead levels plunged 15 points after lead was removed from gasoline in the U.S. (Weiss, 1997). This gives every baby born today a "gift" of four to five IQ points. Conservative calculations suggest each IQ point is worth about $8,300 in additional lifetime income. With about 4 million babies born annually, the elimination of lead has added an economic value of over $100 billion per year to the nations economy for the lifetime income of these children (Wirth, 2000).

Schools are crucial for our children to succeed and our nation to compete. Clearly, to provide the education and training our children require, learning must occur in an environmentally safe place—one that supports, and most certainly does not impede, intellectual growth.

What Makes Children Especially Vulnerable to Environmental Chemicals?

The special vulnerability of children to environmental chemicals demands that schools act to protect them. Children are more often exposed to environmental threats than adults and more susceptible to environmental disease. This makes

them highly vulnerable to chemical exposure. Of small size and still developing, they take in more food, drink, and air per pound of body weight. Children behave like children, and have more years to develop disease. Scientific committees have recommended using a 10-fold safety factor to accommodate these and other differences when estimating health risks for children exposed to toxic chemicals (USEPA, 1998a).

Children are still developing and remain vulnerable through adolescence.

During prenatal development, infancy, and adolescence, children are growing and adding new tissue more rapidly than at any other period of their lives. Because their tissues and organ systems are still developing and mature at different rates, they are susceptible to environmental chemical influences over an extended time.

Children move through several stages of rapid growth and development. From conception to age seven, growth is most rapid. Crucial systems continue to develop from birth through adolescence, such as that of the reproductive system. Insulation of brain nerve fibers is not complete until adolescence. Similarly, air sacs in the lung, where oxygen enters the blood stream, increase in number until adolescence (Needleman, 1994).

During these critical years, as structures and vital connections develop, body systems are not suited to repair damage caused by toxins. Thus, if neurotoxins assault cells in the brain, immune system, or reproductive organs, or if endocrine disruption diverts development, resulting dysfunction will likely be permanent and irreversible. Depending on the organ damaged, consequences can include lowered intelligence, immune dysfunction, or reproductive impairment (Landrigan, 1998).

Children's immature systems are less able to handle toxins.

Because organ systems are still developing, children absorb, metabolize, detoxify, and excrete poisons differently from adults. In some instances, children are actually better able to deal with environmental toxins. More commonly, they are less able and thus much more vulnerable (Landrigan, 1998). For example, children absorb about 50% of the lead to which they are exposed, while adults absorb only about 10%. Their less developed immune system is also more susceptible to bacteria such as strep, to ear infections, to viruses such as flu, and to chemical toxins (Needleman, 1994).

Children eat more, drink more, and breathe more.

U.S. children ages one to five eat three to four times more per pound of body weight than the average adult. Infants and children drink more water on a body-weight basis and they take in more air. Differences in body proportions between children and adults mean children have proportionately more skin exposure (NRC, 1993). Children, therefore, consume and absorb more toxins relative to adults.

Children behave like children.

Normal activities heighten children's vulnerability to environmental threats. Their natural curiosity, tendency to explore, and inclination to put their hands in their mouths often opens them to health risks adults readily avoid. Young children crawl and play on the ground or floor and play outside.

These natural tendencies expose them to contaminated dust and soil, pesticide residue, chemicals used to disinfect or clean, gardenweed-killers, fertilizers, and other potentially hazardous substances. Their curiosity may lead them to explore situations that could expose them to environmental hazards. For example, they may enter fenced-off areas or polluted creeks and streams (Bearer, 1995).

Many children, especially infants readily put toys and other familiar objects in their mouths, especially when teething. Many of these toys are made with the plastic polyvinyl chloride or PVC. In order to make these plastics soft and pliable, chemicals called phthalates are often added to the PVC. These "plastisizers" leach out of the toys and can be ingested by children (CHEJ, 2004; Shea 2003). Phthalates are animal carcinogens, can cause fetal death, malformations, and reproductive toxicity (Shea, 2003).

Children have more time to develop disease.

Children's longer remaining life span provides more time for environmentally induced diseases to develop. Exposure to carcinogens during childhood, as opposed to adulthood, is of particular concern since cancer can take decades to develop (Landrigan, 1998).

THE SCHOOL SITING PROCESS:
Factors that Influence Where New Schools are Located

School districts chronically lack the resources required to meet renovation and construction needs. Often pressure to reduce expenses and expedite the process encourages shortcuts. As a result, far too many schools are located near or on contaminated property.

The push to build new schools is complicated by the dearth of appropriate sites. In urban school districts, the need for schools is often greatest in densely populated neighborhoods that lack vacant land. Building new schools in these communities can mean condemning and clearing existing homes and businesses or siting schools on previously industrial property. In other instances, schools are built on cheap land far from the community served, in industrial or agricultural areas. Wealthy residential communities often deny sites for schools that would serve students of color or low income.

School siting is complex, involving many factors:

- Communities of color and low-income eagerly await new, technologically advanced schools with resources needed by their children since most of their schools are old and rundown, often with asbestos, lead, and mold problems. These schools lack resources for providing learning skills essential to compete in current and future job markets. Parents in these communities often face an unfair decision: accept siting on inexpensive contaminated land so that funds remain to procure needed technology, or build on expensive environmentally safer property, depleting funds for teaching resources.

- Teachers and administrators prefer new schools, especially with fewer students per classroom, new computers, and more resources for children and staff. They face the same dilemma: either cheap contaminated land with more resources, or safer property with fewer resources.

Moton Elementary School: New Orleans, LA

Residents of Gordon Plaza—1,000 low and middle-income African Americans—discovered only after they moved in that they were living on the former Agriculture Street Landfill—the city's municipal waste dump for more than 50 years. The landfill was never properly capped, and residents began almost immediately to dig up trash and building debris in their backyards.

Construction of Moton Elementary School—intended to serve 850 students from Gordon Plaza and a nearby housing project—was completed in 1987 despite residents' concerns about high levels of lead and other toxins at the school site. During the three years the school was open, children and staff were sick with rashes, vomiting, respiratory problems, and headaches, and plumbing problems made it impossible to use the school cafeteria and toilets. In 1990, the superintendent overruled the school board and shut the school down.

The U.S. EPA added Agriculture Street to Superfund in 1994 and began a $20 million cleanup of the site in 1998, replacing two feet of soil while residents remained in their homes, exposed to contaminated dust throughout months of cleanup work. Moton Elementary School reopened in September of 2001. In some areas on the school grounds, only six inches of soil were replaced. Despite its history, 900 students currently attend the school.

- Urban areas face choices still more complex. Fairly clean areas are often green space for public parks or recreation. Citizens must ask whether using these areas for safely housing school children is more important.
- Often no investigation of past land use precedes construction, leaving discovery of chemical contamination until after resources are committed.
- Neighborhoods near industrial complexes and contaminated sites are hard pressed to site a "neighborhood" school out of harm's way. How can school grounds be "cleaner" than neighborhood homes?
- Very few state standards exist to guide school officials to adequately assess the potential "risk" to children when considering a site once used for industrial purposes or near an industrial complex.

Failure of the Regulatory System and Science

Most of the public believe that government agencies and regulations adequately protect children's health at school or that some "authority" surely oversees school safety and takes great care to guard children from exposure to toxic chemicals. This assumption is often incorrect. Only a few very specific and limited laws and regulations are specifically designed to protect children—for example, regulation of asbestos in schools and lead in wall paint. Compounding the problem of a lack in state regulations regarding school siting, it is nearly impossible to definitively link a child's exposure to chemicals from industrial contamination to a specific health outcome. That does not mean no link exists, just that the scientific tools that assess health impacts are too crude to provide certainty.

For example, in a small New York rural school, 24 students, 5 teachers, and 3 custodial workers were diagnosed with cancer. All attended or worked at a public school located on an old industrial site contaminated with cancer causing chemicals. However, because the population is small and information on how the chemicals affect growing children is lacking, an absolute cause and effect link cannot be proven.

The impact of chemicals on children is difficult to assess because of the lack of information and scientific research. Of an estimated 87,000 chemicals in use today, the majority lack basic toxicity testing (USEPA, 1998b). An EPA review of 2,863 of the most commonly used chemicals found no toxicity information available for 43% and a complete set of toxicity data for only 7% (USEPA, 1998c). Toxicity refers to whether a chemical can cause harm. Currently, much attention is given to whether a chemical can cause cancer. Other important health effects, such as impairment of the immune, hormone, reproductive, or nervous systems, generally receive much less research.

New research is beginning to address health effects to children from exposure to low doses of chemicals in combination. A November 2005 study concluded that exposures to the four toxins studied —lead, radon, tobacco smoke and by-products of drinking-water disinfections — are ubiquitous, and there is growing evidence that even low-level exposure can have adverse health consequences (Wigle, 2005).

School Board Accountability

Local school board members live, work, and play in or near the community. Whether elected or appointed by local government officials, they should be accountable to the local community. In some cases, school boards have been very responsive to public concern. Some have taken proactive steps to protect students, staff, and the public at schools by limiting pesticide use or choosing not to build on contaminated land.

However, many take a "business as usual" position that blames bureaucracy to avoid accountability when things go wrong.

There are many documented cases of local school board silence about chemical contamination beneath or next to their school. School administrators fear lawsuits from parents, teachers, and others for placing children and personnel in harm's way. School boards also dread the cost of cleaning up contamination or replacing a school.

Brownfields and Schools

The lack of protective guidelines is of significant concern when districts debate constructing a school on what have come to be called "Brownfield sites." The EPA describes Brownfields as "abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination" (USEPA, 1995). Anyone who purchases property officially designated a Brownfield is essentially free of liability for any contamination that may be found. In some cases, no environmental testing is required to so designate a site.

More importantly, when these sites are redeveloped, they need only be cleaned up to standards set for commercial or industrial property. Such standards vary among states, counties, and cities but all provide less protection of human health than those required for residential property. Designation as a Brownfield is essentially a promotional real estate tool to encourage businesses to purchase and redevelop areas in order to stop sprawl and bring jobs and revitalization to urban areas. Such property is not intended for siting schools, parks, or playgrounds. Brownfields typically are in densely populated urban areas, but some are also in rural locations (e.g., agricultural land, abandoned mine areas, burn dumps, abandoned lumber mills).

Brownfields are often selected as sites for new schools in urban areas because of the lack of available unused property and the need for new schools due to growing student enrollment. In many urban areas, Brownfields are the only option for keeping schools in close proximity to the community served.

Parents Are Often Kept in the Dark

Parents, teachers, and concerned citizens have a right to know about health and safety risks to children in school. Despite current right-to-know laws, parents remain in the dark concerning hazards in the school environment. Nor does the state department of environmental protection provide notice when a nearby industrial facility has been permitted to release chemicals into the environment. When parents do request information through right-to-know or freedom-of-information laws, school districts often are unable or unwilling to produce basic information about contaminants and hazards on or near school grounds.

Few parents realize they have a right to this type of information from school districts, and few districts apprise them of it or provide information without a formal written request.

Schools should offer all safety information including fire safety inspection reports, emergency management plans, asbestos reports, indoor air quality tests and evaluations, records of pesticide applications, and copies of Material Safety Data Sheets, which comprise toxicity, health, and safety information about products used in schools.

EXAMPLES OF SCHOOLS BUILT
On or Near Contaminated Land

Hundreds of schools nationwide have been built on or near contaminated land. In many cases, taxpayers have carried the burden of providing billions of dollars for cleanup, construction of replacement schools, and medical treatment of disease in exposed children. Either we will learn from the tragedies of past mistakes or repeat them.

Brown-Barge Middle School: Pensacola, FL

Florida is one of only eight states in the nation with a school siting law that requires districts to test for hazardous contamination, and prohibits schools from being constructed near major highways. The school in the following case study fails seven Florida statutes for school siting.

