

EPA WORLD TRADE CENTER EXPERT TECHNICAL REVIEW PANEL

comments of

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with regard to:

**Draft Proposed Sampling Program to Determine Extent
of World Trade Center Impacts to the Indoor Environment²;**

**Determination of a Diagnostic Signature for World Trade Center Dust
and Scanning Electron Microscopy Point Counting Techniques³;**

**WTC Community-Labor Coalition Comments
on EPA's "Draft Proposed Sampling Program..."⁴; and**

**Expert Advisory Committee Synthesis Report - CBPR Expert Advisory Committee
Review of the Document Entitled "Draft Proposed Sampling Program..."⁵**

March 1, 2005

1. MANDATE

As we approach the first anniversary of the EPA World Trade Center Expert Technical Review Panel, it may be useful to revisit the panel's mandate. The October 27, 2003 letter from the White House Council on Environmental Quality to Senators Clinton and Lieberman directs the panel to:

¹ New York Committee for Occupational Safety and Health (NYCOSH).

² EPA/600/R-04/169A, October 15, 2004, www.epa.gov/wtc/panel/pdfs/sampling-proposal-20041015.pdf.

³ United States Geological Survey, Meeker, et al., open file report 2005-1031, pubs.usgs.gov/of/2005/1031/OF2005_1031_508.pdf.

⁴ January 18, 2005, docket.epa.gov/edkpub/do/EDKStaffItemDetailView?objectId=090007d480595a32.

⁵ January 18, 2005, docket.epa.gov/edkpub/do/EDKStaffItemDetailView?objectId=090007d480595a32.

- “characterize any remaining exposures and risks;
- identify unmet public health needs, and;
- recommend steps to further minimize risks associated with the aftermath of the World Trade Center attacks.”⁶

In my opinion, to fulfill our mandate the panel must address the following issues:

- determination of the geographic extent of any remaining World Trade Center (WTC) contamination, identification of remaining WTC-derived contaminants, if any, in indoor spaces, determination of whether remediation is warranted, and remediation if and where warranted;
- identification and oversight of disturbance of potential secondary sources of WTC-derived contaminants, such as demolition of WTC-contaminated high-rise buildings in Lower Manhattan and associated debris removal and waste transfer operations;
- assessment of health registry tracking of post-exposure risks by workers and residents;
- assessment of adequacy of access to and provision of health care services for 9/11-impacted individuals and communities, and;
- assessment of the need for further research, including areas of inquiry and possible sources of funding.

2. SAMPLING PROGRAM PROGRESS

Substantial progress has been made by EPA on the design of the proposed sampling program, encompassing to varying degrees many of the suggestions made by panel members and by community and labor representatives, and spurred by the formalization of a Community Based Participatory Research Process (CBPR). Improvements in the program, in my opinion, include abandonment of the “asbestos as surrogate” concept, expansion of the geographic area to be sampled, inclusion of workplaces and indoor commercial and public spaces in the sampling plan, and testing for a suite of potential contaminants.

Also of note is the proposed switch from air sampling to surface dust sampling. Although the relationship between surface load and the potential for resuspension, exposure, and health risk is not well understood, surface dust sampling is useful in

⁶ Council on Environmental Quality, letter to Senators Clinton and Lieberman, October 27, 2003, page 2, www.epa.gov/wtc/panel/pdfs/Clint-Lieb-ltr.pdf.

certain circumstances and mirrors the regulatory requirements of New York State⁷ and New York City⁸ asbestos regulations, which utilize bulk dust samples as triggers for abatement and which utilize air sampling (under aggressive conditions) only for post-cleanup clearance. EPA itself previously used microvacacs to sample porous surfaces for WTC lead and asbestos in its Residential Confirmation Cleaning Study.⁹ Use of dust sampling and jettisoning of air sampling increase the likelihood of community participation in the sampling program by minimizing the potential for significant disruption or damage in the home or workplace.

3. UNRESOLVED SAMPLING ISSUES

The following sections touch on some (but not all) of the sampling issues that I feel warrant further consideration by EPA and by the panel. Although time constraints prevent a more complete treatment in this document, I look forward to a robust discussion of these and other issues with panel members.

