

**18a**



W O N D E R M A K E R S  
E N V I R O N M E N T A L

May 20, 2008

Mr. Vince Sugent  
7768 Pleasant Lane  
Ypsilanti, MI 48197

RE: Initial response to DOT investigation

Dear Vince:

Thank you for your continued hospitality and professionalism during these frustrating endeavors at the Detroit Metro Tower (DTW ATCT). A detailed summary of my observations and conclusions regarding the inspection process conducted by the Department of Transportation (DOT) will be forwarded to you shortly.

Nevertheless, it is important to put the events of the last few days into the appropriate broad context. The Department of Transportation initiated an inspection of the facility in response to the charge filed by the Office of Special Counsel. That charge was prompted by a complaint from NATCA indicating that there was microbiological contamination in the DTW ATCT which is having a negative effect on the health of the building occupants. This claim of adverse health effects from fungal and/or bacterial contaminants in the structure has been supported by medical evidence tying the symptoms to water-damaged building materials. Just as important as the medical diagnoses are the results of multiple inspections that have documented the presence of fungal contamination in both the base building and tower and the voluminous review of documents that have demonstrated that past projects have not been conducted in accordance with the industry standard of care. There have also been allegations that in response to some of these complaints the Federal Aviation Administration (FAA) has harassed some of the occupants and intimidated others.

Given this history it is crucial that any investigation of the building be conducted in accordance with the best practices currently available for dealing with indoor air quality situations that could involve microbiological contamination. Unfortunately, the attempt to encourage the DOT investigators to follow such practices met with resistance and disdain from the very beginning of the process. The industry standard for inspections in these types of cases, as delineated by such documents as the Bioaerosols: Assessment and Control manual published by the American Council of Governmental Industrial Hygienists (ACGIH), follow a specific pattern. Such investigations are to begin with appropriate data collection including information on occupant symptoms and past building history. That the DOT refused to:

- conduct an anonymous occupant health survey,

- review data regarding past building activities, and
- state that "we are not interested in the history of the building, we are only interested in what is happening now

is an indication that they either do not understand or care about performing a comprehensive building investigation.

Unfortunately, the lack of a comprehensive inspection is the problem that has plagued the Detroit ATCT ever since mold was discovered in the facility in the fall 2004. Despite extensive evidence that pointed toward mold contamination between the elevator shaft liner boards, not a single sample in four years has been collected of this material. Worse yet, the Agency has fought tooth and nail to prevent NATCA from collecting samples of this material for over two years. This travesty of limited inspections to avoid dealing with the real problems was further magnified by the events of the last two days. Despite the fact that mold colonies were visually identified inside the wall cavities of previously remediated areas on the ninth and fourth floors no visual inspection or sampling was conducted of the sections between the elevator shaft liner boards.

Another key blunder by the DOT inspectors was the continued minimization of the potential problems by their refusal to investigate other areas of the tower. No visual investigation or sampling was conducted in the wall cavities of the fifth through eighth floors (or the tenth) despite the fact that fungal contamination was observed in a vertical structure on the fourth and ninth floors. Ignoring those intervening floors dooms the recommendations from the DOT inspection to irrelevancy.

Given the time and opportunities that the FAA has had to conduct a comprehensive investigation of the DTW ATCT, the fact they have failed to properly identify and quantify all possible areas of microbial contamination in the structure, and the efforts they have expended to prevent NATCA from completing such a task, is an outrageous example of misconduct at the highest levels.

It is imperative for the health of the occupants of that building that you continue to work for an appropriate evaluation of the situation so that any subsequent control or remediation plan can be based on an accurate understanding of the problems in the facility.

Sincerely,



Michael A. Pinto, CSP, CMP  
CEO

**18b**



W O N D E R M A K E R S  
E N V I R O N M E N T A L

May 28, 2008

Mr. Vince Sugent  
7768 Pleasant Lane  
Ypsilanti, MI 48197

RE: Additional details regarding the DOT investigation of DTW-ATCT  
Wonder Makers Project GC08-7927

Dear Vince:

This letter provides some details about the investigation conducted this week at your facility by representatives of the Department of Transportation (DOT). Although the full results of that inspection have yet to be received, a number of actions and statements documented during the investigation support the initial contention that the DOT failed to properly identify and quantify all possible areas of microbial contamination in the structure. (See May 20, 2008 letter from M. Pinto to V. Sugent for overview information that supports this conclusion.)

This detailed review is based on information obtained from a number of sources including:

- *Agenda And Scope Of Investigation* (May 16, 2008 email from Deborah Rosen to Gretchen McMullen)
- *Detroit Air Traffic Control Tower Mold Investigation Strategy* (provided to NATCA by the investigators on May 19, 2008)
- Notes of the inspection meetings and activities provided by Gretchen McMullen
- Comments made by individuals participating in the investigation
- Personal observations of the activities conducted on May 20, 2008
- *Report On Exterior Building Envelope And HVAC Conditions Detroit Metropolitan Wayne County Airport Air Traffic Control Tower* (April 24, 2006 report from DMJMH+N to the FAA)

The May 20 letter referred to in the first paragraph provides information supporting the claim that the inspectors failed to employ best practices for such an investigation by refusing to conduct an occupant health survey, conduct a comprehensive review of the building history, or try to integrate past findings into their inspection process.

The difficulties and inconsistencies noted with regard to the investigation began with the initial paperwork. The initial scope of the investigation notes that in response to a complaint from the Office of Special Counsel the DOT was requested to "investigate *fully* the allegations" (emphasis mine). The complaint is then summarized as occupants:

...experiencing adverse health effects caused by mold in the air traffic control tower. They claim that despite previous remedial efforts, the mold and moisture problem at the tower continues.

Despite this broad mandate to fully investigate the complaint the inspectors limited the investigation to the "Control Tower CAB, tower elevator shaft, 9<sup>th</sup> floor, 4<sup>th</sup> floor, 3<sup>rd</sup> floor, 2<sup>nd</sup> floor, as well as other areas of concern". If they had listened to the complainants or reviewed any of a number of documents that NATCA provided, the inspectors would have realized that the lack of a *comprehensive* investigation of the facility to identify and quantify fungal contamination in the structure is a continuing problem. Indeed, they would have realized that the FAA has consistently minimized this problem and restricted the efforts of their staff, consultants, and building occupants to conduct a thorough review of the structure.

During the two days that the DOT inspectors were on site they limited their investigation primarily to the areas noted above. This partial investigation is unconscionable given that:

- The design and construction of the tower as a vertical shaft would encourage water to migrate from upper to lower levels
- Fungal contamination was remediated in the past on the gypsum board partitions surrounding the elevator shaft on the 9<sup>th</sup>, 4<sup>th</sup> and 3<sup>rd</sup> floors
- Fungal contamination and active water leaks were identified on the 9<sup>th</sup> floor by occupants and reported to the FAA in February 2008
- Water staining and other evidence of moisture intrusion were reported on every floor of the tower shaft by numerous inspectors including the DMJMH+N engineers (see pages 9–19 of the April 2006 report)
- Fungal growth was previously identified and "cleaned" on the interior of the elevator shaft liner from the top of the shaft to the 2<sup>nd</sup> floor

One of NATCA's main concerns expressed to the Office of Special Counsel was the fact that previous inspections have failed to fully investigate all of the floors of the tower shaft. Another aspect of the complaint was that even though past evidence pointed to a strong likelihood of significant fungal contamination between the two sandwiched layers of elevator shaft liner board no evaluation of this area has been conducted. Worse yet, the FAA has consistently denied the Union's attempts to inspect this specific part of the structure with their own consultant, at no expense to the Agency. Although the DOT inspectors had the opportunity to address both of these concerns during their visit, they failed to live up to their mandate to *fully* investigate the situation.

Other major deficiencies with the investigation were related to its scope. In their agenda the DOT recognized that there were concerns regarding "... the mold *and moisture* problem..." (emphasis mine). Yet, only a cursory review was done of the moisture portion of the problem. In particular, the DOT inspectors did not evaluate the FAA's compliance with the recommendations that were made by the Agency's own consultant (DMJMH+N) to correct the moisture problems. If they had reviewed the engineers' report and compared it to current conditions in the building they could have documented these deficiencies:

1. The absence of "...a fully adhered PVC thermoplastic roofing membrane..." on the junction level walkways. The engineers specifically pointed out, "We do not recommend using the liquid applied products as specified for the CAB walkway". Yet, this is what appears to have

- been used on both the CAB and junction level walkways. (See DMJMH+N recommendation 6.1.9)
2. Uninsulated concrete walls on a number of levels below the 9<sup>th</sup> level of the tower shaft. The engineers cited specifications for the installation and type of insulation that should be added to these areas to control temperature and humidity variations and the subsequent condensation that they believed was contributing to the mold growth in the structure. (See DMJMH+N recommendation 6.2.1)
  3. Improperly installed gypsum wallboard. (See DMJMH+N recommendation 6.2.11)
  4. No dehumidifiers or chilled water fan coil units installed on floors 3 through 10. (See DMJMH+N recommendation 6.2.14)

A proper paperwork review would have allowed the DOT inspectors to determine whether other important corrective measures had been completed, such as appropriate curbing at the CAB walkway (recommendation 6.1.6), installation of a positive pressure system for the CAB (recommendation 6.2.12), and air balancing (recommendation 6.2.13).

Deficiencies with the investigation went beyond the problem of a limited scope to an even more limited execution of the planned inspection. Prior to the start of occupant interviews the DOT provided NATCA with a *Detroit Air Traffic Control Tower Mold Investigation Strategy* document. Part of that document noted that the inspectors:

- Anticipate using the Airbox sampler overnight to gather longer term data for CO<sub>2</sub>, CO, temperature, and relative humidity on the 2<sup>nd</sup> floor of the base building.
- Anticipate running the TSI particle counter overnight to gather longer term spore size data on the 2<sup>nd</sup> floor of the base building.

When the hygienist who was conducting the sampling for the DOT was questioned as to why the two pieces of equipment were not utilized overnight following the visual survey on May 19, he answered that the team was concerned that the equipment would not be “secure”.

The investigation strategy also indicated that a visual inspection/survey would be made above drop ceilings. Given the current concerns regarding the potential for roof replacement work above the base building to disturb potential fungal contamination, it was inexcusable that the DOT inspectors completed this phase of their visual survey by looking into only one area above the lay-in ceiling tiles on the 2<sup>nd</sup> floor. There was no attempt to determine if gypsum board partition walls or other porous materials above the line of the ceiling tiles were water damaged or possible sources of fungal contamination.

In addition to the limited scope and deviations from their initial strategy, there were flaws with the implementation of both the visual survey and the sample collection portions of the investigation. Of primary concern is the reported process used for the visual inspection of the elevator shaft. Stopping the elevator car at every other level to conduct a visual inspection for evidence of water intrusion and mold growth is suspect under the best of conditions. Given the low light conditions in the shaft and the fact that each level of the tower is a double floor over 20 feet high, this inspection process was similar to someone standing on the ground and looking up four floors at dusk to distinguish water stains from fungal colonies. Even when one of the participants pointed out potential problem areas to the DOT inspectors and documented their concerns with photographs the Department of Transportation personnel still did not make the effort to reposition the elevator car in order to get a closer look at the

areas of concern (see photographs you took). The only logical rationale for such a process by experienced inspectors is either laziness or an intentional effort to minimize potential problems.

Other actions by the DOT inspectors also indicated that they were minimizing potential problems in the building by limiting the amount of data collected. After removing gypsum board from the partition wall facing the elevator shaft in room 928 inspectors noted evidence of mold growth on the back side of the first layer of gypsum board and on the front and back sides of the second layer of gypsum board. They also found evidence of fungal growth on the wall cavity face of the double layers of elevator shaft liner boards. Despite this physical evidence and the concern expressed by NATCA that the paper layers sandwiched between the two shaft liner boards were likely sources of fungal contamination in the building, the inspectors made only a half-hearted attempt to examine this material while they had the wall cavity exposed. The inspector began cutting into the exposed layer of shaft of liner board but abandoned the attempt as too difficult when he determined that the material was one inch thick.

The lack of surface sampling of areas of suspect biological growth that were accessed during the inspection is also suspect. The DOT inspection strategy document indicated that the inspectors had culture, swab, and tape sampling equipment available to be used. While it is true that the industry standard of care does not require surface sampling of visible mold on a "normal" mold inspection, the practice of emphasizing the visual portion of the inspection is predicated upon a process of prompt remediation of all interior fungal contamination sources. Best practices encourage sampling in such situations if there are unresolved questions or concerns. Since the FAA has repeatedly told NATCA that there is no fungal contamination in the building since the remediation was completed and has denied any connection between past sampling episodes that have identified airborne fungal spores of *Chaetomium*, *Stachybotrys*, and *Fusarium* and possible indoor sources, that failure to sample in order to identify the types of mold present in the building would again seem to indicate that the inspectors were not interested in truly resolving the building problems.

In a similar vein, the refusal of the DOT inspectors to examine or evaluate the water-damaged ceiling tiles that had been removed from the structure is a clear indication that they did not appreciate the information collected during their initial interviews. These tiles had been removed from areas throughout the base building and tower the day before the inspection began. Not only did this limit the inspectors' ability to identify and inspect areas of previous water damage, but their removal could certainly have impacted the results of the air sampling conducted in structure. Despite these serious implications the DOT inspectors did not conduct a close visual examination or any surface sampling of the tiles after they had been prompted to visit the area where the tiles were stored.

The sampling equipment and process also raised questions. The DOT inspector's use of an SAS sampling unit to collect viable fungal and bacteria samples allowed the process to move forward rather quickly. However, these devices have limitations. As noted in the March 2001 issue of *Indoor Air* the SAS sampler recovers only about half of the non-sporulating species such as *Aspergillus* and *Penicillium*:

Building investigators recognize the advantages of using the SAS portable air impactor rather than the Andersen single stage N6 sampler. However, there is concern about the accuracy of results obtained with the SAS unit. This paper compares the performance of the two samplers in the measurement of fungal spores. The results show that the SAS unit consistently under-reports colony forming units compared to the N6 sampler except for *Cladosporium*. (PETER BELLIN\*, JOHN SCHILLINGER (2001) Comparison of Field Performance of the Andersen N6 Single Stage and the SAS Sampler for Airborne



Fungal Propagules Indoor Air 11 (1) , 65–68 doi:10.1034/j.1600-0668.2001.011001065.x)

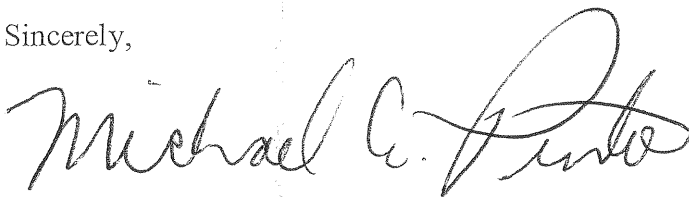
The DOT inspector used appropriate sampling media for the collection of viable fungal and bacterial samples (*i.e.*, triptic soy agar [TSA] for bacteria and malt extract agar [MEA] for fungal samples). The inspector indicated that the sampler was calibrated prior to the beginning of the collection process and he used alcohol wipes to sanitize the sampling cover between each sample. Nevertheless, best practices call for calibration of the unit before each sample and the use of clean surgical style gloves for the loading and unloading of the media Petri dishes. Forgoing the use of clean gloves is especially questionable when collecting bacteria samples as the primary source of bacteria in indoor office environments is the shedding of material from occupants.

Of all of the problems observed with the DOT inspection, the most grievous occurred during the post-inspection summary meeting. During this meeting the DOT inspector stated that it would be 12 to 14 days before they had all of the sample results or a report. Immediately following that statement he responded to a question by indicating that roof repairs and mold remediation work could proceed without delay. Why an investigator would assume that samples that were not yet analyzed would justify starting work activities without engineering controls is incomprehensible.

Safety professionals have a duty to protect workers and occupants through the best use of available data. Both OSHA rules for regulated contaminants and general safety procedures dictate that if work needs to move forward in the time period between sample collection and receipt of data, the work plan must be designed using a worst case scenario. Using appropriate engineering controls and personal protective equipment in such situations prevents later problems if the data indicates the potential for cross contamination. Of course, the best case is to wait until the inspection data is available and then make appropriate decisions based on the information. That the DOT inspector was willing to proceed in such a reckless fashion, even after concerns were raised with him privately by the NATCA representatives, is a strong indication that the entire inspection process was a sham.

Please let me know when you receive the inspection report. Do not hesitate to contact me if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Michael A. Pinto". The signature is written in a cursive, flowing style.

