NIOSH HEALTH HAZARD EVALUATION REPORT

HETA #2004-0195-2951
Teletech
Morgantown, West Virginia

December 2004

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DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

PREFACE

The Respiratory Disease Hazard Evaluations and Technical Assistance Program (RDHETAP) of the National Institute for Occupational Safety and Health (NIOSH) conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health (OSHA) Act of 1970, 29 U.S.C. 669(a)(6), or Section 501(a)(11) of the Federal Mine Safety and Health Act of 1977, 30 U.S.C. 951(a)(11), which authorize the Secretary of Health and Human Services, following a written request from any employers or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

RDHETAP also provides, upon request, technical and consultative assistance to federal, state, and local agencies; labor; industry; and other groups or individuals to control occupational health hazards and to prevent related trauma and disease. Mention of company names or products does not constitute endorsement by NIOSH.

ACKNOWLEDGMENTS AND AVAILABILITY OF REPORT

This report was prepared by Terri A. Pearce, Ph.D. of RDHETAP, Division of Respiratory Disease Studies (DRDS). Field assistance was provided by Rachel Sparks M.S. Desktop publishing was performed by Terry Rooney. Review and preparation for printing were performed by Penny Arthur.

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Highlights of the NIOSH Health Hazard Evaluation

Evaluation of Indoor Air Quality

NIOSH received a confidential health hazard evaluation request to conduct an indoor air quality evaluation of the Teletech call center in Morgantown, West Virginia.

What NIOSH Did

- Interviewed workers and management
- Reviewed a previous report prepared by an outside consultant
- Conducted visual inspection of the facility on two separate occasions
- Monitored the workplace for indoor air quality parameters (temperature, relative humidity, carbon dioxide, and carbon monoxide)
- Conducted real-time measurement of airborne particles
- Provided feedback to the requesters and the management about conditions and activities within the space that could potentially have adverse impacts on indoor air quality

What NIOSH Found

- Water infiltration in a restroom area
- Slightly elevated carbon dioxide concentrations in the area of the building in which the HVAC units were not operating at optimum
- Concentrations of particles in all areas of the building were similar and were much lower than concentrations measured outdoors

What Teletech Managers Can Do

- Ensure that adequate fresh air is supplied to the occupied spaces and that the HVAC is operating according to the design specifications
- Respond to water leaks as they occur and provide for thorough methods of discovery for identifying and correcting water damage or mold
- Continue the policy to minimize the use of fragrances and fragrance-containing products
- Develop an integrated pest management system that will prevent intrusion of insects into the building and minimize the necessity for pesticide use
- Implement a reporting system for conditions or concerns that may adversely effect indoor air quality
- Establish objective criteria for decision-making about activities or equipment that could impact air quality in your building

What Workers Can Do

- Report indoor air quality concerns and health symptoms to management
- Promptly report leaks or other factors that might impact air quality
- Comply with policies that are designed to protect air quality

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We encourage you to read the full report. If you would like a copy, either ask your health and safety representative to make you a copy or call 1-513-841-4252 and ask for HETA Report #2004-0195-2951

Health Hazard Evaluation Report 2004-0195-2951
Teletech
December 2004

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SUMMARY

The National Institute for Occupational Safety and Health (NIOSH) received a confidential request from employees of Teletech in Morgantown, West Virginia in which employees expressed concerns about the air quality in the building and the possibility that contaminants might be causing health effects experienced by some of the employees. Primary health concerns were: frequent sinus infections, respiratory infections, indoor allergies of unknown origin, hives, and skin rashes. Listed exposures included air fresheners, dirty air ducts and vents, inadequate fresh air, water leaks in restrooms that appeared to be from plumbing inside walls, and other airborne irritants.

The NIOSH response consisted of two site visits. The first site visit on April 8th, 2004 allowed the industrial hygienists to visually inspect the premises and interview the building management. Water incursion in a bathroom was observed during the site visit with the water appearing to be clean water from an unknown source. The second site visit was conducted on May 13th, 2004 and included a similar visual inspection of the interior spaces along with the heating and ventilation (HVAC) system and the roof. The water incursion in the bathroom was known to be sporadic and management believed that the water originated from a natural spring located beneath the building. The second visit also included real-time monitoring of temperature, relative humidity, and concentrations of carbon monoxide, carbon dioxide, and airborne particles in several areas of the building and outdoors.

