

**Report of the  
Arbor Heights Air Quality  
Task Force**

**January 19, 2006**

## The Problem

Beginning at least as early as October 2004, there were reports of musty odors and water leaks in the wing of portable classrooms at Arbor Heights Elementary. These were primarily concentrated at the west end (classrooms 15 – 18) but showed up in other areas as well. Along with the smells, there were symptoms of respiratory irritation, asthma and difficulty remaining alert.

The School District's response to these concerns was slow and ineffective. It was finally an incident in April 2005, when workers in hazmat suits entered the crawlspace under room 16 without establishing a containment or decontamination area, which brought the problems under intense focus. This was of particular concern as there was known asbestos insulation on the hot water pipes in the crawlspace.

On May 8, the Department of Labor and Industries responded to a staff complaint of unsafe working conditions and began an investigation. At the same time, parents requested a meeting with District leaders and maintenance staff, held on May 12. At that meeting, Facilities Director Fred Stephens acknowledged that the District should have done a better job and committed to do what it would take to make the school environment healthy again.

Among his commitments were agreements:

- to reimburse the Arbor Heights PTSA for the cost of hiring an independent environmental consultant
- to pay for medical consultations or diagnostic tests required to determine the potential health impacts
- to create a task force with parents and staff from the school to guide the decisions made about how to remedy the problems

## Task Force

The Arbor Heights PTSA designated Scott Roed and Joe Sharp to be the parents on the task force. The school staff selected Mark Ahlness and Mitzi Sato as their representatives. Fred Stephens asked Richard Staudt, the District risk manager, to lead a team from the District.

The task force began meeting weekly and continued to do so through the end of the school year and twice a month through the summer. Discussions were sometimes heated, but always frank and cooperative, as the task force established the scope of the investigation and the cleanup work to be done, set priorities and decided between alternative proposals for remediation.

## Investigation

At the beginning of the process, the District had already found standing water under classrooms 16 and 17, but had not been able to identify the source or to remove it. There were several suspected problems – a dripping domestic water line, leaks in the hot water lines leading to the unit ventilators, cracks in drainpipes from the roof, problems with a storm culvert running under the building, or a high groundwater level. Mold had been observed on a floor joist under room 16 and efforts were underway to better seal off airflow between classrooms and the crawlspace. Despite this, there were more questions than answers.

In May, an inspector from Labor & Industries visited the crawlspace area and much of the rest of the school, interviewed school staff and took air and dust samples from the classrooms. Her investigation found no detectable levels of asbestos in the classrooms, but did result in a series of citations against the District. The most serious resulted from her finding damaged asbestos in the crawlspace. Two others related to medical screening and respirator fit testing that should have been done for a District maintenance worker and were not. These three violations were remedied before the L&I investigation was completed. The fourth violation was for failure to hold regular safety committee meetings and the fifth for not adequately informing staff about the presence and locations of asbestos-containing materials in the building. These have been remedied since the start of school in September.

On May 17, a video camera was run through the storm culvert under the school from SW 104<sup>th</sup> St to SW 105<sup>th</sup> St. No major breaks or blockages were observed, so this was ruled out as a major source of the water in the crawlspace.

On May 19, the Seattle/King County Department of Health and the Puget Sound Clean Air Agency consulted with District staff at the school, but felt that with the L&I inspection underway and the PTSA's hiring of a mold specialist, they could not provide any additional guidance.

Also in May, toxicologist Dr. David Anderson of Envirotest Research was hired and began his investigation. He visited every classroom in the school, as well as the crawlspace, and took samples of dust from carpets and of visible mold found on pipe insulation under the building. At his request, time was scheduled for interviews of all teachers in the building about health symptoms observed in their classrooms. The District also provided him with student absence rates by classroom and for the school as a whole compared to other elementary schools in the area.

By the first week in June, a hydrogeologist from Northwest Land & Water had come out to inspect the water situation and brought a drainage contractor, Bodine Construction, to work with him on a solution. Bodine had a first proposal ready for the task force's review by June 9, but the hydrogeologist report on June 21 recommended additional tests to rule out other possible sources than groundwater.

Dr. Anderson requested that volunteers from a few classrooms where he found clusters of symptoms have blood samples drawn and sent to a diagnostic laboratory in California for a test that would identify mold antibodies. This additional information would assist him in identifying the types of molds he was looking for in the building. The samples were collected within days of the end of the school year on June 22.

On June 28, the pipe chase in room 15 containing the roof drain was opened. It was apparent the pipe had leaked and some mold was observed inside the space. Dr. Anderson took samples before the mold was removed, the pipe repaired, and the chase closed up again.

At about the same time, work began to replace unit ventilators in all of the classrooms in that wing – work that had already been slated for the summer. Dr. Anderson observed the removal and identified several other potential problems – some filters were clogged and gaps existed under the air intake that allowed air to come up from under the building. Mike Skutac, the District's project manager, worked closely with Dr. Anderson and the HVAC contractor to identify changes that would fix these problems and keep them from recurring after the new univents were installed.

On July 9<sup>th</sup>, the task force received an interim report from Dr. Anderson with recommendations for specific remedial actions (removal of damaged sheetrock, replacement of roof drains, cleaning of carpets, removal of floor mats under drinking fountains) and for additional testing. Fred Stephens authorized an additional \$20,000 in funding for Dr. Anderson's continued work.

A geotechnical engineering firm, Garry Struthers Associates, was brought in to do more extensive testing and to solve the water problem. They drilled test holes to 30 feet deep around the perimeter of the classrooms and found no ground water in any of those holes. They pressure tested all of the roof drains and identified others that had leaks and needed replacement. They tested water flow from the playground drains near the building. They then performed a test pouring water on the playground at the base of the walls and found the water quickly pooled in the crawlspace. Finally, this was the evidence needed to be confident that a proposed solution would be effective in keeping the crawlspace dry!