Michael A. Pinto, CSP, CMP  
CEO

**18c**

## Secretary of Transportation Response

Page one, paragraph two:

*"However, there have not been any new OSHA recordable employee injuries....."*

Agency was notified June 2007 of employee health issues. In addition, there have been intimidating statements made about employees involved in the mold lawsuit, action taken against employees who report health issues to include threatening loss of income and employment. The possible loss of medical certification and then no administrative duties available forcing employees to exhaust all leave. This is the single most reason for employees not to step forward concerning health issues.

*"In addition, the measured airborne fungal spores detected within the facility do not indicate elevated mold spore concentrations that would likely to impact employee health."*

The degree and extent of the reaction is dependent on the exposure concentration, the length of exposure, and the individual. We are sensitized by long term exposure at an unknown concentration. If any entity would have or would do a proper employee health survey, a proper picture of mold impact would be known.

### Response from FAA

Page one, paragraph three:

*"Based on the corrective actions that the FAA has taken at these facilities, and the sampling and testing, which have been conducted by FAA and independent third parties....."*

The last facility air quality testing performed by the government, until the May 2008 tests, was March 2005. Not one of independent third parties ever tested for air quality and performed only limited visual inspections. Wonder Makers performed testing in December 2006 and January 2007. These tests showed mold was discovered in the facility and even in areas where mold had not been discovered in the 2005 tests. Mold was even discovered in vents in the TRACON after the Agency cleaned the duct system. We gave the Agency the results and analysis. They did nothing.

Attachment one, page four, L., FAA Response, Action:

*"Roof replacement efforts, including scope specifics and work hours, will be coordinated with facility management and employees"*

Neither employees nor facility air traffic management has been given a scope of work for the roof project as of Wednesday, November 18. I asked for the scope of work from my manager and he informed me that he still had not received a copy from Tech Ops.

Attachment two, page five, number two:

*"The only hazardous ingredient listed in the MSDS is isopropyl alcohol (3-6 percent)."*

Gluteraldehyde was also listed as a hazardous ingredient. When the liquid was tested from the container, the results showed major amounts of benzene (a colorless volatile flammable toxic liquid aromatic hydrocarbon used in organic synthesis, as a solvent, and as a motor fuel), octanol (primary alcohol), undecane, dodecane (normal isomer

occurring in some petroleum) and tridecane (the liquid normal hydrocarbon obtained from petroleum). These were not listed on the MSDS. The test showed only trace amounts of isopropyl alcohol and no trace of glutaraldehyde.

Attachment two, page six, number three:

*"While we did commission the inspection, we now believe Dr. Shoemaker's methodology and work unreliable."*

The Agency did not commission Dr. Shoemaker to inspect anything nor has he ever been involved with an inspection of the facility. I have no idea what the Agency is talking about and really do not know how to respond to such a perplexing statement.

### OST's Investigative Report

Executive Summary, page two, bullet seven:

*"FAA management indicated that stained/wet ceiling tiles are removed and replaced as a part of the routine maintenance."*

This is not true. Numerous tiles are stained and have been since the May and June 2008 inspections. This was the tile status before my charge was filed and the tiles in question were replaced the evening before the May 2008 inspection.

Bullet eight:

*"The measured airborne fungal spores detected within the facility do not indicate elevated mold spore concentrations that would be likely to adversely impact employee health."*

The degree and extent of the reaction is dependent on the exposure concentration, the length of exposure, and the individual. We are sensitized by long term exposure at an unknown concentration. If any entity would have or would do a proper employee health survey, a proper picture of mold impact would be known.

Page three, bullet five:

*"Some past recommendations submitted by outside agencies and consultants have been completed; however other items are still considered incomplete or in progress."*

The FAA has stated numerous times and in writing that mold and moisture project were completed February 2007.

Page eight, bullets two and six:

*"Employees were not reporting cases related to indoor air quality, mold, or respiratory illness prior to 2005, or in 2007 and 2008." "2007 - No employee injuries or illnesses related to indoor air quality, mold, or respiratory illnesses."*

Employees did report facility mold related illnesses in 2007 and the entire Shoemaker report was given to the FAA in 2008 documenting illnesses. They just dismiss Shoemaker's report so as to be able to make these unfounded statements and offer no basis in fact for the refutation.

Page 10, the last paragraph:

*“The elevator shaft itself does not appear to be an effective conduit to spread mold spores. Higher spore concentrations were found on the 9<sup>th</sup> and 4<sup>th</sup> floors of the tower, in areas where we disturbed molded drywall materials. If the tower elevator shaft were effective in disbursing fungal spores, higher concentrations of mold spores would have been evident in the tower cab, junction level break room, or inside the base building. Likewise, if the elevator shaft was an effective pathway for mold spores to spread, it could be concluded that the disturbed Stachybotrys spores was not observed or concluded from the air monitoring results.”*

In paragraph above the last paragraph it is stated that, *“Stachybotrys produces a sticky spore that is not easily airborne, unless disturbed.”* There was ample time between the disturbed drywall panels and the air samples for the Stachybotrys to settle. Stachybotrys has been identified on ceiling tiles in the tower break room and in the filters of air scrubbers in the tower cab that ran for three days after the January 2005 evacuation.

It is apparent that Mr. Cecil had not properly reviewed previous documents concerning building conditions. If the elevator is not an effective conduit for spreading mold, then how did the spores get in the filters of the air scrubbers in the tower and on the break room ceiling tiles? If Mr. Cecil would have reviewed the previous documents and then still did not believe the elevator is not a conduit, he should have properly inspected the break room and tower, at a minimum, to find a possible source. There is an air filter in the tower that has been in the cab for approximately two years. To my knowledge Mr. Cecil did not test the filter.

Then in Appendix D: Industrial Hygiene Report, Executive Summary, paragraph four they state, *“The identified apparent mold growth was located between layers of intact drywall and in unoccupied areas. The unoccupied areas are not serviced by existing ventilation systems currently servicing occupied levels of the tower and totally independent from the base building ventilation systems. The only connection would be the air moved through the piston action of the elevator car in the elevator shaft which contains relief vents allowing air to be discharged at the top and bottom of the shaft.”* So the piston action of the elevator car only disperses mold spores within the shaft? This does not make any sense. The elevator shaft is not air tight. There was never any testing conducted within the elevator shaft.

All three respondents have commented on the lack of employees not reporting cases related to indoor air quality, mold, or respiratory illness and the measured airborne fungal spores detected within the facility do not indicate elevated mold spore concentrations that would be likely to adversely impact employee health. The single most effective way to determine if the measured airborne fungal spores detected within a building would be likely to adversely impact employee health is to conduct a health employee survey or questionnaire.

The fact remains that the three entities responding and the other independent parties have never approached the building occupants. These statements are not based on fact.

Employee health surveys are generally one of the first things done when investigating the conditions of a building and supporting medical documentation is generally not necessary. When given medical documentation, it is dismissed. When given supporting documentation, it is ignored. When we step forward with symptoms or health concerns, we are intimidated.

Not only are some of the facts inaccurate, but the omission of facts and the unwillingness to find them should be just as scrutinized.

Vin

**18d**



WONDER MAKERS  

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ENVIRONMENTAL

November 24, 2008

Mr. Vince Sugent  
7768 Pleasant Lane  
Ypsilanti, MI 48197

RE: Factual Errors in DOT Mold Report  
Wonder Makers Environmental project GC08-7927

Dear Vince:

In conjunction with our recent discussions we reviewed the report provided by the Department of Transportation (DOT) entitled *Investigation of Mold and Moisture at the Federal Aviation Administration Detroit Metropolitan Air Traffic Control Tower Facility*. This report is dated August 21, 2008, although we just received it from you on November 12, 2008. Four appendices were included with the FAA report, including a copy of the report prepared by the industrial hygienist hired to assist the DOT inspector.

While a more comprehensive evaluation of the document and the FAA's response will be forthcoming, you asked for a specific list of items that we deem to be factual errors. The items on the following pages include specific statements from the document and explanatory information that shows why they are false. The information is presented in the order in which the statements appear in the report.

The attached sheets document 22 instances in the report and appendices where factual errors are identified. Please note that we also found a number of errors in the report relating to the omission of critical information. Although intentional omission of relevant data is also a serious error, we only included examples of stated problems with the contradictory facts in this letter.

Sincerely,

Michael A. Pinto, CSP, CMP  
CEO



## Review of Department of Transportation Mold Report for Items that are Not Factual

Each false statement is reprinted in italic type, followed in regular typeface by the facts that support the conflicting position.

Page 2

*The highest indoor concentrations of airborne fungal spores were noted in the unoccupied rooms 928 and 428 of the tower. This correlation is likely due to the air monitoring occurring after the wall cavities were cut open and molded materials observed.*

The second sentence in this statement is not factual as all invasive activities, including the removal of the wall panels, were conducted after the morning walkthrough visual inspection and sampling had been completed. This sequence of events can be verified by other participants in the investigation.

Page 3

*Other measured air quality data for temperature, relative humidity, carbon monoxide, carbon dioxide, and airborne particles, did not reveal any indicators of poor indoor air quality in either the tower or base building.*

This is inaccurate as Table 3 of Appendix D provides particle count information. The afternoon monitoring in the TRACON revealed particulate counts substantially higher indoors than out-of-doors (counts were 21 to 320 times greater indoors depending on the particle size range). The TRACON airborne particulate counts in the afternoon were between 110 and 558 times greater than corresponding particulate counts from that morning. Numerous studies have shown that elevated dust levels contribute to indoor air quality problems both as an irritant and as a vehicle for bacteria and other contaminants to stay suspended in the air.

Page 4

*The visual inspection included an invasive inspection of the wall cavities using a borescope, and a visual inspection of the elevator shaft from the roof of the elevator car. Although it was reported that the DOT contract industrial hygienist had a borescope present it was never used during the investigation. This observation is supported by the inspection description found on page 7 of Appendix D which states: "Drywall panels were physically removed from the fourth and ninth unoccupied levels corresponding to the discolored or cleaned areas in the elevator shaft."*

Page 6

*For a time FAA did conduct inspections of the elevator shaft liner for the return of moisture and mold growth.*

Although the short lived elevator shaft inspection process did involve a visual review for mold growth, no moisture meters or other testing equipment necessary to determine the moisture content of the porous materials was ever utilized. In fact, on numerous

occasions the Agency specifically prohibited NATCA's experts from collecting moisture measurements during the inspections.

Page 10

*A visual inspection of the tower elevator shaft revealed no visible mold growth.*

On page 1 of Appendix C, the photo log and visual observations from the site visit, it states, "Areas where mold had been cleaned away from the wall board liner were lighter in color than areas where past mold growth was present." These two statements are logically inconsistent. If there was no visual evidence of mold growth then how could they tell where past mold growth was present? Visual observations by other members on the inspection team confirmed areas of staining and/or mold growth on the elevator shaft liner. The lack of thoroughness of the elevator shaft inspection would also support the contention that visible evidence of fungal contamination was identified since on page 7 of Appendix D it states that the "elevator car was stopped at every other level." Since each level in the center of the tower is approximately the height of two typical building stories, this means that the inspectors were looking for signs of fungal growth 30-40 feet above them.

Page 10

*The shaft did not appear to be a conduit or active pathway for mold spores to travel within the facility.*

The erroneous nature of this statement is supported by information elsewhere in the report. The investigators identified fungal growth on the back side of the elevator shaft liner boards (page 9). The investigators identified areas in the elevator shaft where cleaning of fungal growth had been completed (page 10). The investigators identified areas of the elevator shaft where evidence of moisture tracking was present (page 10). The investigators' photographs show that the elevator liner panels are held in place by metal tracks with no caulking or other sealing to prevent air from inside the wall cavity from migrating into the elevator shaft (page 1 of Appendix C). The investigators identified the presence of air supply and return vents in the elevator shaft (page 1 of Appendix C). The investigators were aware of the concept of the "stack effect" and that it can move contaminants throughout the building through the elevator shaft. (page 2 of Appendix A). Obviously, the weight of this collective information confirms the inaccuracy of the statement.

Page 10

*The concentration of airborne fungal spores detected was considered insignificant and do not indicate elevated mold spore concentrations within the tower or base building that would be likely to adversely impact employee health.*

This statement is in direct contradiction to the conclusion offered by the same investigators on the previous page where they state, "this investigative team is in agreement with the findings in the July 24, 2006, hazard evaluation by the National Institute for Occupational Safety and Health (NIOSH) which states: ...Mold contamination on drywall resulted in employees' health concerns." This situation has existed since some time in 2004 (possibly earlier), and can be expected to continue or recur until all leaks have been repaired, HVAC deficiencies corrected, and all mold

sources located and successfully remediated. Until this remediation takes place, the employees who experience upper airway symptoms when exposed to mold may continue to experience them.

In addition, a number of facts from other sections of the report support the conclusion of employees being harmed by mold and other contaminants in the building:

- The DOT's contract hygienist confirmed the presence of mold growth in the structure. (See page 8 of Appendix D)
- Over 50% of the reported injuries and illness are related to respiratory and allergic reactions. (See Appendix B)
- The occupants report relief when they are absent from the building for a period of time. (See page 7)

Page 10

*Likewise, if the elevator shaft was an effective pathway for mold spores to spread, it could be concluded that the disturbed Stachybotrys spores would have spread between other floors or other areas of the facility. Spread of Stachybotrys spores was not observed or concluded from the air monitoring results.*

As noted previously, the air monitoring was conducted prior to disturbing wallboard which may have liberated *Stachybotrys* spores. This statement ignores evidence from previous air monitoring reports which the investigative team had available to them that showed *Stachybotrys* concentrations in other parts of the building.

Page 10

*While the finding of Stachybotrys spores is significant because it is an indicator that there is or has been a chronic moisture problem in the tower, it does not pose a health hazard more than any other mold or fungal spore that individuals can become sensitized to.*

This is a factually incorrect. Experienced professionals are aware that certain fungi have been shown to produce mycotoxins, poisonous compounds that are found in or on various parts of fungal organisms. The American Conference of Governmental Industrial Hygienists uses the distinction of fungi that produced mycotoxins as the basis for their definition of "toxigenic fungi". Their book, *Bioaerosols: Assessment and Control*, is recognized as a core document in the mold remediation industry and states that "the most frequently studied mycotoxins are produced by species of *Aspergillus*, *Fusarium*, *Penicillium*, *Stachybotrys*, and *Myrothecium*. (*Bioaerosols: Assessment and Control*, section 24.1.4)

Page 11

*All recorded measurements were within legal, regulatory limits and within or insignificantly below ASHRAE recommended ranges.*

Seven average relative humidity measurements inside the building are provided on page 10 of Appendix D. Not one of the indoor measurements is within the ASHRAE recommended range for the season (40-60%). The closest indoor measurement was 23% below the ASHRAE recommended lower limit with most of the samples more than one

third lower than the recommended value. Obviously, this data set would *not* be considered “insignificantly” outside the recommended values.

Page 11

*Detected airborne particle counts were insignificant for each size range and not significant when compared to outdoor levels.*

As noted for the comment from page 3 of the report, the data in Appendix D does not support this statement.

Page 1 of Appendix A

*Summary of Past Recommendations*

Even the title of the appendix is in error as the group did not include an evaluation of recommendations made by the engineering group DMJMH+N that the FAA had hired to evaluate moisture problems in the Detroit tower.

Page 2 of Appendix A

*Utilizing a HEPA vacuum, vacuum all surfaces under negative pressure and monitor for new occurrences of fungal growth. ...Status - Complete 6/26/2006.*

Despite NATCA's request that the cleaning of the elevator shaft be conducted in a manner consistent with current industry practices, no negative pressure engineering controls or large HEPA filtered air scrubbing units were utilized during the cleaning of the elevator shaft.

Page 2 of Appendix A

*To reduce the potential for microbial growth in the facility, the relative humidity should be adjusted and maintained within the ASHRAE recommended range of 30% to 60%.*

*Status – Complete. Temperature and relative humidity sensors were activated in the elevator shaft and tower floors on 5/19/2008. The documented average relative humidity levels during the site survey was within or insignificantly below the ASHRAE recommended range of 40% to 60% for summer.*

See response for the first item from page 11 for specific refutation of this item.

Page 4 of Appendix A

*Clean the interior elevator shaft wall surfaces by wet-wiping with a bleach solution.*

*Status – Complete. The shaft cleaning was completed on 5/26/2006.*

The documentation from the May 2006 cleaning stated that a dish detergent was utilized. Even this was foolish as the residue from the detergent can serve as a nutrient source for mold. The recommendation for wet-wiping with bleach also points out the limited knowledge of the Agency's consultant since current scientific evidence has shown that such a recommendation is not appropriate. Bleach is ineffective at removing mold from surfaces. Recent studies have shown that bleach washing kills as little as 50% of the active mold colonies on porous materials. Additionally, introducing chlorine into a critical use facility with sensitized individuals is fraught with health implications.