Visual inspection found the building be generally clean and well maintained. The source of water incursion was in the process of being identified and corrected. Real-time measurements were within the currently established values for appropriate building air quality. The exception was carbon dioxide concentrations in an area of the building where one HVAC unit was not operating during the visit. Carbon dioxide concentrations in that area were somewhat elevated and might indicate that the HVAC system is not be entirely adequate for diluting and mixing the air in the building. However, the overall appearance of the building and the results of the real-time monitoring did not identify any items that required immediate correction.

NIOSH conducted two site visits to the Teletech call center in Morgantown, West Virginia to address employee concerns about contamination of the indoor air and health effects they were experiencing. An area of water incursion was found but no signs of mold or excessive dampness were observed. Some measurements indicated that fresh air supply and overall air mixing might not be adequate but not to the extent that employee health effects could be attributed to these findings.

Keywords: SIC 7389 (Business Services); indoor air quality, IAQ, carbon dioxide, particles

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INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH) received a confidential Health Hazard Evaluation (HHE) request from employees of Teletech in Morgantown, West Virginia. Employees were concerned about the air quality in the building and the possibility that contaminants might be causing health effects experienced by some of the employees.

BACKGROUND

The requesters contacted NIOSH prior to submission of the HHE request. They voiced concerns about recent health symptoms that had lead to emergency room care and to a physician diagnosis of asthma for one employee. The request as submitted listed the primary health concerns as frequent sinus infections, respiratory infections, indoor allergies of unknown origin, hives, and skin rashes. Listed exposures included air fresheners, dirty air ducts and vents, inadequate fresh air, water leaks in restrooms that appeared to be from plumbing inside walls, and other airborne irritants.

Additional telephone interviews were conducted with the requesters to discuss the nature of the health complaints and the environmental conditions in the workplace. Concerns about whether the water incursion had lead to mold growth in the building were expressed. Also described as being of concern was the cleanliness of the air supply ductwork. Employees also reported the presence of cockroaches in the employee break area and that pesticides had been applied for roach control. The requesters stated that they felt better when away from the building and that their physicians had stated that their symptoms appeared to be connected to their workplace.

A telephone interview was conducted with the Human Resources manager for the facility who stated that management was aware of the indoor air quality concerns and was anxious to address any problems that could be identified.

NIOSH was supplied with a facsimile copy of an indoor air quality report prepared for the facility in October 2003 by the staff industrial hygienist for their insurance provider. This report included the monitoring results for temperature, relative humidity, carbon monoxide, carbon dioxide, and dust levels in the facility. None of these measurements had been found to exceed the recommended or allowable levels.

After review of the report, a telephone interview was conducted with the site manager for the facility. The site manager expressed a desire to determine what might be causing the health symptoms and complaints in the building. The manager stated that in addition to following recommendations made by the outside consultant, a policy had recently been instituted to discontinue use of air fresheners in bathrooms and that management was working to identify the source of a water leak located in the center of the building that appeared to originate in the wall between the men's and women's restrooms. Smoking was permitted only in designated areas outside the building.

METHODS

Walk-through Observations

A site visit was conducted on April 8th, 2004 for the purpose of observing the conditions in the building and to familiarize NIOSH personnel with the building layout. The site director and the facility manager accompanied two NIOSH staff on a walk-through of all employee-occupied and storage areas in the building. The site manager explained that the facility was previously a department store and that the space was completely renovated for use as a call center prior to occupancy by Teletech in September 2000 and that current employee occupancy was at about three-quarters of design capacity.

All areas of the building appeared clean and well-maintained. The water leak in the men's restroom was active during the visit and standing water was present on the floor near the sinks. The site manager explained that the cause of the leak was still under investigation. A plumber

had recently inspected the plumbing located in the area of the leak. According to the site manager, this included removal of the ceramic tile to allow inspection of the plumbing located in the interior wall. The plumbing was found to be intact and did not appear to be the source of the leak. The site manager reported that the water incursion was not constant, and that it was suspected that the source was below the floor. It was speculated that the water might be leaking from old plumbing lines remaining from when the space was a department store or possibly a natural underground spring that periodically rose to the level of the soil surface beneath the building. The standing water was observed to be located mainly on the tile floor. The site manager stated that the interior wall was examined during the plumbing inspection and that no mold was observed.

No other areas of the building showed signs of water incursion or mold and no perceptible odors were detected. Slight differences in perceptible temperatures or air flows were observed but were not obviously affecting the employee-occupied areas. The site manager stated that in addition to the usual temperature sensors, carbon dioxide sensors were in place in the air conditioning system to ensure that fresh air supplies were adequate. Ventilation ductwork for both supply and return air was suspended from the ceiling at approximately two-thirds of ceiling height above the floor. Visible dust was observed on the metal surface of some of the air supply vent covers with the source of dust seeming to be surface collection of dust from room air. No rust or signs of condensation were observed on the metal duct surface.

