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Program Support Center

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Preliminary Report

for the:

Federal Bureau of Investigation
Headquarters
Washington, DC

Industrial Hygiene Survey

Staten Island Landfill
Muldoon Avenue, Staten Island, NY
World Trade Center Project

Survey Period:
September 17 through December 5, 2001

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Industrial Hygiene Survey

Federal Bureau of Investigation, Staten Island, NY

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Industrial Hygiene Survey

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Industrial Hygiene SurveyFederal Bureau of Investigation, Staten Island, NY**1.0 Introduction**

At the request of the Federal Bureau of Investigation (FBI), industrial hygiene monitoring was conducted during law enforcement investigation activities at the Staten Island Landfill located on Muldoon Avenue in Staten Island, NY. Edward Olmsted, and Bernard Fontaine, representing the U.S. Public Health Service, Federal Occupational Health, New York Field Office conducted the survey. The project involved industrial hygiene monitoring over the course of three weeks to determine levels of worker exposure to fibers, total dust, silica dust, volatile organic compounds, and heavy metals. Those workers included in the monitoring were Federal law enforcement employees, and New York City police Department employees. This report summarizes the results of sampling conducted from September through December 5, 2001.

Industrial Hygiene SurveyFederal Bureau of Investigation, Staten Island, NY**2.0 Background**

The Staten Island landfill project involves recovery of evidence from building debris, which resulted from the collapse of the world trade center building complex, including the twin towers and buildings 6 and 7. The buildings were constructed of cement, steel, glass, gypsum wallboard, acoustical tile ceilings, sprayed-on insulation (asbestos-containing and non-asbestos types) and contained wood, plastic and metal furniture, computers and fixtures and paper products. Most of these materials were either physically destroyed (compressed, pulverized) or burned in the collapse of the building. This process gave rise to particulate matter ranging from a very fine dust to larger sized, quicker settling particles. The project involves inspection of the building debris for evidence. The building materials were transported to the landfill where the material is dumped, sorted, and carefully inspected. The New York City Police Department (NYPD) and Federal law enforcement agents conduct the inspections. New York City Sanitation workers and contractors hired by the City of New York operate the heavy equipment.

The following is a brief outline of the operation is provided below. The processing of the debris evolved over the course of the project. In the early stages almost all screening of debris was done manually. The building debris arrives at the site either by barge or truck. The debris is dumped in designated area at the landfill where the steel beams and columns are immediately segregated and the large debris is screened out.

Manual screening of debris

Debris from the WTC site is dumped onto the debris field either by trucks or payloaders. Law enforcement personnel sort through the debris using rakes, and hoes. After sifting through the material the workers move out of the debris field to the perimeter, and the payloaders remove the debris. During the winter months the debris fields put under a large temporary enclosure. Two sides and the roof are enclosed. Prior to November 2001, the manual screening of the debris was done in the open air.

Screening Machines

As of November 2001 almost all sorting of debris is done on screening machines. As of November there are four screening machines at the site. Payloaders are used to dump debris into a hopper on the screening machine and the material is screened onto two conveyors, which receive debris of large and small size respectively. Law enforcement personnel, stationed along each conveyer, visual inspect the debris and remove evidence. In December each of the screeners was enclosed in plastic sheeting on a tube frame.

In the early phases of the project the work was conducted around the clock, seven days a week. Each Federal worker was on site for an eight-hour shift, which includes a lunch break. NYPD worked a 12-hour shift. As of December, the facility operated from 6 AM to 8 PM and all shifts were eight hours. The Federal law enforcement workers work two shifts including 6 AM to 2 PM and 12 noon to 8 PM. There are generally eight to twelve FBI employees searching debris on any given shift. On most days there are usually four US Customs employees searching debris on each shift. On some days there have also been law enforcement employees from the US Secret Service and from the Alcohol, Tobacco, and Firearms (ATF). Personal sampling has been

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conducted on employees from all of the agencies indicated above.

The facility is set up with an exclusion zone and clean areas. The clean areas include the trailers. The Federal workers are usually stationed in the Building 6 and 7 areas of the site. Building 7 was a building partially occupied by Federal Agencies and Building 6 was the US Customs House. Building 7 was constructed in the early 1990's and did not have asbestos materials, however the North tower fell into Building 7 and caused asbestos contamination. Building 6 had asbestos containing fireproofing on the structural steel.

