

Fwd: ATSDR Indoor Air Sampling - revised plan

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Date: Thu, 11 Oct 2001 17:49:39 -0400

From: "Jessica Leighton" <jleight@health.nyc.gov>

To: <gkelpin@nysnet.net>

Let me know if you received this. thanks.

Subject: ATSDR Indoor Air Sampling - revised plan

Date: Thu, 11 Oct 2001 15:59:15 -0400

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Hi.

Attached is the Oct. 10 version of the indoor air sampling plan.

Please note: bold items represent issues that were discussed in a 2 pm conference call today.

Another version will be released early next week (hopefully, Monday) but we will need to submit our Resource Request as soon as possible.

Changes to the attached plan include:

- 1) focus will be on residential (commercial spaces will not be sampled)
- 2) the sampling objective 2 will be revised; sampling will be based on concentric areas/zones radiating out from ground zero.
- 3) not all the substances currently listed will be tested for....e.g. mica/gypsum, and magnesium will be deleted
- 4) there will also be minor changes to the cost equipment list forwarded to you earlier today to reflect changes in the sampling plan.

We are hoping to have the 2 additional health educators join us early next week, so sampling can begin the week after.

bye, Nancy.

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Ambient and Indoor Sampling for Public Health Evaluations for areas near WTC

DRAFT ATSDR/DHAC Version 6, October 10, 2001

I. Introduction:

This sampling protocol was developed to address settled surface dust and airborne materials that entered residential/commercial areas following the collapse of the World Trade Center (WTC) buildings. Another protocol is being developed to ensure that the potential for contaminants from ongoing cleanup activities are not being emitted from the work zone at levels of public health concern. The collapse of the WTC buildings resulted in a large number of residents and office workers being evacuated from their homes **or places of work.** Until DATE, residents were not allowed to re-enter their homes in south Battery Park City (from West Thames Street and south, west of Broadway) or north of Chambers Street up through Canal Street, west of Broadway. Currently areas south of Chambers Street and north of West Thames Street, west of Broadway remain restricted; however, it is anticipated that residents will soon be allowed to move back into their homes. **To date, environmental sampling efforts have focused on rescue/recovery areas (occupational); some sampling of commercial buildings to ensure office worker safety; and ambient air sampling for asbestos in a number residential/commercial areas. Additional environmental sampling is necessary to ensure that residential and commercial areas are not adversely impacted by WTC collapse-related materials.**

Surface dust and debris containing <1-4% asbestos has been found in lower Manhattan. Asbestos has been detected in personal air samples of "hot-zone" workers. In addition, low levels of asbestos have been detected in air samples collected on the "hot-zone" perimeter. Crystalline silica quartz has been detected in some of the 30 settled dust samples collected by NIOSH. Although most samples contained less than 5%, some samples contained from 15-20% crystalline silica quartz. Detectable levels of crystalline silica have not been found in the few personal air samples **from the work site** that have been analyzed to date.

Dust, bulk, and air samples (**mostly on or near the work site**), as well as surface runoff water, river sediment, and river water have been analyzed for other contaminants, including metals, **volatile organic compounds (VOCs)**, PAHs, dioxins and PCBs. The low levels of these contaminants found do not indicate an immediate need to conduct widespread environmental testing for them.

Materials in airborne dust that may be of more immediate health concern—especially to residents who are **returning to lower Manhattan**—are those that may cause eye, nose, and throat irritation. Materials that can be inhaled or respired from airborne dust may cause respiratory irritation and may cause exacerbation of pre-existing problems such as asthma, emphysema, and cardiopulmonary disease. Analysis of residential surface and airborne dust, both indoors and outdoors, is necessary to determine 1) if residents are being exposed to materials that may be of public health concern; and 2) **whether areas already cleaned (inside and outside**

environments) contain materials that may be of public health concern. 3) Another suggestion: to provide information to the public; 4) another suggestion: conduct personal sampling during professional cleaning efforts to determine potential exposures to the public if they perform similar cleaning activities.

