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Metals: OSHA has taken 626 air samples to monitor worker exposures to dusts, fumes, oxides, and other compounds of metals such as antimony, beryllium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, vanadium, zinc, cadmium, magnesium, arsenic, and mercury. Results from these samples are generally well below the applicable OSHA limits. However, torch cutting and burning structural steel at the rubble pile have resulted in instances of overexposures as follows: copper (9); iron oxide (20); lead (12); and cadmium (2). Accordingly, OSHA is recommending that workers engaged in these operations wear appropriate respiratory protection.

Ionizing Radiation: A survey of the rubble pile was conducted on 10/22-10/23 to check for latent radiation with particular attention to alpha radiation. Preliminary results show no elevated levels.

Dioxins: OSHA has taken samples for dioxin and these samples were analyzed by EPA. One initial sample, representing exposure directly on the pile, showed elevated levels of dioxins when compared to ambient background levels. This value was comparable to the levels found by EPA sampling. The dioxins at this location are being emitted from the on-going rubble fire. Additional sampling was conducted around the perimeter of the pile and revealed levels that were considerably lower than those on the rubble pile. Dioxins are considered collectively as suspect human carcinogens. OSHA does not have a worker standard for dioxins. OSHA is coordinating with EPA, and the Salt Lake City Analytical Laboratory to fully assess the risk posed by the elevated levels of dioxins.

Polynuclear Aromatic Hydrocarbons OSHA has taken 132 samples. The majority of the samples have not shown the presence of benzo(a)pyrene and/or one or more of five additional fused polycyclic hydrocarbons: anthracene, acridine, pyrene, chrysene and phenanthrene. Sample results to date have identified seven samples which reached or exceeded OSHA's coal tar pitch volatile PEL of $0.2mg/m^3$. These personal samples were taken on the pile on iron workers and grappler operators. OSHA continues to strongly recommend the use of respiratory protection when working on the rubble pile.

Freon R-22, Hydrogen Fluoride & Phosgene: OSHA has taken 105 samples for Freon R-22 (chlorodiflouromethane). The majority of sample results received to December 17th reveal non-detectable airborne levels. During operations involving Freon removal from the auxiliary chiller that started on 12/5/01, direct reading instrument revealed readings ranging from 100 ppm to one peak near a leaky valve of 500 ppm. SCBA tanks were and are being worn by workers, and masks are to be worn only when direct reading instruments reveal 850 ppm Freon and/or less than 20.4% Oxygen. OSHA does not have an exposure limit for Freon R-22. (The NIOSH REL for Freon is 1000ppm.) In response to information about exposure to the decomposition by-products of Freon R-22 used in the air conditioning systems of WTC towers, sampling for hydrofluoric acid (HF) had been conducted. Results for HF revealed non-detectable levels. Sample results for phosgene to date show non-detectable levels.

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OSHA SAMPLING RESULTS SUMMARY AS OF 12/20

Asbestos: A total of **872** air monitoring samples for asbestos have been taken. From 9/13 -9/21, 177 samples were taken in the financial district. They were taken on OSHA personnel as they walked within certain predetermined zones. Results revealed asbestos concentrations ranging from ND (none detected) to .037 f/cc., well below OSHA's permissible exposure limit (PEL) of .1 f/cc. After 9/21, sampling focused on the rubble pile and those workers working on or immediately next to it. **82** of the samples analyzed exceeded OSHA's limit via PCM analysis. However, upon further analysis using discriminating counting methods and/or TEM analysis, the number of asbestos fibers found dropped dramatically to below detectable levels or well below .1 f/cc.

Carbon Monoxide: A total of **77** personal samples of workers on the rubble pile showed results ranging from 1 ppm to 34 ppm which are well below the OSHA 50 ppm permissible exposure limit.

Noise: OSHA has been conducting noise monitoring in the rubble pile. **41** personal samples have been conducted on employees performing (or working near) various operations such as jack hammering, drilling and equipment operations. Employee's exposure to the noise range from 73.7 dBA to 94.5 dBA. OSHA's permissible noise exposure for construction is 90 dBA. One personal sample and one area sample during core drilling operations exceeded the OSHA noise PEL of 90 dBA. OSHA continues to recommend the use of appropriate hearing protection for workers performing tasks where high noise levels are likely to be encountered.

Respirable Silica: The overwhelming majority of the **402** silica samples show no detectable levels of airborne silica. However, fourteen exposures exceeded the PEL. The highest sample result was approximately nine times the OSHA limit (pre-drillers working on the slurry or "bathtub" wall). The other twelve elevated exposures were approximately one to seven times the OSHA limit. These exposures occurred during: 1) rubble removal and loading operations near the Winter Garden; 2) during the breaking up of concrete in the pit; 3) while core drilling the concrete slurry wall, and 4) while chipping concrete with power tools during demolition activities at 7 WTC's parking garage. Most of the work areas where apparent overexposures to silica occurred were in the rubble pile; an area where OSHA continues to encourage the use of respiratory protection.

Volatile Organic Compounds: OSHA has taken **608** samples for (VOCs) such as acetaldehyde, acrolein, acrylonitrile, benzene, 2-butanone, carbofurans, chlorodiphenyl (PCB), ethyl benzene, formaldehyde, Freon R-22 (chlorodiflouromethane), hexone, isocyanates (e.g. MDI, TDI), perchloroethylene, phosgene, styrene, toluene, 1-3 butadiene, trichloroethylene, vinyl chloride, glutaraldehyde, and xylene. Screening samples initially showed elevated levels of some organic chemicals resulting from the fires burning in the rubble pile. Subsequent personal and area samples show worker exposure levels to be below OSHA limits. However, one personal sample result for benzene was found to be at the 8-hr. OSHA Allowable Limit concentration of 1 ppm. This was found on a backhoe operator moving debris. See information below for polynuclear aromatics, Freon R-22, phosgene and dioxin.

Oxides of Nitrogen/ Sulfur: Sampling on grappler operators on the rubble pile, and on employees manning truck wash stations revealed trace levels of nitric oxide and nitrogen dioxide. SO_2 personal and area results were found to be below OSHA limits.

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