## Page 4 of Appendix A

*Modifications have been made to the building's HVAC system and temperature and relative humidity sensors have been installed in the tower elevator shaft and in some unoccupied rooms of the tower. FAA is monitoring the data obtained from the sensors.*

Page 1 of Appendix C, Visual Observations from Site Visit on May 19-20, contradicts the second part of the above information. It notes, "The elevator shaft had devices installed to measure temperature and relative humidity. FAA had not been using the sensors, but decided to activate them during the investigation. There are 9 moisture monitors in total; some are outside the elevator shaft in unoccupied tower space." How could the FAA be "monitoring the data obtained from the sensors" if the sensors were not in use?

## Page 3 of Appendix D

*The only connection would be the air moved through the piston action of the elevator car in the elevator shaft which contains relief vents allowing air to be discharged at the top and bottom of the shaft.*

This statement about relief vents conflicts with the statement on page 1 of Appendix C which states, "The elevator shaft had air supply and return vents."

## Page 4 of Appendix D

*The remediation must be conducted in a similar manner as asbestos abatement and as previously performed on the third, fourth, and ninth unoccupied levels of the ATCT.*

The statement implies that the previous remediation was performed in a manner similar to asbestos abatement projects. Numerous documents have been submitted by NATCA indicating that the previous work did not even meet the standard of care for mold remediation, let alone asbestos abatement. For example, a three-stage decontamination unit with a shower is required for asbestos abatement work within a negative pressure enclosure. No such decontamination unit was used on any of the previous remediation projects.

## Page 5 of Appendix D

*The elevator shaft (central to the tower) is constructed with four layers of gypsum wallboard; the inner shaft is lined with two layers of fire-rated gypsum wallboard on metal framework and the outer shaft (unoccupied levels) is lined with two layers of gypsum wallboard.*

This description of the construction of the elevator shaft conflicts with information presented on page 1 of appendix C, which states that the shaft is constructed of 1-inch wallboard to form a liner, metal studs (with paper backed fiberglass insulation), and two layers of ½-inch drywall to form the outer layers.

## Pages 8 and 9 of Appendix D

*The detected fungal concentrations for the first sampling period were insignificant.*  
and

*The detected fungal concentrations for the second sampling period were insignificant.*

On the previous page the report author notes that "interpretation of such sample results depends on professional judgment as to whether types and amount of organisms are comparable to normal background and the likelihood that the identified organisms will

cause allergic reactions or infections.” When coupled with the numerous reports of allergy type symptoms (and worse) from the building occupants while they are in the structure and submitted medical evidence that connects the problems to mold exposure, the author’s own evaluation criteria indicates that his interpretation of the results is false.

Page 10 of Appendix D

*The average relative humidity was within or insignificantly below the ASHRAE recommended range of 40 – 60% for summer.*

See response for the first item from page 11 for specific refutation of this item.

Page 11 of Appendix D

*The particle count for each size range and at each location was not significant when compared to the outdoors.*

See response for the first item from page 3 for specific refutation of this item.

**19**

SAFE TECHNOLOGY, INC.



June 7, 2007

Mr. Wayne Vogelsburg  
Safety Assurance Group AJO-2C1  
2601 Meacham Blvd  
Fort Worth, TX 76137

Re: DTW ATCT WME Report Review  
Project #2006-0269

Dear Wayne,

Per your request I have reviewed the documents described as Investigation Data and Associated Correspondence, Project Number IA06-7235, prepared by Wonder Makers Environmental (WME) for NATCA, their client. The report described the findings and recommendations resulting from their December 18, 2006, December 19, 2006, January 22, 2007 and January 23, 2007 visits at the Detroit Metro (DTW) ATCT.

**Background**

On the dates described above, WME visited the DTW ATCT, and associated base building, and gathered a variety of samples, including cultured (viable) and non-cultured (non-viable) air samples, surface swabs and particulates vacuumed from surfaces. Additionally, room temperature and relative humidity were measured. Photographs were included in the report. I was not present during the WME visit.

**Discussion**

Conclusions and recommendations provided by WME are largely dependent on the outcome of their sampling efforts. Unfortunately, deficiencies in the methods utilized by WME preclude drawing meaningful conclusions from much of the data. The sampling that was conducted seemed to be directed at finding mold rather than evaluating conditions in a carefully planned and objective manner.

*Air Samples*

Air sampling is not usually necessary to determine the presence and severity of mold growth within a building. When mold growth occurs as a result of floods, or chronic wetting of finishes, it is usually visible to the unaided eye. On occasions, such as when microbial growth is suspected, but may be concealed and cannot be seen, air sampling may be a useful tool. In those cases, considerable care must be exercised when designing a sampling strategy that will permit meaningful conclusions to be made. Indoor areas of concern are usually compared to the outdoors, or to other areas of the building thought to be in acceptable condition.



Airborne concentrations of microbial agents are known to be extremely variable, temporally and spatially, therefore the number of air samples to be gathered at each location of interest must be adequate to define the distribution as well as the mean.

Comparisons of areas of interest typically involve two components; comparison of means of total spore counts, and comparison of taxa, preferably at the species level<sup>1,2</sup>. Buildings in good condition will usually have indoor concentrations of mold spores that are less than outdoor concentrations. Weather and season can influence the results and must be considered. Buildings in good condition will also have a similar distribution of taxa at the locations of interest. Similarity is determined through the Spearman rank order correlation test using mean taxa values from each location.

Unfortunately, an air-sampling plan defining the areas of concern, reference locations, and the number of samples needed at each location to make meaningful and reliable comparisons was not described or implemented by WME.

Relatively few cultured air samples were collected from the site. Air sampling conducted by WME was inadequate to compare areas of interest with reference locations. No conclusions could be drawn from this data.

Most of the air samples were collected on Air-O-Cell cassettes that permitted identification of some spores to the genus level only, based on morphology of the structures. This limiting factor somewhat reduced the ability to compare areas of interest. In any event, WME did not evaluate this data in any systematic or recognized manner.

As reported by WME, a large percentage of their Air-O-Cell samples were too obscured by particulates to permit normal analysis. WME concluded this was evidence of 'ventilation and filtration problems' in the building, when it was actually the predictable outcome of poor technique. The samples were rendered useless simply because the sample air volume was excessive. The 'alternative' analytical technique employed by WME for these samples was never described, but appeared to be the same method used to evaluate their microvac samples (see discussion below). The outcome of this alternative analysis demonstrated that, in all cases, mold spores made up less than one percent of the particulates 'quantified'. Interestingly, this 'less than one percent' fraction was excluded from category totals, which were classified as the 'estimated percent of sample'. Even so, WME reported genera of spores present within this excluded fraction down to the single percentile level. It is not at all clear how this was accomplished.

WME noted that analysis of Air-O-Cell samples was conducted in house via their own protocol. The data sheets revealed that the reported 'target fungal spores types' were not actually encountered during the normal counting procedures. They were reported only as part of the 'qualified analysis' which appeared in some of the 'notes' sections. This suggested that these spore types occurred very rarely, or they would have also appeared in a field that was counted. They clearly were not quantified.

When forming their conclusions, WME seemed to rely heavily on information that was only anecdotal at best. See also comments related to 'target fungal spore types' below.

#### *Air-O-Cell Data Analysis*

While most WME air sampling data was inadequate to be used for forming conclusions, the large number of Air-O-Cell samples collected over several days presented an opportunity for analysis, though with limitations. Samples that were not overloaded were separated into three groups; outdoors, indoor tower and indoor base building. The mean total spore counts were compared, as were the rank order of observed genera. Results are provided in Attachment 1.

Analysis revealed that mean outdoor concentrations of total mold spores were higher than mean concentrations in both the tower and base buildings. When the means of the base building and tower building were compared, there was no meaningful difference.

When the Spearman rank order correlation test was used to compare mean genera data, a difference in biodiversity was not detected. In other words, the genera observed in both indoor and outdoor samples appeared to originate from the same source.

The data strongly suggested that a source of microbial growth did not exist within the buildings. It is not clear why WME did not perform a similar evaluation of their data.

#### *Aspergillus/Penicillium Limitations*

As noted by WME, aspergillus and penicillium spores are essentially indistinguishable under the light microscope, and are therefore usually reported collectively as aspergillus/penicillium. This is simply a limitation of the light microscopy technique that must be considered when interpreting data. There are approximately 200 different species of penicillium and the same for aspergillus. This means up to 400 different species might actually be lumped into the aspergillus/penicillium finding. Because the light microscope cannot distinguish the species, or even the genus, of these spores, care must be exercised when drawing conclusions from this type of data, and the limitations must be acknowledged. This was a limiting factor within the evaluation I performed above.

Penicillium and aspergillus species are ubiquitous in the environment. Penicillium is commonly found in ordinary house dust, even in environments not subjected to water damage. Some species of aspergillus are xerophilic, and do not require free water for growth.

#### *Swab Samples*

Like all techniques, swab sampling has limitations that must be understood. The usefulness of the WME results was extremely limited, and even potentially misleading. Since WME did

not estimate the area of the surface the sample was to represent the data had limited value, other than to conclude that some mold (or bacteria) was, or was not, found.

Since mold spores are extremely small, a very large number might be found on a spot no larger than the period at the end of this sentence. A one-millimeter spot on the wall will easily accommodate more than 160,000 mold spores that are about 2.5 microns in diameter. The highest concentration of spores found by WME was 23 spores per square centimeter, an area that is 100 times larger than my one-millimeter example. In absence of an estimation of the area represented by the swab sample, not much can be concluded other than perhaps some small fraction of a tiny dot of mold was encountered. Certainly, this form of data did not permit the sweeping conclusion that the building had been adversely impacted by mold.

My impression of the WME data is that remarkably little mold was found through swab sampling. This was surprising considering how ubiquitous mold is in the environment.

#### *Microvac Samples*

Microvac samples were gathered by vacuuming a surface with an Air-O-Cell cassette attached to an air pump. The device is the same one used for the collection of non-cultured (non-viable) air samples. It shares all of the limitations of that technique, with the additional complications created by using an inertial impactor designed for air sampling for vacuuming particles from surfaces.

WME described findings as relative percentages of various categories. 10 of 15 samples indicated that fungal spores made up less than one percent of the material reported. The remainders ranged from one to five percent. The contents of sample 7235-E12 added up to 102% without explanation.

WME utilized a unique interpretation scheme for these results. They interpreted fungal spores at one percent or less (absent 'target fungal types') as 'normal fungal ecology'. Fungal spores at more than one percent, but less than three percent represented an 'environment contaminated with settled spores that were dispersed directly or indirectly'. Fungal spores at greater than three percent were 'an indication of an indoor environment contaminated with the presence of actual mold growth and associated spores'. These criteria were, apparently, based solely on WME's own experience, and did not reference any published work. In absence of further explanation the criteria appeared to be completely arbitrary and without basis. Further, the analytical method was not described, and appeared to be another in-house method. No evidence of method validation was offered. Given the difficulty of accurately quantifying low concentrations of particulates via light microscopy, I do not believe the method can reliably distinguish such small differences in spore concentrations.

As in the case of swab samples, there was no estimation of the surface area the sample was intended to represent.

### *Bacteria*

Air sampling for bacteria is of limited value in most environments because of uncertainties in interpretation. Most bacteria found in buildings are those shed by the human occupants. Comparison of indoor and outdoor environments therefore becomes problematic. Air sampling conducted by WME was inadequate to compare areas of interest with reference locations. No conclusions could be drawn from this data.

### *Target Organisms*

The terms 'target fungal type', or 'target organism' are not standard nomenclature and are not recognized or defined in any of the published references commonly relied upon by professional investigators. WME seemed to use the term to convey special status upon a small number of genera, without any basis for doing so.

The infrequent occurrence of stachybotrys and other genera from WME's 'target' list within the building was far from conclusive evidence of present or even past moisture related problems. As illustration, a recent study demonstrated that stachybotrys was found in a significant portion of buildings, both commercial and residential, that were categorized as 'clean', meaning they had no history or indications of moisture related problems or microbial growth<sup>3</sup>.

### *Temperature and Relative Humidity*

WME reported generally acceptable room temperature and relative humidity measurements at test locations.

### *Other Observations*

Non-cultured air and microvac samples were analyzed by WME staff according to their own protocols. WME does not appear on the list of AIHA accredited laboratories participating in the Environmental Microbiology Laboratory Accreditation Program (EMLAP). AIHA accredited laboratories have successfully demonstrated personnel qualifications and quality assurance procedures, established standard operating procedures, maintain proper records, have adequate facilities and equipment, and additionally participate in the AIHA Environmental Microbiology Proficiency Analytical Testing (EMPAT) Program. Aerotech P&K, utilized by WME only for analysis of cultured samples, is EMLAP accredited.

### **Conclusions**

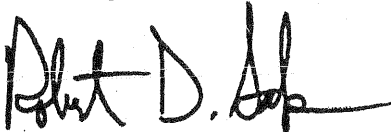
The data provided in the WME report did not support a finding that the DTW air traffic control tower and base building was 'contaminated' with microbial growth. Airborne concentrations of mold spores within the building were less than the outdoors. The biodiversity of genera observed indoors and out was similar. The usable data strongly suggested the absence of a source of microbial amplification within the building.

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In absence of evidence to suggest the presence of a significant concealed source of microbial growth within the building, there is no obvious benefit to invasive sampling.

Please contact me if you have an questions or require clarification.

Best Regards,



Robert D. Safe, CIH, LIH, QEP

#### References

1. Bioaerosols: Assessment and Control, ACGIH 1999.
2. Field Guide for the Determination of Biological Contaminants in Environmental Samples, Second Edition. AIHA 2005.
3. A Regional Comparison of Mold Spore Concentrations Outdoors and Inside "Clean" and "Mold Contaminated" Southern California Buildings. Daniel M. Baxter et al. , Journal of Occupational and Environmental Hygiene, 2: 8-18.

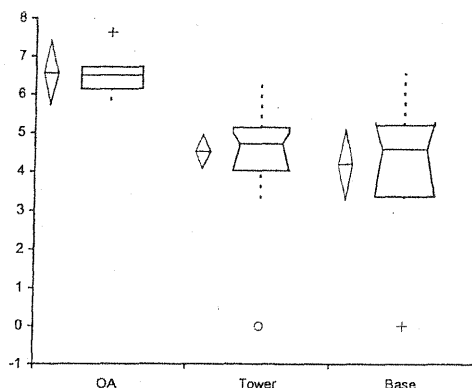
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Attachment 1

analysed with: Analyse-it + General 1.73

Test | Comparative descriptives  
 Variables | LN: OA, Tower, Base  
 Performed by | R

Date | 6 June 2007



LN	n	Mean	SD	SE	95% CI of Mean	Median	IQR	95% CI of Median
OA	5	6.567	0.6805	0.3043	5.722 to 7.412	6.500	0.580	- to -
Tower	32	4.515	1.2073	0.2134	4.080 to 4.951	4.718	1.118	4.025 to 5.011
Base	18	4.200	1.8269	0.4306	3.292 to 5.109	4.583	1.839	3.367 to 5.278

	n	GMean
OA	5	710.902
Tower	32	91.421
Base	18	66.720

Air-O-Cell data that was not overloaded was separated into outdoor, tower and base building categories based on the WME report. Because the data was lognormally distributed, it was first normalized by calculating the natural log (LN) for each value before the comparative statistical analysis, above, was performed. The resulting geometric mean values are also shown in the lower section of the table.

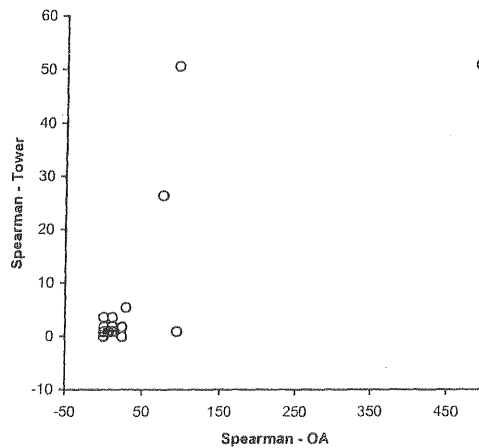
The results of parametric and non-parametric analysis are graphically displayed for ease of comparison. The centerlines of the diamond shape plots, and the box plots, indicate the mean values. The 95% confidence limit around the mean values are indicated by the plot boundaries. The outdoor mean value is clearly different from both indoor mean values. The indoor mean values cannot be distinguished, as the mean confidence intervals overlap.