Brown-Barge Middle School first opened its doors in 1955 as an African-American elementary school. After decades of varied use and vacancy, Brown-Barge is now one of the region's leading magnet schools. The school sits just a short distance from two federal Superfund Sites, the Escambia Wood Treating Company and the Agrico Chemical Company. Utility pole preservation operations and the manufacture of sulfuric acid and fertilizer left a toxic legacy to residents of the surrounding neighborhood that includes contaminated surface soil, groundwater and drinking water. Contamination levels were so high around the two sites that 358 neighboring families were relocated in 1998, after a five-year struggle by the local community.

Recent samples taken from the Brown-Barge property found dioxin, one of the most toxic chemicals ever tested, to be twice as high, arsenic to be 4 to 18 times higher, and polycyclic aromatic hydrocarbons (PAH's) to be 87 times higher than state residential exposure standards. The PAH levels were twice as high as those found on the Agrico Chemical Superfund site. Several of these chemicals are known carcinogens that move through surface water runoff and wind-carried soil.

Many former students, now in their fifties and sixties, recount brushing yellow powder off their chairs and desks; the settling of clouds of sulfuric acid from Agrico Chemical. Recent graduates report autoimmune system, respiratory, skin and reproductive problems they believe are caused by exposure to arsenic. Several have recounted severe skin rashes from contact with the school's sports fields or from wading in water after a heavy rain.

In 2004, a portion of the school's property was purchased for a major highway project. Tests conducted by the Department of Transportation found high levels of PAH's and arsenic directly in front of the school, but they proceeded with the work anyway. Chemical laden dust clouds the school grounds during class and after school activities.

Panther Parents Against Pollution (PPAP) organized in 2004 to win school relocation. At a meeting with the Florida Department of Environmental Protection (FDEP) and the local school district, officials tried to calm parents' concerns by attributing the dioxin contamination found in 19 on-site samples to "contaminated potting soil brought in by a parent" and to "roof tar." The community asserted that the contamination was too widespread and too toxic to be disregarded so simply, maintaining that the widespread contamination and high toxicity of the chemicals found at Brown-Barge were from the neighboring Superfund sites, a link the Florida Department of Health (FDOH) was not willing to make. The FDOH report attempted to further minimize the public's concerns by reporting that the risk to children of getting a non-cancer illness was "low" because they were not going to be "eating" the soil.

Several scientists, concerned that students, teachers, administrators and others are being continually exposed to unacceptable levels of PAH compounds, dioxins, and other substances found at the site, have recommended closing the school and cleaning up the contamination. Pensacola officials contend that although toxics on the site are a problem, it does not warrant school relocation.

PPAP, former students and Citizen's Against Toxic Exposure (CATE), the community group responsible for winning relocation of the surrounding neighborhood, continue to struggle to win a safe school site for the children of the Brown-Barge Middle School (Rowan, 2005).

Cesar E. Chavez High School: Houston, TX

Texas is one of 20 states in the nation with no policy of any kind that restricts building schools on or near contaminated sites. See the 50 State Survey for details on Texas's current school siting laws and regulations.

Flare burns from the Texas Petrochemical factory provide onlookers with an ominous backdrop at a Cesar E. Chavez High School football practice. The facility's flames, in plain sight from the school's practice field, serve as a constant reminder to nearby residents of the hazardous chemicals they are exposed to on a daily basis. Cesar E. Chavez High School is in Houston's Harris County, the national leader in benzene and butadiene releases. Some neighborhoods in the county have registered high concentrations of the carcinogen 1,3-butadiene.

Cesar E. Chavez High School sits approximately ¼-mile from three industrial facilities, with a fourth facility just over a mile away. The school site was previously used as an auto repair facility, auto salvage yard, dry cleaner, service station, and lavatory chemical factory. Underground industry pipelines still traverse the school property. Suspicion of residual contamination and concern over the school's proximity to industry brought the community together to fight for justice.

The community group Unidos Contra Environmental Racism (UCER), and many other concerned citizens, believe that their primarily Hispanic community (83% of the students at Cesar E. Chavez High School are of Hispanic origin) suffered an environmental injustice with the siting of Cesar E. Chavez High School. Community members argue that the school district took advantage of the fact that the predominantly low-income community lacked the resources and political clout to stop the project, and that school construction in such close proximity to environmental hazards would never have been permitted in a more affluent neighborhood.

However, the new high school was to be a state-of- the-art facility with the latest technological advances and many community members viewed the school as a dream come true, despite the risk posed by environmental hazards.

In their initial efforts to halt construction in 1998, UCER sought the help of local officials and elected representatives, citing the surrounding plants and site history as obvious, categorical deterrents, and pointing to other available sites that would not pose health risks to current and future students and staff. They voiced their concern about long-term exposures of students to high levels of toxins, as well as the imposing risk of an industrial accident at one of the surrounding plants. When City Council and School Board members did nothing to assist the group, UCER gathered 650 signatures petitioning the EPA to intercede on their complaint of environmental injustice. The EPA took some initial action, but their involvement fizzled for reasons unknown to the community. UCER continues to fight for environmental justice and has sought the assistance of organizations such as CHEJ and the Cesar E. Chavez Foundation for help in educating the community about health hazards and environmental toxins.

Students at Cesar E. Chavez High School are starting to voice their own concerns over the school's air quality issues. Recently, at a summer youth program sponsored by the National Wildlife Federation, students worked on a project they titled "The Right to Breathe." The project documented the struggles students face at the hands of industrial pollution (Cappiello, 2005; Parras, 2005; Auliff, 2000).

New Bedford High School and Keith Middle School: New Bedford, MA

Massachusetts is one of eight states in the country with laws that offer districts some direction for evaluating site contamination. Unfortunately, this guidance is often ignored in the face of immediate need for new school facilities. The following case study illustrates how one school is knowingly being constructed on the site of a former city dump, while another requires remediation for the same reason.

Both New Bedford High School and the site of the new Keith Middle School have sorted histories. Directly across the street from one another, their polluted pasts are intertwined, sharing contaminants from the same source. New Bedford High School was constructed in the early 1970's on the site of the former Parker Street Dump. Soil excavated during the construction of the high school was deposited across the street on a piece of property previously referred to by locals as "the swamp," and consequently renamed "the dump."

Illegal dumping continued at the site for years. Some 35 years later, "the dump" would become the site of the new Keith Middle School.

In 1994, then-Mayor Rosemary Tierney asked the Army Corps of Engineers to transform the vacant property ("the dump") into soccer fields. The site was to be renamed McCoy Field, in honor of Andrea McCoy, an Olympic hopeful boxer from New Bedford, who died in a plane crash in 1980. No testing for chemical contaminants was conducted at that time. McCoy Field opened to the public in 1996. Play continued on the grounds until 2003, despite tests in 2000 and 2001 revealing PCB contamination at low levels. When asked at a 2005 City Council meeting whether youth should have been allowed to play soccer on the fields after contamination was discovered, an EPA PCB expert responded, "No, that was not advisable."

Two non-contaminated sites were rejected before the city council chose the contaminated McCoy Field as the site for the new Keith Middle School: the first because it was too small, and the second because it was too expensive. The EPA approved New Bedford's cleanup plan, and remediation efforts of McCoy Field were underway by 2004. Testing conducted during the first stage of excavation at the site revealed PCB levels at 25 times the EPA safety standard. To date, more than 40,000 tons of contaminated soil have been removed from McCoy Field, with total cleanup and site preparation costs estimated at $10 million. Both the City Council and the EPA are confident that high levels of lead, PCBs, barium and other chemicals can be cleaned up to levels that pose no "unreasonable" risk to users of the site. Concerned parents and community members, including the community group Wasted Away, believe the only way to ensure safety at the new school is to remove all of the contaminated soil, an effort that would increase total costs to an estimated $30 million.

In the spring of 2005, chemical testing was conducted in the neighborhoods surrounding McCoy Field in an effort to measure the extent of PCB contamination in the surrounding areas. Low levels of lead, PCBs, barium and other contaminants were discovered beneath the flagpole at New Bedford High School, just across the street from McCoy Field. Upon discovery of contamination, city officials scheduled cleanup plans for the summer of 2006, saying that the levels detected did not pose an immediate public health risk. Remediation plans scheduled for 2006 closely mirror actions being taken at the new Keith site, including removal of the most contaminated soil, capping of less contaminated soil, and covering of the cap with 3 feet of clean soil. No tests were conducted inside of the school, or under any paved areas. If McCoy Field had not been chosen for the site of the new Keith Middle School, harmful PCB contamination at New Bedford High School may never have been addressed.

Community groups continue to fight for proper cleanup of the Keith site as construction of the school continues. Many concerned citizens feel that leaving any contaminated soil at the site is unacceptable, and poses a risk to students and staff (USEPA, 2005; Nicodemus, 2005).

Anthony Carnevale Elementary School, Springfield Middle School, Robert Bailey Elementary School, and Adelaide Avenue High School: Providence, RI

Rhode Island is one of twenty-one states that has school siting policies that direct or suggest school siting officials "avoid" siting schools on or near specified man-made or natural environmental hazards, or direct the school district to "consider" those hazards when selecting school sites. Despite these policies, Rhode Island's capital has become the poster child for poor school siting decisions.

In nearly every year since 1998, Providence has constructed one new school building or renovated an existing building for use as a school. Nearly all the sites chosen for new schools were contaminated by hazardous substances by prior users of the sites. In 1999, the Anthony Carnevale Elementary School and Springfield Middle School were constructed on top of the former Providence City Dump. Concerned parents, neighbors, and the tenant association of a nearby public housing development sued the City and state Department of Environmental Management (DEM), challenging the school siting decision and the cleanup plan for the site.

In a landmark 112-page ruling handed down in October of 2005, the trial court ruled that DEM violated the state's contaminated site cleanup law (the Industrial Property Remediation and Reuse Act or "IPRARA") by failing to consider "issues of environmental equity for low income and racial minority populations" when it approved the cleanup plan for the school. It also found that DEM failed to "develop and implement a process to ensure community involvement throughout the investigation and remediation of [the] contaminated [school] sites," as required by IPRARA. Finally , the Court ruled that the City failed to give proper notice to abutting property owners and tenants concerning the City's investigation of the school site, that the failure to give proper notice rose to the level of a procedural due process violation under the federal and state constitutions, and that DEM was also liable for the City's failure to give proper notice since IPRARA requires DEM to ensure proper notice is given.

Following the controversy surrounding the schools built on the former City Dump, Providence continued to build schools on contaminated sites. In 2000, the Robert Bailey Elementary School was built on the site of a former factory where high levels of lead and beryllium were found in the soil. In 2004 and 2005, respectively, two high schools were proposed on separate contaminated sites, both formerly used for industrial purposes. One site was abandoned by the City after an incinerator ash dump was discovered on the site and DEM required the City to perform additional environmental tests. Instead of proceeding with that site, the City renovated a nearby commercial building for what became the E Cubed Academy so it could be opened on schedule (Fall 2004).

The second school, the Adelaide Avenue High School, was proposed to be built on a portion of the now demolished Gorham silver factory, one of the nation's largest silver manufacturing facilities. The soil where the school is proposed is contaminated with unsafe levels of trichloroethylene (TCE) and polycyclic aromatic hydrocarbons (PAHs), and high levels of arsenic and lead are found in soil on other parts of the Gorham site where no remediation is planned. The City stopped work on the Gorham school site in the spring of 2005 when DEM filed suit against the City to halt work until a cleanup plan *only for the portion of the Gorham site where the school was proposed* was reviewed and approved by the agency. The Court forbade the City from undertaking even limited work on the school site until a plan for that limited work was reviewed and approved by DEM.

While the litigation challenging the dump school has not yet affected the City's choice of sites for schools, the litigation has forced DEM to more closely scrutinize cleanup plans for contaminated school sites. DEM has also required the City to hold more community meetings where results of environmental testing and proposed cleanup plans are discussed (Fischbach, 2005).

Roberto Clemente Learning Academy: Detroit, MI

Michigan is one of the 20 states in the nation with no policies of any kind that restrict building schools on or near contaminated sites. See the 50 State Survey for details on Michigan's current school siting laws and regulations.