3A. LIMITATIONS

As I stated to the panel almost a year ago,¹⁰ the limitations of any sampling program must be clearly defined. In particular, appropriate end use of data and limitations on end use must be unambiguous. The presence or absence of contaminants at this late date should not be used to extrapolate backwards in time to draw conclusions about the presence or absence of contaminants at an earlier date. In the absence of health-based benchmarks, no correlation should be made between sampling results and risk or lack of risk. However, downtown residents and workers must be given accurate information as to the potential hazards of exposure to sampled contaminants. The aforementioned limitations must be prominently incorporated in all communications pertaining to the sampling program.

3B. GOALS

The primary goal of the sampling effort should be to identify WTC-derived contaminants, if any, that remain in indoor spaces, to determine whether remediation is warranted, and to provide remediation if and where warranted. A secondary goal should be to utilize data accumulated in this effort to determine the nature and geographic extent of any remaining WTC contamination.

⁷ New York State Industrial Code Rule 56, www.labor.state.ny.us/business_ny/employer_responsibilities/safety/s56.htm.

⁸ New York City Asbestos Abatement and Control Rules and Regulations, www.ci.nyc.ny.us/html/dep/pdf/asbestos.pdf.

⁹ United States Environmental Protection Agency, Region 2. Interim Final WTC Residential Confirmation Cleaning Study, Volume 1. May 2003, www.epa.gov/wtc/confirmation_clean_study.htm.

¹⁰ www.epa.gov/wtc/panel/pdfs/newman-2-20040412.pdf.

3C. WTC SIGNATURE

I expect that the effort to validate a proposed PAH (polycyclic aromatic hydrocarbons) signature will not be successful due to differences in combustion sources, distinct combustion events, volatility over time, degradation from exposure to ultraviolet light, and other factors.

Presentations by Greg Meeker at recent panel meetings indicate that substantial progress has been made in our ability to identify slag wool that is WTC-derived. The ability to identify slag wool that is of WTC origin is a significant step forward in the process of validating slag wool as a WTC signature. However, at this point in time, validation of slag wool as a WTC signature must be considered premature, for the following reasons:

- Identification of slag wool of WTC origin thus far has been predicated on analysis of a small number of samples obtained from a limited geographic area (below Chambers Street). We must exercise caution in drawing any conclusions about the ability to identify WTC-derived slag wool beyond the area from which the samples were obtained.
- Differences in ratios of surface area to mass may have resulted in particle size segregation of contaminants by distance and elevation. Larger, heavier particles such as slag wool typically would not be expected to travel as far as lighter particulates such as chrysotile, thus reducing the potential utility of slag wool as a WTC signature beyond a limited geographic area. On the other hand, an exceptional event such as the force of the WTC collapse may have propelled slag wool fibers further than would be expected under normal conditions. More data are needed on this issue.
- Slag wool fibers may be less prone to resuspension than are contaminants of potential concern (COPCs) such as chrysotile asbestos. Consequently, it is possible that over time slag wool fibers that have settled out on indoor surfaces may have been more likely to have been removed through normal cleaning activities than other COPCs which may have been resuspended rather than removed. It is therefore possible that WTC-slag wool is now absent in some WTC-impacted indoor spaces while COPCs may remain. Were such a scenario to occur, the sampling proposal as currently written, particularly with its emphasis on accessible spaces, would improperly exclude these COPCs from identification as WTC-derived.
- Several panelists have commented on the issue of the degree of reliability of a slag wool signature (or any signature). Anything less than 100% certainty, which is not achievable, may result in false positives or false negatives. False positives may bias interpretation of sampling results by indicating the absence of COPCs in indoor spaces that are incorrectly presumed to be WTC-impacted. In this

scenario, indoor spaces that were not impacted by 9/11 events and thus have no residual 9/11 contamination will be counted as impacted but without residual contamination, thus skewing the data to show that fewer impacted spaces have residual contaminants. False negatives, on the other hand, may inappropriately rule out remediation of COPCs that may be present.