Information from a south Battery Park resident supports the need to assess indoor and outdoor environmental health issues. Burning throats have been reported to be a common problem in the recently re-occupied residential areas. Residents in south Battery Park, who left windows open prior to the WTC collapse, have settled dust in their homes. Some have disposed of furniture, stereo equipment, etc., because they were covered with “ash and dust.” Homes in the Tribeca zone (Chambers Street to Murray Street, west of Broadway) are not yet occupied, but were reported to have roofs covered with hand-sized chunks of insulation-like material that contain small pieces of mica-like material. In addition, the mica-like material has clogged roof drains and resulted in standing pools of water on residential roof tops. Finally, streets, **sidewalks and other open spaces** are periodically **cleaned** (HEPA vacuum trucks) and wetted (water trucks). However, the resident and others have reported swirling dust throughout the area.

II. Sampling Objective:

The **overall objective** of this sampling is to provide results upon which public health agencies can determine the potential for environmental exposures and possible health effects from the WTC building collapse. Sampling will **[delete..begin to]** characterize ambient and indoor airborne and potentially airborne particles (surface dust) that remain in residential areas and commercial areas of lower Manhattan from the collapse of the World Trade Center.

Specific Objectives, in order of priority are:

1. Characterize the make-up and size distribution of settled dust and airborne breathing zone dust in residential **and commercial** areas—both indoors and outside—closest to the WTC. This information will be used to determine if materials are present at levels of public health concern; **and if materials present in settled surface dust can become airborne and result in exposures of public health concern. [delete...the best methods for cleaning/removing the materials; and the best methods to prevent/minimize future material track-in into residential areas].**
2. Characterize the make-up and size distribution of settled dust and airborne breathing zone dust in other residential **and commercial** areas—both indoors and outside—located further from the WTC, but still impacted by debris and dust from the collapse. For example, modeling the debris/dust impact areas may indicate residential areas more than ten blocks away were affected, as debris and dust from the collapse were forced along street arteries [EPA’s ERT is attempting to determine if this modeling is possible]. **Other suggestion: Base sampling on aerial photography from 9/11 or 9/12, or from other visual signs like debris and settled dust on roofs.** Impact areas further from the site of collapse may have dust/debris with a different composition than what settled closer to the WTC. This information will be used to determine if

materials are present at levels of public health concern; **and if materials present in settled surface dust can become airborne and result in exposures of public health concern.**
[delete...and the best methods to prevent future material track-in into residential areas].

3. **delete...**Re-characterize a selected number of areas throughout the WTC cleanup to ensure that removal operations are not impacting area residents, cleaning methods remain effective, and exterior material track-in is not occurring.

Substitute: Conduct personal sampling of professional cleaners during vacuuming, mopping, etc., to determine potential for exposures to dust and its components.

III. Data and Quality Assurance:

Being developed based on final sampling/analytical mtds.

IV. Sampling Parameters:

Parameter	Sample Type	Indoor/Outdoor	Rationale for Selection
Asbestos	breathing ht., time-weighted air	I/O	known use in building construction, evidence of presence in early air sampling and in settled dust, known inhalation carcinogen
Total Suspended particulates	breathing ht., Continuous, real- time, air	O	Characterize amount of airborne dust that is inhalable ($\leq 100 \mu\text{m}$ aerodynamic diameter)
PM10 and PM2.5	breathing ht., Continuous, real- time, air	O	Characterize the amount of airborne dust that is respirable
Inhalable ($<100\mu\text{m}$)* thoracic ($<10\mu\text{m}$)* respirable ($<4\mu\text{m}$)*	breathing ht., time-weighted, air	I/O	To determine relative amounts of each fraction present and to have each fraction analyzed for silica, gypsum, asbestos, mica, and calcite to qualitatively determine potential hazards.
Respirable crystalline silica	breathing ht., time-weighted, air	I/O	Known component of concrete, evidence of presence in some settled dust samples, known inhalation carcinogen.
pH**	dust	I/O	Concrete has a high pH, if dust has a high pH, it may be contributing to reported symptoms of ENT irritation
Asbestos**	dust	I/O	Determine if asbestos is present in dust
gypsum, mica, calcite**	dust	I/O	Associated with building materials (concrete, drywall) and known to be irritating to ENT
magnesium	dust	I/O	May act as a tracer for WTC-related dust, levels found in metals analysis of settled dust from 16,000-29,000 ppm

* results will be used to better understand the potential for ENT and respiratory irritation, and possibly for determining the possibility of acute/chronic health problems. Results will assist in providing information/recommendations to the public (e.g., what is contributing to irritation, how to reduce exposures)

** to assist in characterizing dust that can become airborne (re-intraintment of settled dust that may be the source of continuing air contamination), and to make recommendations for outdoor dust remediation

