UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

DATE: August 29, 2002

SUBJECT: **Stuyvesant High School Testing**
– EPA validates use of sonication testing
– Brookfield CT school system using sonication

FROM: Cate Jenkins, Ph.D.*
jenkins.cate@epa.gov
Waste Identification Branch (Mail Code 5304 W)
Hazardous Waste Identification Division

TO: Joel Kupferman
New York Environmental Law and Justice Project
Other Concerned Parties and Responsible Officials

As per my communications with you and several of the parents, I have prepared this memorandum validating both the use of and results from ultrasonication testing of carpets and other woven fabrics. It appears that officials responsible for the Stuyvesant High School clean up are trying to back away from proper testing after finding high asbestos levels with EPA's ultrasonication test.

EPA validates and relies on ultrasonication test results as way of showing hazards of ANY fabric contaminated by asbestos, and recommends considering their replacement

EPA recently stated that results from the EPA ultrasonication method show high levels of asbestos in carpet even after HEPA vacuuming and wet extraction cleaning. EPA further states that there is a potential problem with all asbestos contaminated fabric including upholstered furniture and curtains as well as carpet, based on ultrasonication tests.

In its fact sheet on all fabrics contaminated with asbestos after the World Trade Center collapse, EPA discusses two EPA studies which evaluated the effectiveness of cleaning asbestos contaminated carpet. These two EPA studies used ultrasonication testing, not any microvacuum test method, to determine asbestos levels before and after cleaning. (Note that on December 9,

* The conclusions and opinions in this memorandum are those of the author and do not necessarily reflect those of the U.S. Environmental Protection Agency.

2001, I widely distributed a memorandum discussing these same two EPA studies that showed that neither HEPA vacuuming alone, nor HEPA vacuuming in conjunction with wet extraction, could effectively remove asbestos from carpets, and reiterated this data in subsequent memoranda.)

Therefore, it is established that EPA is basing its conclusions as to the asbestos hazard from contaminated carpet and other woven fabrics, and the difficulty in removing asbestos from same, on ultrasonication test results, not the ASTM microvacuum test results.

Thus, any parties, such as the New York City Board of Education, making decisions for the asbestos testing and cleanup of the Stuyvesant High School auditorium, would be in opposition to the position taken by EPA if they claim that results from ultrasonication testing of carpets and upholstered seats are irrelevant.

The web page fact sheet posted by EPA on its website on August 16, 2002 at http://www.epa.gov/wtc/factsheets/fabrics.html states the following:

> There are two key studies, which were conducted for EPA, which examined the effectiveness of various cleaning methods on carpets impacted by asbestos. The first, Evaluation of Two Cleaning Methods for Removal of Asbestos Fibers from Carpet (1), found that cleaning asbestos- contaminated carpets with a hot-water extraction cleaner was most effective, reducing asbestos levels by approximately 70%. The second study, Evaluation of Three Cleaning Methods for Removing Asbestos from Carpet: Determination of Airborne Asbestos Concentrations Associated with Each Method (2), again found that a hot-water extraction cleaner was most effective, producing a 60% reduction in asbestos levels in contaminated carpets. [*Both studies used EPA's ultrasonication test method to establish the 70 and 60% levels.*]
>
> The first study spread asbestos on carpeting and used a steel roller to embed the asbestos in the carpet; the second study used carpet from an asbestos-contaminated office building in which the asbestos had been embedded in the carpet by normal foot traffic. Note that if your carpeting was cleaned prior to reoccupancy, the dust and whatever asbestos it may have carried had not been embedded in the carpet and the cleaning may therefore have been more effective (meaning a greater reduction in asbestos levels).
>
> However, because of the results of these studies, EPA cannot guarantee to residents that all asbestos fibers, if present, can be removed from fabric items. EPA anticipates that available cleaning methods for fabric items that were significantly impacted by dust or debris may not be sufficient to address the concerns of residents or EPA's concern for people's long-term health.
>
> With this information in mind, EPA recommends that residents consider replacing some or all carpets, upholstered furniture or draperies if their home was impacted by WTC dust or debris.
>
> ...
> If a resident decides to discard fabric materials, EPA will remove and dispose of them as part of the cleaning program, and will provide residents with contacts at the American Red Cross (ARC) or other service agencies that may be able to provide reimbursement assistance.
>
> [*Note that EPA is replacing all carpeting and upholstered furniture at government expense in residents at the Libby, Montana Superfund site. This disparity in treatment of NYC residences is egregious.*]