In a broader context, I believe the search for a WTC signature has been fundamentally compromised by the failure to articulate in advance a precise definition of a signature and to specify clear and objective criteria by which to evaluate the validity of candidate substances. In my opinion, the criteria proposed by Weisel¹¹ for validation of a surrogate are applicable as well to the search for one or more WTC signature substances:

- the proposed signature substance must be a component of all dispersed materials;
- the proposed signature substance must not become separated from other substances during dispersion;
- the ratio of the proposed surrogate to other contaminants must be consistent (and remain consistent over time and with disturbance), and;
- remediation must be as effective for all contaminants as it is for the proposed signature substance (or remediation and clearance testing must be substance-specific).

Stated differently, it is my understanding that scientific inquiry proceeds through the formulation of a hypothesis and the implementation of a testing process to either prove or disprove and revise the hypothesis. In the search for a WTC signature, I am not aware that any hypothesis has been postulated.

The sampling proposal in its current version is entirely dependent upon the determination of a valid signature. At this point in time, although progress has been made, there is no way of knowing with certainty whether or when a valid signature will be identified. The presentation to the panel on February 23, 2005 by Jacky Rosati anticipates "final results/validation" by May 31, 2005.¹² This means that a sampling plan cannot be rolled out before June at the earliest. As I have pointed out to the panel on several occasions, the sampling proposal collapses without a signature. As I have also pointed out, no "Plan B" has been proposed.

¹¹ Weisel, Clifford. "Scientific Input on Issues Related to EPA's Response Activities to the Attacks on the World Trade Center," Task Order #59, EPA Contract 68-C-02-060, www.epa.gov/wtc/panel/pdfs/weisel.pdf.

¹² National Homeland Security Research Center, "Development of WTC Dust and Fire Screening Methods," www.epa.gov/wtc/panel/pdfs/Rosati-20050223.pdf.

In fact, the current proposal states that if a signature is not validated, “the WTC Expert Technical Review Panel and the Community Based Participatory Research planning group will be asked to evaluate the overall results of the sampling program and provide EPA with their interpretation of the results.”¹³ This is absolutely ludicrous. It is unrealistic to expect that Lower Manhattan residents, landlords, or employers (workers are excluded under the proposal) will let EPA in the door in the absence of a clearly defined sampling plan with a clear decision process and a clear commitment to cleanup where warranted. Consequently, it is highly unlikely, in my opinion, that there will be any results to evaluate or that any sampling at all will occur.

3D. CONTAMINANT RESERVOIRS

Reservoirs are materials or areas that accumulate and retain contaminant substances and that have the potential to release these substances over time or upon disturbance. Release has the potential to increase exposure and health risk. There are only limited data available on release and retention rates, and the mechanics of retention and release are not well understood. Three types of contaminant reservoirs are addressed in the sampling proposal - porous surfaces, inaccessible spaces, and heating, ventilation, and air conditioning (HVAC, or mechanical ventilation) systems.

The sampling proposal calls for porous surfaces such as carpets to be sampled for asbestos, man-made vitreous fibers (MMVF), and crystalline silica. The proposal restricts testing for lead and polycyclic aromatic hydrocarbons (PAHs) to hard surfaces only, and does not offer scientific or methodological rationales for their exclusion from testing on porous surfaces.

EPA elsewhere acknowledges that carpets can hold large amounts of lead dust, that carpet dust-lead loading can be high, and that lead levels in carpet dust tend to have a significant positive association with children's blood-lead concentration.¹⁴ In a 1995 document, EPA describes 9 different vacuum methods for lead dust sampling.¹⁵ EPA in the past has been able to collect and evaluate PAHs from carpets using the High Volume Small Surface Sampler (HVS3), a high powered vacuum cleaner equipped with a sampling nozzle that can be adjusted to a specific static pressure within the nozzle as well as a cyclone to fractionate particles collected.¹⁶ A variation on HVS3 collection of

¹³ U.S. Environmental Protection Agency, “Draft Proposed Sampling Program to Determine Extent of World Trade Center Impacts to the Indoor Environment,” EPA/600/R-04/169A, October 15, 2004, page 11, www.epa.gov/wtc/panel/pdfs/sampling-proposal-20041015.pdf.