V. Residence Selection/Sampling Rationale

The selection of priority residential areas should be decided upon by NYC DOH or the agency of their choosing, or by someone else on the scene with the concurrence of NYC DOH. Currently, NYCDOH is proposing approximately 60 residential units be sampled. Locations are being selected based on worst-case scenario(s) first, which will likely involve a visual determination (e.g., visible dust in lobby area, broken windows, dust along roadways and sidewalks). Worst-case residential areas would include:

This section will change based on input of priorities:

- A. Occupied [~~delete...~~and unoccupied] residential areas closest to the WTC with visible exterior dust/fallout material
- B. Residential areas further from the WTC, where debris fallout may be tracked indoors
- C. **In-use commercial areas near the WTC, where visible dust is present**
- D. ~~delete...~~[Residential areas where Search/Rescue/Removal vehicles have spread dust that may be tracked indoors]

Once locations are selected, then sampling can be pursued. **Need to discuss/determine if sampling will be conducted in unoccupied residences.** If results in worst-case locations show indoor contamination/materials present at levels of concern, a thorough cleaning (these instructions need to be developed) should follow and the locations should be re-sampled. If the post-cleaning round of sampling indicates successful cleaning, then a thorough cleaning should be conducted prior to sampling any additional locations. If post-sampling confirms that contaminants are below levels of health concern, then as other residential areas are cleaned, post-cleaning sampling should occur periodically as a quality assurance check of cleaning effectiveness.

It should be noted that contaminant/materials of concern may vary as the distance of the residence increases from the WTC.

If results of outdoor testing show contamination/materials present at levels of concern, efforts should be made to reduce these levels and take steps that eliminate transporting them indoors (e.g., reduce contaminant track in by removing or changing shoes prior to entering residence, use HEPA filters on HVAC systems, keep windows closed).

VI. Sampling Approach:

1. Interior

Air and dust sampling should focus on common/high traffic areas of the building (e.g., lobbies, front entryways) and in a selected number of apartments/units where visible dust is and is not reported. These areas should be representative of worst case conditions for contaminant/material track-in from outdoors and for fallout deposition. Selecting apartments/units in the same building should provide information the ranges found in indoor living spaces.

[~~delete...~~If the building is unoccupied, aggressive (leaf blower, high-power fan) indoor air sampling should be conducted.] If the building is occupied, air sampling should be conducted with the building HVAC system in continuous operation. After sampling is completed, filters for

the HVAC system, if applicable, should be inspected. If dust is present, recommend filter replacement.

Indoor air sampling will be conducted for: asbestos (NIOSH 7400 and, if an action level is exceeded, NIOSH 7402, PCMe), respirable crystalline silica (NIOSH 7500), and inhalable, thoracic, and respirable airborne particulate matter for fraction analyses of silica, gypsum, mica, etc. (IOM sampler).

Indoor floor dust sampling will be conducted for asbestos (via TEM as the detection limit for PLM is 1%); for silica, gypsum, mica (XRD); and for magnesium (EPA Method#). Floor dust sampling will be conducted using EPA's Environmental Response Team (ERT) SOP for household dust collection. Any deviations from the SOP in actual field collection will be documented by the sampling team.

2. Exterior

Air and settled dust sampling should occur in a grid pattern in residential areas.

Ambient air sampling will be conducted at breathing height for: asbestos (NIOSH 7400 and, if an action level is exceeded, NIOSH 7402, PCMe), respirable silica (NIOSH 7500), and inhalable, thoracic, and respirable airborne particulate matter for fraction analyses of silica, gypsum, mica, etc. (IOM sampler). In addition, 24-hour real-time TSP, PM10 and PM 2.5 sampling will be conducted—again at breathing zone height.

Settled dust samples will be collected and analyzed for asbestos (via TEM as the detection limit for PLM is 1%); for silica, gypsum, mica, and calcite (XRD); and for magnesium (EPA Method #).