Visual observation of the employee break area did not find evidence of cockroaches or other insects. Appropriate numbers of trash receptacles were provided and the area appeared to be generally clean and adequately maintained.

Indoor Air Quality Measurements

A return visit was conducted on May 13th, 2004 to further investigate the conditions in the building. Visual inspection was conducted in all interior areas and the exterior of the building including the roof and the heating and air conditioning (HVAC) units located there. Indoor and outdoor measurements for indoor air quality parameters (temperature, relative humidity, carbon dioxide concentration, and carbon monoxide concentration) were made using a TSI Q-trak™ indoor air quality meter. Airborne particles were measured with a TSI P-trak™.

RESULTS

Results for the measurements in specific areas of the building are provided in Table 1. Particle concentrations were approximately one-third of the concentration measured outdoors. Measured values for temperature and relative humidity were within the acceptable range specified in the American National Standards Institute/American Society for Heating, Refrigeration, and Air Conditioning Engineers (ANSI/ASHRAE) Standard 55-1992.[1] Carbon monoxide concentrations were very low to non-detectable, i.e., 0-1 parts per million (ppm). Carbon dioxide concentrations were generally below 1000 ppm except in the in the East Floor area. One of the HVAC units for that area was not operating during the site visit as it had experienced an electrical failure and malfunctioned the night before. Repairs had been made to the unit by a HVAC technician but the unit had not been brought back online as there were concerns that the electrical system was not yet operating as it should. Measured concentrations of carbon dioxide in the East Floor area ranged from 1100 to 1200 ppm.

DISCUSSION AND CONCLUSIONS

During both site visits, the buildings were observed to be clean and well maintained. Facilities personnel appeared to be conscientious about building maintenance and to address maintenance issues as they were identified. The interior spaces had been specifically designed

for their current use and occupancy was at less than full capacity.

In general, measurement values for indoor air quality parameters monitored during the second site visit were within the recommended ranges in all areas of the building. The exception was the carbon dioxide levels in portions of the building served by the non-operational HVAC unit. Some concentrations in this area were found to exceed the ANSI/ASHRAE recommendation that indoor carbon dioxide levels be no more than 700 ppm greater than the outdoor concentration[2]. In most areas of the country, outdoor concentrations are generally in the range of 300 to 350 ppm. Therefore, the usual interpretation of the ANSI/ASHRAE recommendation is a concentration no greater than 1000 to 1050 ppm. The values measured during the site visit indicated that inadequate fresh air was being supplied to the space in relation to the number of people present. The insufficient fresh air was attributed to the fact that one HVAC unit was not in normal operation.

No standard exists for allowable numbers of small particles in indoor spaces[3,4]. However, other researchers have shown that small particles can be irritating to building occupants. In this evaluation, the data from the P-trak™ measurements was used qualitatively as a means for real-time determination of differences in particle counts in separate areas of the building. Differences in particle counts between areas would have been compared to determine if those differences coincided with areas where employees reported problems. While a slightly higher numbers of particles were measured in the West floor area, the counts were not strikingly different and were similar to concentrations NIOSH has measured in a non-problem building[5].

The roof appeared relatively new and to allow adequate drainage for both rainwater and condensation from the HVAC units. All HVAC units were made by the same manufacturer and appeared to be the same age. Many units were running during the inspection and appeared to be cycling appropriately.

Internal visual inspection was conducted only on the HVAC unit that had malfunctioned and was currently locked out. The interior of this unit appeared clean and well maintained. Building maintenance reported that the filters on all units had been replaced according to the normal change-out schedule. The visual appearance of the filters showed normal amounts of material and no rips or tears in the filter material. The condensate pan was clean and did not show signs of corrosion, mineral deposits, or microbial growth.

In conversations with the site manager and the facilities manager about the source of the water incursion in the men's restroom, they expressed certainty in an underground spring as the source of the water and that they prepared a plan of action for addressing the water incursion. No other areas of the building were known to have water leaks and no areas of staining or mold were observed during the NIOSH inspection.

In addition to addressing repairs to the HVAC system and finding the source of the water incursion, the site management had instituted a policy to minimize the use of fragrances and other products that might produce odors or contribute to the chemical load in the building. This policy included removing the air fresheners from the restrooms and instructing employees not to apply or use personal care or other fragrance-containing products while in the building.