Constructed in 1886, the former Beard Elementary School facility in a densely populated, predominantly low-income and minority area of southwest Detroit was bursting at the seams from a century's worth of wear and soaring student enrollment. In 2000, Detroit Public Schools (DPS) proposed construction of a new Beard Elementary School (later renamed Roberto Clemente Learning Academy) on a new site. The site selected by DPS was used for industrial purposes for the better part of the 20th century, and was contaminated with lead, arsenic, polychlorinated biphenyls (PCBs), and other toxic chemicals.

Concerned parents teamed up with the environmental group, Southwest Detroit Environmental Vision (SDEV), to fight the school's construction. In 1999, SDEV hired an environmental consultant to review the site's history, which prompted DPS to conduct their own testing. Testing revealed high levels of lead, PCBs, arsenic, and other contaminants at the site, warranting involvement of the Michigan Department of Environmental Quality (MDEQ).

Together with concerned parents, SDEV closely monitored MDEQ throughout the site evaluation process. Both the community group and MDEQ put pressure on DPS to ensure that environmental dangers at the site were properly characterized. Though their 2001 lawsuit to halt construction was lost, the judge ordered that numerous safeguards be put in place to address the community's health concerns, including increased monitoring of environmental contaminants, hiring an independent consultant to advise on additional testing and cleanup actions, providing bilingual reports on monitoring and maintenance at the site, and creating a Citizens Advisory Committee.

Extensive remediation efforts were taken at the Roberto Clemente Learning Academy. Contaminated soil was removed from the site to a depth of 7 to 26 inches depending on the intended use for that particular area. All paved areas, including the parking lots, curbs, sidewalks and the basketball court, were underlain with four inches of aggregate and topped with either four inches of paved concrete or three inches of asphalt. A triple-layered protective barrier of varying thickness was installed on all unpaved areas on the property. On landscaped areas, the barrier consists of a geotextile layer, placed on top of the contaminated soil to be left on-site, followed by 4 inches of compacted crushed concrete, and 8 inches of clean topsoil. Grass and other landscaping were planted in the clean topsoil. On areas with a higher level of activity, such as sports fields, a more protective 8 inches of compacted crushed concrete were used, followed by the same 8 inches of topsoil. For the baselines of the baseball field, eleven inches of crushed concrete were placed on top of the geotextile layer, followed by five inches of stone dust.

Because children are more sensitive to chemical exposures, an even more conservative barrier was installed beneath the kindergarten and preschool play areas. The barrier for these areas consists of 6 inches of sand, a 4-inch thick poured concrete slab with reinforcement rod, followed by 4 inches of pea gravel, covered by 12 inches of wood fiber as a cushioned barrier. An 8-inch concrete wall tied into the 4-inch concrete slab surrounds each play area to keep the surrounding soil out and retain cover materials. A maintenance and monitoring plan was prepared to ensure the integrity of the preventative measures taken at the site. The plan includes monthly inspections of the site cap, paved areas, concrete building floor, and other exposure barriers.

Parent and community activist involvement early on in the process helped hold authorities accountable for proper cleanup of the Roberto Clemente Learning Academy. Without laws requiring DPS to conduct site assessments, testing, alternate site evaluations, remediation, and to encourage public involvement, it was left up to the community to put pressure on DPS to clean up the site.

The extensive remediation efforts at the new school site have been called into question. Various breaches in the multi-layered barrier have not been promptly repaired, school officials have been accused of not taking the monitoring plan seriously, and the community is experiencing difficulty in gathering the latest information about the site's safety (Benjamin, 2005; UM, 2005).

50 STATE SURVEY:
Existing School Siting Laws, Policies and Regulations

To better inform policy discussions surrounding the siting of schools, a survey of the laws, regulations and policies (referred to hereafter as "policies") related to the siting of schools on or near sources of environmental pollution in all fifty states was conducted (Fischbach, 2005a). This research grew out of a lawsuit filed by Rhode Island Legal Services in 1999 challenging the siting of an elementary and middle school on top of the former Providence City Dump. The results of the survey show a pressing need for the adoption of policies to prevent the siting of public schools on sites where children may be exposed to unhealthy levels of hazardous substances or pollution. Visit http://www.childproofing.org to view a summary document of the survey that includes a comprehensive list of each state's policies and links to web sites where the actual policies can be located.

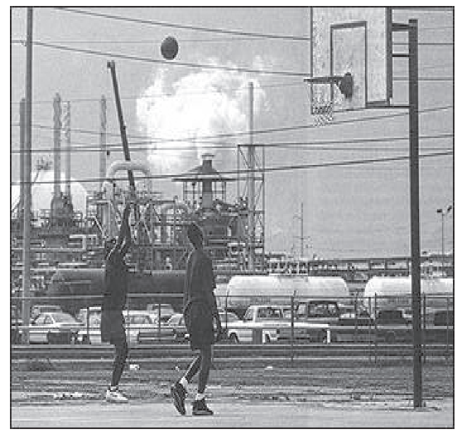


Table 1 provides an overview of the survey results. As the table shows, there is currently a significant policy gap with respect to siting schools on or near contaminated land or sources of pollution. Despite the health hazards that on-site and off-site environmental contaminants pose to children:

- Only five (5) states prohibit or severely restrict siting schools on or near hazardous or toxic waste sites. Another nine (9) states have policies that prohibit outright the siting of schools on or near sources of pollution or other hazards that pose a risk to children's safety (see Table 1, Column 2).
- Twenty-four (24) states have no policies that require sponsors of new school projects to investigate or assess environmental hazards at potential school sites (see Table 1, Column 4).
- Only five (5) states have policies that specifically require sponsors of new school projects to undertake remediation or cleanup measures at contaminated school sites (see Table 1, Column 5).

In the other forty-five (45) states, contaminated school sites may be subject to cleanup requirements under state hazardous waste laws or other authority applicable to any contaminated site. The policies reported in this section specifically relate to contaminated sites used for new school construction projects.

- Twenty-one (21) states have school siting policies that direct or suggest school siting officials "avoid" siting schools on or near specified man-made or natural environmental hazards, or direct the school district to "consider" those hazards when selecting school sites (see Table 1, Column 3). Fifteen (15) of these states have adopted siting policies that direct school districts to either consider the proximity of sources of pollution when selecting sites or to avoid siting schools near those sources. Eight (8) of these states have a vaguely worded directive relating to environmental factors or safety of a proposed site, which provides little guidance to school officials on how to safely site schools.

- Twenty (20) states have no policies of any kind affecting the siting of schools in relation to environmental hazards, the investigation or assessment of potential school sites for environmental hazards, the cleanup of contaminated sites, making information available to the public about potential school sites or providing some role for members of the public in the school siting process (See Figure 2, or Table 1, Column 1).

- Only seventeen (17) states require the sponsors of school projects to solicit public input on school sites through the use of public notice and comment policies; limited notice and comment afforded to particular agencies or constituencies; school siting advisory committees; and vaguely worded directives that encourage public participation (see Table 1, Column 7). Formal mechanisms for public input in school-siting decision-making add a layer of accountability over those bodies vested with siting authority, to ensure those bodies give proper consideration to environmental hazards.

- Of the thirty (30) states that have some policy regulating the siting of schools in relation to sources of man-made or natural environmental hazards, in twenty (20) states the policy is administered solely by the state education agency; in eight (8) the policy is administered by the state education agency and another agency, usually the state environmental agency or health department; in one (1) state, by the state health department and in one (1) state, by local officials.

Figure 2:

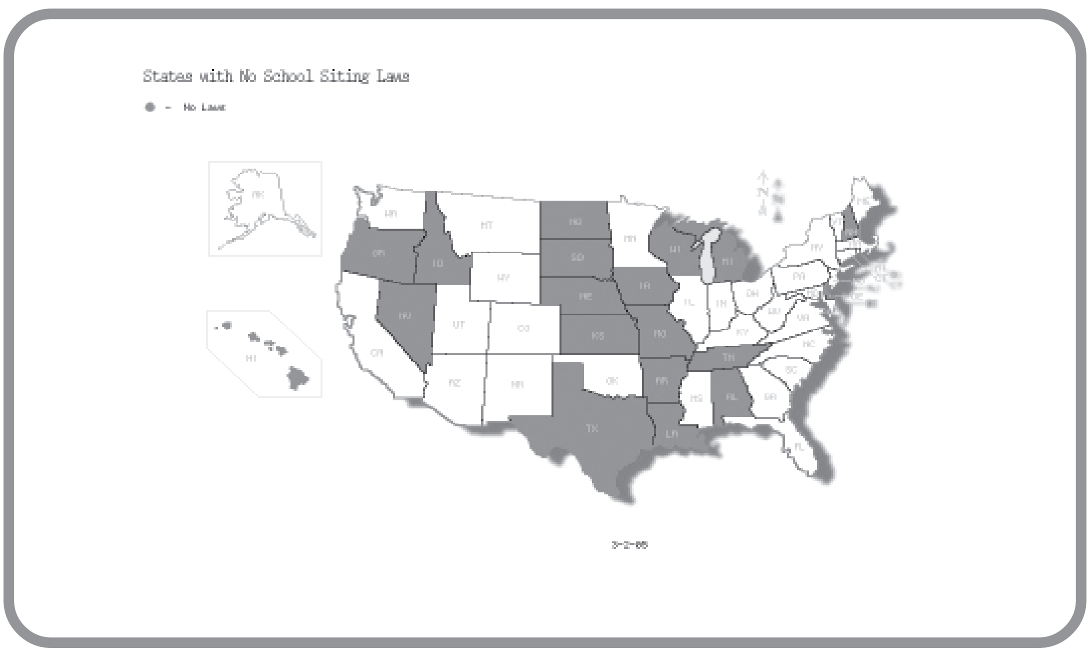


Table 1: State-by-State School Siting Policies

State	No Policies of Any Kind	Prohibited Sites	Siting Factors	Environmental Evaluation	Remediation	Funding Provisions	Public Participation	Information Available	Form Available
Alabama	X								
Alaska			X	X					X
Arizona			X	X					
Arkansas	X								
California		X	X	X	X	X	X	X	X
Colorado				X			X		
Connecticut		X		X		X			X
Delaware	X								
Florida		X	X	X	X				
Georgia		X	X	X			X		X
Hawaii	X								
Idaho	X								
Illinois			X	X	X		X	X	
Indiana		X	X				X	X	
Iowa	X								
Kansas	X								
Kentucky		X		X		X			
Louisiana	X								
Maine			X	X			X		X
Maryland				X			X		X
Massachusetts			X	X	X		X	X	
Michigan	X								
Minnesota			X	X			X	X	X
Mississippi		X	X	X					X
Missouri	X								
Montana		X							
Nebraska	X								
Nevada	X								
New Hampshire	X								
New Jersey		X		X	X	X	X	X	
New Mexico		X		X					X
New York			X	X			X		X
North Carolina			X	X			X		X
North Dakota	X								
Ohio			X	X		X			X
Oklahoma		X							
Oregon	X								
Pennsylvania				X			X	X	X
Rhode Island			X						
South Carolina		X	X	X			X		
South Dakota	X								
Tennessee	X								
Texas	X								
Utah		X	X	X			X		X
Vermont			X	X		X	X		X
Virginia	X								
Washington			X	X		X		X	X
West Virginia		X	X	X		X			
Wisconsin	X								
Wyoming			X	X			X		

Definitions of Categories in Table 1:

COLUMN 2: Prohibited Sites — Policies that prohibit a school district from using certain sites for school projects due to health or safety concerns with regard to transportation routes, transmission routes (e.g. pipelines, power lines), point sources of pollution, prior land uses, natural hazards, and other general environmental conditions.

COLUMN 3: Siting Factors — Policies that direct or suggest how school siting officials should evaluate potential school sites in relation to the site's proximity to transportation routes, transmission routes, point sources, prior uses, natural hazards, and other general environmental conditions. This category is distinguishable from the "prohibited site" category in that the policies listed here do not categorically exclude a site from consideration, thus giving school districts greater discretion as to where to site schools.