The Spearman rank order correlation test, as described in reference 1, was performed. The resulting data is presented in tabular and graphical form. For  $n=17$  the single tailed critical value, at  $P=0.05$ , was 0.4118. The calculated  $r_s$  statistic was compared against the critical value to accept, or reject, the null hypothesis that the populations were independent (not related), or the alternative hypothesis that the populations were not independent (they were related) The data demonstrated that the biodiversity of the populations were related. In plain English, the mold genera present in the indoor samples could not be reliably distinguished from the outdoor samples. Likewise, the samples from the tower and base buildings could not be distinguished. If there were a significant source of mold growing inside the buildings, we would expect the genera to be different from the outdoors.

analysed with: Analyse-it + General 1.73

Test	Spearman rank correlation	
Alternative hypothesis	Spearman: OA $\neq$ Tower	
Performed by	R	Date   6 June 2007

n	17
rs statistic	0.54
95% CI	0.09 to 0.81
2-tailed p	0.0241 (t approximation, corrected for ties)





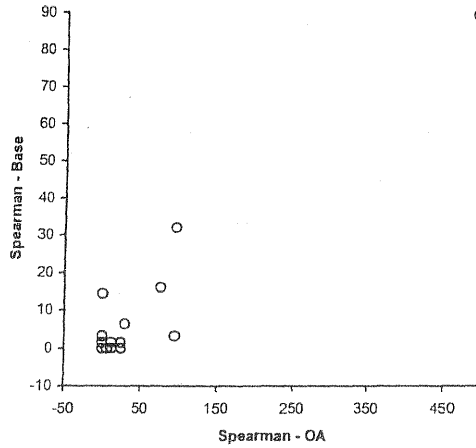
analysed with: Analyse-it + General 1.73

Test	Spearman rank correlation
Alternative hypothesis	Spearman: OA $\neq$ Base
Performed by	R
Date	6 June 2007

n | 17

rs statistic | 0.54  
95% CI | 0.08 to 0.81

2-tailed p | 0.0251 (t approximation, corrected for ties)



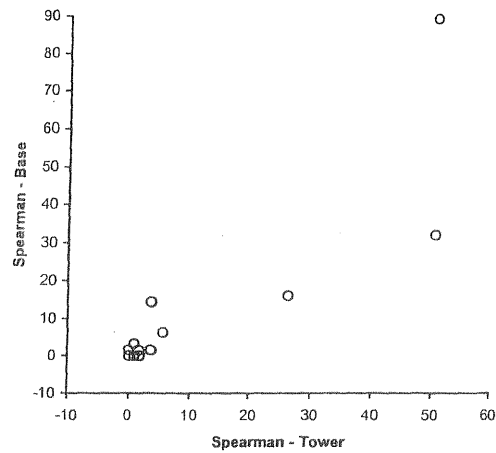
analysed with: Analyse-it + General 1.73

Test	Spearman rank correlation
Alternative hypothesis	Spearman: Tower $\neq$ Base
Performed by	R
Date	6 June 2007

n | 17

rs statistic | 0.65  
95% CI | 0.24 to 0.86

2-tailed p | 0.0049 (t approximation, corrected for ties)



**19b**



**W O N D E R M A K E R S**  
**E N V I R O N M E N T A L**

Review of Letter from Robert Safe  
On June 7, 2007 to Mr. Wayne Vogelsburg  
Regarding DTW ATCT WME Report Review

(Items in bold print are direct references from Mr. Safe's letter)

**I have reviewed the documents described as Investigation Data and Associated Correspondence** (page one, paragraph one)

Although Mr. Safe ultimately offers a negative opinion regarding the value of the proposed core sampling, his letter indicates that he did not review the sampling protocol and numerous detailed documents that were submitted by NATCA at the request of the FAA to explain the union's rationale for physical sampling. It is clear that the FAA had additional information that was germane to the situation as the cover memorandum from Joe Figliuolo that was submitted to NATCA with the letter from Robert Safe stated: "On April 12, 2007 you sent a letter to justify the need for the additional testing/sampling. You also provided data and test results supplied by Wonder Makers following their previous sampling."

Providing limited and select data to their consultants in order to justify a preferred outcome is a pattern that the Agency has used repeatedly since mold contamination was initially identified in the Detroit tower. In this specific case the misdirected focus on analysis of previous sampling data obscures the fact that the FAA has never completed their *risk analysis report* of the planned invasive sampling. It was this risk analysis report that was used as an excuse to keep NATCA and their environmental expert from collecting needed bulk samples at the time of the first part of the investigation in December 2006 and second visit in January 2007.

**The sampling that was conducted seemed to be directed at finding mold rather than evaluating conditions in a carefully planned and objective manner.** (page one, paragraph three)

This is a curious conclusion given that Mr. Safe did not have the sampling protocol to evaluate, and apparently did not request it from the FAA. It also ignores important information related to the interpretation of the data including:

- Continued reports of serious illnesses from occupants related to their time in the structure
- Past identification of significant quantities of visible fungal growth in the structure with some of that growth being in the wall cavities, which makes it difficult to identify without invasive sampling

- FAA statements indicating that past mold remediation efforts had removed all sources of interior fungal growth

The sampling that the FAA allowed to be conducted was created in a carefully planned and objective manner to provide baseline information regarding the conditions throughout a building that houses a 24-hour per day operation with a multitude of HVAC systems and settings. One aspect of the sampling plan was indeed to look for certain specific types of mold. This is recognized in the industry as an important part of any such investigation and is supported by a number of the references that Mr. Safe cites in his report.

**On occasions, such as when microbial growth is suspected, but may be concealed and cannot be seen, air sampling may be a useful tool.** (page one, paragraph four)

Although Mr. Safe is using this as a general example, from his past efforts for the FAA he should know that this is the case at Detroit Metro ATCT. There are multiple pieces of evidence that verify the past presence of fungal growth in hidden spaces on the 3<sup>rd</sup>, 4<sup>th</sup>, and 9<sup>th</sup> floors. In addition there is reasonable evidence to suggest that additional fungal materials are present in wall cavities on some of the floors that have not been remediated and on the elevator shaft liner boards in areas that were inaccessible during the past remediation attempts. Through NATCA, Wonder Makers proposed to use a variety of air, surface, and bulk samples to address the primary question: Is the elevator shaft liner serving as a substantial fungal reservoir for the building that could account for the illnesses being suffered by the occupants?

**Buildings in good condition will also have a similar distribution of taxa at the locations of interest. Similarity is determined through the Spearman rank order correlation test using mean taxa values from each location.** (page two, paragraph two)

Mr. Safe is correct in noting that the Spearman rank order correlation can be used as a tool to interpret the sampling data. One of the suggestions for using that analytical technique is found in the American Industrial Hygiene Association's (AIHA) *Field Guide for Determination of Biological Contaminants in Environmental Samples*. Mr. Safe cites this document as one of his references. However, even the AIHA guide notes that the Spearman correlation must be used with caution. The paragraph following the example of using the Spearman correlation is of particular interest and is reprinted below:

A word of caution, however, for interpretation of this particular example and for the conclusions that one might draw from other cases. Although the ranking is similar, the actual species found and their concentrations should also be used in drawing conclusions, especially when the presence of *Stachybotrys chartarum (atra)* is indicated in the indoor sample(s). (page 52)

One of the reasons for the caution in the AIHA guide is that the Spearman correlation is a non-weighted statistical measure. In other words, each data point carries the same weight as every other. Professionals dealing with mold contamination problems on a regular basis understand that certain data points need to carry more weight for a meaningful analysis of conditions in buildings where *Stachybotrys* and other toxigenic types of fungi have proliferated—particularly when such buildings have multiple reports of occupant illnesses that appear to be related to their presence in the structure.

Later in his letter Mr. Safe goes further and contends that Wonder Makers was not systematic in their evaluation of the data because we did not use the Spearman rank order correlation test. However, a review of the specific application of the statistical process by Mr. Safe points out why a statistical analysis should be done carefully and the results reviewed in context with other available information. In a note on the first page of Attachment 1 Mr. Safe states:

**Because the data was lognormally distributed, it was first normalized by calculating the natural log (LN) for each value before the comparative statistical analysis, above, was performed.**

Ironically, one of the references that Mr. Safe cites in his letter (his third reference, from the Journal of Occupational and Environmental Hygiene) cautions against comparing spore averages that are lognormally distributed in this way. The article authors state: *“Transforming the data to logs, and then using t-tests or analysis of variance, can lead to errors since the true variance is underestimated”*. In their conclusions, the authors are more direct when they advise: *“Because airborne fungal spore distributions are lognormal, the application of statistical tests based on normally distributed data is inappropriate.”* (pages 12, 13, & 17 from: A Regional Comparison of Molds Spore Concentrations Outdoors And Inside “Clean” and “Mold Contaminated” Southern California Buildings, Daniel M. Baxter et al., Journal of Occupational and Environmental Hygiene 2: 8-18)

**Unfortunately, an air-sampling plan defining the areas of concern, reference locations, and the number of samples needed at each location to make meaningful and reliable comparison was not described or implemented by WME. (page two, paragraph three)**

As noted previously, NATCA submitted extensive information regarding the sampling plan developed by Wonder Makers Environmental. It is also important to note that part of the sampling protocol was to collect baseline information from numerous areas of the building to help determine which areas are of greatest concern. The design of the building, with the elevator shaft providing a substantial pathway for the spread of potential contaminants, dictated the need for a comprehensive sampling scheme. The fact that the Agency had not conducted a comprehensive survey of the potential health effects being experienced by building occupants also contributed to a more generic sampling approach. Assuming that occupant concerns were limited to certain areas of the building where the symptoms are most pronounced is ill advised in an air traffic control

facility where stringent medical requirements for duty often make workers reluctant to mention problems unless anonymity is provided.

**Relatively few cultured air samples were collected from the site. Air sampling conducted by WME was inadequate to compare areas of interest with reference locations. No conclusions could be drawn from this data.** (page two, paragraph four)

Mr. Safe's conclusion appears to be based solely on the ability to perform statistical analysis on each data set independently. It is a common practice in the industry to utilize direct read sampling techniques as the primary method of collecting data during a general investigation of building conditions and then match that with the more detailed information that is garnered from viable sampling techniques. For example, in the section entitled Spore Sampling and Counting in the book *The Fifth Kingdom* author Bryce Kendrick notes:

If a general or introductory survey is called for, I would recommend the 'non-viable' approach since it detects the widest range of taxa, while if a more detailed breakdown of some common fungi such as *Aspergillus* and *Penicillium* was needed, I would suggest that a 'viable' technique be added. (page 139)

Proper use of both sampling formats ensures that important trends are not overlooked because of the limitations inherent in each type of sampling. As such, it is important to look at the data as a whole, the interpretation approach taken by Wonder Makers.

**Most of the air samples were collected on Air-O-Cell cassettes... In any event, WME did not evaluate this data in any systematic or recognized manner.** (page two, paragraph five)

If Mr. Safe does not agree with the sample interpretation approach and subsequent recommendations offered by Wonder Makers that does not mean the evaluation was not systematic or that it was not within the industry standard of care. Indeed, Mr. Safe's over reliance on statistical manipulation of sampling data without regard to

- the past history of the building,
- reports of occupant illnesses for years with increases in symptoms corresponding with past attempts at remediation, and
- multiple industry recommendations that certain spore types recovered from buildings trigger a more aggressive management response

is the approach that is not recognized by experts in the indoor air quality field.

**As reported by WME, a large percentage of their Air-O-Cell samples were too obscured by particulates to permit normal analysis... The samples were rendered useless simply because the sample air volume was excessive.** (page two, paragraph six)

Although a number of the air samples had extensive particulate levels that required an alternate analysis technique, they were not rendered “useless”. As was explained in Wonder Makers’ report, the disparity in particulate concentration helps to identify specific areas of concern as the data is often an indication of ventilation and filtration problems in a building. It is important to remember that at the time of the investigation the FAA was (and still is) claiming that the entire tower structure was a clean and “positive” environment. As such, Wonder Makers selected the sample collection time based on the Agency’s claim about the condition of the structure and extensive historical evidence so that the samples would produce “...a particle deposition on the slide in which the edges of the trace are sharply defined and the particles dispersed well enough to enable good microscopic evaluation”. (Air-O-Cell bioaerosol sampling cassette instructions from Zefon International)

The importance of finding high levels of airborne particulates is also significant because elevated dust levels contribute to indoor air quality problems regardless of the percentage of biological contaminants found in the samples. Elevated dust levels take on added significance when they are found in conjunction with low levels of relative humidity and in facilities where occupants do substantial work using computer monitors. This combination of conditions has been documented to exacerbate symptoms such as eye irritation and headaches to the point where it has been dubbed “office eye syndrome” by a number of researchers. Since a number of controllers had complained about inadequate humidification and the sorts of symptoms that contribute to office eye syndrome, the discovery of a number of areas in the building with elevated dust levels means that the samples can be very useful in resolving the problems.

Wonder Makers’ conclusion about ventilation and filtration problems existing in the building at the time of the sampling was further borne out by the FAA when, following the investigation, the Agency completed a number of projects related to the building’s HVAC system including cleaning the entire duct system.

**WME reported genera of spores present within this excluded fraction down to the single percentile level. It is not at all clear how this was accomplished.** (page two, paragraph six)

Even if the spore concentration is less than 1% of the particulate matter captured on a sample the number and type of spores can still be identified. The type of spores identified on the slide are then listed in order of preponderance with the percentages showing the relative distribution of each type as compared to the total number of spores present.

**The data sheets revealed that the reported ‘target fungal spores types’ were not actually encountered during the normal counting procedures... When forming their conclusions, WME seemed to rely heavily on information that was only anecdotal at best.** (page two, paragraph seven continuing on to page three)



Part of the analysis process for every sample submitted to Wonder Makers' laboratory is the addition of a quality control step to the regular microscopic procedure. This post-analysis scan allows for the identification of mold types that may be otherwise missed due to their low concentration and/or uneven distribution on the microscope slide. The data presented from the post analysis scan is not quantified but it is accurate and scientific data. Such data is *not* anecdotal, a term that implies the information is subjective and untrustworthy.

As noted previously in the discussion of the Spearman rank order correlation, it is extremely important to identify and consider the presence of low concentrations of certain types of fungi when evaluating data from a mold related investigation. The observation of target spores, whether in the quantified portion of the analysis or in the post-analysis scan, is critical in developing a comprehensive understanding of the building conditions.

#### **Air-O-Cell Data Analysis** (page three, paragraphs two through five)

Mr. Safe has a number of paragraphs criticizing the evaluation techniques utilized by Wonder Makers and explaining his process of separating the data into three categories, averaging the total spore counts for each category, and applying the Spearman rank order correlation test to the list of spore types found in each category. He concludes with the statement: **The data strongly suggested that a source of microbial growth did not exist within the buildings.**

However, as explained previously, utilizing the Spearman rank order correlation test, even if it is done properly, is only one step in the complete evaluation of sampling data from a building suspected of having fungal contamination problems. As emphasized by the AIHA, "the actual species found and their concentrations should also be used in drawing conclusions, especially when the presence of *Stachybotrys chartarum* (*atra*) is indicated in the indoor sample(s)". To this end, Wonder Makers correctly pointed out that in the December round of sampling *nine* different mold types were captured on various indoor samples that were not represented on any of the outdoor comparison samples. In the January third shift sampling *thirteen* different types of fungal organisms were recovered from indoor samples that were not identified in any of the out-of-doors comparisons samples.

Two of the mold types recovered indoors but not out-of-doors, *Stachybotrys* and *Chaetomium*, are known to produce a range of mycotoxins (*i.e.* mold poisons). Therefore, many industry references, including the AIHA manual cited by Mr. Safe, recommend that special attention be paid to such "target spores". The fact that these spores were recovered during multiple sampling episodes and in a variety of locations in the building are clear evidence that interior sources of fungal contamination likely exist in the structure. It is also important to remember that the presence of *Stachybotrys* in the air was confirmed by a second sampling method (viable sampling) and that a number of targets spores, such as *Stachybotrys* and *Fusarium* were recovered from surface samples throughout the building. In fact, 30% of the surface samples collected from the inner

elevator shaft liner recovered *Stachybotrys* – with those samples collected after two attempts to remove mold contamination through cleaning and use of biocides.

When viewed along with all the information—including building conditions, documented occupant reports of building-related illnesses, past evidence of improper remediation of mold-contaminated surfaces, and sampling results—the data does, indeed, suggest that a source(s) of microbial growth exists in the Detroit tower.

### **Aspergillus/Penicillium Limitations** (page three)

Mr. Safe provides some useful background information on *Aspergillus* and *Penicillium* spores, as well as the limitations of direct microscopy of Air-O-Cell cassettes when distinguishing these types of spores from one another or categorizing them to a species level. However, this information appears to have been included in order to call into question some of the conclusions drawn from the sampling data.