The exclusion zone areas are indicated by signs, which list the personal protective equipment required on all workers in the area. In the exclusion zone the workers wear respiratory protection consisting of dual cartridge respirators with high efficiency particulate filters (N100). Other personal protective equipment worn by each worker includes a Tyvek suit, latex inner gloves, leather outer gloves, a hardhat, eye protection, steel toe safety boots, and rubber outer boots. When working on the screener machines, the workers wear hearing protection consisting of the earplug type. Federal law enforcement workers are trained and fitted for respiratory protection on site by the FBI health and safety professionals prior to performing the work. NYPD workers are fitted for respiratory protection and provided PPE by NYPD. Personal exposure monitoring of NYPD is performed by EEG Inc, an environmental contractor under the supervision of the Army Corp of Engineers. The Army Corp has overall responsibility for the operation of the site. They have developed the site safety plan and they coordinate all work site functions and activities.

In October two decontamination buildings were erected for workers to remove and clean their protective equipment. Decontamination workers are stationed in these buildings to help clean protective equipment including respirators. There is also a trailer with sinks and showers where workers can wash. All workers are required to wash their protective equipment, and remove their Tyvek suit and gloves before entering the cafeteria building. There is also a decontamination area at the building six area of the landfill. A decontamination worker assists workers in the removal of their protective gear and cleans their boots and other PPE. There is also a warming shed in the Building 6 area.

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3.0 Survey Methods

Personal exposure monitoring was conducted for fibers in air, respirable silica dust, total dust, heavy metals including lead, and volatile organic compounds. Personal sampling pumps were attached to a representative number of workers and were used to collect air from the breathing zone of the worker. The samplers were calibrated in the field with a rotameter, which was calibrated against a Gilibrator (bubblemeter). The personal samples give the best indication of the level of exposure to the worker. A small number of area samples were also collected. In most cases these were taken along the perimeter of the work zone in order to verify that respirators were not required in clean areas. In some cases the area samples were taken within the debris field. The following summarizes the analytical methods used for this survey:

Asbestos

Fibers in air were collected on 25 millimeter mixed cellulose ester filters at flow rates between 1.2 to 2.0 liters per minute (LPM). The samples were analyzed following the National Institute of Occupational Safety and Health (NIOSH) method 7400 by the Federal Occupational Health Environmental Lab located in Denver Colorado. Some of the samples were selected for additional analysis by transmission electron microscopy (TEM) following the NIOSH method 7402. Sample results are reported in fibers per cubic meter of air (f/cc).

Asbestos bulk samples were also analyzed for asbestos content using polarizing light microscopy and additional analysis was done on selected samples using TEM. Results are reported in % asbestos by weight.

Metals

Each sample was collected on mixed cellulose ester 37-millimeter filters. The sample was collected using personal sampling pumps operated at 2.0 liters per minute. The sample media was prepared and analyzed by Galson Laboratories of Syracuse New York. They are an American Industrial Hygiene Association (AIHA) accredited lab. Results are reported in milligrams of metal contaminant per cubic centimeter of air (mg/M3). For some of the samples metals scan was performed for 23 metals using inductively coupled plasma.

Volatile Organic Compounds

Volatile organic compounds were collected using charcoal tubes and personal samplers operated at a flow rate of 0.2 liters per minute. The samples were analyzed by the Galson Laboratory using gas chromatography. Results are reported in micrograms of contaminant per sample.

Total Dust

Total dust samples were collected on 37 millimeter, 5 micron preweighed polyvinyl chloride filters at a flow rate of 2 lpm. The samples were prepared and analyzed by Galson Laboratory. Results are reported in milligrams per cubic meter.

Respirable Dust

Respirable dust samples were collected on 37 millimeter, 5 micron preweighed polyvinyl chloride filters. The cassettes were mounted in a nylon cyclone (MSA) and respirable dust was

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collected at a flow rate of 1.7 lpm. The PVC cassettes were prepared and analyzed gravimetrically by Galson Laboratory. The samples were analyzed by NIOSH method 0600/7500. The respirable dust samples were also analyzed for crystalline silica including quartz, cristobalite, and tridymite. Results are reported in milligrams per cubic meter.

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4.0 Exposure Criteria

The US Department of Labor Occupational Health and Safety Administration (OSHA) regulates exposure to air contaminants. The OSHA permissible exposure limits represent legal standards. Most of the limits are time-weighted averages over an eight-hour shift. These are intended to prevent long term or chronic health effects to workers exposed over eight-hour days for five days a week over a working lifetime. These limits are called an eight-hour time weighted average (8 hr TWA).