Brookfield, CT township using ultrasonication extraction for both carpets and seat cushions in asbestos contaminated high school auditorium

The Brookfield CT school system is undergoing asbestos abatement over the summer months after the confirmation of extensive asbestos contamination in several schools. The following table shows "before" and "after" data for asbestos in carpet, seat cushions, and curtains in the Brookfield high school auditorium.[1] Attached to the end of this memorandum is a news article showing pictures and describing in detail the extensive cleaning efforts that were undertaken. As seen from the following table, the cleaning was not effective in removing the asbestos.

ASBESTOS TESTING, BROOKFIELD HIGH SCHOOL AUDITORIUM all results in units of asbestos structures per square centimeter (s/cm^2)	
Seat Cushions - Before and after sampling points are not necessarily for the same seats.	
Before abatement **ASTM microvacuum method.**	**After HEPA vacuuming, steam extraction** **EPA ultrasonication test method**
less than 267	12,835
535	6,417
1,070	23,179
3,210	42,159
1,605	35,861
535	58,989
less than 535	32,260
1,070	16,215
	less than 3,243
	35,110
Carpet - Before and after sampling points are not necessarily for the exact same areas of the carpet.	
Before abatement **ASTM microvacuum method.**	**After HEPA vacuuming, steam extraction** **EPA ultrasonication test method**
less than 535	115,521
535	405,383
2,675	51,616
less than 891	
less than 535	

As can be seen, the ASTM microvacuum testing for the Brookfield auditorium before cleaning was unable to detect the elevated levels of asbestos. Obviously, the carpet and seat cushions would be more contaminated before cleaning than after. But the ASTM microvacuum results were LOWER than the ultrasonication results after cleaning.

Stuyvesant High School carpet and seat cushion testing

Stuyvesant High School was contaminated with asbestos from the fallout from the World Trade Centers. The auditorium carpet was cleaned with HEPA vacuuming and some type of wet extraction method. After cleaning the carpet was tested with the superior EPA sonication method. It was found to contain from 60,000 to 2,500,000 structures asbestos per square centimeter, which is unacceptably high.

Stuyvesant appears to be avoiding additional testing using ultrasonication methods based in part on the advice of Mr. Howard Bader, the consultant hired by the Parent Teachers Association. Reportedly, Mr. Bader is claiming that EPA's ultrasonication method is "new" and that it is only a "research method" and that it is "impossible to relate the results of ultrasonication [as opposed to ASTM microvacuum results] to hazards."

Mr. Bader is incorrect. The EPA method, even if newer, would take precedent over any ASTM method, since it is an official EPA method which underwent all the necessary impartial government review prior to its promulgation. Furthermore, the EPA ultrasonication method was published in final form in 1993, two years earlier than the 1995 ASTM microvacuum method, so it is not in any way "new." Furthermore, the EPA method is hardly a research method; it is offered by over 12 major asbestos laboratories, in some cases at prices lower than the ASTM microvacuum method!

As far as the claim of not being able to relate the results to possible hazards, Mr. Bader is again wrong. As seen from the beginning of this memorandum, EPA has interpreted the results from ultrasonication studies of carpets to be a reliable indicator of the fact that neither HEPA vacuuming nor wet extraction processes will remove embedded asbestos, and that after the WTC collapse citizens should consider disposing of carpet and other fabric items.