The limitations in the Air-O-Cell sampling technique were one of the reasons that viable sampling was also conducted. The viable sample results provide additional data to help interpret the Air-O-Cell sample results. More importantly, since all of the Air-O-Cell samples were subject to the same analytical limitations and the data on those spore types was presented in a uniform manner, comparisons can be made between the samples. That is why the Wonder Makers report of the December sampling noted that *Aspergillus/Penicillium* spores were the primary fungal type in all four out-of-doors samples, but were dominant in only 6 of 21 other air samples subjected to similar analysis. This notable difference in the rank order of the spores is another indicator that fungal contamination sources may exist in the building.

### **Swab Samples** (page three and the top of page four)

Mr. Safe gives another interesting example, providing an estimate of the number of mold spores that can be present in a small space under ideal mold growth conditions. He uses his example to support the contention that “...**the data had limited value, other than to conclude that some mold (or bacteria) was, or was not, found.**”

This narrow view of the data is inexcusable. The fact that swab sampling of the dust on two HVAC supply diffusers in the TRACON showed *Fusarium* as a contaminant is critically important when properly understood. This particular mold is one of the small number of fungal contaminants considered a target type by many professionals in the industry because it 1) is often associated with water-damaged structures, 2) can produce a range of mycotoxins and 3) has been linked to a number of occupant symptoms including eye irritation. Given that occupants of the TRACON reported complaints of eye irritation and frequent upper respiratory infections, the presence of *Fusarium* in samples collected from diffusers at both ends of the TRACON points to that contaminant as a potential cause of the problems. It is also a strong indicator that that portion of the air supply system was contaminated. This concern over the air supply duct contributing to some of the health complaints voiced by the TRACON employees was further

supported in the second round of sampling when a swab sample of the supply diffuser recovered the highest level of bacterial contamination of any of the swab samples collected in Detroit Metro ATCT.

Another important piece of information gained from the swab samples that was ignored by Mr. Safe was the fact that a significant number of swabs samples from the elevator shaft liner had relatively high fungal levels when compared to samples taken from other surfaces in the building. This is especially important as the elevator shaft has been subjected to several attempts at remediation and consistently described by FAA personnel as visually clean.

#### **Microvac Samples** (page four)

Mr. Safe identified a mistake in the presentation of the data for sample 7235-E12. This information has been corrected and provided to NATCA as an addendum to the report.

Mr. Safe accurately describes the evaluation criteria used for microvacuum samples as based on Wonder Makers' experience. However, he then concludes that the evaluation criteria was "**completely arbitrary and without basis**" primarily because we did not cite a published reference. Although the references were not listed, the Wonder Makers evaluation criteria has been presented at numerous conferences and published in several trade journals including the January 2003 *Cleaning and Restoration* magazine.

Of greater importance is the fact that Mr. Safe uses his concern about the evaluation criteria to dismiss the importance of the recovery of *Stachybotrys* spores from three of the ten microvacuum samples collected from the elevator shaft liner. The presence of this fungal material points toward the elevator shaft liner as a source of contamination for the building and clearly illustrates the inadequacy of using visual inspections as the sole criteria for determining whether remediation has been completed properly.

#### **Air sampling for bacteria is of limited value in most environments because of uncertainties in interpretation... No conclusions could be drawn from this data.**

(page five, paragraph one)

Mr. Safe's comments regarding the usefulness of bacteria sampling data did not address any of the specific information presented in the Wonder Makers report. The importance of this sampling was clearly explained in the report and summary letters that were included as part of the report:

Bacteria sampling is often conducted in conjunction with mold sampling as they are competing organisms, meaning that fungal counts can be impacted by the presence or absence of bacteria in the environment. In addition, the presence of certain bacteria, Gram negative bacilli, is often associated with water- or sewage-damaged environments. Such bacterial contamination can produce symptoms that are similar to those reported by individuals in mold-contaminated environments.

... Most significant was the fact that Gram negative bacilli were recovered in the air in the TRACON break room and Rooms 328, 428, 828, and 928.

**The terms ‘target fungal type’, or ‘target organism’ are not standard nomenclature...WME seemed to use the term to convey special status upon a small number of genera, without any basis for doing so.** (page five, paragraph two)

Mr. Safe is correct in his assessment that the term ‘target fungal type’ has not risen to the level where it can be considered standard nomenclature for the industry. However, the concept that when certain types of mold are found in buildings special care should be given to the interpretation of that data is well founded in the industrial hygiene industry. For example the AIHA *Field Guide* discussed earlier has a section starting on page 58 titled “Interpretation of Data”. The third specific guideline given for interpretation of sampling results states:

The confirmed presence of *S. chartarum*, *Aspergillus versicolor*, *A. flavus*, *A. fumigatus* and *Fusarium moniliforme* requires urgent risk management decisions to be made. “Confirmed presence” means colonies in several samples, many colonies in any sample or, where a single colony was found in a single sample, evidence of the growth of these fungi on building materials by visual inspection or bulk sampling.

The Environmental Health Directorate of Health Canada, a group referenced in the interpretation section of the AIHA *Field Guide*, is also quite blunt in its advice to pay special attention to certain fungal types. In section 3.2 of their publication *Fungal Contamination in Public Buildings: A Guide to Recognition and Management* it states:

The persistent presence, demonstrated on repeated sampling, of toxigenic fungi (e.g., *Stachybotrys atra*, toxigenic *Aspergillus*, *Penicillium*, and *Fusarium* spp.) indicates that further investigation and appropriate action should be taken.

In light of this long established industry approach it is disappointing that Mr. Safe dismissed the importance of the evidence presented by the repeated recovery of “toxigenic fungi” simply because he was unfamiliar with the terminology.

**As illustration, a recent study demonstrated that stachybotrys was found in a significant portion of buildings, both commercial and residential, that were categorized as ‘clean’...** (page five, paragraph three)

Care in interpreting the study cited by Mr. Safe is required since the authors specifically stated that “The relatively small sample size of the study did not permit differentiation of airborne fungal spore concentrations in clean versus moldy building for less commonly occurring genera (e.g., *Chaetomium*, *Epicoccum*, *Stachybotrys*)”. Earlier in the report the authors noted that *Stachybotrys* was recovered in airborne samples from 11% of the moldy buildings and 3% of the clean buildings.

There are many scientific reasons why the recovery rate of certain spores such as *Chaetomium* and *Stachybotrys* is relatively low in air samples. In his book *Indoor Environment Quality* (Lewis Publishers, New York, 2001) Thad Godish explains:

In other cases, airborne molds spore concentrations may be low despite the fact that significant infestation is present. This is the case with *Stachybotrys chartarum*, a toxigenic species with large, initially sticky spores, which may cling together and settle out rapidly.

Therefore, Mr. Safe's inference from his illustration that the repeated recovery of *Stachybotrys* and other 'target fungal types' at the Detroit tower does not support "... **present or even past moisture related problems**" is misguided.


#### **Other Observations** (page five, paragraph five)

In this section Mr. Safe notes that the non-cultured and microvacuum samples were analyzed by the Wonder Makers laboratory, which does not participate in the AIHA laboratory accreditation program. However, there are other measures of proficiency for laboratories and analysts. One of the three certifications recognized by the state of Texas for qualifying laboratories to analyze samples from that state is certification through the Pan American Aerobiology Certification Board (PAACB). Wonder Makers laboratory manager has earned such certification.

**The usable data strongly suggested the absence of a source of microbial amplification within the building. In absence of evidence to suggest the presence of a significant concealed source of microbial growth in the building, there is no obvious benefit to invasive sampling.** (page five, paragraph six and page six, paragraph one)

Throughout his review Mr. Safe repeatedly focused on a very limited data evaluation based primarily on statistical analysis rather than a comprehensive review of all the evidence. This may be due, in part, to the selection of documents that was provided to Mr. Safe by the FAA. Even so, there was substantial evidence presented in Wonder Makers' reports that was ignored by Mr. Safe in his conclusion. In particular, the complete disregard for reported health effects is disturbing coming from an individual who is a Certified Industrial Hygienist, as their mission is to anticipate, recognize, evaluate, and control hazards. The code of ethics published by the American Board of Industrial Hygiene states: "First and foremost, ABIH certificants and candidates give priority to health and safety interests related to the protection of people..." By providing a stilted review of the reports Mr. Safe has contributed to the concerted effort on the part of the FAA to avoid a meaningful investigation of the elevator shaft liner. In doing so, he has hampered the efforts to identify the building conditions that are causing occupants to suffer significant building-related illnesses.

**19c**



WONDERMAKERS  
ENVIRONMENTAL

August 2, 2007

Vince Sugent  
National Air Traffic Controllers Association  
7768 Pleasant Lane  
Ypsilanti, MI 48197

RE: Addendum to WME project #IA06-7235:  
Correction to results for sample 7235-E12


Dear Vince:

A table containing corrected data for biological surface sample 7235-E12, collected on January 22, 2007, is attached. An error in the presentation of data for this sample was identified by Robert D. Safe in his DTW ATCT WME Report Review submitted to Wayne Vogelsburg, Safety Assurance Group AJO-2C1, on June 7, 2007. As Mr. Safe noted, the total for constituents present on this sample exceeded 100%. The error occurred in data entry and unfortunately was missed in our review process.

To verify that the reported fungal spore percentage was correct, the slide was re-analyzed on July 30, 2007. The new analysis re-confirmed that fungal spores composed 5% of the total materials present on the sample, as initially reported. Their order of preponderance was also re-confirmed. The error occurred in the data entry for the level of miscellaneous particulate. The value reported should have been 93%, not 95%. The percentages recorded for all other sample constituents were correct. Most importantly, as stated above, the value originally reported for fungal spores was correct.

Our company apologizes for the mistake in data entry, but be assured that the revised level of particulate on sample 7235-E12 does not impact our overall interpretation of the data or conclusions.

Sincerely,



Michael A. Pinto, CSP, CMP, CEO

Attachments: Revised Biological Surface Sample Results for Sample 7235-E12

**19d**



# BIOLOGICAL SURFACE SAMPLE RESULTS



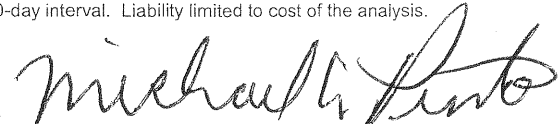
WONDER MAKERS  
ENVIRONMENTAL

Project name: NATCA / DTW  
 Project number: IA06-7235  
 Date sampled: January 22, 2007  
 Revised sample results for 7235-E12

Sample number →	7235-E02	7235-E05	7235-E12	7235-E13	7235-E15
Location or description →	Junction level, south wall, southeast corner	Junction level, west wall	8 <sup>th</sup> level, south wall, southeast corner	8 <sup>th</sup> level, north wall, northwest corner	7 <sup>th</sup> level, north wall, northwest corner
SAMPLE CONSTITUENT	ESTIMATED PERCENTAGE OF SAMPLE				
Particulate-free area	79	54	1	79	<1
Miscellaneous particulate	20	45	93	20	100
Opagues	1	1	1	<1	<1
Fibers	<1	<1	<1	<1	<1
Pollen	<1	<1	<1	BMDL	BMDL
Fungal spores	<1	<1	5	1	<1
	FUNGAL SPORES LISTED IN ORDER OF PREPONDERANCE (percentage of total fungal spores)				
	Cladosporium 53%	Nigrospora 62%	Alternaria 86%	Alternaria 94%	Basidiospore 54%
	Basidiospore 30%	Basidiospore 30%	Cladosporium 8%	Stemphylium 5%	Algal spore 40%
	Hyphae 8%	Hyphae 3%	Hyphae 5%	Basidiospore 1%	Nigrospora 5%
	Epicoccum 5%	Stachybotrys 2%	Basidiospore 1%	Hyphae <1%	Alternaria 1%
	Pithomyces 2%	Alternaria 2%	Ascospore <1%		Cladosporium <1%
	Aspergillus/ Penicillium-like spores 1%	Epicoccum 1%			
	Alternaria 1%				
Notes:					

BMDL = Below method detection limit Samples were analyzed by brightfield light microscopy at 1000x magnification. All samples will be disposed of by Wonder Makers Environmental 90 days from the date of analysis unless otherwise notified by the client within the 90-day interval. Liability limited to cost of the analysis.

Microscopist/Analyst:    
 Steve Dykstra

Reviewed by:   
 Michael A. Pinto, Ph.D., CSP, CMP

**20**

June 13, 2007

Mr. James Burton  
Lockheed Martin Services, Inc.  
400 Virginia Avenue, SW, Suite 500  
Washington, D.C. 20024

**Ref : Purchase Order 7100026924 – Mold Inspection, Detroit Air Traffic Control Tower**

Dear Mr. Burton:

Under the above referenced Purchase Order, Applied Environmental, Inc. conducted a mold inspection within the Detroit Metropolitan Wayne County Airport (DTW) Air Traffic Control Tower (ATCT) located in Detroit, Michigan. The undersigned conducted the inspection. I am a Board Certified Industrial Hygienist (CIH) and a Board Certified Safety Professional (CSP) with over 25 years of applicable industrial hygiene experience, including performing mold and Indoor Air Quality (IAQ) assessments.

### **Background and Scope**

A visual inspection for the presence of mold was performed within the entire ATCT and associated base building. Moisture testing and air and/or surface sampling for viable mold or non-viable (spore) sampling was beyond the scope of this assignment and were therefore not attempted. I was escorted throughout the facility by Mr. Steve McClinchey, DTWB SSC Manager, and Ms. Patricia Bynum, Support Manager, Plans and Programs. Mr. Vince Sugent also accompanied me in his capacity as union representative for the National Air Traffic Controllers Association (NATCA). The assistance of all three of these individuals was very much appreciated. As part of the visual inspection, photography was performed, as needed, to document the relevant conditions at the facility.

The facility is a 12 story tower connected to a 2 story base building with a basement. The basement houses offices, locker rooms, a lunch room, and the Terminal Radar Approach Control (TRACON) facility. A central elevator shaft extends from the basement to the 12<sup>th</sup> floor of the ATCT. Floors 3 to 10 are unoccupied spaces and are not conditioned.

It is my understanding that past water incursion events were documented in the structure and mold contamination was observed in areas of the tower on the 9<sup>th</sup>, 4<sup>th</sup>, and 3<sup>rd</sup> levels and within the elevator shaft itself. Contract work was completed which consisted of sealing and caulking the exterior of the tower to eliminate water incursion. Mold remediation, prompted by past visual inspections, consisted of removing sections of drywall from the 9<sup>th</sup>, 4<sup>th</sup>, and 3<sup>rd</sup> levels. Elevator shaft surfaces were cleaned using a High Efficiency Particulate Air (HEPA) vacuum and wiped with a detergent solution. A review of sampling data, remediation reports, and other documents was beyond the scope of this inspection.

### Findings

In general, no visible mold growth or active sources of water incursion were observed and no unusual odors were noted in any spaces. Several ceiling tiles that had small areas of staining were observed in interior spaces of the ATCT and base building. In all cases, inspection above the ceiling grid revealed that the source of the staining was plumbing valves and joints that were not completely insulated, giving rise to condensation. On several levels of the tower, fireproofing on the ceiling (at an approximate 20-foot height) appeared to be stained. A visual inspection of the elevator shaft (conducted from the top of the elevator cab during the overnight shift) did not reveal evidence of active water incursion nor visible mold growth. Specific observations are provided in the table below and a photographic log is provided as Attachment A.

#### Specific Observations During Site Inspection Detroit Air Traffic Control Tower

Location/Floor	Observations/Comments
Penthouse/Cab Level	No signs of water damage or visible mold growth. No unusual odors detected. A new heating, ventilation and air conditioning (HVAC) unit was recently installed in this space. The unit was indicating 50% relative humidity in the space.
Cab Floor Level	No signs of water damage or visible mold growth. No unusual odors detected. Inspection included opening and inspecting perimeter electrical cabinets under equipment consoles. Suspended ceiling tiles and carpet (squares) showed no visible sign of water damage.
Cable Access Level	No signs of water damage or visible mold growth. No unusual odors detected. The half-floor under the cab has been waterproofed. Inspection of the crawl space exterior wall was performed on this level also.
Junction Level	No signs of visible mold growth or unusual odors detected. In the Air Traffic Break Room (J6) several ceiling tiles were noted that had small areas of staining. Inspection above the ceiling grid revealed that the source of the staining was pipe joints that were not completely insulated, producing condensation. <i>(Please refer to photos 1, 2, and 3 in Attachment A.)</i>
Sub Junction Level	No signs of visible mold growth. No unusual odors detected. In room SJ4 (climate-controlled with radio communication equipment present) there is an area of staining which may be the result of drainage through a hole in the ceiling slab communicating to the floor above. <i>(Please refer to photo 4 in Attachment A.)</i> The mechanical equipment room (SJ7) has a floor drain that is functioning properly to drain condensate from the HVAC unit.