COLUMN 4: Environmental Evaluation for Site — Policies that require sponsors of school projects to evaluate environmental conditions at proposed school sites and environmental impacts of school projects. Only those states having policies that specifically address school sites or school projects are included in this section.

COLUMN 5: Remediation — Policies that provide for site remediation measures or standards developed specifically for the cleanup of contaminated school sites. This criterion does not address cleanup standards for specific hazardous substances other than those levels established specifically for school sites; rather it surveys general remediation measures for school sites.

COLUMN 6: Funding Provisions — Policies that provide funding to reimburse school districts for costs incurred specifically for environmental evaluation and/or remediation of site, as opposed to funding generally for site acquisition or preparation. Also includes policies that provide funding to cover staff positions to oversee remediation of contaminated school sites.

COLUMN 7: Public Participation — Policies that require public hearings and/or public comment periods regarding potential school sites; the formation of school siting committees or other committees charged with selecting school sites composed of members of the public; other policies whereby the public becomes involved in the site selection process. Excluded from consideration were requirements to place school construction projects before voters for approval.

COLUMN 8: Information Available — Policies that require information about potential school sites to be made available to the public during the school site selection process regarding environmental investigations and conditions at potential school sites.

COLUMN 9: Form Available — Forms for Site Evaluation and Remediation that are available online. These forms are used to evaluate environmental conditions and develop cleanup plans at potential school sites in these states. (Available in the Summary Document of the 50 State Survey at www.childproofing.org.)

MODEL SCHOOL SITING LEGISLATION:
Guidance for Acquiring School Property and Evaluating Existing Sites

The siting of schools on clean, uncontaminated property is critical to providing a safe learning environment for children and a safe working environment for teachers and employees. However, no federal and very few state guidelines or criteria exist for where to locate schools or how to avoid environmental health risks to children and staff. Across the nation, school boards and school districts seek to define cleanup goals that protect children from harmful exposures to chemical contaminants when assessing potential contamination on candidate sites located on or near contaminated property. School boards/districts also struggle to understand whether nearby operating industrial sites and other sources of chemical releases to the air, soil, and water pose health risks to students and staff. School boards, local government agencies, parents, and school staff need guidance to define how close a contaminated site or source of contamination can be to a school without posing a health threat.

Laws related to the siting of schools differ from state to state. In some states, local school districts have no limits on their power to select school sites. In other states, local districts must obtain approval from state education officials before proceeding with construction. A handful of states have created special school construction corporations that have the power to select school sites. Similarly, laws governing the environmental assessment and cleanup of sites where hazardous and/or solid waste was disposed varies considerably between states. These differences make it difficult to draft a single piece of model legislation that could be adopted in every state.

CPOC developed this model legislation to help local activists working with legislators to develop comprehensive school siting legislation (covering both public and private primary and secondary schools) that protects children's health. This model legislation was informed by the 50 state survey of school siting laws and contains many of the elements of school siting policies identified in the survey (e.g. public participation, categorical exclusions of sites, environmental evaluation of sites, required remediation of sites, and making information available to the public). The drafters of legislation in your state will need to check their own laws to determine how the authority for selecting school sites has been delegated to local or state officials and to develop timetables for completing the environmental review process included in the model. For information on your state's laws regarding school siting, see the *50 State Survey: Existing School Siting Laws,* earlier in this report.

KEY ELEMENTS
of a Protective School Siting Policy

1. ENSURING MEANINGFUL PARTICIPATION IN SCHOOL SITING DECISIONS

The Public Body responsible for siting new schools is usually the local school board or a school committee. State law must require the "Public Body" (used throughout this section to mean the local school board or school district committee) to establish a school siting committee, whose job it is to recommend to the Public Body sites for building new schools, leasing space for new schools, and/or expanding existing schools. The committee shall include representatives of the Public Body as well as representatives from the following stakeholders: parents (particularly those from the feeder schools that will comprise the new school's population), teachers, school health nurse or director, officials from local health departments, community members, local public health professionals, environmental advocacy groups, and age-appropriate students. The Public Body shall also establish a web site for the School Siting Committee, where information about candidate school sites is posted, including notices of environmental evaluations required under this model legislation, public and agency comments received on those evaluations, and key correspondence of the Public Body regarding candidate sites. Many states already require school districts to form school facility planning committees, which could also serve as a school siting committee. Only public bodies that have appointed School Siting Committees representing such stakeholders should be eligible to receive federal or state money for the assessment, and cleanup of school sites, or the construction of a new school. State law must also require the Public Body to notify parents, school staff, members of the local community, and "feeder" parents of the new school's students of plans to build, or lease space for, a new school and to solicit their participation in writing and at public meetings. This outreach effort should include prominent placement of public notices about the proposed plan in commonly read newspapers or local magazines and on the web site of the School Siting Committee. A notice shall also be posted in a conspicuous place in every school within the Public Body's jurisdiction (in multiple languages if there are a significant number of non-English speaking parents). A copy shall also be delivered to each parent-teacher organization within the jurisdiction, each labor union covered by a collective bargaining agreement signed by the Public Body, and each landowner within 1,000 feet of the proposed site.

Public participation is an essential element in the environmental evaluation and remediation of candidate school sites. The process, outlined in Section 3 of this chapter, contains additional public participation requirements that public bodies must follow when considering school sites that may be impacted by pollution.

2. CATEGORICAL EXCLUSION OF CANDIDATE SCHOOL SITES

State law must prohibit the siting of new school facilities (whether by new construction or leasing) on certain sites that pose unacceptable risks to future users of the school. Under no circumstances should a school be built on top of or within 1,000 feet of a site where hazardous or garbage waste was landfilled, or where disposal of construction and demolition materials occurred. To determine whether a candidate school site has been used for these purposes, an Initial Environmental Assessment should be undertaken, and, if necessary, a more extensive Preliminary Endangerment Assessment (see discussion below) shall be done. If either evaluation reveals that the site has been used for these purposes, or if the site is within 1,000 feet of any property used for these purposes, the site must be abandoned. For other sites impacted by on-site or off site sources of environmental pollution, extreme care must be taken before such sites can be used for schools (see next section).

3. EVALUATING CANDIDATE SITES

Overview

To ensure that the Public Body selects school sites that do not present dangers to the health of students, teachers and school workers, CPOC developed a process that ensures that candidate school sites are thoroughly investigated, evaluated and where necessary, cleaned up. The Public Body shall not proceed to acquire a site, by purchase or leasing, or to prepare a site for construction of a school, including the expansion of an existing school, until the Public Body completes the required environmental investigations and evaluations and the state environmental regulatory agency has approved each of them. The process for evaluating candidate sites where a school might be built involves multiple steps, as shown in the flow chart in Figure 3.

The first step is an Initial Environmental Assessment (IEA), often referred to as a "Phase I Assessment." Based on the information found during this initial assessment, a more extensive investigation, a Preliminary Endangerment Assessment (PEA), may be required. This second step is often referred to as a "Phase II Assessment." The IEA and PEA proposed in this model are more comprehensive than those performed for typical Phase I and Phase II assessments, thus the use of different terminology.

The third step involves the Public Body making a decision on whether to proceed with building a school on a contaminated site. This decision should be based on a review of information gathered in steps 1 and 2, particularly evaluating contamination levels found during the PEA.

- The PEA might indicate that a candidate site is not contaminated, and the site can be safely used for school purposes,
- The PEA may indicate that there is minor contamination at the site that needs to be cleaned up so the site can be used for a school, or;
- The PEA may reveal that the site contains amounts of contaminants at high enough levels that the Public Body should abandon the site.

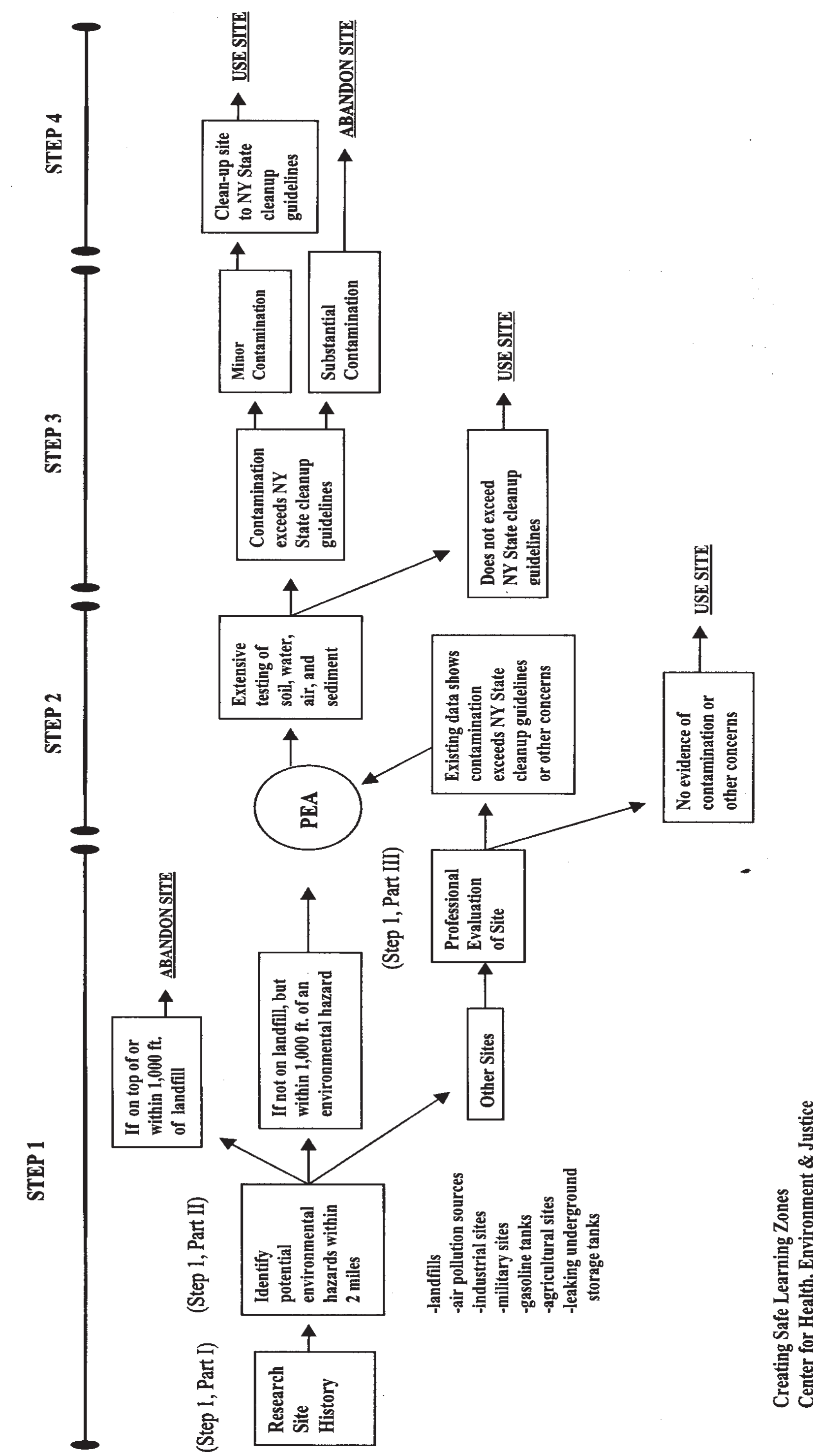
If the Public Body decides to proceed with constructing a school on a contaminated site, a Site Remediation Plan needs to be developed by the Public Body with input from the public and approved by state environmental officials. In any event, no school shall be built on any portion of a larger contaminated site unless the whole site is safely remediated.