¹⁴ U.S. Environmental Protection Agency, “Summary and Assessment of Published Information on Determining Lead Exposures and Mitigating Lead Hazards Associated with Dust and Soil in Residential Carpets, Furniture, and Forced Air Ducts - Executive Summary,” December 1997, EPA 747-S-97-001, http://www.epa.gov/lead/cfad_ex.htm.

¹⁵ U.S. Environmental Protection Agency, “Sampling House Dust for Lead - Basic Concepts and Literature Review, Final Report.” EPA 747-R-95-007, September 1995, www.epa.gov/lead/r95-007.pdf.

¹⁶ U.S. Environmental Protection Agency, “Analysis of Soil and House Dust for Polycyclic Aromatic Hydrocarbons,” EPA600/Sr-96/060, May 1996, www.epa.gov/ORD/WebPubs/projsum/600sr96060.pdf.

PAHs from carpets has also been reported in a study of pesticides and other compounds in carpet dust.¹⁷

Because reservoirs offer the potential for the release and bioavailability of retained contaminants, and because reservoirs, by definition, offer high potential for sample collection, and because technologies for sample collection from soft surfaces are well documented in the scientific literature, porous surfaces such as carpets should be sampled for all COPCs included in any sampling plan.

The current sampling plan proposes to exclude samples collected from “inaccessible areas” such as “behind or on top of cabinets” from clean-up decision-making. I find the comments of the CBPR Expert Advisory Comment persuasive on this issue:

[There are] less contaminated accessible locations, while a reservoir accumulates in infrequently cleaned and/or inaccessible locations. Consequently results from none of the sampling should be excluded from cleanup decision-making criteria. If it is determined based upon program objectives and statistically based sampling design that samples are to be collected from a particular location then the results should be considered part of the cleanup criteria. Dust samples present in inaccessible locations, like those found in HVAC ducts or ceiling plenums, represent the most significant reservoirs of contaminated dusts available for introduction into residential living space and workspace alike....These reservoirs must receive the highest priority in the sampling program design....If inaccessible areas and/or soft surfaces are found to be contaminated enough to be a source of exposure, they should be cleaned, or, in the case of soft surfaces, removed. Cleaning should target the reservoirs of the toxics. Also samples collected from “inaccessible areas” are a good indicator or surrogate of past contamination.¹⁸

With regard to HVACs, EPA’s proposed sampling plan calls for sampling of outdoor air inlets, air mixing plenums, discharge outlets, and HVAC filters. In my opinion, this aspect of the proposal places a higher priority on convenience of access than it does on obtaining scientifically useful results. The presentation of Les Sparks, EPA’s ventilation expert, to the panel on June 22, 2004, clearly noted that deposition is most likely to occur at duct work “dead spots” - i.e., at bends in high velocity areas as well as in areas of low velocity.¹⁹ These areas should be included for sampling in the sampling plan.

3E. COPCs

The proposed sampling plan considers and rejects dioxin as a plan COPC, based on

¹⁷ Colt, et al., “Comparison of Pesticides and Other Compounds in Carpet Dust Samples Collected from Used Vacuum Cleaner Bags and from a High-Volume Surface Sampler.” Environmental Health Perspectives. Volume 106, Number 11, November 1998, ehp.niehs.nih.gov/members/1998/106p721-724colt/colt-full.html.

¹⁸ Expert Advisory Committee Synthesis Report - CBPR Expert Advisory Committee Review of the Document Entitled “Draft proposed Sampling Program...” January 18, 2005, docket.epa.gov/edkpub/do/EDKStaffItemDetailView?objectId.