Mr. Bader has been incorrect in his understanding of ultrasonication extraction before. On May 17, 2002, Mr. Bader sent me an email claiming that EMSL Laboratories could only perform 10 ultrasonication extraction tests a day, and this was the reason that EMSL would not be able to perform ultrasonication tests of carpet for EPA during the free testing of residences in Manhattan. I suspected that this information was incorrect, and contacted EMSL laboratories myself. EMSL informed me that it would be using other laboratory locations for the EPA testing and therefore was not limited to only 10 ultrasonication tests per day.

Interestingly, Mr. Bader stated in his email that he did not have the necessary expertise to comment on whether higher volume air sampling should be used to test residences in Manhattan. EPA will be performing this more sensitive air testing, because the AHERA air clearance test cannot detect the very low asbestos levels of concern because too small a volume of air is pumped. It is like trying to find a needle in a haystack by only testing one handful of hay. Obviously, Mr. Bader is not as familiar with testing as other aspects of evaluating cleanup requirements after the WTC collapse.

A copy of this email interchange between Mr. Bader, EMSL laboratories, and myself is attached.

The "seat beating" air testing that was done at the Stuyvesant auditorium is highly suspicious.

Behind closed doors, with no independent observers, the seat cushions in the Stuyvesant auditorium were reportedly “beaten” while the air was tested for asbestos. No asbestos in the air was found.

It defies all credibility that no asbestos would be found in the air after beating the seat cushions! Perhaps the monitors were not held within 2 feet of the cushions while they were being beaten, the breathing zone of a person who would sit in the chair. Or, the beating could have taken place long before any air testing, or only immediately prior to air testing. Probably, too few seats were beaten, even if the beating took place during the entire testing period. The air testing might not have been at the high sensitivity levels planned in EPA’s testing for Manhattan (much higher sensitivity than 2 s/mm2). Or, the operator of the air testing device might not have turned on the air pump or closed the portal to the air collection device. We do not know.

The seat cushions should be tested using EPA’s ultrasonication method, as was done for the Brookfield School System. Sufficient numbers of seats should be tested to insure some degree of statistical significance. Curtains and other woven fabrics throughout the school should also be testing using sonication. To allay any doubts and protect the children, all these items should be replaced.

1. Rhode, Vernon (August 27, 2002) Personal communication. S & B Environmental, LLC, 40 Valley Field Road S., Sandy Hook, CT 06482. S & B Environmental was contracted by the Brookfield, CT town Selectmen to independently monitory the abatement progress in the Brookfield school system. Note that the 8/27/02 tables from S&B Environmental had a typographical error in the units, showing asbestos concentrations as “structures per square mm" instead of the correct units: “structures per square cm".

The News-Times

LOCAL

More than a dusting

Brookfield asbestos removal is painstaking

By Heather Barr
THE NEWS-TIMES
2002-08-11

As temperatures soared into the 90s on a recent weekday, workers wearing protective fabric suits and respirators vacuumed and then wiped down a set of blinds in a bathroom at Brookfield High School. The air was as hot and heavy as in a sauna because no air conditioning or fans are allowed. Each set of blinds takes up to an hour to clean.

Such attention to detail is required when removing asbestos fibers. That is why crews have been working 24-hours a day to clean all four schools in Brookfield so they can open by Aug. 27. Day workers are bused from New Jersey every day, and some supervisors and project managers have been living at the schools.

Supervisor and foreman Marvin Aguilar's home for the last month has been the high school.He taped together two cots in a school office and used them as a platform for an inflatable mattress.

On one wall he taped pictures and letters from his family, which drives from New Jersey on weekends to visit him. On another wall is a poster showing the inside of the human body, a reminder that his temporary home will revert to a nurse's office when school begins.

Aguilar said it is hard to be away from his family, but he added the job of cleaning asbestos from the schools is important to him.

"Imagine your child exposed to something like this," he said.

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"There is no tool, no machine or no miracle," said

The News-Times/Wendy Carlson
Asbestos removal cleaners vacuum up and wipe down equipment in the computer room at Brookfield High School.

The News-Times/Wendy Carlson
Clean air is filtered out of the chemistry rooms from a tube connected to a machine called a microtrap, which collects the air and sends it through its filters to remove asbestos particles.