Tenth Level	No signs of water damage or mold growth. No unusual odors detected.
Ninth Level	No signs of remaining water damage or active visible mold growth. No unusual odors detected. On-site contacts reported that remediation in this area was completed in March of 2005 during which drywall was removed and replaced. In some areas, spackling tape was not replaced. <i>(Please refer to photos 5 and 6 in Attachment A.)</i> The corridor area outside of the elevator door was also remediated in a similar manner. <i>(Please refer to photo 7 in Attachment A.)</i>
Eighth Level	No signs of water damage or visible mold growth. No unusual odors detected.
Seventh Level	No signs of active visible mold growth. No unusual odors detected. In one corner of room 728 the fireproofing on the ceiling (at an approximate 20-foot height) appeared to be stained. Mr. Sugent commented that this stained area has been present for some time and has not appeared to change in appearance or size over time. <i>(Please refer to photo 8 in Attachment A.)</i>
Sixth Level	No signs of active visible mold growth. No unusual odors detected. In one corner of room 628 the fireproofing on the ceiling appeared to be stained in a manner similar to room 728 on the 7 <sup>th</sup> level. <i>(Please refer to photo 9 in Attachment A.)</i>
Fifth Level	No signs of active visible mold growth. No unusual odors detected. On one side wall and in one corner of room 528 the fireproofing on the ceiling appeared to be stained (similar to the 6 <sup>th</sup> and 5 <sup>th</sup> level) in two locations. <i>(Please refer to photo 10 in Attachment A.)</i>
Fourth Level	No signs of remaining water damage or active visible mold growth. No unusual odors detected. On-site contacts reported that remediation in this area was completed in March of 2005 (concurrent with the 9 <sup>th</sup> level) during which drywall was removed and replaced <i>(Please refer to photos 11, 12, and 13 in Attachment A.)</i> The corridor area outside of the elevator door was also remediated in a similar manner. <i>(Please refer to photo 14 in Attachment A.)</i>

Third Level	No signs of remaining water damage or active visible mold growth. No unusual odors detected. On-site contacts reported that remediation in this area was completed in January of 2006 during which drywall was removed and replaced ( <i>Please refer to photo 15 in Attachment A.</i> )
Second Level	No signs of visible mold growth. No unusual odors detected. In the Supervisor's office (base building, room 208) a ceiling tile was noted that had a small area of staining. Inspection above the ceiling grid revealed that the source of the staining was pipe joints that were not completely insulated, giving rise to condensation. ( <i>Please refer to photo 17 in Attachment A.</i> ) Site contacts reported past water incursion events in the security office on this level. No active water incursion was observed.
First Level	No signs of water damage or visible mold growth. A slight jet exhaust odor was noted.
Elevator Shaft	An inspection of the elevator shaft was conducted during the overnight shift. The inspection was facilitated by an elevator mechanic locking out the elevator and controlling its movement from the top of the cab. Staining and streaking of drywall (gypsum shaft liner) and concrete surfaces was apparent, most likely as result of past remediation activities involving liquid microbicide products. Inspection (by flashlight) revealed no signs of active water incursion or visible mold growth and no unusual odors were observed. ( <i>Please refer to photos 18, 19, and 20 in Attachment A.</i> ) In some locations within the shaft, what appeared to be residual dust and particulate matter were observed on the walls. In physically inspecting and touching these materials, they had a texture and physical appearance that was not consistent with mold growth and therefore did not appear to actually be mold. Samples of these materials were not collected for laboratory analysis per the scope of the inspection process ( <i>Please refer to photo 21 in Attachment A.</i> )

### Conclusions

At the time of this survey, no visible mold growth or active sources of water incursion were observed in the ATCT and base building. No unusual odors (suggesting damp conditions) were noted in any spaces. Several ceiling tiles, having small areas of staining, were observed in interior spaces. In all of these cases, inspection above the ceiling grid revealed that the source of the staining was plumbing valves and joints giving rise to condensation. On several levels of the tower, fireproofing on the ceiling (at an approximate 20-foot height) appeared to be stained. A visual inspection of the elevator shaft (conducted from the top of the elevator cab during the overnight shift) did not reveal evidence of active water incursion nor visible mold growth.

Mr. James Burton  
June 13, 2007]  
Page 6

### **Recommendations**

Based upon observations made at the Detroit ATCT during this inspection, and consistent with standard practice, Applied Environmental recommends the following:

1. Facility management personnel should remain vigilant for any new cases of water leakage or incursion events and take prompt reactive steps, should they occur, to assess and dry any affected building materials. The document: Guidance for the Management of Mold in FAA Facilities (Environmental and Occupational Safety and Health {EOSH} Services Group, September, 2006) should be consulted for appropriate guidance.
2. Mr. McClinchey noted that prompt action is taken when stained ceiling tiles are discovered. A consistent practice of promptly investigating and correcting the source of the staining, and replacing the ceiling tiles in a timely manner, should be maintained.
3. Consideration should be given to establishing a routine inspection of the elevator shaft (on at least a yearly basis) to assure that water incursion and/or mold growth is not present.

### **Closing**

Applied Environmental, Inc. appreciates this opportunity to be of service to Lockheed Martin and the Federal Aviation Administration. If you have any questions regarding this report, or if you need further assistance, please feel free to contact me directly.

Sincerely,

David P. O'Konski, CIH, CSP  
Principal

**20b**



Review of Letter dated June 13, 2007  
from David P. O’Konski to Mr. James Burton  
Ref: Mold Inspection, Detroit Air Traffic Control Tower

(Items in bold print are direct references from Mr. O’Konski’s letter or attachments)

**...Applied Environmental, Inc. conducted a mold inspection...** (page 1, paragraph 1); **Moisture testing and air and/or surface sampling for viable mold or non-viable (spore) sampling was beyond the scope of this assignment and were therefore not attempted.** (page 1, paragraph 2); **A review of sampling data, remediation reports, and other documents was beyond the scope of this inspection.** (page 1, paragraph 4)

The limitations placed on the inspector by the FAA were so severe that the effort by Applied Environmental could hardly be called a mold inspection. Most professionals conducting investigations related to mold or other biological contaminants utilize a document from the American Conference of Governmental Industrial Hygienists (ACGIH) entitled *Bioaerosols: Assessment and Control* as a key reference for such endeavors. Chapter two of that document details the process for developing an investigation strategy. On page 3-3 the ACGIH guide details the “fundamental steps in an investigation” which start with the recommendation to “gather information”. It then provides further details and encourages the investigator to conduct a health assessment to “determine if symptoms occupants report appear to be building-related...” and a bioaerosol assessment to “determine if the building’s history suggests a potential for a biological problem” prior to conducting a visual inspection. The *Bioaerosol* manual is very clear that all of these activities are important aspects of the investigation as it goes on to state: “Construct plausible hypotheses using the available information about (a) occupant complaints and potential causes, (b) possible sources of biological agents, and (c) the building environment.” As such, limiting the investigator’s ability to gather important information prior to the site assessment severely restricts the value of any subsequent conclusions and recommendations.

Prohibiting the investigator from taking samples further weakened the usefulness of any conclusions made as part of the study. After gathering and reviewing appropriate information the ACGIH guide directs the investigator to collect and analyze “...relevant environmental information” and “... air and source samples for specific biological agents”. This fundamental expectation that a mold investigation should include environmental measurements, such as moisture readings and sampling is also reinforced by the American Industrial Hygiene Association (AIHA). Their *Field Guide for the Determination of Biological Contaminants in Environmental Samples* notes that following a visual inspection:

“If nothing is observed, though unexplained occupant complaints persist, then a program of sampling for biological contaminants is probably justified. Studies of microbial problems in large buildings have shown that perhaps 50% of microbial problems are not visible.”

This well established principle of using a visual assessment as the starting point for a mold investigation rather than the ending point is also supported in the FAA's own documents. The Agency's directive from the Environmental and Occupational Safety and Health Services Group (EOSH) entitled *Guidance for the Management of Mold in FAA Facilities* directs facility managers to continue to investigate for sources of hidden mold if health complaints persist in buildings where no visible fungal growth has been identified (see Appendix J of the FAA document). Denying the Applied Environmental inspector information related to health complaints may explain why he did not recommend additional investigation and sampling even though it is clear that he was familiar with the FAA mold document – having cited it on page six of his letter.

With review of building and occupant data so clearly a part of accepted mold inspection practices, it is disturbing that such an experienced inspector does not provide any rationale in the letter why such severe limitations were imposed on the scope of his work.

In addition, there is no indication in the letter that the inspector was informed that the FAA would be using “the findings and recommendations from the visual assessment...to determine if additional investigation and/or sampling will be conducted in the facility.” (June 6, 2007 letter from Bobby Sturgell to Patrick Forrey, page 3, paragraph 2) For the FAA to limit information and the scope of the project to the point where the inspection that results is so narrow as to be outside the bounds of the industry standard of care for microbial investigations severely compromises the findings. To then use those findings to support a decision to prohibit NATCA from completing invasive testing that could assist the occupants suffering illnesses in the building is unconscionable.

**Mr. Vince Sugent also accompanied me in his capacity as union representative...**  
(page 1, paragraph 2)

Although Mr. Sugent was able to accompany the inspector from Applied Environmental, the inspector had been directed to minimize discussions and was not willing to take or review copies of previous inspection reports, sampling data, or medical information related to the occupants. As such, Mr. Sugent was prohibited from actively participating in the inspection process.

**It is my understanding that past water incursion events were documented in the structure and mold contamination was observed in areas of the tower... Elevator shaft surfaces were cleaned using a High Efficiency Particulate Air (HEPA) vacuum and wiped with a detergent solution.** (page 1, paragraph 4)

While the inspector was not provided with documents, he did have some knowledge of previous conditions and remediation activities in the building. However, it is unclear whether the inspector was provided with drawings of the structure or other information that indicated that the elevator shaft liner is composed of two sheets of paper-faced gypsum board sandwiched together. It is also unclear whether the inspector understood that extensive, active, mold growth was observed on the two visible sides of the shaft liner at numerous locations, or that the visible mold identified on the 9<sup>th</sup>, 4<sup>th</sup> and 3<sup>rd</sup> levels

was primarily in the same locations. These facts are important in understanding the past situation in the building, conducting a valid inspection, and making reasonable recommendations. Had the inspector known these facts, he might have been more critical of the FAA's decisions to:

- "Clean" active mold colonies from porous materials rather than removing the source of the mold as is recommended in all major guidance documents related to fungal contamination
- Restrict him from taking samples from the wall cavities on the 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, and sub-junction levels to determine if the pattern of mold growth was consistent on those levels inside the wall cavity even though it was not yet visible on the storage room side of the walls
- Prohibit NATCA from conducting its own comprehensive inspection of these areas where logic dictates that mold contamination may be present.

**In general, no visible mold growth or active sources of water incursion were observed... Several ceiling tiles that had small areas of staining were observed in interior spaces... On several levels of the tower, fireproofing on the ceiling (at an approximate 20-foot height) appeared to be stained.** (page 3, paragraph 1)

Without testing it is difficult to determine whether porous materials with water stains are supporting fungal growth. Past studies by Wonder Makers Environmental have documented that when samples of water-stained ceiling tiles are collected up to 80% of the samples recover fungal growth structures. (See *Water-Stained Ceiling Tiles May Be More Than An Eyesore: Proper Removal to Protect People and Property Values*; Nov/Dec 2001 Housing Operations Manager magazine) The inspector did no testing of the stained tiles to determine if fungal growth was present. No testing of the water stained fireproofing has ever been conducted or allowed by the FAA to determine whether those areas are a source of fungal contamination.

**A visual inspection of the elevator shaft ...did not reveal evidence of active water incursion nor visible mold growth.** (page 3, paragraph 1)

Later in the report the inspector notes that "**Staining and streaking of drywall (gypsum shaft liner) and concrete surfaces was apparent...**" Many of the photos that the inspector included in the report clearly show this staining. The inspector's conclusion that there were no "active" water leaks is curious since he was not allowed to collect moisture measurements to determine the actual condition of the drywall. Past inspections and sampling data make it clear that at least some of the water that was supporting mold growth was likely a result of condensation on uninsulated structural metal components inside the wall cavity between the drywall and elevator shaft liner. A visual inspection alone would not be adequate for the inspector to determine if this type of moisture incursion was still occurring.

**Junction Level. No signs of physical mold growth or unusual odors detected. In the Air Traffic Break Room (J6) several ceiling tiles were noted that had small areas of staining.** (page 3, table row 5)

Again, additional information could have helped the inspector interpret his findings correctly. Pipe leaks and condensation in the break room have been a long term problem. Past sampling of the impacted ceiling tiles have recovered *Stachybotrys* and other fungal contaminants growing on the water-damaged ceiling tiles in this area. Having such background information may have resulted in a recommendation other than: **“A consistent practice of promptly investigating and correcting the source of the staining, and replacing the ceiling tiles in a timely manner, should be maintained.”** (page 6, recommendation 2).

**Sub Junction Level. ...there is an area of staining which may be the result of drainage through a hole in the ceiling slab communicating to the floor above.** (page 3, table row 6)

The inspector makes no recommendation to further investigate this problem or determine if the stained material is supporting fungal growth even though the discoloration is on the porous material.

**Ninth Level. On-site contacts reported that remediation in this area was completed in March of 2005 during which drywall was removed and replaced.** (page 4, table row 2)

Although remediation of the mold contaminated drywall was conducted, the remediation process did not remove the visible mold growth on the elevator shaft liner that was discovered inside the wall cavity. As such, enclosing the walls with drywall has served to hide a known source of fungal contamination. There is no indication that the inspector removed drywall sections, even those sections where **“spackling tape was not replaced”** in order to conduct a thorough visual inspection of past problem areas. Failure to investigate the conditions inside the wall cavity is especially troublesome given that the unfinished drywall is not an airtight barrier that would minimize potential for contamination spreading from the wall cavity if mold sources are still present. These same concerns regarding the inspector's decision to not evaluate the wall cavity are also appropriate for his review of the 4<sup>th</sup> and 3<sup>rd</sup> floors.

**Fifth Level. On one side wall and in one corner of room 528 the fireproofing on the ceiling appeared to be stained (similar to the 6<sup>th</sup> and 5<sup>th</sup> level) in two locations.** (page 4, table row 6)

Given the context of the information, it is clear that the inspector's parenthetical comment should relate to the 7<sup>th</sup> and 6<sup>th</sup> floors rather than the 6<sup>th</sup> and 5<sup>th</sup> floors. More importantly, the inspector recognizes the pattern of water infiltration following gravitational forces down from floor to floor as it relates to the stained fireproofing. Even so, there is no mention in the report that a similar problem could have resulted in the mold being visible on the drywall in the 9<sup>th</sup>, 4<sup>th</sup> and 3<sup>rd</sup> floors and suggesting that the wall cavities on the intervening floors be checked for possible contamination.

**Elevator Shaft. Staining and streaking of drywall (gypsum shaft liner) and concrete surfaces was apparent, most likely as a result of past remediation activities involving liquid microbicide products.** (page 5, table row 4)

The assumption that the staining and streaking was a result of the remediation efforts rather than an indication of past water intrusion is inconsistent with the evidence. Significant corrosion of the metal brackets that hold the shaft wall liner panels in place is visible in photo 21 of the report. This and many other visual clues provide clear support for the contention that the shaft liner panels had been impacted by moisture sources beyond those that were intentionally applied during the two attempts at remediation of the elevator shaft.

**Elevator Shaft. Inspection (by flashlight) revealed no signs of active water incursion or visible mold growth...** (page 5, table row 4)

The inspector again acknowledges that the process was limited to a visual review even though many moisture meters are as simple to operate as a flashlight.

**Elevator Shaft. In some locations within the shaft, what appeared to be residual dust and particulate matter were observed on the walls. In physically inspecting and touching these materials, they had a texture and physical appearance that was not consistent with mold growth and therefore did not appear to actually be mold. Samples of these materials were not collected for laboratory analysis per the scope of the inspection process.** (page 5, table row 4)

Although the dust observed during the evaluation of the elevator shaft did not appear to be mold growth, the absence of sampling prevented the inspector from determining whether it included an amount or type of fungal spores that would indicate airborne deposition from hidden sources. This is a serious limitation given the fact that in a previous investigation *Stachybotrys* spores were recovered from three of ten microvacuum samples collected from the elevator shaft liner. The presence of this fungal material points toward the elevator shaft liner as a source of contamination for the building and clearly illustrates the inadequacy of using visual inspections as the sole criteria for determining whether dust in the elevator shaft is a concern.

**At the time of the survey, no visible mold growth or active sources of water incursion were observed in the ATCT and base building.** (page 5, Conclusions paragraph)

As noted previously, the inspection was limited to a visual survey. The FAA then used the visual survey results to justify their denial of invasive sampling to determine if mold was present in hidden areas of the building – the very areas that could not be reviewed during the visual survey. The illogic of this process defies justification.