¹⁹ U.S. Environmental protection Agency, “Particles and HVAC Systems,” www.epa.gov/wtc/panel/pdfs/sparks-20040622.pdf.

results of EPA's Indoor Air Cleanup program in 2002. The proposal does not consider, however, findings of elevated levels of dioxin in at least five commercial and government buildings near Ground Zero (90 Church Street, 100 Church Street, 30 West Broadway, 130 Liberty Street, and 4 Albany Street). It is noteworthy that EPA early on characterized (outdoor) dioxin emissions as follows:

Typical [dioxin] urban air concentrations are in the range of 0.10 to 0.20 pg TEQ/m³... The WTC and Church & Dey measurements from...September 23 through November 21 show unambiguous elevation, with concentrations ranging from about 10 to 170 pg TEQ/m³... The 6 Park Row measurements between October 12 and 29 averaged 5.6 pg TEQ/m³... The highest TEQ concentration reported in the US was >1.0 pg/m³, downwind of an incinerator...Certainly, no reports in the literature could be found on similar circumstance where there is, what is essentially, an area source at ground level continually emitting dioxin near to where individuals are exposed. It would be reasonable to conclude that the concentrations to which individuals could potentially be exposed, in the range of 10.0 to 170.0 pg TEQ/m³ within and near the WTC site found through the latter part of November, are likely the highest ambient concentrations that have ever been reported.²⁰

The proposed sampling plan does not consider mercury for sampling inclusion, also not taking into account elevated levels found at several downtown commercial and government buildings. The R.J. Lee Group, Inc., the primary environmental consultant for Deutschebank, conducted extensive tests for elemental mercury at 130 Liberty Street in December 2003 and January 2004. Mercury surface concentrations were found to average 1.32 µg/ft², to a maximum of 58.7 µg/ft². The highest mercury levels were found on the surfaces of structural steel. Mill scale averaged 0.53 ppm, with a maximum of 1.5 ppm, exceeding the New York State soil cleanup objective of 0.1 ppm. Cutting of steel in the gash area resulted in mercury levels in excess of the OSHA Permissible Exposure Level (PEL). Average concentrations in air in the gash area during non-cutting operations were 11, 12, 13, and 17 ng/m³; average concentrations in air during cutting were 204, 177, 275, and 107 ng/m³. Ambient indoor mercury levels, measured with a Lumex Analyzer, averaged 90 ng/m³ compared to 5 to 20 ng/m³ in other Manhattan buildings and to less than 5 ng/m³ outdoors. Identical indoor heated (83°F) and unheated office spaces (<60°F) were compared. The heated space averaged 92 ng/m³, with spikes from 160 to greater than 300 ng/m³, in excess of the ATSDR Minimum Risk Level and the EPA IRIS Inhalation Reference Concentration. The unheated space averaged 37 and 18 ng/m³.^{21,22}

²⁰ National Center for Environmental Assessment, USEPA, "Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster," EPA/600/P-2/002A, October 2002, pages 75 - 77, oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=36387.

²¹ R.J. Lee Group, Inc., "Mercury Assessment, 130 Liberty Street Property, Technical Memorandum H2: Mercury Air Monitoring," May 2004, www.nyenvirolaw.org/WTC/130%20Liberty%20Street/Mike%20Davis%20LMDC%20130%20Liberty%20Documents/Mercury/H2_TechMemo.050704.1505.L3.pdf

²² R.J. Lee Group, Inc., "Mercury Assessment, 130 Liberty Street Property, Expert Report: Mercury," May 2004, www.nyenvirolaw.org/WTC/130%20Liberty%20Street/Mike%20Davis%20LMDC%20130%20Liberty%20Documents/Mercury/Mercury_ExpertReport.051104.2010.so.pdf.

Given the well-documented findings of dioxin and mercury in some Lower Manhattan indoor spaces, it would seem prudent to consider their inclusion in the sampling plan, at least on a limited basis and near to Ground Zero.

3F. SHORT FIBERS

The debate over whether short fibers, less than five microns in length, demonstrate harmful biological activity has passionate and knowledgeable scientists on both sides of the question, including some members of our panel. The issue remains controversial and unresolved and certainly will not be settled by this panel. In the absence of scientific or medical consensus, it is always better to have more data. I believe it is appropriate to collect, count, and report short fibers in this sampling effort.