Most workers, but not all, will be protected from adverse health effects if their exposures are maintained below the OSHA regulatory levels. A small percentage may experience adverse health effects because of individual susceptibility, or a pre-existing medical condition. In addition, some hazardous substances may act in combination with other workplace exposures, the general environment, or with medications or personal habits of the worker to produce adverse health effects, even if the occupational exposures are controlled at the level set by OSHA.

Asbestos

The World Trade Center tower buildings 1 and 2 had asbestos containing fire proofing on the structural steel on some of the floors. This consisted primarily of chrysotile asbestos. Asbestos fibers are recognized as a human carcinogen, which primarily affect the respiratory system. The types of cancer associated with asbestos exposure include lung cancer, pleural mesothelioma and peritoneal mesothelioma. Asbestos can also cause asbestosis, a debilitating respiratory disease. The latency period between exposure to asbestos and development of disease is 15 to 25 years. The principle route of exposure to asbestos is through inhalation. The Occupational Safety and Health Administration (OSHA) regulates asbestos under the construction standard (cited as 29 Code of Federal Regulations Part 1926.1101). The permissible exposure limit for asbestos is 0.1 fibers per cubic centimeter of air (f/cc) as an eight-hour time weighted average. There is also an excursion limit of 1.0 f/cc over a 30-minute sample.

Asbestos bulk samples were also taken at the landfill. Sample results are reported as either none detected, or the specific type of asbestos material is identified, and where possible the quantity of the asbestos is indicated. The OSHA asbestos standard as well as the EPA asbestos standards defines asbestos containing material as having greater than 1- % asbestos.

Metals

Given the extent of pulverization of the building there is a small potential for exposure to heavy metals present in the dust. OSHA regulates exposure to a number of metals as an 8-hour TWA. The OSHA PELs for the scanned metals are:

Silver	0.01 mg/M3
Aluminum	15 mg/M3
Arsenic	0.01 mg/M3
Antimony	0.5 mg/M3
Barium	0.5 mg/M3
Beryllium	0.002 mg/M3
Cadmium	0.005 mg/M3

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Cobalt	0.1 mg/M3
Chromium	1 mg/M3
Copper	1 mg/M3
Iron	10 mg/M3
Lead	0.05 mg/M3
Magnesium	15 mg/M3
Manganese	5 mg/M3
Nickel	1 mg/M3
Thallium	0.1 mg/M3
Vanadium	0.5 mg/M3
Zinc	5 mg/M3

Silica Dust

Crystalline silica is found in materials such as concrete, masonry and rock. When these materials are made into a fine dust and suspended in the air, such as in the WTC buildings, breathing in these fine particles can produce lung damage, leading to a disease called silicosis. The crystalline silica dust limit is for respirable dust (<10 microns) and is regulated as an eight-hour time weighted average. The current OSHA PEL for respirable dust containing crystalline silica (quartz) for the general industry is measured by (mg/M3) and is calculated using the following formula:

$$PEL = \frac{10 \text{ mg/M3}}{\% \text{ silica} + 2}$$

In addition, for cristobalite and tridymite forms, the same formula should be used for determining the PELs, divided by one-half. The National Institute for Occupational Safety and Health's (NIOSH) recommended exposure limit (REL) for respirable crystalline silica is 0.05 mg/M3 (50 mg/M3) for up to ten hours/day during a 40-hour work week. Where no silica detected in the sample the PEL is 5 mg/m3. Where the sample is 100 % quartz the PEL is 0.1 mg/m3. This gives a range for permissible exposure limits for respirable dust of 0.1 to 5 mg/m3 depending upon the crystalline silica content.

Volatile Organic Compounds

The charcoal tube samples were desorbed and scanned on a gas chromatograph for 36 different volatile organic compounds. The detection limit for each VOC ranged from 3 to 5 micrograms. The volume of air sampled for the VOC samples ranged from 60 to 80 liters. This gives a detection limit for each VOC ranged from 0.04 to 0.06 mg/m3. The compounds tested have permissible exposure limits that range from the lowest limit for benzene of 3 mg/M3 to the highest limit set for acetone of 2400 mg/m3. The OSHA Z tables provide the permissible exposure limit for each of the compounds tested. In the results section of this report the PEL is provided for each of the compounds detected.

5.0 Findings

Air sampling for metals, volatile organic compounds and crystalline silica was performed during the early phase of the project. The levels of metals including lead, silica dust, and volatile organic compounds were negligible. Sampling for these contaminants was discontinued in October. Sampling for asbestos in air has continued throughout the project.