**Based upon observations made at the Detroit ATCT during this inspection, and consistent with standard practice,...** (page 6, paragraph 1)

Although the inspector cites standard practices as a basis for his recommendations and references the FAA's mold guidance document in his first item, the recommendations are notable for what they did *not* advise. As detailed in the first section of this response, the continuing health problems of the occupants that are experienced when they are in the structure should be the driving factor for any mold investigation. Such investigations should follow industry accepted practices—particularly the collection and review of available data to put visual observations into a proper context and the use of a well designed sampling strategy to address logical hypotheses. That the inspector did not recommend such a plan is not consistent with either the industry standard of care or the Agency's own guidance documents.

NATCA has presented a substantial body of evidence indicating that significant mold contamination may be present between the layers of the elevator shaft liner and in the wall cavities on floors other than those that have been remediated. The union has offered a reasonable sampling plan that incorporates a greater level of engineering controls than those utilized by the Agency during previous inspections conducted by FAA contractors. In denying the sampling the Agency has relied on an inspection that was specifically limited to visual observations—the very limitations that the proposed invasive sampling is designed to overcome.

Prepared based on 6/08  
assessment. Diane Morse  
developed Engineering  
Package. Project  
awarded.

**STATEMENT OF WORK**  
**MICROBIOLOGICAL REMEDIATION**  
**FOR**  
**FEDERAL AVIATION ADMINISTRATION**  
**DETROIT METROPOLITAN WAYNE COUNTY**  
**AIRPORT TRAFFIC CONTROL TOWER (DTW ATCT)**  
**DETROIT, MICHIGAN**

Note: The north  
wall in Room D28  
will be removed  
rather than  
cleared.

**1.0 WORK SUMMARY.** The Contractor is required to furnish all labor, materials, services, equipment, insurance, and perform all the work to remove and dispose of all microbiological contaminated materials (MCM) and microbiological contaminated elements (MCE) described in this Statement of Work (SOW). The Contractor shall be responsible for the cleanup and removal of moisture and microbiological contaminated gypsum board, shaft liner, and insulation in the DTW ATCT Rooms 928, 527, 527A, and 428 in accordance with the guidelines established by the New York City Department of Health entitled *Guidelines on Assessment and Remediation of Fungi in Indoor Environments* (GARFIE) attached and incorporated herein by reference (See Attachment 1). Included in the scope of work is the removal of any MCM between the bottom metal runner/track and the concrete floor; between the top metal runner/track and the structural deck; and between the metal stud and exterior concrete wall. The Contractor shall minimize dust generation and use the methodologies outlined in GARFIE for dust prevention and suppression. Prior to performing microbiological remediation procedures, the Contractor shall seal all critical penetrations and openings to the work area with a minimum of two layers of 6-mil polyethylene, and shall be responsible for ensuring adjoining areas are not exposed to the microbiological contamination during the remediation. The Contractor shall provide additional cleaning procedures and pipe insulation removal/replacement as described herein in Rooms 1028, 927, 829, 827, 728, 727, 727A, 628, 627, 529, 527, 427, 328, and 327. A complete list of the work required is included in Section 7.0 Work Procedure and the Supplemental Statement of Work (SSOW). All removals and other cleaning procedures shall be conducted at night between the hours of 6:00 PM and 6:00 AM. Negative air pressure equipment shall be equipped with a HEPA filter and discharged outside of the building whenever possible, otherwise discharged through a second HEPA filter in order to permit recirculation of air inside the building. See the SSOW for additional work required to perform the remediation work and to restore the facility.

**1.1. CONTRACTOR'S RESPONSIBILITY.** The Contractor shall perform all work required to give a complete and satisfactory job as required by this Statement of Work. The Contractor shall be responsible for performing this work in accordance with GARFIE. The Contractor shall perform the work per the schedule and sequence identified in the SSOW. The Contractor shall be responsible for all

permitted to use the areas as directed by the Government for staging and storage of materials. The area is restricted to uncontaminated work equipment and supplies. The area shall be left clean and restored to the same condition as when accepted by the Contractor.

**1.4. SUBMITTAL REQUIREMENTS.** The Contractor shall submit the following additional documents prior to starting work.

- Material Safety Data Sheets for all chemical products.
- Respiratory Fit Test and Medical Surveillance for employees scheduled for this project.
- Negative Air HEPA Filtration Equipment Specification Sheet
- Proposed Phasing Schedule.

**2.0 MEDICAL REQUIREMENTS.** Contractor shall provide medical surveillance and have a written Respiratory Protection program in place as required by OSHA 29 CFR 1910.134 for all personnel engaged in the removal and demolition of MCM and MCE. Respirators and filters provided shall be NIOSH approved and provide the appropriate level of protection.

**3.0 PROTECTIVE CLOTHING.** Contractor shall provide workers and government representatives with sufficient sets of protective full body clothing. Such clothing shall consist of full body coveralls including head covers, foot covers and hand covers. Contractor shall provide additional personal protection safety equipment as required by applicable OSHA safety regulations. Contractor shall ensure that all employees who will conduct mold remediation activities are provided with, fit tested for, and trained in the correct use of personal protection equipment.

**4.0 REMEDIATION AREA.** Contractor shall establish a remediation area and restrict the access to the microbiological work areas during work conducted in the ATCT. Contractor shall establish a roped-off perimeter and provide warning barrier tape and signs outside the perimeter of the negative pressure enclosure system. Contractor shall establish a negative pressure enclosure system by sealing all critical penetrations or openings to the work area with a minimum of two layers of six-mil polyethylene. Negative pressure enclosures shall have a minimum of four air exchanges per hour and shall be maintained and recorded with a magnehelic guage or equivalent device under a minimum negative pressure differential of -0.02 inches of water relative to adjacent non-work area space. Negative air pressure equipment shall be equipped with a HEPA filter and exhaust shall be discharged outside the building, a minimum of 25 feet from building access points and building make-up air sources, or wherever necessary, negative air pressure equipment shall be equipped with a HEPA filter and exhaust shall be discharged through a second HEPA filter in order to permit recirculation of air inside the building. Personnel shall wear and utilize protective clothing and equipment in the remediation area as specified herein.

**5.0 DECONTAMINATION AREA.** Contractor shall establish a decontamination unit for passage to and from the work area during remediation operations in order to minimize the leakage of mold-contaminated dust to the outside. This unit shall consist of a minimum of



- 7.4. The walls undergoing remediation are fire rated partitions and have multiple layers of fire resistant gypsum board on each face unless otherwise indicated. Removal limits shall coincide with existing metal studs at or beyond the limits identified below. Joints between gypsum board on the surface and concealed layer shall be staggered horizontally and vertically and less than the length of gypsum board utilized. Demolition work shall be conducted utilizing methods to minimize noise and the spread of dust, such as the use of HEPA vacuums at the point of cutting and/or tools with shrouds or boots connected to a HEPA vacuum. See SSOW for additional requirements. The locations and approximate quantities for gypsum board remediation are listed below:

Gypsum board, shaft liner, and insulation totaling approximately 311 square feet will be removed from Room 928. This area includes the east (elevator shaft) wall, 8' wide to a height of 5' (surface layer), 8' wide to a height of 4'6" (concealed layer), and 8' wide to a height of 4' (shaft liner). This area includes the south (elevator shaft) wall, 10' wide to a height of 5' (surface layer), 10' wide to a height of 4'6" (concealed layer), and 10' wide to a height of 4' (shaft liner). This area includes the northwest column beam enclosure, on the north wall, 6' wide to a height of 3' (surface layer), 6' wide to a height of 2'6" (concealed layer), and 6' wide to a height of 2' (shaft liner); and on the west wall, 3' wide to a height of 3' (surface layer), 3' wide to a height of 2'6" (concealed layer), and 3' wide to a height of 2' (shaft liner). While these areas contain minimal mold contamination, it is present on multiple layers; therefore, the removal of additional quantities of gypsum board is required.

Gypsum board and insulation totaling approximately 15 square feet will be removed from Room 527. This area includes the portion of the north wall, between the east wall and the door to Room 527A, 2' wide to a height of 4' (surface layer) and 2' wide to a height of 3'6" (concealed layer).

Gypsum board and insulation totaling approximately 5 square feet will be removed from Room 527A. This area includes the portion of the south wall, between the east wall and the door to Room 527, 2' wide to a height of 18" (surface layer) and 2' wide to a height of 12" (concealed layer).

Gypsum board, shaft liner, and insulation totaling approximately 243 square feet will be removed from Room 428. This area includes the east (elevator shaft) wall, 8' wide to a height of 5' (surface layer), 8' wide to a height of 4'6" (concealed layer), and 8' wide to a height of 4' (shaft liner). This area includes the south (elevator shaft) wall, 10' wide to a height of 5' (surface layer), 10' wide to a height of 4'6" (concealed layer), and 10' wide to a height of 4' (shaft liner). While these areas contain minimal mold contamination, it is found on the inner layer; therefore, the removal of additional quantities of gypsum board is required.

contaminated chilled and heating water pipe insulation shall be removed and replaced.

7.16. Place MCM and MCE in a fiber/cardboard type drum or two layers of 6-mil polyethylene disposal bags with contents clearly labeled. At completion of each phase, notify the Government of completion so that Government can perform a visual inspection of the work area. Allow negative pressure system to operate a minimum of two hours after the last clean-up effort.


7.17. Upon approval of Government, remove barriers and disassemble regulated work area. Additional cleaning required in the work area because of the Government inspection shall be performed by Contractor, at no additional cost to the Government.

**8.0 AIR MONITORING AND INSPECTION.** The Government-retained Industrial Hygienist will determine any requirement for air monitoring, both during the remediation process and/or upon completion of the remediation process. Such area sampling will be conducted using Zefon filters and a high volume sampling pump. Procedural modifications to the decontamination procedures may be necessary at the discretion of the Government-retained Industrial Hygienist. The Government has the right to inspect the remediation work at times to be determined by the Government, but, at a minimum, once upon completed removal of contaminated materials, but before restoration materials are installed.

**9.0 FINAL CLEARANCE.** Acceptance of work will be dependant upon visual inspection. In areas where the gypsum board removal quantity exceeds 100 square feet, clearance air sampling shall also be conducted. The Contractor shall notify the Government when the microbiological removal is completed for each phase and the Government-retained Industrial Hygienist shall perform a thorough visual inspection of the phase within 24-hours. Clearance air sampling shall be conducted in Rooms 928 and 428. Clearance criteria shall be dependent upon the requirements stipulated in the DTW ATCT Mold Remediation Project Clearance Protocol attached and incorporated herein (See Attachment 2). All remaining rooms shall be cleared solely by visual examination.

**10.0 DISPOSAL.** All microbiological waste shall be disposed of at a municipal sanitary landfill. Waste bags shall not be overloaded and shall be securely sealed and stored in the designated area until disposal. Label bags, disposal containers, and truck during loading and unloading, in accordance with Federal, State and Local regulations. Contractor is responsible for removal of all materials from the Government's property.

**20c**



WONDER MAKERS  
ENVIRONMENTAL

June 23, 2009

Mr. Vince Sugent  
7768 Pleasant Lane  
Ypsilanti, MI 48197

RE: Review of the Statement of Work, Microbiological Remediation for Federal Aviation Administration, Detroit Metropolitan Wayne County, Airport Traffic Control Tower (DTW ATCT), Detroit, Michigan, WM project GC09-8593

Dear Vince:

Following the review of the Statement of Work, Microbiological Remediation for Federal Aviation Administration, Detroit Metropolitan Wayne County, Airport Traffic Control Tower (DTW ATCT), Detroit, Michigan, two glaring deficiencies are evident with the document. The first deficiency is the lack of contingencies in the specifications for dealing with the discovery of additional hidden mold during the mold remediation effort. The second deficiency is the exclusive use of the New York City Department of Health document entitled *Guidelines on Assessment and Remediation of Fungi in Indoor Environments* (GARFIE) for the development of the mold remediation specifications.

Concerning the first deficiency, the existence and quantity of hidden mold within the DTW ATCT has been a continuing unresolved issue. The possibility of uncovering hidden mold during remediation is not accounted for within these DTW ATCT microbiological remediation specifications. Mold remediation specifications for work in the tower should include guidelines and contingencies for dealing with the discovery of hidden mold during remediation. This hidden mold could add dramatically to the scope of work for the project. It is generally accepted within the mold remediation industry that remediation of mold-contaminated drywall should continue until the drywall is contamination free two stud bays past areas of visible mold contamination.

Prior to the development of mold remediation specifications, a comprehensive indoor air quality (IAQ) and water intrusion investigation by qualified individuals should have been conducted. The information from these types of investigations is crucial in developing accurate mold remediation specifications for the DTW ATCT.

Concerning the second deficiency, the use of only one of numerous documents that make up the mold remediation standard of care in the generation of mold remediation specifications is a narrow approach to mold remediation that can lead to problems such as an expanded scope of work and/or a lack of contingencies for dealing with hidden mold. Seven of the eleven reference documents that make up what is generally referred to as the

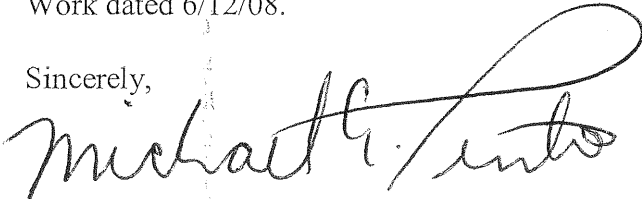
mold remediation industry standard of care state that hidden fungal growth should be considered when determining the scope of work for a project. Those seven reference documents include:

- Texas Mold Assessment and Remediation Rules (25 TAC Sections 295.301-295.338)
- Wonder Makers Environmental, *Fungal Contamination: A Comprehensive Guide for Remediation*
- Occupational Safety & Health Administration (OSHA), *A Brief Guide to Mold in the Workplace*
- American Conference of Governmental Industrial Hygienists, *Field Guide for the Determination of Biological Contaminants in Environmental Samples*
- The Institute of Inspection Cleaning and Restoration Certification (IICRC), *S520 Standard and Reference Guide for Professional Mold Remediation*
- American Industrial Hygiene Association, *Report of Microbial Growth Task Force*
- Environmental Protection Agency, *Mold Remediation in Schools and Commercial Buildings*

It seems these documents were ignored as references during the development of the mold remediation specifications for the DTW ATCT. Because of this, the discovery of hidden mold during remediation could unexpectedly add significantly to the scope of work for the project and to the level of engineering controls needed to conduct the remediation without contaminating other areas within the ATCT.

From this brief analysis it is clear that a more comprehensive approach is needed to the development of mold remediation specifications for the DTW ATCT than was used during the development of the DTW ATCT Microbiological Remediation Statement of Work dated 6/12/08.

Sincerely,



Michael A. Pinto, CSP, CMP  
CEO

**21**

ATTACHMENT 2

DTW ATCT MOLD REMEDIATION PROJECT CLEARANCE PROTOCOL

# Mold Remediation Project Clearance Protocol

PREPARED FOR:

**FEDERAL AVIATION ADMINISTRATION**

**Detroit Metropolitan Wayne County  
Airport Traffic Control Tower  
(DTW ATCT)**

**DETROIT, MICHIGAN**

June 13, 2008



PREPARED BY:

Barbara Hebert, CIH  
NISC, KANSAS CITY ARTCC DISTRICT TSU



The DTW ATCT Mold Remediation and Restoration Project will include the removal of moisture and microbiological-contaminated gypsum board, shaft liner, and insulation.

After Rooms 928 and 428 have passed a thorough visual inspection, and before the outer containment barrier is removed, clearance air sampling will be performed.

Five consecutive samples will be collected inside the containment area using a high volume air sampler and Zefon Air-O-Cell® cassettes. Sampling will be conducted at a flow rate of 15 liters per minute for a period of five minutes each, resulting in a collection volume of 75 liters of air. Environmental conditions may warrant the sample collection period to be reduced to one-minute intervals, in order to reduce the collection of non-microbial particulates that can mask the presence of mold spores.

Three consecutive samples will be collected outside the containment area, but inside the ATCT in a noncomplaint area, in the same manner as above. Sampling will be conducted at a flow rate of 15 liters per minute for a period of five minutes each, resulting in a collection volume of 75 liters of air.

Three consecutive samples will be collected outside of the building, in the same manner as above. Sampling will be conducted at a flow rate of 15 liters per minute for a period of 10 minutes each, resulting in a collection volume of 150 liters of air.

For all samples collected, the high volume air sampler will be calibrated before and after use.