Sample/Analytical Methods [NOTE: action/screening levels will dictate detection limit needs and will change sample times]

<u>Parameter</u>	<u>Environmental Media</u>	<u>Sampling/Analytical Method</u>	<u>Sample Flow/time</u>	<u>Analytical LOD / LOQ*</u>
Asbestos	I/O** air	NIOSH 7400, NIOSH 7402 Breathing zone sample height	2 L/min / 4 hrs?	
Total Suspended Particulates	O air	EPA Method # (continuous realtime) Breathing zone sample height	?	
PM10 and PM2.5	O air	EPA Method # (continuous real-time) Breathing zone sample height	?	
Inhalable (<100µm) thoracic (<10µm) respirable (<4µm)	I/O air	IOM personal sampler. Analyze each fraction for asbestos,(TEM), and for crystalline silica, gypsum, calcite (XRD)	2 L/min / 4 hrs?	
Respirable crystalline silica	I/O air	NIOSH 7500	2.2 L/min / 4 hrs?	
pH	I/O dust	EPA SW 846 Mtd 9045C (soils)	10-25 g	
asbestos	I/O dust	PLM, and if <1% TEM	?	
asbestos, gypsum, mica, calcite	I/O dust	XRD	?	
magnesium	I/O dust	ICP (EPA? NIOSH?)	?	

* LOD: Limit of analytical detection; LOQ: Limit of analytical quantitation

** I: indoor; O: outdoor

VII. Action Levels/Data Interpretation:

Action levels will be developed for silica and PM in air; and for asbestos in vacuum dust and outdoor surface dust samples.

Data will be evaluated by local, state and federal public health agencies. Evaluations will include:

- 1) Indoor sampling will be evaluated on a residence-by- residence basis (for the individual occupants)**
- 2) Evaluate all indoor data to determine the extent of public health implications for building occupants near the WTC**
- 3) Evaluate all outdoor data to determine the extent of public health implications for the general public living/working near the WTC**
- 4) Evaluate the relationship between materials found in indoor and outdoor samples**

VIII. Using Mg as a tracer:

In an attempt to determine if dust is related to the WTC, it is proposed that magnesium be analyzed in the indoor and outdoor dust samples. Outdoor dust samples analyzed for metals by EPA have shown magnesium levels from 16,000-29,000 ppm. NIOSH has reported similar results.

Magnesium has not been found in ambient or occupational air samples collected to date. Therefore, surface dust sampling analysis for magnesium may assist in whether the areas sampled have been impacted with dust deposited by the WTC event. Evaluating trends between distance and direction from the WTC and dust levels of magnesium, along with crystalline silica and other analytes, may assist making the determining that an area has NOT been impacted.

IX. Interference from existing bldg materials:

It is anticipated that some of the contaminants/materials found in this sampling effort will be unrelated to the WTC event. Attempts will be made during sample collection to note other possible sources of contaminants.

To better determine if contaminants/materials found are within area background levels; consideration is being given to include sampling at several (?) representative background residential/commercial locations (W 42nd and 10th Ave in Manhattan has been suggested).

X. Sample Description Needs:

In order to interpret results, the following information should accompany each area sampled:

1. Reason for selection of site for sampling (e.g., apartment had windows open or broken during the WTC event; visible dust present in ambient air adjacent to apartment building)
2. Description of sample location
 - Physical address
 - Apartment/floor number
 - Side of building (N, S, E, W)
 - Main entryway
3. NYDEP check list/building inspection report
4. For indoor sample locations, provide the following:
 - Has area been cleaned since WTC event?
 - Date(s) of cleaning
 - If so, description of cleaning
 - wet mopping
 - dusting
 - sweeping (Broom, vacuum, HEPA vacuum)
 - carpets washed
 - Is visible dust present?
 - If so, describe
5. For entryway sampling locations (e.g., lobbies)
 - Is there evidence of dust track-in from outdoors
 - Same questions as #3
6. For outdoor sampling, provide the following:
 - Location of samples relative to main entryways of residential buildings
 - Side of building (N, S, E, W)
 - Location of samples relative to roadways
 - Location of samples relative to dust-generating activities (e.g., construction)
 - Is visible dust present (air, surfaces)
 - If so, describe
7. Description of HVAC system
 - Single or multi-unit system (if multi-unit, how many?)
 - Location of HVAC air handling unit (e.g., in each unit, in each window, on roof-top)
 - Description of conditions around HVAC air handling unit (e.g., heavy dust, no apparent dust)
 - Location(s) of intake(s)
 - Location(s) of discharge(s)
 - Date of last filter cleaning or filter replacement
 - Filter type (e.g., electrostatic)

Filter condition (visible dust present?)

Has it been in use since the WTC event?

If so, is it recirculating air or drawing from the outside?

8. Description of localized contributions to materials of interest (provide description and materials used)

Nearby construction

Remodeling activities

Road work