### Work Completed

Over the course of last summer, the work completed at Arbor Heights included:

- Installation of a perimeter drainage system around the affected classrooms. This involved trenching to the base of the foundation walls, applying a waterproofing to the walls, installing a perforated drainage pipe to carry away water running off the playground, backfilling with gravel and fill soil and repairing the asphalt surface.
- Installation of sump pumps inside the crawlspace to remove any water that might enter.

- Pumping of water from the space and drying of the soil with warm air blowers.
- Replacement of unit ventilators in affected classrooms, with modifications to the air intake recommended by Dr. Anderson to ensure that all air drawn in would be coming from outside the building. These new univents supply significantly more fresh air than the old ones did and, by themselves, create a positive pressure differential between the classrooms and the crawlspace, so that any air movement is towards the crawlspace.
- Repair of gaps in floors underneath the old univent intake ductwork.
- Installation of three rooftop fans drawing air from the crawlspace. These were located and adjusted to create a negative air pressure differential between the crawlspace and the classrooms. Dr. Anderson tested these and determined that, by themselves, they are enough to keep air flowing down out of the classrooms into the crawlspace.
- Installation of an airtight access door between the boiler room and the crawlspace to prevent boiler room fans from pressurizing the crawlspace.
- Replacement of all sections of the roof drain system that were found to have leaks when pressure tested.
- Removal of all water damaged sheetrock recommended by Dr. Anderson.
- Cleaning with a fungicidal product of the stained carpets suspected of harboring mold.
- Removal of mold growth on pipe insulation and on floor joists where it was found underneath classrooms 15 through 18.
- Replacement of mats under water coolers with ones that do not provide a favorable place for mold to grow.
- Thorough cleaning of the affected classrooms.

Two remaining tasks were completed over the recent winter break. The first of these was the installation of a supplemental floor joist alongside some of those that were sanded to remove mold. Our structural engineer recommended this as a precautionary measure. The second was the installation of a sensor tape around the perimeter of the affected classrooms that will detect if there is any future water intrusion under the building. The system ties directly to both the school custodian's computer and to the District's central environmental management control system that is monitored on an ongoing basis.

At this time, all of the work recommended by Dr. Anderson has been completed and recent inspections of the crawlspace found it to be dry, despite the record rains we have had over the past 30 days.

## Health Impacts

It is widely accepted that molds can have adverse impacts on human health. Four kinds of effects are known – irritant, allergic, infectious or toxic. In sensitive persons, the allergic and irritant characteristics of molds found in the indoor environment are clearly associated with upper respiratory tract symptoms, coughing, wheezing and increased asthma symptoms. Generally, these symptoms disappear when the person is no longer exposed to the irritant or allergen. It has been estimated that at least five percent of the population has an allergy to one or more kinds of mold.

It is also well documented that people with weakened immune systems, resulting from serious illness, chemotherapy or immunosuppressant drugs, are at risk of potentially life-threatening infections from molds. Fungal infections are common in many environments and, in healthy persons, usually resolve quickly. Athlete's foot is a well-known example of this kind of fungal infection, while the infection causing the greatest risk to immunocompromised persons comes from the *aspergillus* mold species, which is common in both indoor and outdoor environments.

Molds can also produce mycotoxins, or toxic compounds, some of which can become airborne under the right conditions. Serious illness and even death has resulted from the mycotoxins found in moldy grains, both airborne (workers in grain silos) and ingested (consumption of moldy tortillas). Whether significant health impacts can be caused by the levels and types of mycotoxins that have been found inside normal buildings, even when heavily water-damaged, is still the subject of some scientific controversy. Our consultant, Dr. Anderson, believes they can be but also has indicated that, for the vast majority of people, once the exposure is removed the human body is capable of eliminating any residual toxins in a relatively short time. In fact, this would be expected to happen more quickly for children than for adults.

If you or your child have unresolved symptoms that continue now that the school environment has been cleaned up, the Arbor Heights Task Force would recommend that you discuss your concerns with your doctor. If they feel that a referral to a specialist with expertise in environmental exposures is warranted, we have identified several such resources in the list that follows. If you want or need financial assistance in seeking such medical care, please contact Richard Staudt at the District who will arrange with the provider.

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Phillip Ranheim, MD  
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Gail Shapiro, MD or Leonard Altman, MD  
NW Asthma & Allergy  
4540 Sand Point Way NE #200  
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Thomas Martin, MD, MPH  
NW Pediatric Environmental Health Specialty Unit  
Harborview Medical Center  
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### Lessons Learned

Each of the members of the Arbor Heights Task Force has dedicated many hours over the past 9 months to ensure that the school would be safe for our students and staff. We are pleased with the apparently successful outcome of this project, but feel that the biggest payoff will be if the District uses the lessons learned from this project to improve their way of handling future environmental concerns. Fred Stephens has taken several steps that give us some cause for optimism - giving people at the school a substantial role in decision-making and creating an autonomous environmental health unit within his department. It is our sincere hope that this progress will continue so that other schools are not faced with the fear, doubt and uncertainty that Arbor Heights Elementary has recently experienced.

Finally, thank you to all of the members of our community who have shared their questions, concerns and suggestions but, above all, their patience with us as we worked through this problem.

Respectfully submitted,

The Arbor Heights Air Quality Task Force

Mitzi Sato   Mark Ahlness   Joe Sharp   Scott Roed   Richard Staudt   Mike Skutac