George Stokes III, senior project manager of PT&L Contracting Corp.

"The only way to clean top to bottom is 100 percent pure labor.”

The tools of an asbestos cleaner are both specialized and mundane.

Each worker, who is certified to do asbestos clean-up, wears a full suit of Tyvek, material that keeps out dirt and dust while allowing body heat to escape. Some also wear gloves, Tyvek booties over their shoes, Tyvek hair covering and respirators that cover the mouth and nose.

After sealing a room, a worker goes through with a leaf blower, aiming jets of air at the floors and walls. The object is to make any asbestos airborne so it can be sucked into a "microtrap,” a three foot square box with three filters.

Clean air is vented outside the building.

After the leaf blower makes all dust airborne, workers go over every surface with a specialized vacuum cleaner that also has three filters.

Stokes said a Hepa vacuum will trap 99.97 percent of the asbestos it picks up.

Finally, after the vacuuming, every surface or object is wiped up to four times with four different cloths.

Room radiators are cleaned using the same process, but the radiators, where much of the asbestos seemed to gather, are sealed off from the room with a plastic bubble around them.

The air in the bubble is then sampled before the plastic is taken down.

Most of the workers are originally from South or Central America. Marvin Aguilar, a general foreman, walks around the high school with a radio instructing workers in Spanish. Supervisors who do not speak Spanish use red lasers to point out to workers which sites need to be cleaned.

The News-Times/Wendy Carlson
George Stokes III, the senior project manager, stacks up some of the cleaned items that have been put in storage and surrounded by plastic.

Erin Kiernan
Workers steam clean seats in the auditorium. Later, cloth samples are removed to insure asbestos does not exist.

Visitors occasionally arrive for tours. U.S. Rep. Nancy Johnson, R-6th Dist., walked through the building during the last week of July.

Before a room is cleaned, workers remove all the objects inside, from desks to crayons. They are cleaned in holding areas that are sealed from the rest of the building.

In the high school's ceramics room, students still had items in the kiln when school was closed early for the year. Each object had to be removed carefully and cleaned.

Erin Kiernan
The cleaned sections are covered in plastic until removal is complete.

"When we cleaned we paid attention to students' projects to make sure they were not damaged or destroyed. We know a lot of students spent time on a project. We are sympathetic to their needs," said Stokes.

"Besides radiators, laboratories (chemistry or biology rooms) were difficult to clean because of chemicals and items in drawers," said worker Marco Salgado. "You had to move things one by one."

Every item in a contaminated area must be cleaned, including light fixtures, the insides of exit signs, lockers, and the like.

Cleaning a computer takes up to 90 minutes. All computer mouses and keyboards were thrown out, along with about 25 computers deemed to be so old they were not worth cleaning.

A total of about 190 computers were cleaned and wrapped in plastic to await an air sampling of the room in which they were sanitized.

The dust collected in the vacuums, filters and rags is bagged, labeled as dangerous, and taken to a landfill that accepts asbestos.

A trailer outside the school has a shower and an area for the workers to clean up before going home if they wish.

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High levels of asbestos were found in Huckleberry Hill School in May after music teacher Margaret Fitzgerald, acting on her own concerns, hired a company to test her room. Further testing by the district found that all four schools were contaminated.

Students were transported to other schools in the region to for several days at the end of the year. The town authorized $900,000 toward a clean-up, and state officials approved use of a

disaster relief statute that allowed the town to issue short-term bonds for another $3.2 million. An Aug. 27 referendum is scheduled for residents to vote on whether to pay to cover the notes.

Infinity Environmental Services of New York was hired to clean Huckleberry Hill and Whisconier Middle schools and PT&L Contracting Corp. of New Jersey was contracted to clean Center School and the high school. Work began in early July.

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A large piece of asbestos hangs from a return air intake duct at Brookfield High, looking like five or six gray cotton-balls stuck together. Stokes took a photo of it before a small robot on a tether went through the duct sweeping up all dust. The larger ducts were cleaned by workers who crawled through them.