Some sites that are abandoned due to the presence of substantial contamination identified by the PEA may be reconsidered as a Last Resort Site if the Public Body genuinely has no other choice of sites. Remediation measures for addressing Last Resort Sites are discussed in detail later in this chapter. This situation might occur in an urban setting where available sites are limited because of existing development. These sites should **only** be considered as a last resort, after all other candidate sites have been evaluated and eliminated (at least two other sites must be considered) and if specific remediation measures to clean up the site are used. Each step in this process is described in more detail below.

3A. Step 1
Initial Environmental Assessment

Once a candidate site is identified, the Public Body must hire a licensed environmental professional (typically a professional engineer or geologist, or an environmental health scientist with an engineering background) to conduct a three part Initial Environmental Assessment (IEA). The professional who conducts the IEA shall collect information on current and past site uses, evaluate past and/or existing site contamination, and identify potential sources of pollution located nearby and evaluate whether they might impact the candidate site. The purpose of the initial assessment is to determine whether a proposed site falls under the categorical exclusion for former landfill sites and to determine whether the site was likely contaminated by hazardous substances and, thus, requires a more thorough investigation, referred to as a Preliminary Endangerment Assessment or PEA.

FIGURE 3: OVERVIEW OF PROCESS FOR EVALUATING AND REMEDIATING CANDIDATE SCHOOL SITES



3A. Part I: **Research and Review the Site's History -** Review public and private records of current and past land uses, historical aerial photographs, environmental databases, and federal, state and local regulatory agencies' files; conduct a site visit and interviews with people familiar with the site's history, including past and present owners.

3A. Part II: **Identify Potential Environmental Hazards** within two miles of the candidate site including all of the following potential sources of contamination:

- Any known or suspected hazardous, industrial, or municipal waste disposal site
- Any private, commercial, industrial, military, or government facility where toxic chemicals were used, stored or disposed of
- Refineries, mines, scrap yards, factories, dry cleaning facilities, sites where there have been chemical spills or other significant contamination
- USEPA or state designated Brownfield sites (even if remediated)
- Facilities found on EPA's Toxic Release Inventory (TRI)
- Agricultural land where pesticides and herbicides have been applied
- Dust generators such as fertilizer or cement plants, or saw mills
- Leaked gasoline or other products from underground storage tanks
- Concentrated electrical magnetic fields from high intensity power lines and cellular communication towers
- Areas of high concentrations of vehicular traffic such as freeways or highways
- Railroad yards and beds
- Waste water treatment plants

If the IEA finds that a candidate site was previously used for hazardous or garbage waste disposal, or for disposal of construction and demolition materials, or if it is within 1,000 feet of any property used for these purposes, the site must be abandoned as described in Section 2 above.

If the IEA finds that a candidate site is within 1,000 feet of any potential source of contamination including those listed above, a more extensive site assessment, the PEA, must be conducted. A PEA shall also be required if any data or information collected in the Initial Environmental Assessment reveal that the site, or any portion of the site, is subject to serious hazardous chemical exposures as a result of the past or current presence of any of the above sources.

3A. Part III: **Render Professional Judgment About Whether to Conduct a PEA -** If a PEA is not otherwise required (see above), data and information identified and collected during Parts I and II of this assessment will be considered at this stage. Such existing information might include test results from samples collected from soil, soil gases, surface water, groundwater, sediment, and ambient air. Other factors that could affect candidate sites including the direction of surface or groundwater flow, wind direction and patterns, and contaminant transport processes identified in soil or sediment at the site will also be evaluated at this stage. This evaluation shall be conducted by a licensed environmental professional (typically a professional engineer or geologist, or an environmental health scientist with an engineering background) who will use professional judgment to decide if a PEA was warranted for a candidate site. For example, a candidate site that is located downwind from stationary or mobile sources of air pollution that could impact children attending school at a candidate site might warrant a PEA in the judgment of an environmental professional.

If existing contamination is discovered as part of this evaluation, as a result of previous sampling conducted at the site, the levels found should be compared to a list of cleanup guidelines developed by the New York State Department of Environmental Conservation (see Table 2 and discussion in Section 3C below). If contaminant levels exceed any of these values, a more extensive site assessment, a PEA, must be conducted. If any portion of a candidate site is found to be contaminated, then the entire site must undergo a PEA.

The state environmental regulatory agency must review the final draft of the Initial Environmental Assessment. Depending on the thoroughness of the assessment, the state agency shall give preliminary approval to the assessment, disapprove the assessment, or request more information.

When the final draft of this assessment is complete and has received preliminary approval by the state environmental regulatory agency, the Public Body shall publish a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) and create a website where this notice is posted and includes the following information:

- A statement that an Initial Environmental Assessment has been completed;
- Prior uses of the site that were identified that might raise health and safety issues;
- Proximity of the site to environmental hazards (waste disposal sites, point sources of air pollution, etc.);
- A brief statement describing the results of the assessment such as a list of contaminants found in excess of regulatory standards;
- A brief summary of the conclusions of the assessment; the location where people can review a copy of the assessment or an executive summary written in the appropriate foreign language (if applicable); and
- An announcement of a sixty-day public comment period including an address where public comments should be sent.

A copy of this notice shall be posted in a conspicuous place in every school within the Public Body's jurisdiction (in multiple languages if there are a significant number of non-English speaking parents). A copy shall also be delivered to each parent-teacher organization within the jurisdiction, each labor union covered by a collective bargaining agreement signed by the Public Body, and each landowner within 1,000 feet of the proposed site.

The state environmental regulatory agency will review all comments received on the Initial Environmental Assessment. This agency will then accept or reject the conclusion of the assessment, determine whether the site can be used without further remediation or study, whether the site is categorically excluded for use as a school, or whether further study (i.e., a Preliminary Endangerment Assessment) is required. The state environmental agency shall explain in detail the reasons for accepting or rejecting the assessment.

After the state environmental agency has approved the Initial Environmental Assessment, the local School Siting Committee must also review the assessment and public comments received. The purpose of this review is for the School Siting Committee to make a recommendation to either abandon the site or continue evaluating the impact of environmental hazards at the site with a Preliminary Endangerment Assessment. If no environmental hazards were identified on the property, if no identified sources of pollution located nearby were considered likely to impact the candidate site, and if no concerns were raised during the data and information evaluation step, then the property would be considered suitable for school site development.

If a PEA is required, the School Siting Committee should recommend to the Public Body whether to abandon the site or proceed with a PEA. Alternative sites and options should be considered at this point. An IEA should be completed for any alternative site being considered. Then, the Public Body must vote whether to abandon the site originally investigated, conduct an IEA for the alternative sites, or proceed with a PEA for the candidate site.

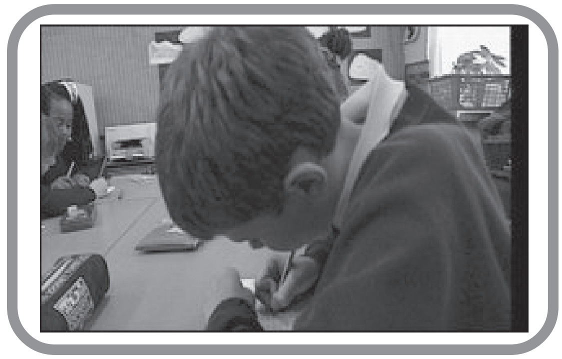
3B. Step 2
Preliminary Endangerment Assessment

A Preliminary Endangerment Assessment (PEA) is an in-depth assessment of the environmental contamination present at a site. A licensed environmental professional must do this assessment. As with the IEA, this will typically be a professional engineer or geologist, or an environmental health scientist with an engineering background. The state environmental regulatory agency shall oversee the PEA process and issue regulations that prescribe the precise contents of the PEA. A model for such regulations can be found in California, where the assessment must meet the California Department of Toxic Substances Control Preliminary Environmental Assessment Guidance Manual requirements (CEPA, 1999). The PEA must also be approved by the state environmental regulatory agency before the Public Body may acquire or lease a candidate site for school purposes or start construction of a school.

The Public Body must perform a Preliminary Endangerment Assessment if the results of the Initial Environmental Assessment indicate one or more of the following:

- The candidate site is likely to have been contaminated by hazardous substances as a result of the past or current use of the site or adjoining properties;
- The candidate school site was found to be within 1,000 feet of any of the potential sources of contamination listed above (in Section 3A, Part II);
- The candidate school site was likely to be impacted by potential sources of contamination that are more than 1,000 feet away, based on the professional judgment of a licensed environmental professional.

Before any work is done on the PEA, the Public Body must develop a public participation plan that ensures public and community involvement in the PEA process. The plan shall indicate what mechanisms the Public Body will use to establish open lines of communication with the public about the potential construction of a school on a candidate site. Activities such as public meetings, workshops, fact-sheets, and websites are all appropriate ways to notify the public about the proposed PEA investigation activities, that include taking soil, groundwater or air samples, holding public meetings, announcing a public comment period and releasing the results of the PEA. The state environmental regulatory agency must approve the public participation plan before the Public Body can begin PEA-related activities.



The primary objective of the PEA is to determine if there has been a release or if there is a potential for a release of a hazardous substance that could pose a health threat to children, staff, or community members. The PEA will include full-scale grid sampling and analysis of soil, soil gases (if any), surface water, groundwater, sediment, and air in order to accurately define the type and extent of hazardous material contamination present on the candidate site.

Before any sampling is conducted as part of the PEA, a work plan must be prepared that defines the goals of the sampling; the rationale for the sampling strategy including the number and location of sampling sites and what substances to test for; the sampling methods and procedures that will be used and the analytical methods and procedures.

The public will be involved in the development of the work plan and be given the opportunity to review the final draft and prepare comments. The work plan will be approved by the state environmental regulatory agency.

The PEA will also include an evaluation of the risks posed to children's health, public health, or the environment based on the contamination found. This evaluation shall include:

- A description of all possible pathways of exposure to those substances by children as well as adults using a school on the candidate site;
- The identification of which pathways will more likely result in children being exposed to those substances; and
- A description of health consequences of long-term exposure to any hazardous substances found on the site.

The state environmental regulatory agency must review the final draft of the PEA. Depending on the thoroughness of the assessment, the state agency must give preliminary approval to the assessment, disapprove the assessment, or request more information.

When the final draft of the PEA is completed and has received preliminary approval by the state environmental regulatory agency, the Public Body shall publish a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) and create a website where this notice is posted, and includes the same information released for the Initial Environmental Assessment:

- A statement that a PEA of the site has been completed;
- A brief statement describing the results of the PEA, such as a list of contaminants found in excess of regulatory standards, prior uses of the site that might raise health and safety issues, the proximity of site to environmental hazards (waste disposal sites, point sources of air pollution, etc.);
- A brief summary of the conclusions of the PEA;
- The location where people can review a copy of the PEA or an executive summary written in the appropriate local language(s); and
- An announcement of a sixty-day public comment period including an address where public comments should be sent.

As described for the Initial Environmental Assessment, a copy of this notice shall be posted in a conspicuous place in every school within the Public Body's jurisdiction (in multiple languages if there are a significant number of non-English speaking parents). A copy shall also be delivered to each parent-teacher organization within the jurisdiction, each labor union covered by a collective bargaining agreement signed by the Public Body, and each landowner within 1,000 feet of the proposed site.

The state environmental regulatory agency will review all comments received on the PEA. The state environmental agency shall then either accept or reject the conclusion of the PEA, determine whether the candidate site can be used without further remediation or study, whether the site is categorically excluded for use as a school, or whether a Site Remediation Plan is required. The state environmental agency shall explain in detail the reasons for accepting or rejecting the PEA.

3C. Step 3
The Public Body Decides Whether to Proceed or Abandon a Contaminated Site

After the state environmental agency has approved the PEA, the local School Siting Committee must also review the assessment and public comments received. The purpose of this review is for the School Siting Committee to make a recommendation to either abandon the site or consider remediation. Alternative sites and options should be considered at this point. Then, the Public Body must vote whether to abandon the site, consider an alternative site or option, or proceed with a remediation plan.