The data for each air or bulk sample is provided in the spreadsheets in appendix A of this report. Those samples taken at the landfill are indicated under the location column. Limited sampling was conducted in September at the World Trade Center cleanup site in September. This was discontinued when FBI moved all evidence collection activity to the Landfill. Field blanks indicated in the location section indicate a quality control sample that verifies that the sample media was handled, shipped, prepared and analyzed without introducing contamination. The top of each table indicates the type of sample, which is as follows: asbestos bulks; asbestos air area; asbestos air personal; air samples for metals; air samples for volatile organic compounds. The following summarizes the sample data:

Asbestos Bulk Samples

Landfill Debris

Bulk samples at the landfill were taken from the dust and debris that is dumped into the screeners and onto the ground for searching. The four bulk samples analyzed to date were all found to have less than 1 % asbestos. Two of the samples had detectable levels of chrysotile asbestos using TEM but it was not possible to quantify. The only bulk sample found to have over 1 % chrysotile asbestos was taken from the ground on Church street at the Trade Center tower collapse area. The EPA reported taking 10 bulk samples at the Staten Island landfill and found them all to have less than 1 % asbestos. Under the State of New York, and Federal regulations, the debris at the landfill is not considered regulated asbestos containing material. Given the fact that a number of bulk samples taken by the EPA as well as other agencies in the ground zero area have been found to have over 1 % chrysotile asbestos. It is likely that some debris arriving at the landfill contain over 1% asbestos.

Debris on Cars

The FBI and New York City Police (NYPD) are inspecting each vehicle removed from the World Trade Center Disaster site. The vehicles were located on the streets around the buildings during the collapse. As a result all of the vehicles were covered with dust and debris from the buildings. In many cases the windows on the cars were broken allowing dust and debris to settle on surfaces inside the car. All of the cars and trucks were removed from the Trade Center site and transported to the landfill. The cars were stored in a large lot at the landfill, which is under the control of the FBI, NYPD, and NY City Department of Sanitation. The FBI and NYPD inspect every car for evidence, which requires entering the vehicle and inspecting the entire interior as well as inspecting the exterior. Because workers must come in direct contact with the surfaces of the vehicles, and with the debris, workers raised a concern of potential asbestos contamination. Four samples of debris were taken from four cars to determine the level of asbestos contamination.

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Automobile 967195- The sample number 967195 represents debris taken from the windshield and the interior of the car. This sample was found to have 0.3 % chrysotile asbestos.

Automobile 9964661 - The sample number 9964661 was taken from the exterior and the back seat of this car and found to have 0.8 % chrysotile asbestos.

Automobile 967200 - The sample number 967200 was taken from the exterior of this car and found to have 1.8 % chrysotile asbestos. This material meets the definition of asbestos containing material.

Automobile 967179 - The sample taken from this car was found to have 0.4 % asbestos.

All FBI agents searching cars have been provided a respirator, Tyvek suit, gloves, eye protection and rubber boots.

Asbestos in Air Samples - Area Samples

In September, a total of ten area samples were taken in the landfill for levels of airborne fibers. Six were taken around the perimeter of the debris fields. The locations of the perimeter samples include the NYPD personal protective equipment (PPE) change area, the K9 tent at the edge of the debris field, and at a light stand at the edge of the debris field. The airborne fiber level on the six samples ranged from 0.01 to 0.07 f/cc. These are all below the PEL of 0.1 f/cc. These results indicate that when workers leave the debris field they may remove their respiratory protection.

Four area samples were taken inside the debris field at light stands or at the debris screeners. The levels ranged from 0.007 to 0.065 f/cc. These were also below the OSHA PEL of 0.1 f/cc. The EPA has also conducted area sampling around the landfill and reportedly has found levels of fibers less than 0.1 f/cc.

An area sample was collected in the FBI trailer

Asbestos in Air Samples - Personal Samples

The personal sample results for asbestos in air are summarized on pages 2 through 6 in the attached data spreadsheet. Personal exposure air samples for fiber levels in air were collected on employees working in the debris fields raking and sorting debris, working at the screeners while open and while enclosed in plastic sheeting. The samples were collected on eleven (11) different days from September 17 through December 5 2001. A total of 66 personal samples were collected at the landfill and are included in this report. The following summarizes the results:

1. Twenty-four (26) samples were at or above the OSHA PEL of 0.1 f/cc. This represents a fraction of approximately 40 %.
2. The range of exposure to asbestos was from 0.018 to 0.488 f/cc.
3. Six of the 66 samples (10%) were above 0.2 f/cc.
4. Seventeen of the sixty-six personal air samples were further analyzed using TEM to determine the presence of very small fibers. In most cases the TEM results did not differ significantly from those results using phase contrast microscopy, however the TEM

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results usually confirm the presence of asbestos fibers. In one case, on October 23, 2001, an air sample analyzed by PCM revealed 0.488 and the follow-up TEM analysis 0.106 f/cc.