No conditions or activities were identified that would be obvious indicators of current or potential indoor air quality problems. Attention should be paid to the finding that carbon dioxides levels had the potential to exceed the ANSI/ASHRAE recommendations with only one HVAC unit non-operational. This finding could be particularly important in light of the fact that occupancy was not at full capacity.
The amount of fresh air supplied to the space appears to be adequate for the number of occupants currently in the building. However, the conditions observed during the May 13th site visit indicate that fresh air supply to the building is very dependent upon operation of all air conditioning units. Therefore, should the

number of employees or the space allocations change, it will be necessary to re-evaluate the adequacy of the system. In addition, most of the air supply ducts are located in exposed, ceiling-suspended duct work. Return air ducts are at a similar height and are located on the ceiling side of the return air box. This design appears adequate but may lead to incomplete mixing of room air. Additional consultation with the HVAC contractor regarding the proper balancing of the system may be advisable. The carbon dioxide sensor function should be evaluated to ensure that the sensors are operating properly and are placed in locations that will reflect the conditions in the floor level work area. The dust on air supply vent surfaces should be wiped clean and maintaing the vent surfaces should be added to the cleaning activities for general building maintenance.

RECOMMENDATIONS

- Ensure that the HVAC system is operating as designed and that carbon dioxide sensors are operational
- Consult with the HVAC contractor regarding the proper balancing of the system in relation to the location of air supply and return ducts
- Continue the policy to minimize the use of fragrances and fragrance-containing products
- Be certain to provide adequate exhaust for areas such as bathrooms and breakrooms where airborne particles or odors may be present
- Respond to water leaks as they occur and provide for thorough methods of discovery for identifying and correcting water damage or mold
- Develop an integrated pest management system that will prevent intrusion of insects into the building and minimize the necessity for pesticide use
- If office equipment such as printers or copy machines is to be located near employee work stations, ensure that ventilation is adequate as these items may act as sources of particles or odors
- Implement a reporting system for conditions or concerns that may adversely effect indoor air quality

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TABLE

Table 1. Indoor Air Quality Parameter Values and Sub-micron Particle Counts by Location.

Location	Particle Count (particles/cc)	CO_2 concentration (ppm)	Relative humidity (%)	Temperature (ºF)
Monongahela room	3600	780	52.0	72.3
Central copy supply	2850	833	50.9	73.9
Entrance to East floor, near the copy machine	3840	1077	49.7	74.6
NW Corner of East floor, near copy machine	3700	1217	49.5	73.8
SW Corner of East floor	3430	1115	49.6	73.3
East floor, near center copy machine	3570	1100	49.3	73.8
SE Corner of East floor	3700	1250	51.2	75.4
Small room at SE corner of East floor	3680	1225	Not measured	Not measured
NE Corner of East floor	3610	1179	49.0	75.7
Small room at NE corner of East floor	3630	1168	49.3	75.7
OSC	Not measured	1088	47.6	75.1
Seneca room	2410	838	49.0	73.9
Women's Central restroom	2680	880	48.6	72.2
Entrance to West floor	4000	874	50.5	73.9
S wall of West floor	4070	885	50.2	74.5
SW corner of West floor	4100	870	49.4	73.7
NW corner of West floor	4100	895	49.2	73.7
Small room at NW corner of West floor	3300	870	49.3	73.2
Central of West floor aisle	4100	877	50.2	73.6
QA area	4000	885	50.3	74.0
SE Corner of West floor	4000	857	50.6	74.0
NE Corner of West floor	4000	901	50.7	74.0
Small room on E side of West floor	3800	774	47.7	72.9
Break room	5500	780	46.7	72.7
Quiet room	6300	743	47.7	72.0
Otter Creek room	4400	712	46.4	73.5
Facilities	4000	748	50.9	75.1
Outdoors	12000	384	51.8	86.2

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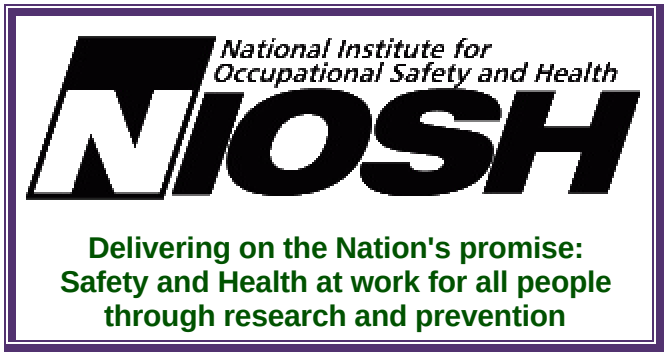

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