To help decide whether to abandon a site or proceed with cleanup of a contaminated site, the Public Body should carefully evaluate the levels of contamination found on the site and pay close attention to how widely dispersed contaminants are across the site (both laterally and depth-wise). CPOC found that no health-based child-sensitive standards exist at the federal, state, or local level for determining "safe" levels of contamination in soil that will protect children. Lacking such standards, parents, school districts, regulating agencies, and others will find it difficult to evaluate contamination at new or existing sites.

Until such standards are developed, the campaign recommends the use of the New York State Department of Environmental Conservation Recommended Soil Cleanup Objectives (NYDEC, 1994). These values were developed to provide a "basis and procedure to determine soil cleanup levels" at state and federal Superfund and other contaminated sites in the state. Thirty-nine representative values of New York's soil cleanup guidelines are shown in Table 2. A complete listing of all 126 values can be found in Appendix B and on the Internet at: http://www.dec.state.ny.us/website/der/tagms/prtg4046.html.

CPOC's recommendation to use the NYDEC standards resulted from a review of cleanup standards or guidelines for several states conducted by a small group of scientists and engineers from a variety of disciplines. This group grew out of a symposium on Children's Environmental Health convened by CHEJ in 2002 attended by grassroots leaders, scientists and engineers. This working group of scientists and engineers found the New York state values to be generally lower than others considered and concluded that this list is a good, reasonably sound, and conservative list to use as an initial screen to provide the Public Body with a way to evaluate sites early on in the site selection process.

Table 2: New York State Recommended Soil Cleanup Objectives For Chemicals Commonly Found at Contaminated Sites

Solvents		Pesticides/other		Metals	
Acetone	0.2	Aldrin/Dieldrin	0.041	Arsenic	7.5
Benzene	0.06	Chlordane	0.54	Barium	300.0
2-Butanone	0.3	DDT/DDE	2.1	Beryllium	0.16
Carbon Tetrachloride	0.6	Lindane	0.06	Cadmium	1.0
Chloroform	0.3	Benzo(a)anthracene	0.224	Chromium	10.0
1,1-Dichlororethane	0.2	Benzo(a)pyrene	0.061	Cobalt	30.0
1,2-Dichloroethane	0.1	Chrysene	0.4	Copper	25.0
Methylene Chloride	0.1	Dibenzo(a,h)anthracene	0.014	Iron	2000.0
Tetrachlorethene	1.4	Naphthalene	13.0	Mercury	0.1
Trichloroethene	0.7	Butylbenzylphthalate	50.0	Nickel	13.0
Toluene	1.5	Hexachlorobenzene	0.41	Selenium	2.0
Vinyl Chloride	0.2	Pentachlorophenol	1.0	Vanadium	150.0
Xylene	1.2	PCBs	1.0	Zinc	20.0

Note: All values are in parts per million (ppm)

The results of soil samples collected during the PEA should be specifically compared to the NYDEC Recommended Soil Cleanup guidelines. If these or other results from the PEA sampling effort indicate that some contamination of the candidate site exists, and that some minor cleanup will be needed, then the PEA will provide recommendations on cleanup levels that are at least as stringent as the cleanup guidelines developed by the NYDEC and shown in Table 2. When a state has a standard for an individual substance that is more protective than the New York State cleanup guideline values, the more protective standard should be used. A Site Remediation Plan (see Section 4 below) would need to be developed that would reduce contaminant levels to the applicable safety standard for each contaminant before the site could be used.

If the PEA indicates that the site has substantial contamination, the Public Body must abandon the site and consider alternative sites. At this time, CPOC has not developed specific criteria that the School Siting Committee or Public Body can use to determine when a site has a substantial contamination problem. Information in the PEA, such as the types of contaminants found on the site, the levels of contamination compared with the NYDEC standards and the number of locations on the site where contaminants were found should help inform this determination. The health effects of the contaminants found on the site and the age of students that will use the site should be additional considerations in making this decision.

The Public Body may choose to consider alternative sites at this point. At least two other sites must be considered. At a minimum, an IEA should be completed for any alternative site being considered. If, however, no alternative sites to a substantially contaminated site exist, the Public Body could reconsider this site by agreeing to adopt the Last Resort remediation measures outlined in Section 5 below. These engineering measures are intended to reduce risk to the maximum extent by cutting off all potential routes of exposure. Adopting these measures at a candidate site should **only** be considered as a last resort, after all other potential sites have been evaluated, and eliminated and if the specific remediation guidelines outlined in Section 4 below are followed. The Public Body has no choice but to abandon the candidate site if the PEA reveals that the site was previously used for hazardous or garbage waste disposal, for disposal of construction and demolition materials, or is within 1,000 feet of any property used for these purposes.

4. Developing a Cleanup Plan for a Contaminated Site

If the Public Body decides to proceed with the cleanup of a contaminated site, a Site Remediation Plan must be developed. This plan must:

- Identify methods for cleaning up the entire site to contaminant levels that meet the applicable safety standards, including the New York State Soil Cleanup guidelines;
- Contain a financial analysis that compares estimated costs for the identified cleanup methods that will bring the site into compliance with applicable safety standards;
- Recommend a cleanup plan from the alternatives identified;
- Explain how the recommended cleanup option will prevent children from being exposed to the hazardous substances found at the site; and
- Evaluate the suitability of the site in light of available alternative sites and alternative cleanup plans.

For any site where the PEA requires remediation, cleanup levels will be at least as stringent as the New York State Recommended Soil Cleanup guidelines shown in Table 2.

As part of the cleanup, the Site Remediation Plan must include provisions for covering any residual contamination in soils and sediments by a minimum of 2 feet of clean topsoil. A minimum of 2 feet of contaminated soil must be removed or treated prior to being covered by the 2 feet of clean topsoil. The cover soil shall be underlain by a continuous layer of an orange-colored geotextile material designed to provide a long-term future warning to others who might disturb or excavate to below this level.

If excavation is required below this level, such as to install a utility line, then the appropriate Occupational Safety and Health Administration (OSHA) safety requirements must be used and any soil removed must be taken off site for proper disposal and replaced with clean fill.

Exceptions to this 2-foot cover provision will only be allowed if the situation is specifically brought to the attention of the state environmental agency and approved by that agency. Before any final decision is made to grant an exception, the public will need to be notified and given the opportunity to comment on such a proposal.

The Site Remediation Plan should also provide recommendations for the final site sampling to be done after the cleanup has been completed to ensure that all residual contamination is less than the cleanup goals defined for the site. Such sampling recommendations shall be designed to discover the highest possible concentrations of contamination on the candidate site.

The Public Body shall submit the Site Remediation Plan to the state environmental regulatory agency for approval. Before submitting this plan, a draft remediation plan shall be given to the School Siting Committee for review and comment. Once the remediation plan is submitted to the state agency for approval, the Public Body shall proceed with a public notification and outreach plan similar to that conducted for the Initial Environmental Assessment and the Preliminary Endangerment Assessment. This will include publishing a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) and creating a website where this notice is posted that includes the following information:

- A statement that a Site Remediation Plan has been submitted to the state environmental agency for approval;
- A brief statement describing the Site Remediation Plan, including a list of contaminants found in excess of regulatory standards and a description of how the plan will reduce the level of contamination to meet those regulatory standards;
- The location where people can review a copy of the Remediation Plan or an executive summary written in the appropriate local language(s); and
- An announcement of a sixty-day public comment period and the address of the state environmental agency where public comments should be sent.

A copy of this notice shall be posted in a conspicuous place in every school within the Public Body's jurisdiction (in multiple languages if there are a significant number of non-English speaking parents). A copy shall also delivered to each parent-teacher organization within the jurisdiction, to each labor union covered by a collective bargaining agreement signed by the Public Body, and each landowner within 1,000 feet of the proposed site.

At least thirty days after the conclusion of the public comment period the state environmental regulatory agency shall conduct a public hearing on the remediation plan in the neighborhood or jurisdiction where the candidate site is located.

The state environmental agency shall publish a notice of the hearing in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) and post this notice on their website stating the date, time and location of the hearing. The state environmental regulatory agency shall provide translators at the public hearing if the school district has a sizable number of non-English speaking parents.

After the public hearing and after reviewing any comments received during the public comment period, the state environmental regulatory agency shall either approve the Site Remediation Plan, disapprove the Site Remediation Plan, or request additional information from the Public Body. If the state agency requires additional information, a copy of the letter requesting additional information shall be sent to the School Siting Committee. Any additional information submitted by the Public Body to the state environmental regulatory agency shall also be given to the School Siting Committee. After reviewing any additional information, the state environmental regulatory agency must approve or reject the Site Remediation Plan. The state environmental agency shall explain in detail the reasons for accepting or rejecting the Site Remediation Plan.

After the state environmental regulatory agency approves the Site Remediation Plan, the local School Siting Committee must also review the plan and recommend to the Public Body whether to abandon the candidate site or proceed with acquiring the site and implementing the remediation plan. Alternative sites or options should be considered at this point. The Public Body must then vote whether to abandon the site or to acquire the site and implement the remediation plan. Only upon voting to acquire the site and implement the remediation plan may the Public Body take any action to acquire the site and prepare the site for remediation and eventually construction of a school.

Prior to the onset of any school construction on the candidate site, the remediation effort must be completed, including demonstration that the cleanup goals have been achieved. This will be verified by a final sampling effort in accordance with the guidelines established in the PEA, though perhaps modified by the Remediation Plan. Documentation regarding the implementation of the plan and all final sampling results will be subject to review by the state environmental agency who may require additional sampling and/or remediation efforts as they deem appropriate. Any modifications to the Remediation Plan will also have to go through the appropriate public review processes. Only after the state has agreed that remediation is complete may any school construction begin.

5. The Last Resort – Building on a Highly Contaminated Site

There are times when the Public Body may be forced to reconsider a site that would have been abandoned during the Preliminary Environmental Assessment (PEA) process because of the presence of substantial contamination (see Section 3C above). This situation might occur in an urban setting where the number of undeveloped sites is limited because of existing development. There may be other times when the Public Body will be left with no other choice of sites. These sites should **only** be considered as a last resort after all other potential sites have been evaluated and eliminated. A minimum of two other sites must be considered before a Last Resort site would be considered.

In these situations, extra precautions need to be taken to ensure to the maximum extent possible that students, teachers, parents, administrative staff or workers will not be at risk from exposure to toxic chemicals. These precautions include a number of redundant cleanup measures and engineering controls that go beyond meeting minimum requirements. This redundancy is needed to provide the necessary level of safety and public confidence to permit the construction and operation of a school on a contaminated site.

Remediation Goals and Objectives

In this section, we propose steps that must be taken to identify potential exposure pathways and to eliminate to the maximum extent possible exposure of any users of the site to toxic chemicals. These steps would be taken at a site that would have been abandoned during the PEA site evaluation and was not categorically excluded from consideration, because it was a site located on top of, or within 1,000 feet of land where hazardous or household garbage waste was landfilled, or where disposal of construction and demolition materials occurred (see Section 2 of this chapter).

- The primary goal of the Last Resort guidelines is to fully cut off and eliminate all exposure pathways. This will prevent people from coming into contact with contaminated soil and with contaminants present in the soil, water, or air. If there's no exposure, there's no risk of injury.

- A secondary goal is to prevent mixing of clean and contaminated soil. A multi-layered engineered barrier must be part of any effort to achieve this goal (see Required Remediation Steps below, bullet #2).

- Build as much redundancy as possible into the remedial work plan for the site in order to eliminate or cut off the exposure pathways. This approach compensates for uncertainties in information about the site and will minimize risks associated with building on a contaminated site. Moreover, this approach will direct the selection of the safest remedial options, which will build public confidence in the safety of the site.

- Establish an on-going monitoring plan to monitor the integrity of the cleanup efforts.

Properly Characterize the Site and Identify Exposure Hazards

- **The site must be completely characterized.**
  There must be sufficient testing of all media – soil, groundwater, surface water, and air – across the site to be reasonably confident that you have an accurate assessment of the extent and severity of the contamination existing at the site. This testing must be done using a grid or similarly consistent pattern for determining sample locations. An evaluation consistent with a Preliminary Endangerment Assessment (PEA) would be appropriate (see Section 3B).

