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Liberty Mutual. WTC IH OPERATIONS

Date: 04/25/02

To: Bruce Rottner - DDC

CC: Bob Adams - DDC

—> Ray Master - Bovis Lend Lease, LMB

John Rabovsky - LMG

Vic Hillman - LMG

Mike Ramsey – LMG

Mike Donavan - ATC

From: Donald A. Weber

RE: WTC 5 Mold Assessment – Non Viable (spore) Results

Bruce,

Mike Donovan of ATC Associates and I conducted an assessment of mold on 4/23/02. We collected samples in two areas of WTC 5 B4, in the NE stairway leading from the loading dock and outside at the ATC trailer. We collected samples for non-viable airborne fungi, viable airborne fungi and bacteria and bulk samples for microbial analysis.

Analytical results for fungal spores are attached . The balance of the results should be available within several days due to the need for culturing and "growing" the samples The results reported here quantify total fungal spores and provide general identification guidance.

Sample #16 –A3-1 VaultSuspect Possible was not a usable sample due to equipment problem. Sample #17 was collected at the same location. As a result of our observations and attached sample results the following recommendation is submitted:

IH02-12: Management and Remediation of WTC 5 Mold

Reduce exposures to mold to the lowest feasible level. This should be accomplished by implementing the following controls at a minimum:

- Upgrade barriers to airtight seals in stairwells leading to WTC5 B4.
- Label these entry points as permit required confined spaces (based on restricted means of egress and acute hazard presented by very high bioaerosol levels)..
- Manage entry into the space under the sites PRCS program.
- Enforce minimum PPE guidelines previously recommended including full face respirators with tri-combination filters, full body coverings- Tyvek suits, protective gloves and shoe coverings.

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- Remove entrant protective clothing prior to leaving the stairwell area to minimize contamination drag out. Respiratory protection should only be removed when outside of the B2 area.
- Clean the stairwell wall, ceiling , etc. surfaces with a biocide or chlorine solution.
- Require workers performing this stairwell cleaning to wear full face respirators with tri-combination filters and full body coverings. This PPE is needed primarily to provide protection against biocide chemical spray or splatter
- Remediate microbial contamination throughout WTC 5 B4 and on B2 in the first room on the right room as you enter the loading dock from the J ramp (West) side, as well as any additional areas that may be identified moving forward. At a minimum the remediation should follow the NYC guidelines for mold remediation. This work should be performed under the over sight of an industrial hygienist. Liberty Mutual is available to fulfill this role.
- Utilize a contractor with a broad experience remediating microbial contamination including both fungi and bacteria, especially fecal bacteria.
- Conduct a review of at least the following for any contractors being considered to perform the remediation:
  - fungi/bacteria remediation work history experience
  - fungi/bacteria remediation training and qualifications
  - hazard communication program
  - medical surveillance program
  - respiratory protection program
  - PPE programs
  - Blood Borne Pathogens program
  - waste handling plan

  Liberty Mutual industrial hygiene and medical consultation staff are available to assist in this review. It is highly recommended that this service be utilized.

Data Interpretation

The outdoor samples contained 27 and 173 spores per cubic meter of air. (cu.m.) These consisted of Amerospores and Cladosporium. The attached glossary describes the major fungal genii found .

The B4 Vault 1 and Kitchenette contained 322,667 fungal spores/cu.m. and 289,333 fungal spores/cu.m. These consisted of Aspergillus/Penecillium-like spores and Basidiospores (refer to the attached glossary). These high levels are considered extremely high as they are in excess of 25,000 times the average outdoor level found on the sampling day[1]. These levels support the decision to: secure the space, treat entry into the space as a permit required entry, require Tyvek coveralls, gloves,

[1] The outdoor level found on the sampling day is typical for this area and time of year, per data posted on the American Academy of Allergy Asthma and Immunology (AAAAI) web site.

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and full face respirators with the Tri Combination filters. PPE requirements may need to be modified after the viable fungi and bacteria sample results are available.

The sample collected on the stairway landing at the loading dock level contained 80,053 spores/cu.m., consisting largely of Basidiospores with lesser concentrations of Aspergillus/Penecillium-like spores and Arthrinium. The elevated concentration at this location is reflective of upwelling air currents into the landing from the B4 level and is not reflective of growth within the staircase. All openings into B4 should be sealed in such a way that air is not communicated into the travel ways. There is evidence of some surface mold growth in the staircase. This may be remedied by a through cleaning with a biocide or a 10% chlorine solution. Workers performing this activity should done full body skin protection and full face respirator. This level of protection is recommended to protect from chemical overspray or splatter and NOT because of the presence of surface mold. Further, workers simply passing through the stair way upward from B2 or downward to B2 should don ½ mask respirators with P100 filters until the openings from below are "airtight".

Vic Hillman closed the double doors from the rest of the floor into the "pit room" and taped a CSE sign to the door. The sign was down and doors were open during the 4/23/02 entry. In addition, temporary lighting had been strung in a portion of B4 between Mr. Hillman's entry and mine. Lastly, there was a vending machine in the kitchenette area that was observed to have been compromised during my entry. I was informed that the machine was intact during the previous entry.

All stairwells leading into WTC 5 B4 or the pit room need to be sealed and labeled as PRCS's. Also note that as you enter the loading dock from the J ramp the first room on the right (West) side has a small section of drywall. It is heavily mold contaminated and should not be disturbed until it can be remediated. The sprayed on fireproofing in the dock area may soon become affected as well.

The B4 level of WTC 5, pit room and the room mentioned above will require remediation under II I oversight. Careful selection of a remediation contractor is advised. The contractor's microbial (including fecal coliform) remediation work history experience, hazard communication program, medical surveillance program, respiratory protection program, PPE programs, etc. Liberty Mutual industrial hygiene staff is available review these elements. It is highly recommended that this service be utilized.

The following definitions were extracted from Aerotech Laboratories (www.aerotechlabs.com)

Amerospores Small round spores that are indistinguishable at 600X by light microscopy and include *Trichoderma* and unchained *Aspergillus* and *Penicillium.*

Aspergillus/Penicillium These genera are indistinguishable by light microscopy at 600X. Both are ubiquitous, common Type I & III allergens and opportunistic pathogens. These fungi occupy a wide variety of environments and conditions. Aspergillosis is the second most common fungal infection requiring hospitalization in the U.S. *A. niger* is the most common species within the genus and is associated with "fungus ball", a condition wherein fungus actively grows in the human lung, forming a ball, without invading the lung tissue. *Aspergillusfumigatus, A.flavus, A. niger, A. ustus, andA. versicolor* are some of the known toxin producers, there are many others in the *Penicillium* genus. Some *Penicillium* species produce mold VOC's that the human nose can detect. *P. marneffei* is capable of infecting the lymph system, lungs, liver, spleen, and bones.

Basidiospores A general category of spores that have are released from the basidium of a fungi. Ubiquitous, Type I & III allergen, saprophyte, plant pathogen. Spores disseminate at high humidity. A rare opportunistic pathogen, toxin producing (mushrooms). Agent of dry/wood rot.

Cladosporium Ubiquitous (the most frequent spore found in outdoor air in temperate climates), Type I & Ill allergen, an opportunistic pathogen, C. *carrionii* causes a chronic subcutaneous infection (distinguishable by its ability to grow at 35-37° C). Rarely toxigenic, sporulates easily with airborne levels elevated during seasons of high humidity.

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