NYC 9/11 Public Portal Document

hearing

Summary Report to the New York City Department of Health:

NIOSH Air Sample Results for the World Trade Center Disaster Response

Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

From September 18 through October 4, 2001, National Institute for Occupational Safety and Health (NIOSH) personnel (and contractors) collected air samples in areas immediately adjacent to the debris pile and on personnel actively involved in rescue efforts on or in the vicinity of the debris pile to characterize occupational exposures during the disaster response at the World Trade Center site in New York City, NY. This report is a compilation of sampling efforts that were undertaken over the course of providing technical assistance to the New York City Department of Health (NYCDOH), and were used to identify potential hazards and to recommend appropriate protective measures where needed for the workers whose exposures were sampled. As a result of this activity, workers using acetylene torches to cut metal beams were found to have hazardous exposures to carbon monoxide; this information lead to interventions that addressed the problem. Because these findings are based on limited sampling, they may not be representative of more general exposures. However, they are consistent with those reported by the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA). The area air samples were collected in the immediate vicinity of workers at a height approximating their breathing zone. The personal air samples were collected on workers with the sampling device placed in the worker's breathing zone. Additional bulk sampling was conducted and results were included in the daily summaries to the NYCDOH. Blank sampling was also performed for quality assurance; these results are not included in this report.

Asbestos:

A total of 827 air samples were collected for asbestos. No fibers were detected in over 50% (455) of these air samples as determined by phase contrast microscopy (PCM). The remaining 372 air samples indicated time-weighted average (TWA) concentrations ranging up to 0.89 fibers/cc as determined by PCM. Twenty-five of these samples exceeded the NIOSH recommended exposure limit (REL) and the OSHA permissible exposure limit (PEL) of 0.10 fibers/cc. In addition, 119 of these air samples were analyzed for asbestos by transmission electron microscopy (TEM), a more sensitive analytical method that can distinguish between asbestos and non-asbestos fibers. No asbestos fibers were detected in over 45% (56) of these air samples as determined by TEM. The remaining 63 air samples indicated TWA concentrations ranging up to 0.063 asbestos fibers/cc as determined by TEM, none of which exceeded the NIOSH REL and the OSHA PEL of 0.10 fibers/cc. These TEM results indicate that the vast

CONFIDENTIAL, CITY_21MC100_003402503

SUBJECT TO PROTECTIVE ORDER NO. 2, SEPT. 2008

NYC-WTC_000181704

NYC 9/11 Public Portal Document

majority of the fibers reported from the PCM analyses are non-asbestos fibers. Further analyses are being performed to determine the nature of these non-asbestos fibers.

Carbon Monoxide:

A total of 98 air samples were collected for carbon monoxide indicating TWA concentrations ranging from 0.16 to 242 ppm. All but 4 of these measurements were below the NIOSH REL of 35 ppm and all but 1 were below the OSHA PEL of 50 ppm. One sample (242 ppm) exceeded the NIOSH recommended ceiling limit of 200 ppm. Additionally, 2 instantaneous peak measurements (1,239 and 1,368 ppm) exceeded the NIOSH immediately dangerous to life or health (IDLH) value of 1,200 ppm and 15 others exceeded the NIOSH recommended ceiling limit of 200 ppm. All carbon monoxide measurements exceeding one or more of these evaluation criteria were being performed by workers using either a cutting torch or a cutting saw. This underscores the need for adequate ventilation and worker awareness when using these tools.

Diesel Exhaust:

A total of 8 air samples were collected for diesel exhaust indicating TWA (elemental carbon) concentrations from none detected to 0.023 mg/m^3. These measurements are all well below the proposed American Conference of Governmental Industrial Hygienists (ACGIH®) threshold limit value (TLV®) for diesel exhaust of 0.20 mg/m^3 (elemental carbon). (NIOSH and OSHA currently have no evaluation criteria for diesel exhaust.)

Freon® 22:

A total of 5 air samples were collected for Freon® 22 (chlorodifluoromethane). No Freon® 22 was detected on any of these air samples.

Hydrogen Sulfide:

A total of 10 air samples were collected for hydrogen sulfide. Hydrogen sulfide was detected on only 1 of these samples indicating a TWA concentration of 1.0 ppm and a instantaneous peak concentration of 3.0 ppm. These measurements are well below the NIOSH recommended ceiling limit and the OSHA ceiling limit of 10 ppm.

Inorganic Acids:

A total of 27 air samples were collected for inorganic acids including hydrobromic, hydrochloric, hydrofluoric, nitric, phosphoric, and sulfuric acids. Except for sulfuric acid, only trace amounts of inorganic acids were detected on these samples. Small quantities of sulfuric acid were detected on all but 1 of the air samples which were below the NIOSH REL and OSHA PEL of 1.0 mg/m^3.

CONFIDENTIAL, CITY_21MC100_003402504

SUBJECT TO PROTECTIVE ORDER NO. 2, SEPT. 2008

NYC-WTC_000181705

NYC 9/11 Public Portal Document

Mercury:

A total of 16 air samples were collected for mercury indicating TWA concentrations from none detected to 0.002 mg/m^3. These measurements are all well below the NIOSH recommended ceiling limit and the OSHA ceiling limit of 0.1 mg/m^3.

Metals:

A total of 45 air samples were collected for 27 different metals including arsenic, beryllium, cadmium, chromium, cobalt, lead, magnesium, manganese, molybdenum, nickel, phosphorus, selenium, silver, tellurium, thallium, vanadium, and zinc. Only trace amounts of these metals were detected on any of the air samples.

Polynuclear Aromatic Hydrocarbons:

A total of 12 air samples were collected for 16 different polynuclear aromatic hydrocarbons (PAHs) including anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, chrysene, phenanthrene, and pyrene. Only trace amounts of PAHs were detected on any the air samples. Four of the PAHs detected on the air samples in trace amounts are the suspected human carcinogens benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and chrysene.

Respirable Particulate:

A total of 18 air samples were collected for respirable particulate and indicated TWA concentrations ranging from none detected to 0.32 mg/m^3. These measurements are well below the OSHA PEL of 5 mg/m^3. (NIOSH does not currently have an REL for respirable particulate.)

Respirable Crystalline Silica:

A total of 18 air samples were collected for respirable crystalline silica. No respirable crystalline silica was detected on any of these air samples.

Total Particulate:

A total of 36 air samples were collected for total particulate and indicated TWA concentrations ranging from none detected to 2.3 mg/m^3. These measurements are well below the OSHA PEL for total particulate of 15 mg/m^3. (NIOSH does not currently have an REL for total particulate.)

Volatile Organic Hydrocarbons:

A total of 76 air samples were collected for volatile organic hydrocarbons including benzene, ethyl benzene, styrene, toluene, and xylene(s). Except for benzene, only trace amounts of VOCs were detected on any of these air samples. Two of these samples (0.35 and 0.46 mg/m^3)

CONFIDENTIAL, CITY_21MC100_003402505

SUBJECT TO PROTECTIVE ORDER NO. 2, SEPT. 2008

NYC-WTC_000181706

NYC 9/11 Public Portal Document

exceeded the NIOSH REL for benzene of 0.32 mg/m^3 but did not exceed the OSHA PEL for benzene of 3.2 mg/m^3.

CONFIDENTIAL, CITY_21MC100_003402506

SUBJECT TO PROTECTIVE ORDER NO. 2, SEPT. 2008

NYC-WTC_000181707