- **Identify all existing and potential exposure pathways.**
  Exposure pathways describe the ways that people who use a site might come into contact with toxic substances at the site. They also show how those substances move through a medium such as groundwater, and from one medium to another, such as occurs when volatile organic compounds (VOCs) evaporate from soil into the air. Unless the site is completely characterized, it will not be possible to identify all the exposure pathways.

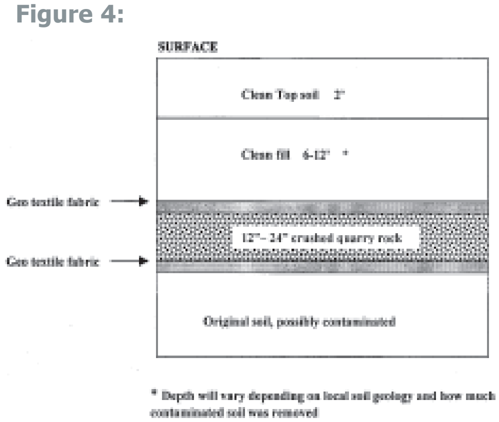
- **Identify all areas that exceed the New York State Recommended Soil Cleanup guidelines.**
  The testing done at the site should identify all contaminants present in soil and other media. Soil with contaminant levels that exceed the New York State soil cleanup guidelines, as described in Table 2 in Section 3C, must be completely removed to a depth below which there is no anticipated excavation so as to reduce overall risk.

- **Determine the highest seasonal level of the groundwater table.**
  Evaluate whether the groundwater at a candidate site rises at any time during the year to a level that is above any proposed barrier or other underground remedial measure that would be installed at the site. If this occurs, then this factor must be taken into consideration as part of the Site Remediation Plan.

Required Remediation Steps

- **Remove all contaminated soil on the proposed site that exceeds the New York State Recommended Soil Cleanup guidelines up to the "excavation depth."**
  Soil containing levels of contaminants in excess of these standards must be removed to at least a depth below which there is no anticipated excavation, such as might result from the installation of utility lines and connections, or construction of footers to support a building. This is referred to as the "excavation depth" and might reasonably range from 8 to 15 feet, depending on local site geology.

Figure 4:



- **Install a multi-layered barrier over any contaminated soil left in place at the site.**
  This multi-layered barrier will separate clean topsoil from any residual contamination left in place. Starting at the surface and moving downward, this barrier shall consist of the following layers (see Figure 4). First, a minimum of 2 feet of certifiably clean contaminated soil removed to the excavation depth (this depth will vary depending on how much contaminated soil was removed); next will be 12 to 24 inches of sharp, angular crushed rock (quarry rock, not crushed cement or some other stone that will disintegrate with high acidity) surrounded on both sides by a brightly colored orange Geotextile fabric (see Figure 4). This colored fabric serves as a "marker layer" to warn anyone who might dig into the soil that below this marker is contaminated soil. The crushed stone layer provides a "capillary break" that limits the upward and downward movement of water or leachate. This layer will also prevent burrowing animals and worms from transporting contaminated soil into the clean fill and potentially to the surface. If volatile gases are present in the soil, most of the gas will preferentially move through the crushed stone and be transported laterally. These gases will need to be vented and captured. Care must be taken to ensure that these gases do not reach buildings on or near the school property.

- **Install a "chimney" system** to capture and vent volatile gases before they enter the school building if VOCs are detected in the soil or groundwater in excess of the New York State cleanup guidelines. In much the same way that venting systems are used to intercept radon gas before it enters a home, a similar venting system installed under and around a school building could be installed to intercept any VOCs that might be present in residual contaminated soil.

This system will use perforated pipes placed under or around a building that would intercept VOCs off-gassing from the soil. Solid pipes would then transport the gases up and out of the school building. A filter may have to be installed as well to capture these gases rather than release them directly into the ambient air. This system may not always be necessary and could be considered in addition to a multi-layer barrier.

- **Construct a two-foot concrete slab** built on top of a polyethylene vapor barrier if a new foundation is needed for a school building built on contaminated soil. The plastic vapor barrier will provide another means to reduce vapor infiltration from soil under the building.

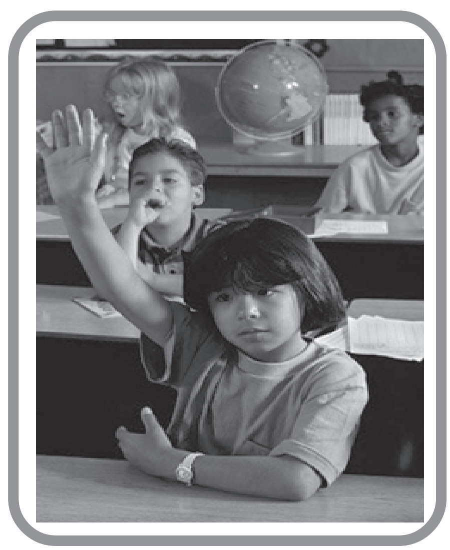
Institutional Controls and Monitoring Options

Institutional controls should be implemented to provide notice and information for future users of the school, or in the event future users of the site ever tear down the building. Institutional controls are legal or administrative mechanisms for managing risks. They should include notice of where the residual contamination is located, what contaminants are present, and how to monitor the integrity of barriers or other steps taken to prevent exposures at a site. These procedures are needed because contaminated soil remains at the site below the engineered multi-layered barrier.

- **Install** a metal or stone plaque in the school lobby or other prominent place that includes a warning in English and Spanish (or other language appropriate for the school community) that describes the contamination beneath the school and/or school property and directs the readers to the "Due Care Plan." Ideally, the lettering should be raised or cut into the metal.

- **Prepare** a "Due Care" Plan that includes a history of the uses at the site, a summary of the environmental evaluation, a summary of the remedial work done at the site, and a list of the steps needed to maintain monitoring of the site in perpetuity. This Plan would also list activities that are prohibited at the site in order to maintain the integrity of the remedial work completed at the site. The Due Care Plan is to be permanently kept at the school in a location that is accessible to parents.

- **Create** a position within the school facilities department for a technically knowledgeable worker who will be trained and responsible for environmental oversight of the school and the grounds. This person should provide a report at least annually to the school staff, the School Board, parent groups, central district, and other applicable parties that summarizes the Due Care Plan and includes the results of any environmental monitoring completed in the past year.



- **Require** training of school personnel responsible for managing the school building and grounds. Such training will cover techniques for monitoring cracks in the foundation and breaches of the topsoil, procedures on how to handle equipment malfunctions or other problems with remedial systems that might occur, and how to serve as a contact for complaints or suggestions about environmental conditions at the school.

- **Each year**, the school facilities department will hire an environmental professional to conduct tests to assess the presence of contaminants in the soil, soil gas, indoor air, and groundwater on the school grounds. Surface soil will only need to be tested if it were disrupted for some reason. The results of the testing must be included in a report prepared by an environmental professional that describes the purpose of the testing, the sample location and collection procedures, and the analytical methods used. This report should be made available to school staff, the School Board, parent groups, the central district, and other interested parties. A brief summary of the report must be translated into Spanish or other foreign language as appropriate. This information should also be posted online by the regulating agency and the website of the school or Public Body.

- **Each year**, health complaints among the students and teachers/staff should be monitored. Illnesses such as headaches, lethargy, recurring upper respiratory illness, and asthma should be routinely monitored and if the rate that these illnesses are reported exceeds seasonal averages by 25%, then a more thorough investigation of these illnesses should be conducted.

- If **VOCs** were identified in the soil or groundwater, install soil gas and groundwater monitoring wells around the proposed school building and develop a long term monitoring plan designed to detect VOCs or other gases that move through the soil and subsurface. The gas wells should be installed under the building or as close to the building as is feasible if the structure already exists. Samples should be taken from the wells and analyzed for a full range of VOCs every 6 months following completion of the remedial work and construction of the school building. Testing could continue annually if no VOCs are found in the first year following construction.

- **Consider** using radon as a natural tracer as part of the soil gas monitoring plan to evaluate the integrity of a foundation or a cap/barrier installed between clean fill and contaminated soil. Radon gas is found naturally in soil in many areas and can be used as a surrogate for VOCs in evaluating whether VOCs are entering the school building. Radon concentrations would be measured simultaneously in the building and in the soil gas. The ratio of the soil gas concentration to the indoor air concentration represents an attenuation factor between soil gas and indoor air that directly measures the rate at which soil gas enters the building. To determine if VOCs are entering the building, the soil gas concentrations of VOCs measured in the soil monitoring wells are divided by the attenuation factor. Soil gas monitoring wells need to be installed under the school or as close to the building as is feasible. Radon detectors should be installed in the soil gas wells and monitored at least every 6 months following completion of the remedial work and construction of the school building. Testing could continue annually if no VOCs are found in the first year following construction.

- No plants or trees that have extensive root systems should be planted on top of the multi-layered barrier. Shrubs whose root systems that don't extend more than a couple of feet down are acceptable, but tap rooted varieties of plants that penetrate deep into the soil are not. Frequent mowing of school grounds will reduce the likelihood that burrowing animals will penetrate the top layer of the engineered barrier.

- If cement is used in the crushed stone layer of the multi-layered barrier, lime the soil above the geotextile layer as often as possible to maintain neutral to basic conditions in the topsoil. This will help to neutralize acid rain before it reaches the

crushed stone layer of the multi-layered barrier. Acid rain will hasten the degradation and dissolution of the cement in this layer. This is not necessary if hard quarry rock is used.

- If it is absolutely necessary to dig through an installed multi-layered barrier, such as to install utility lines or connections or to construct footers to support a new building, then the appropriate Occupational Safety and Health Administration (OSHA) safety requirements must be used and any soil removed must be taken off site for proper disposal and be replaced with clean fill. Upon completion of the work, the multi-layered barrier must be put back in place. Footers should be installed so that they do not penetrate the barrier.

ACTION STEPS:

For Parents And Community Representatives

Federal policy which adequately addresses school siting as it relates to hazardous sites may take years to create and implement, and may fall short of adequately addressing state or local specific issues, such as the types of contamination, types of soil, weather patterns, urban density and lack of available space, and other local issues. It is up to local communities to educate school and elected officials to make changes in their own backyards. A state by state passage of protective school siting policies will drive home the message at the federal level that this is an issue people care about, and that they should take action on.

With this report, you have enough guidance and ideas to take action now to proactively protect the children in your community from unwittingly attending school in a contaminated area. There are several key steps to begin the work of safeguarding kids, all of which can be done by any motivated individual.

For New School Construction:

1. Talk with your neighbors. Share the information you have, and see if they would like to help pass a local policy to protect community schools from being built on a contaminated site.

2. Host a meeting with others who may want to learn more about this issue, and help you pass a local policy. At your first few meetings, you will need to make your plan. As a group, brainstorm:

    a. What are your goals? Is it to pass a protective policy to prevent schools from being sited on or near toxic sites? Is it to deal with a school already sited on or near a toxic site?
    b. Who are your allies? Who, locally, can help you work on this project? Educators, School Boards, facilities departments, parent/teacher organizations, elected officials, environmental or health organizations, parents, etc?
    c. Who has the power to pass a policy around school siting? This will take a little research. Currently, when a school is built in your community, who is involved in that decision? The local School Board, the central school district, the state Department of Education? What policies currently exist around school siting? Does your district have a five or ten year plan for new school construction?

c. you with this project? Make a list of what each person in your group can contribute to this work. Include all resources, such as interested people, friends in high places, financial resources, access to a copier, fax machine, etc.

d. Make a Plan of Action. What would constitute success for your group? That vision of success is your long-term goal. What smaller goals will help you reach that long-term goal? List all goals and the tasks that will be necessary to achieve them. Set up a timeline, and determine who will do what task.

e. At the end of each meeting, set a next meeting date and continue to meet with your group. This group will build a cohesive voice of local people who are committed to this protective policy, give you visibility through numbers, spread the workload out over many people, and help you spread your message to get others involved.