5. Exposure monitoring of eight (8) workers manually raking out debris in an open area was done on 51 workers and revealed levels ranging from 0.004 to 0.417 f/cc. The average exposure level was 0.08 f/cc.
6. Exposure monitoring of workers while manually raking debris in an enclosed area was done on 12/5/01. Four personal samples were collected and ranged from 0.074 to 0.092. This suggests that the enclosures do not significantly increase exposure levels.
7. Exposure monitoring of workers while inspecting debris at a screener was done on 11/9/01 and 11/14/01. On both days the screener was not enclosed, but was in the open air. The results ranged from 0.051 to 0.251 f/cc. The average level was 0.143 f/cc.
8. Personal sampling was conducted on a FBI bomb technician while working throughout the day searching cars removed from the WTC site. The exposure level was 0.303 f/cc. Additional analysis of the sample by TEM revealed an exposure level of 0.488 f/cc.

These findings indicate that workers should continue to wear the half face respiratory protection currently issued while working in the debris field. Tyvek suits and gloves should also be used. The results indicate that exposures to asbestos can exceed the PEL as much as 30 % of the time. When the PEL is exceeded it is usually by a very small margin and never approaches the maximum allowable limit for a half face respirator.

Metals in Air Samples

Both personal and area sampling was conducted for metals in air. The results of metal scans were summarized in the prior report. Additional sampling for metal scans has not been conducted since the earlier report. Additional sampling was conducted for lead exposure. For the total metal scans, four personal samples were collected on workers in the debris field and one area sample was collected. Only five metals were detected in the samples. These include aluminum, calcium, magnesium, barium, and manganese. The levels of each of the metals scanned were well below the OSHA PEL. The levels of metals measured are summarized below:

Metal	OSHA PEL	Level Detected
Silver	0.01 mg/M3	<0.006 mg/M3
Aluminum	15 mg/M3	0.008 to 0.01 mg/M3
Arsenic	0.01 mg/M3	<0.2 mg/M3
Antimony	0.5 mg/M3	<0.001 mg/M3
Barium	0.5 mg/M3	<0.002 mg/M3
Beryllium	0.002 mg/M3	<0.0002 mg/m3
Cadmium	0.005 mg/M3	<0.0002 mg/M3
Cobalt	0.1 mg/M3	<0.002 mg/M3
Chromium	1 mg/M3	<0.002 mg/M3
Copper	1 mg/M3	<0.004 mg/M3
Iron	10 mg/M3	<0.021 mg/M3
Lead	0.05 mg/M3	<0.0005 mg/m3
Magnesium	15 mg/M3	0.012 mg/M3
Manganese	5 mg/M3	0.0005 mg/M3

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Nickel	1 mg/M3	<0.0004 mg/M3
Thallium	0.1 mg/M3	<0.0002 mg/M3
Vanadium	0.5 mg/M3	<0.001 mg/M3
Zinc	5 mg/M3	<0.003 mg/M3

Levels of each of the metals scanned were well below the OSHA permissible exposure limits. Because of the extremely low levels of metals detected in the samples, testing for metals was discontinued and in subsequent testing only lead was tested for.

Seven personal exposure samples were collected on seven days in October and analyzed for lead. Page 7 of the attached analytical report summarizes the lead in air sample reports. The results are reported in milligrams per filter. Each sample volume typically ranged from 500 to 700 liters (0.5 to 0.7 M³). Six of the samples were found to have no detectable lead (<0.002 mg/M³). One personal sample for lead had 0.002 mg/M³. These were well below the PEL of 0.05 mg/M³. Additional sampling for metals has not been conducted since October 31, 2001.

Total Dust

Page 34 of the attached analytical data table summarizes the total dust in air samples. The results are reported in total milligrams per filter. The volume collected for each sample ranged from 500 to 700 liters. Six personal samples were collected for total dust levels. The OSHA permissible exposure limit for total dust is 15 mg/M³. The highest level detected was 1.03 mg/m³.