Not every inch of each school had to be cleaned so vigorously.

About 11 rooms in Huckleberry Hill School, 45 rooms in Whisconier Middle School, 12 rooms in Center School and 70 rooms in Brookfield High School were completely cleaned.

Cleaning started after all rooms and areas were tested for asbestos. A color-coded map was prepared of the inside of each school to guide workers.

To separate non-contaminated rooms from contaminated areas, large blankets of plastic were attached to doorways throughout the building. Signs warning "Asbestos: Cancer and Lung Disease Hazard," were posted throughout each school.

In some rooms, the specialists cleaned only the radiators and air ducts, and janitors cleaned the rest.

Some carpets were removed, but the rest were steam-cleaned. Contractors were able to save hundreds of cushioned chairs by steam-cleaning them.

Asbestos levels are ruled safe only after each school gets a final test of air that is circulated with blowers.

And then Aguilar, the supervisor and father of four, will be able to pack up his photos and letters and finally sleep in his own bed again.

"I miss my family," he said.

Contact Heather Barr

at hbarr@newstimes.com

or at (203) 731-3331.

Cate Jenkins
05/20/02 01:47 PM

To: amy.rutkin@mail.house.gov, envjoel@ix.netcom.com, ihconsult@msn.com, jan1006@comcast.net, actsnyc@cs.com, paulwoodsbartlett@hotmail.com, artandpolitics@yahoo.com, mclarke@shiva.hunter.cuny.edu, flynnktm@aol.com, lisette.morton@mail.house.gov, dave@nycosh.org, jbennett@nycosh.org
cc:
Subject: Howard Bader's misrepresentation of EMSL's capacity to do carpet sonication tests under EPA cleanup contract, and concurrence with my comments on other issues

As per the below interchange between Howard Bader, he director of EMSL Laboratories, and myself, it is apparent that EMSL Laboratories does have the capacity to perform sonication extraction tests of carpet samples for residents under the EPA downtown cleanup contract.

Howard Bader's email to me claiming that EMSL did not have the resources to do this was erroneous.

The following from Robert DeMalo from EMSL Laboratories makes it clear that EMSL can perform these inexpensive tests, even though they are labor intensive. Each sonication extraction of carpets would only cost $200 on the open market, substantially less if under a large contract with the additional cost savings.

Sonication extractions of carpet are important. They will show over 100 times the amount of asbestos that a microvacuum sample will show.

Carpets are resevoirs of asbestos, and cannot be cleaned effectively even with HEPA wet extraction procedures. Typical professional asbestos abatement procedures simply dispose of asbestos contaminated carpet. That is what they are doing in Libby, Montana.

Howard Bader does concur with me on the other aspects of my comments on EPA's draft scope of work and testing, however.

"DeMalo, Robert" <RDemalo@EMSL.com>
05/20/02 11:04 AM

To: Cate Jenkins /DC/USEPA/US@EPA

RE: Howard Bader's quotation of Robert DeMalo

- -

Dear Ms. Jenkins,

EMSL is currently under contract for both the outdoor and residential sampling events with the USEPA. Presently, we utilize our Manhattan branch for the ground zero samples and our Long Island branch for the landfill samples. The phase 2 of the residential work has not

been clearly defined.I was told testing will
be made available to approximately 15,000 residences
through a hotline. Furthermore, an upper limit
of 75,000 samples was estimated.

The ability for EMSL to handle this amount of
samples will depend on at what rate the
samples are submitted to the laboratory and what
turnaround time is expected. I do not have
this information at this time.

I can tell you that EMSL plans on utilizing,
at a minimum, our 6 regional labs that are
the closest proximity to NYC: Manhattan, Long
Island, Elmsford, Piscataway, Buffalo and
Westmont, NJ (Corporate office & Lab). If
the sample influx exceeds these 6 labs, then
I will consider utilizing our other 15 nationwide
labs. The carpet sonication method is labor intensive,
especially on the preparation steps.