3. Set up a meeting with key players to introduce the issue, and your willingness to help them develop a policy that would prevent schools from being built on contaminated sites. Many people have simply never thought about this issue, or have not known how to develop guidelines protecting schools from hazardous chemicals. Education and a positive, achievable plan of action can go a long way toward achieving success.

4. Frame your message as positive, proactive, and trend setting. It is!

5. The guidelines in this report are not "one size fits all." Your community may have to adapt them to address your local situation. For instance, the depth of the groundwater table, soil composition, wind and weather patterns, types of industry, and available school siting space need to be considered in detail, and will affect your approach.

6. Be prepared to compromise with your elected officials, if necessary. Cash flow, current policies, and other limitations will affect their perspectives on this issue. However, a knowledgeable and committed group of community members can help develop a policy that meets everyone's needs. At the outset of your work, determine as a group, which guidelines are not negotiable.

7. Continue planning, meeting, setting and achieving your organizational goals as you move through this process, and of course, for additional assistance in organizing to pass local ordinances, contact the Child Proofing Our Communities Campaign at the Center for Health, Environment and Justice.

Schools Located on or within a Half-mile of a Known Toxic Waste Site

If your local school is near a toxic site, it does not necessarily mean that your child is endangered. What it does mean is that you should check to see if a danger is present.

- Drive around the contaminated site and see where it actually is, if you don't already know. How close is the site to where your child walks to and from school each day?
- Contact the city or county department of environment and ask them where you can find information on the site. Check to see what was beneath the land that your local school is built on. Often this information is located at a local library. You can also contact CHEJ or a local environmental group to help you decipher the information and its potential threats, if any.
- Begin to organize a group to work on this issue. The process is detailed in the preceding section.

- Contact CHEJ for assistance, resources and technical support.

Please share any local initiative you are working on, so that we can help spread the message to other communities, and continue to build the base of local parents and schools taking actions to protect the health and well being of our children.

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APPENDIX A

Table A-1: New York State Recommended Soil Cleanup Objectives for Chemicals Commonly Found at Contaminated Sites

Solvents		Pesticides/other		Metals	
acetone	0.2	aldrin/dieldrin	0.041	arsenic	7.5
benzene	0.06	chlordane	0.54	barium	300
2-butanone	0.3	chrysene	0.4	cadmium	1
carbon tetrachloride	0.6	DDT/DDE	2.1	chromium	10
chloroform	0.3	naphthalene	13.0	lead	400
1,1-dichloroethane	0.2	pentachlorophenol	1.0	mercury	0.1
1,2-dichloroethane	0.1	PCBs	1.0	nickel	13
methylene chloride	0.1				
tetrachloroethene	1.4				
trichloroethene	0.7				
toluene	1.5				
vinyl chloride	0.2				
xylene	1.2				

Note: **All values are in parts per million (ppm)**

Source: New York State Department of Environmental Conservation (NYDEC, 1994)

Table A-2: Adverse Health Effects Associated With Chemicals Commonly Found at Contaminated Sites

Substance	Adverse Health Effects
Solvents	
Acetone	Liver, kidney, nervous system damage; reproductive effects
Benzene	Nervous system, immune and blood damage; reproductive effects; leukemia
2-Butanone	Nervous system damage
Carbon Tetrachloride	Liver, kidney, nervous system damage; liver cancer
Chloroform	Liver, kidney; nervous system damage; reproductive effects, kidney cancer
1,1-Dichloroethane	Kidney, heart damage; liver cancer
1,2-Dichloroethane	Kidney, liver, lung, heart, and nervous system damage; cancer of the colon and rectum
Methylene Chloride	Nervous system damage; skin rashes; liver cancer
Tetrachloroethene	Nervous system, reproductive, liver, kidney damage; liver and kidney cancer
Trichloroethene	Nervous system, liver, kidney, immune, heart damage; skin rashes, reproductive effects*; liver, lung cancer and possibly leukemia [TP]
Toluene	Nervous system, kidney damage; reproductive effects*
Vinyl Chloride	Nervous system, liver, immune damage; reproductive effects; liver cancer
Xylene	Liver, lung, nervous system damage; reproductive effects *
Pesticides/other	
Pentachlorophenol	Liver, kidney, immune, lung, blood, nervous system damage; liver and adrenal cancer
Aldrin/Dieldrin	Kidney and nervous system damage; liver cancer[TP]
Chlordane	Nervous system, digestive, liver damage; liver cancer
Chrysene	Skin cancer [TP]
DDT/DDE	Liver, nervous system damage; reproductive effects*; liver cancer
Naphthalene	Red blood cell, lung damage
PCBs	Skin disorders; liver damage; developmental and behavioral effects; reproductive effects; liver, biliary tract cancer
Metals	
Arsenic	Skin disorders; lung, heart, blood damage; birth defects and other reproductive effects*; skin, bladder, lung, kidney, liver, prostate cancer
Barium	Circulatory system effects; heart, liver, kidney damage
Cadmium	Kidney, lung damage; birth defects and other reproductive effects*; lung cancer
Chromium	Kidney, liver damage; skin disorders; lung cancer
Lead	Kidney, immune damage; neurological damage leading to developmental effects – learning disabilities and reduced growth; cancer
Mercury	Permanent kidney and brain damage; birth defects and other reproductive effects*; neurological damage leading to developmental effects
Nickel	Kidney, liver, lung damage; allergic reactions; lung cancer

Sources:
The primary source used to prepare this table is the Agency for Toxic Substances and Disease Registry (ATSDR) Division of Toxicology ToxFAQs. These fact sheets are available on the web at http://www.atsdr.cdc.gov/toxfaq.html. Some information was obtained from the full Toxicity Profile (TP) for a substance. Reproductive effects (*) are supplemented from *Generations at Risk, Reproductive Health and the Environment*, Schettler, T., Solomon, G., Valenti, M., and Huddler, A., MIT Press, Cambridge, MA, 1999.

APPENDIX B

Complete List of New York State Recommended Soil Cleanup Objectives

All values in parts per million (ppm)

Substance	Cleanup Level
Volatile Organic Contaminants	
Acetone	0.2
Benzene	0.06
Benzoic Acid	2.7
2-Butanone	0.3
Carbon Disulfide	2.7
Carbon Tetrachloride	0.6
Chlorobenzene	1.7
Chloroethane	1.9
Chloroform	0.3
Dibromochloromethane	N/A
1,2-Dichlorobenzene	7.9
1,3-Dichlorobenzene	1.6
1,4-Dichlorobenzene	8.5
1,1-Dichloroethane	0.2
1,2-Dichloroethane	0.1
1,1-Dichloroethene	0.4
1,2-Dichloroethene (trans)	0.3
1-3 dichloropropane	0.3
Ethylbenzene	5.5
113 Freon (1,1,2 Trichloro-1,2,2 Trifluoroethane)	6.0
Methylene chloride	0.1
4-Methyl-2-Pentanone	1.0
Tetrachloroethene	1.4
1,1,1-Trichloroethane	0.8
1,1,2,2-Tetrachloroethane	0.6
1,2,3-trichloropropane	0.4
1,2,4-trichlorobenzene	3.4
Toluene	1.5
Trichloroethene	0.7
Vinyl chloride	0.2
Xylenes	1.2
Semi-Volatile Organic Contaminants	
Acenaphthene	50.0 *
Acenaphthylene	41.0
Aniline	0.1
Anthracene	50.0 *
Benzo(a)anthracene	0.224 or MDL
Benzo (a) pyrene	0.061 or MDL
Benzo (b) fluoranthene	1.1
Benzo (g,h,i) perylene	50.0 *
Benzo (k) fluoranthene	1.1
bis(2-ethylhexyl)phthalate	50.0 *
Butylbenzylphthlate	50.0 *
Chrysene	0.4
4- Chloroaniline	0.220 or MDL
4-Chloro-3-methylphenol	0.240 or MDL
2-Chlorophenol	0.8
Dibenzofuran	6.2
Dibenzo(a,h)anthracene	0.014 or MDL
3,3'-Dichlorobenzidine	N/A
2,4-Dichlorophenol	0.4
2,4-Dinitrophenol	0.200 or MDL
2,6 Dinitrotoluene	1.0
Diethylphthlate	7.1
Dimethylphthlate	2.0
Di-n-butyl phthalate	8.1
Di-n-octyl phthalate	50.0 *
Fluoranthene	50.0 *
Fluorene	50.0 *
Hexachlorobenzene	0.41
Indeno (1,2,3-cd)pyrene	3.2
Isophorone	4.40
2-methylnaphthalene	36.4
2-Methylphenol	0.100 or MDL
4-Methylphenol	0.9
Naphthalene	13.0
Nitrobenzene	0.200 or MDL
2-Nitroaniline	0.430 or MDL
2-Nitrophenol	0.330 or MDL
4-Nitrophenol	0.100 or MDL
3-Nitroaniline	0.500 or MDL
Pentachlorophenol	1.0 or MDL
Phenanthrene	50.0 *
Phenol	0.03 or MDL
Pyrene	50.0 *
2,4,5-Trichlorophenol	0.1
Organic Pesticides / Herbicides and PCBs	
Aldrin	0.041
alpha - BHC	0.11
beta - BHC	0.2
delta - BHC	0.3
Chlordane	0.54
2,4-D	0.5
4,4'- DDD	2.9
4,4'-DDE	2.1
4,4'-DDT	2.1

Dibenzo-dioxins (PCDD)	N/A
2,3,7,8 TCDD	
Dieldrin	0.044
Endosulfan I	0.9
Endosulfan II	0.9
Endosulfan Sulfate	1.0
Endrin	0.10
Endrin keytone	N/A
Heptachlor	0.10
gamma - BHC (Lindane)	0.06
gamma - chlordane	0.54
Heptachlor epoxide	0.02
Methoxychlor	*
Mitotane	N/A
Parathion	1.2
PCBs	1.0 (Surface) 10 (sub-surface)
Polychlorinated dibenzo-furans (PCDF)	N/A
Silvex	0.7
2,4,5-T	1.9

Heavy Metals

Aluminum	SB
Antimony	SB
Arsenic	7.5 or SB
Barium	300 or SB
Beryllium	0.16 (HEAST) or SB
Cadmium	1 or SB
Calcium	SB
Chromium	10 or SB
Cobalt	30 or SB
Copper	25 or SB
Cyanide	**
Iron	2,000 or SB
Lead	SB ***
Magnesium	SB
Manganese	SB
Mercury	0.1
Nickel	13 or SB
Potassium	SB
Selenium	2 or SB
Silver	SB
Sodium	SB
Thallium	SB
Vanadium	150 or SB
Zinc	20 or SB

MDL = Method Detection Limit
N/A = Not Available
SB = Site Background

* As per TAGM #4046, Total VOCs < 10 ppm, Total Semi-VOCs < 500ppm and Individual Semi-VOCs < 50 ppm.

** Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.

*** Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

Note 2: Some forms of metal salts such as Aluminum phosphide, Calcium cyanide, Potassium cyanide, Copper cyanide, Silver cyanide, Sodium cyanide, Zinc phosphide, Thallium salts, Vanadium pentoxide and Chromium (VI) compounds are more toxic in nature. Please refer to the USEPA HEASTs database to find cleanup objectives if such metals are present in soil.

Note 3: For heavy metals, recommended soil cleanup objectives are average background concentrations as reported in a 1984 survey of reference material by E. Carol McGovern, NYSDEC.

Source: New York State Department of Environmental Conservation (NYSDEC) (1994) *Technical and Administrative Guidance Memorandum (TAGM) on the Determination of Soil Cleanup Objectives and Cleanup Levels* (rev.), January 24. Available at http://www.dec.state.ny.us/website/der/tagms/prtg4046.html.

Child Proofing Our Communities Campaign
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