Silica Dust

Eleven personal samples were collected and analyzed for respirable dust. The results are summarized in the analytical results provided in the appendix. The results are reported in total milligrams per filter and milligrams of Quartz, cristobalite, and tridymite. Four area samples were collected in the debris field and analyzed for respirable dust. These are reported as ambient in the attached analytical data report. The levels of respirable dust on the area samples were all below the detection limit of 0.01 mg/M³. A total of thirteen respirable dust samples were taken on Federal law enforcement personnel while raking debris in the open field. The following summarizes the personal sample results:

1. There was no detectable respirable dust on four of the personal samples.
2. On the nine other samples the levels ranged from 0.1 to 0.51 mg/M³. The amount of quartz, cristobalite, and Tridymite were measured in a most of these samples. Cristobalite and tridymite were not detected in any of the samples. Quartz was detected in only one sample. It was found to be at a level of 0.056 mg/M³ and represented 11 % of the sample. The OSHA PEL in this case was 0.77 mg/M³. The level of quartz was well below the OSHA PEL.

Because of the low levels detected on the personal samples, respirable dust exposure monitoring was discontinued after October 31, 2001.

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Volatile Organic Compounds

Two personal samples were collected on charcoal tubes and scanned for volatile organic compounds. There were no VOCs detected. Levels of each organic compound were below 5 micrograms. This is below 0.05 mg/M3 for each VOC. This is well below any of the PEL's for the organic compounds tested. Additional sampling has not been done since October.

Noise

Noise exposure monitoring was conducted on twelve workers in the debris field. The following table summarizes the results.

Sample description	Time sampled	Average Exposure dBA	% Dose
NYPD working in the debris field	5 hrs 40 min	84.0	31
NYPD working in the debris field	3 hrs 21 min	80.0	10.5
On agent in debris field	5 hrs 9 min	75.37	8.49
On agent in debris field	7 hrs 52 min	85.25	51.0
On agent in debris field	5 hrs 58 min	74.7	8.9
On NYPD in debris field	6 hrs 30 min	84.5	37.5
On NYPD in debris field	5 hrs 31 min	78.3	9.1
On NYPD in debris field	5 hrs 14 min	76.8	10.6
On NYPD at screener	6 hrs 36 min	80.72	23.36
On NYPD in debris field	3 hrs 53 min	77.6	8.7
On NYPD in debris field	3 hrs 52 min	75.05	6.14
On NYPD at conveyor	5 hr 28 min	85.76	35.09
On NYPD in debris field	7 hrs 20 min	81.58	28.6
On FBI agent in Bldg. 7 debris field	5 hrs 46 min	70.6	5.59
On Customs agent in the Bldg. 7 debris fields	6 hrs 43 min	71.0	6.0
On FBI agent working in the Bldg. 7 debris field	5 hrs 31 min	72.14	5.81
On Secret Service Agent working at the screener	6 hrs 12 min	85.29	40.23 %
On Secret Service Agent working at the screener	6 hrs 8 min	85.11	39.03
On FBI agent at screener	7 hrs 43 min	82.14	32.53
On FBI agent at screener and in debris field	3 hrs 51 min	69.8	2.92
On FBI agent at screener	7 hrs 43 min	82.38	32.65
On NYPD at conveyor	6 hrs 42 min	85.13	42.7

The OSHA action level for noise exposure is 85 dBA over an 8-hour time weighted average. The permissible exposure limit is 90 dBA over an 8-hr TWA. Working at the screeners (on the conveyor belt), usually results in exposures around 85 dBA when averaged over the entire shift. Workers all wear hearing protection when on the conveyors, and they should continue to wear them. Workers in the debris field are exposed to levels well below the action level of 85 dBA and are not required to wear hearing protection.

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6.0 Recommendations

In light of the findings of this survey the following recommendations are made:

1. The only contaminant exposure of significance is asbestos. Approximately 40 % of the workers sampled were exposed at the PEL of 0.1 f/cc. Levels were always below 0.5 f/cc.
2. Agents working in the debris field at the conveyors, and searching cars should continue to wear the proscribed personal protective equipment. This includes a half-face respirator with N100 cartridges, a Tyvek suit, gloves, hard hat and boots.
3. Continue to monitor asbestos exposure levels on agents working at the landfill. It is not necessary to monitor exposure each day. The current plan to test exposures once each week is more than adequate.
4. Continue to periodically monitor exposure to noise on agents working in the landfill while at the screeners. The current plan to test exposures once each week is more than adequate.
5. Additional exposure monitoring for VOC's, respirable dust, silica, metals and lead should be discontinued.

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