I did quote Howard Bader 10 samples
per day, however this was only for
our Manhattan lab. Until I can get a
project schedule, I cannot predict what
laboratory capacity will be. I hope
this information is helpful.

Thank you,
Robert De Malo

_____
_____
_____

-----Original Message-----
From: Jenkins.Cate@epamail.epa.gov
[mailto:Jenkins.Cate@epamail.epa.gov]

Sent: Monday, May 20, 2002 10:11 AM

To: rdemalo@emsl.com

Subject: Howard Bader's quotation of Robert DeMalo

- -

Rob,

I just left you a voice mail message. The attached
is an email from Howard Bader, who contacted you
regarding the EPA contract. I was wondering if
he was quoting you accurately.

As I stated in my voice mail message, I have no
official duties related to the EPA contract.
However, in l discussions with concerned
citizens, I was suggesting offering them the
option of having sonication extraction tests
performed on their carpet. I had not previously
contacted your laboratory regarding sonication
extractions under the EPA contract, or intend
to in the future. I had called you earlier
asking whether your lab could perform these
services on behalf of private parties who

were wondering about their options for testing a
co-op in Manhattan, not related to
the EPA contract.

Since Howard Bader is quoting you now,
I would personally be surprised if EMSL were
planning on fulfilling all of its analytical
capabilities with only one laboratory out
of the many available EMSL facitilies,
or that if requested by EPA to perform
additional services that did in fact
tax current EMSL resources, that EMSL
would not consider increasing the available
staff either trained to do sonication
extrations or consider sub-contracting
out sonication extractions to other laboratories.

Thank you very much for clearing up any confusion.

Cate Jenkins
703/308-0453

Howard Bader <hbader1@nyc.rr.

To: Cate Jenkins /DC/USEPA/US@EPA

cc: "Rutkin, Amy" <Amy.Rutkin@mail.house.gov>

Subject: Re: Response to your tele message 05/17/02 02:22 PM

- -

Cate, my voice mail message to you was not
intended to say I disagreed with
you, rather it was to express concerns
I had. I spoke to Rob Di Malo of EMSL
before my call to you and he thought
they would be heavily burdened with
just doing the air and microvac samples.
He thought EMSL could only do 10
sonication samples per day. I'm not
sure how many other labs do this work.
This may be a huge problem for a potential
15,000 apartment project. I'm also concerned
that we can establish an agreed upon
criteria for evaluating the sample results.

I agree with you that the publics health should
come before cost or convenience, however
we need to make sure whatever we
recommend can actually be accomplished
(given the time parameters at
hand).

Since that time I have read your
detailed e-mail. I agree with you on
all the remaining items except the air
sample analysis methodology, I don't

have the expertise to comment this.

----- Original Message -----

From: <Jenkins.Cate@epamail.epa.gov>

To: <hbader1@nyc.rr.com>

Sent: Friday, May 17, 2002 12:38 PM

Subject: Response to your tele message

- -

Howard, I could not get you by phone.
But if you are reading this, you got my
email of the comments I sent Amy.

The sonication extraction only cost $250.
It is hardly a research option. Many labs
offer it. And remember, we are talking about
protecting citizens. We do not need to
consider bogging down the labs. Not many
people will choose to use it. You can't
say it will stretch the resources of any
labs, because the volume of the other
samples they will be doing far exceeds
any sonication samples.

I talked to the president of EMSL
who got the indoor monitoring subcontract,
and they can do it. Also, you seemed
dubious about the high volume air samples.
But EMSL already says that EPA is going
to require 4800 liters of air, so I am not asking
for anything not planned.

My attitude is that we really need to be
protective of the citizens here. It may be
that industrial hygienists did not offer these
options to New Yorkers in the past, but that
should not influence their advice now. I really
do not think that any IH is at risk for liability
by NOW recommending these more protective
tests because they did not do them in the past.

Now that the government is paying the bill,
the lower quality testing recommended by
IH's in the past should be forgotten
and excused because the citizen
was paying for it.

Cate