3G. GEOGRAPHIC EXTENT OF SAMPLING

The exclusion of Brooklyn from Phase 1 of the proposed sampling plan means that it is possible, or even likely, that no sampling will take place there under this proposal. As panelists have repeatedly indicated, failure to sample in Brooklyn is unacceptable. Initial testing must include, at a minimum, those areas of Brooklyn immediately across the river from Lower Manhattan, below the equivalent of a line drawn from Houston Street (south of approximately Grand Street in Brooklyn).

3H. CHEMICAL MIXTURES

Simultaneous exposure to multiple contaminants may produce adverse health impacts through additive or synergistic effects beyond those anticipated from the respective toxicities of individual components. The proposed sampling plan is silent on the issue of chemical mixtures. The potential for exposure to multiple contaminants should be considered by a revised sampling plan. Although there is very limited history of interventions for protection against mixed exposures upon which to draw, initial guidance may be found in both occupational health and environmental regulations. OSHA's Air Contaminants Standard (29 CFR 1910.1000) specifies an exposure additivity formula to compute reduced workplace exposure limits for chemical mixtures.²³ The National Contingency Plan (40 CFR 300.430) requires consideration in remedial investigations of cases involving multiple contaminants or pathways which will result in cumulative risk of 10^{-4} excess cases.²⁴

3I. ACCESS AND PARTICIPATION

The comments of the WTC Community Labor Coalition are persuasive on the issue of access and participation:

²³ www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9991.

²⁴ a257.g.akamaitech.net/7/257/2422/12feb20041500/edocket.access.gpo.gov/cfr_2004/julqtr/pdf/40cfr300.430.pdf.

Although the plan allows for individual residential tenants to self-enroll, access to common spaces and to mechanical ventilation systems is to be controlled by the landlord, and access to workplaces is to be controlled by the employer. This arrangement effectively disenfranchises the overwhelming majority of downtown residents and workers by preventing them from requesting sampling, and possibly cleanup, of their indoor spaces.²⁵

This situation is a significant disincentive to community support of, and participation in, a sampling effort, and may ultimately doom any such sampling effort.

This issue cannot be resolved without clarification of EPA's right of access or lack thereof to private and public property. EPA has made clear its position that it prefers and plans to implement a strictly voluntary process. On the other hand, EPA has refused to provide, despite repeated requests from panel members and community and labor representatives, a legal memorandum that delineates its powers and limitations in gaining access to private and public property. Regardless of the position that EPA chooses to take on the access issue, it should provide the legal memorandum, as requested.

4. POTENTIAL IMPEDIMENTS TO SUCCESS OF SAMPLING PLAN

While residential and labor representatives have been advocating for and strongly support a comprehensive sampling effort, their support for the current proposed plan is not yet certain. Without their support, any sampling effort will have little chance of success. Even with their support, the ability to gain the trust and cooperation of the larger community should not be taken for granted. The following potential substantial impediments to the success of a sampling plan have not yet been addressed by the panel or the agency, but need to be:

- the lack of a clear and unequivocal commitment on the part of the government to remediation, where sampling results warrant, and the methodologies and clearance tests associated with such remediation;
- adequacy of the budget for sampling and remediation;
- the content, timing, and methods for outreach and public health education efforts to be associated with a sampling effort, and the nature of community participation in these efforts;
- guarantees of adequate QA/QC measures, and acknowledgment of failures in QA/QC during the previous residential cleanup program.

Community and labor buy-in to a sampling effort is also likely to be impacted by the

²⁵ Expert Advisory Committee Synthesis Report - CBPR Expert Advisory Committee Review of the Document Entitled "Draft proposed Sampling Program..." January 18, 2005, docket.epa.gov/edkpub/do/EDKStaffItemDetailView?objectId.

transparency and effectiveness of EPA in assuming its proper lead-agency, proactive coordination role in oversight of the demolition of contaminated high rise buildings in Lower Manhattan. These demolitions constitute imminent and pressing unmet public health needs associated with the aftermath of the WTC attacks, and as such, are part of the mandate of the panel.