All samples, one lab blank, and a completed Chain of Custody form will be sent to Aerotech Laboratories, Inc., by Federal Express Priority Overnight delivery. The samples will be mailed in a rigid container or box. There is no additional temperature handling requirement.

All samples will be clearly labeled. The sample identification number appearing on the cassette **must** match the identification number shown on the Chain of Custody form. The samples will be analyzed in accordance with Aerotech Method A001 (equivalent to the cassette manufacturer's recommended analytical procedure) via light microscopy at 600X magnification, with the entire slide (100% of the sample) being analyzed. The results will be reported as a total fungal spore count, in counts per cubic meter (counts/M<sup>3</sup>), which includes both viable and non-viable spores.

The area will be considered "clean" when the average airborne total mold spore concentration measured inside the containment area was not statistically higher than the average airborne concentration measured outside the containment area, **and** the **genus level** constituents similar for all samples taken inside the containment, inside the building (but outside of the containment) and outside of the building.

Statistical significance may be determined in the following manner:

A. All containment sample airborne total concentration levels are lower than those taken from outside the containment, or

B. The Z-test score is less than or equal to 1.65 Standard Deviations from the Mean, indicating a 90% confidence interval. The Z-test is carried out by calculating:

$$Z = \frac{Y_I - Y_O}{0.8 (1/n_I + 1/n_O)^{1/2}}$$

where  $Y_I$  is the average of the natural logarithms of the inside samples,  $Y_O$  is the average of the natural logarithms of the outside samples,  $n_I$  is the number of inside samples and  $n_O$  is the number of outside samples.

Alternative A shall be considered first, then if necessary, Alternative B. Should the calculated Z-test score exceed 1.65, the abatement area must be recleaned. An additional set of 10 samples must then be collected, as defined above, in order to establish clearance.

The **genus level** constituents will be evaluated using the Spearman Rank Order Correlation (SROC), which is a statistical technique used to test the direction and strength of the relationship between two variables. It uses the statistic "Rs", which falls between -1 and +1. If the "Rs" value is -1, there is a perfect negative correlation; between -1 and -0.5, there is a strong negative correlation; between -0.5 and 0, there is a weak negative correlation; if 0, there is no correlation; between 0 and 0.5, there is a weak positive correlation; between 0.5 and 1, there is a strong positive correlation; and if 1, there is a perfect positive correlation. Calculated "Rs" values will also be compared to the Critical Values (CV) listed in Table 13.7 of the American Conference of Governmental Industrial Hygienists "Bioaerosols: Assessment and Control", which are drawn from a standard statistical table. Comparing the "Rs" value to the CV permits a methodical acceptance or rejection. If the "Rs" value exceeds the 0.1 confidence level, the populations appear to be related or similar. If the "Rs" value is below the 0.1 confidence level, the populations do not appear to be related or are different. Should the "Rs" value be below the 0.1 confidence level, the remediation area must be recleaned unless a professional opinion can justify rank differences to be insignificant.

Once the abatement area has passed the clearance criteria, the outer containment barrier will be removed and the room will be available for restoration.

Visual inspections and clearance air sampling will be performed upon completion of the mold remediation, but prior to the re-installation of new building materials.

The visual inspection, clearance air sampling, and data interpretation will be conducted by the government-retained Industrial Hygienist.

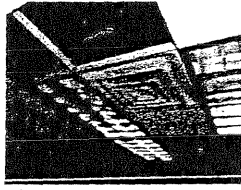
**22**



AUS LD High Activity Design



AUS-ATCT-A05-01



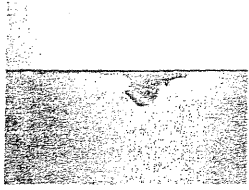
b Junction Level Ceiling Tiles Removed due to Wat...



c Dehumidifier in Junction Break Room setting on Re...



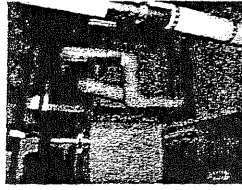
d Dead bats on same level may be source of some of...



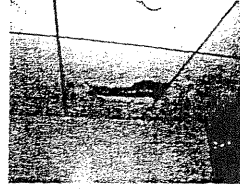
e Equip Level paint damage apparent water running do...



f more paint damage and the only visible black spots on...



g catch trays below condensate lines on equip...



h lower floor have been extensively finished out wit...

**22b**



WONDER MAKERS  
ENVIRONMENTAL

June 23, 2009

Mr. Vince Sugent  
7768 Pleasant Lane  
Ypsilanti, MI 48197

RE: Review of Photographs from Austin, Texas, AUS ATCT  
Wonder Makers Environmental Project GC09-8593

Dear Vince:

Part of the information received from the FAA in response to the information request you made through the Office of Special Counsel was a set of photographs with descriptions related to the Austin, Texas, tower. The document is a photocopy of a partial page with very small (*i.e.*, 1" x 1.25") photographs and partial captions.

It is not clear why this page of photos was included with the information provided to the Office of Special Counsel. These photographs are different than the ones that were supplied as part of the inspection report for the Austin tower that was completed by Applied Environmental in 2008.

Although the copies of the photographs are of very poor quality, several of the photographs and photograph descriptions allow for the identification of numerous potential hazards within the AUS ATCT. It is also important to note that many of these hazards were not identified in the inspection report compiled by Applied Environmental. While that may indicate that the hazards were remediated prior to the inspection by Applied, it may also indicate that the focus of the Applied Environmental inspection was so narrow that they did not address these significant concerns.

Of the nine images and captions we can offer comments on six of them. The partial caption is shown in bold type with our comments in italics.

- **b Junction Level Ceiling Tiles Removed due to Wat...**

*This photograph shows what appears to be suspended ceiling tile grid work, an HVAC supply diffuser suspended in the ceiling tile grid work, and areas of the ceiling tile grid work with nothing suspended from it. From the photograph description it seems the missing ceiling tiles were removed due to water damage. A water intrusion or water leak problem with subsequent fungal growth was confirmed on this level in the Applied Environmental report.*

- **c Dehumidifier in Junction Break Room setting on Re...**

*This photograph shows what appears to be the inside of a room with windows along the left side of the photograph. Apparently it is the Junction Break Room. The photo description states there is a dehumidifier in this room, which is an indication of excessive moisture levels in this room. While dehumidification is an appropriate interim step, it is necessary to identify and correct the moisture source to prevent ongoing mold contamination problems.*

- **d Dead bats on same level may be source of some of...**

*This photograph shows what appears to be a dead bat. Based on this photograph description and the previous one, this dead bat was observed on the junction level of the AUS ATCT. The observation of a dead bat within the AUS ATCT brings with it the possibility of numerous hazards within the ATCT associated with bats. These would include the following:*

- *The possibility of an AUS ATCT occupant being bitten by a bat and contracting rabies.*
- *The possibility that other vermin could enter the AUS ATCT the same way the bat entered.*
- *The possibility of AUS ATCT personnel contracting other diseases associated with the presence of wild animals in the AUS ATCT such as those related to exposure to bat guano or decomposing animal carcasses.*
- *If there are voids in the AUS ATCT building envelope large enough for bats to enter, moisture intrusion could undoubtedly enter through those voids.*

- **e Equip Level paint damage apparent water running do...**

- **f more paint damage and the only visible black spots on...**

*From these photo descriptions these are photographs of paint damage due to water intrusion into the AUS ATCT or some type of leaking water or condensation within the AUS ATCT. Such events may lead to water-damaged building materials which could result in mold-contaminated building materials.*

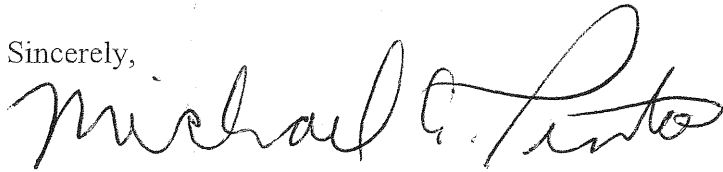
- **g catch trays below condensate lines on equip...**

*This photograph appears to show insulated piping in the AUS ATCT. From the photograph description there are catch trays below condensate lines. It would seem the catch trays were positioned below the condensate lines in an attempt to capture moisture from leaking or condensation forming on the lines due to an improper mechanical insulation seal.*

Even from partial descriptions and illegible photographs, it is clear that there are a number of issues that need to be addressed at the Austin tower, including breaches of the exterior shell large enough to allow both water and animals to enter, plumbing systems that need additional insulation or repair, and damaged paint that should be checked for lead contamination. In a broader sense, these photographs confirm that the FAA's activities do not live up to its plan of addressing water intrusion incidents promptly. You

have experienced that for many years at Detroit, and now these documents confirm that the problems may be system-wide.

Sincerely,

A handwritten signature in black ink, reading "Michael A. Pinto". The signature is written in a cursive style with a large, prominent initial "M".

Michael A. Pinto, CSP, CMP  
CEO



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# **Kansas City, Missouri Airport Traffic Control Tower (MCI ATCT)**

## **Mold Evaluation**

**Completed: June 19 – September 1, 2006**

### **Tables:**

Table 1: Summary of Tape Lift Sampling Results

Table 2: Summary of Bulk Sampling Results

### **Attachments:**

1 - Aerotech Laboratories Total Fungal Spore Tape Reports

2 - Aerotech Laboratories Total Fungal Spore Bulk Sample Reports

## Introduction/Background

As identified in Standard OPS Requirement Number 0682MH572, most unoccupied areas of the MCI ATCT are unconditioned spaces and as a result, condensation or frost forms on the exterior walls at certain times of the year. This source of water was one of the contributing factors to the wetting of building materials that led to the growth of mold.

In recent months, mold has been discovered on the Sub Junction Level due to a clogged floor drain under the raised access from when water is pumped from a humidifier in the Sub Junction Equipment Room. Significant amounts of water were found under the raised floor and leaking onto the 11<sup>th</sup> and 10<sup>th</sup> Floors below and the exterior walls of the elevator shaft, as a result of the clogged floor drain. Since the walls on all of these levels are fire-rated partitions, it is likely that mold growth could be occurring on the concealed layers of the gypsum board, and a thorough and destructive investigation was needed to determine all areas of accumulated mold and potential problem areas conducive for mold growth.

During the course of the evaluation, once identified, mold quantities were estimated for future remediation. This report reflects sampling data collected from suspect materials uncovered during the investigation.

# Fungal (mold) Spore Testing

## *Sampling Procedures*

Tape lift samples were collected by direct contact using Scotchbrand® gloss finish transparent tape. Sampling was conducted under the **Cab Level** on August 15, August 24, and September 1; on the **Junction Level** on July 20 and September 1; between the **Junction** and **Sub Junction Levels** on August 24 and September 1; on the **Sub Junction Level** on June 20, June 21, July 13, and July 20; on **Level 11** on July 12, July 20, July 28, and September 1; on **Level 10** on July 11 and September 1; on **Level 6** on September 1; on **Level 4** on July 13; on **Level 3** on June 22, July 13, July 20, and July 28; and on **Ground Level** on September 1. Analysis was completed by Aerotech Laboratories, Inc.

Bulk samples were collected from drilled sheetrock paper sections or cored using Wonder Maker Environmental, Inc.® cutter sleeves. Sampling was conducted on the **Sub Junction Level** on June 20, June 21, and June 22; on **Level 11** on June 22; on **Level 10** on June 22, July 11, and July 20; on **Level 8** on July 20; on **Level 7** on July 12, July 20, and July 28; on **Level 6** on July 20; on **Level 5** on July 28; and on **Level 4** on July 28. Analysis was additionally completed by Aerotech Laboratories, Inc.

## *Results/Recommendations*

The tape lift samples collected under the Cab Level contained mold spores at a concentration level ranging from 15 to 107 counts/cm<sup>2</sup>. *Ascospores* (31 counts/cm<sup>2</sup>) were detected on the west wall, adjacent to the CA2 sign. No mycelial fragments, the actively growing assimilative phase of mold, were detected. *Ascospores* (31 counts/cm<sup>2</sup>) were detected on the east wall, south of the return air vent. No mycelial fragments were detected. *Alternaria* (15 counts/cm<sup>2</sup>) was detected on the stair stringer. Mycelial fragments represented 100% (15 out of 15) of the total concentration detected. After a detergent cleaning, *Basidiospores* (31 counts/cm<sup>2</sup>) were detected in the same area. No mycelial fragments were detected. *Alternaria* (31 counts/cm<sup>2</sup>), *Ascospores* (46 counts/cm<sup>2</sup>), *Pithomyces* (15 counts/cm<sup>2</sup>), and *Smuts* (15 counts/cm<sup>2</sup>) were detected on the west side and middle of the west stair wall. No mycelial fragments were detected. After a detergent cleaning, *Ascospores* (15 counts/cm<sup>2</sup>) were detected on the middle of the west stair wall. No mycelial fragments were detected. *Alternaria* (15 counts/cm<sup>2</sup>) was detected on the door entrance south stair stringer. No mycelial fragments were detected. HEPA-vacuuming, followed by biocide cleaning measures, will be required in the areas represented by these sample locations.

The tape lift samples collected on the Junction Level contained mold spores at a concentration level ranging from 893 to 1201 counts/cm<sup>2</sup>. *Alternaria* (31 counts/cm<sup>2</sup>), *Ascospores* (15 counts/cm<sup>2</sup>), *Aspergillus* (662 counts/cm<sup>2</sup>), *Basidiospores* (31 counts/cm<sup>2</sup>), *Cladosporium* (92 counts/cm<sup>2</sup>), *Epicoccum* (15 counts/cm<sup>2</sup>), *Pithomyces* (15 counts/cm<sup>2</sup>), and *Smuts* (31 counts/cm<sup>2</sup>) were detected above the elevator door. Mycelial fragments represented only 7% (62 out of 893) of the total concentration detected. It is, however, important to note that this sample location represents an occupied area and

*Aspergillus* is the key component reported. Fungal disease organisms associated with environmental sources include species of *Aspergillus*, *Penicillium*, *Fusarium*, and *Stachybotrys*. Recent research has implicated many toxin-producing fungi such as these to indoor air quality problems and building-related illnesses. A number of potted plants were observed in the area. Potting soil can contain active microbes including bacteria and molds such as *Aspergillus*, therefore, may be a contributing factor to the elevated count reported. *Alternaria* (108 counts/cm<sup>2</sup>), *Ascospores* (92 counts/cm<sup>2</sup>), *Basidiospores* (31 counts/cm<sup>2</sup>), *Cladosporium* (755 counts/cm<sup>2</sup>), *Nigrospora* (31 counts/cm<sup>2</sup>), *Pithomyces* (15 counts/cm<sup>2</sup>), *Smuts* (15 counts/cm<sup>2</sup>), and *Stachybotrys* (154 counts/cm<sup>2</sup>) were detected on the top of the stairs on the top of the stair stringer. Mycelial fragments represented 5% (62 out of 1201) of the total concentration detected. Biocide cleaning measures will be required in the areas represented by these sample locations.

The tape lift samples collected between the Junction and Sub Junction Levels contained mold spores at a concentration level ranging from 46 to 2171 counts/cm<sup>2</sup>. *Alternaria* (262 counts/cm<sup>2</sup>), *Aspergillus* (108 counts/cm<sup>2</sup>), *Basidiospores* (108 counts/cm<sup>2</sup>), *Bipolaris* (46 counts/cm<sup>2</sup>), *Cladosporium* (1140 counts/cm<sup>2</sup>), *Epicoccum* (108 counts/cm<sup>2</sup>), *Nigrospora* (15 counts/cm<sup>2</sup>), *Smuts* (293 counts/cm<sup>2</sup>), and *Stachybotrys* (92 counts/cm<sup>2</sup>) were detected on the gypsum wallboard cover between the stairs. Mycelial fragments represented 3% (62 out of 2171) of the total concentration detected. *Alternaria* (123 counts/cm<sup>2</sup>), *Ascospores* (31 counts/cm<sup>2</sup>), *Basidiospores* (31 counts/cm<sup>2</sup>), *Cladosporium* (108 counts/cm<sup>2</sup>), *Epicoccum* (62 counts/cm<sup>2</sup>), *Nigrospora* (15 counts/cm<sup>2</sup>), and *Smuts* (31 counts/cm<sup>2</sup>) were detected on the horizontal aluminum ledge of the window. Mycelial fragments represented 8% (31 out of 400) of the total concentration detected. *Ascospores* (31 counts/cm<sup>2</sup>) and *Epicoccum* (15 counts/cm<sup>2</sup>) were detected on the vertical aluminum ledge of the window on a water-stained patch. Mycelial fragments were below the limit of detection. *Aspergillus* (46 counts/cm<sup>2</sup>) was detected on the east wall under the window. Mycelial fragments were below the limit of detection. A significant quantity of dust was observed in this general area. Dust, when present in substantial amounts, provides a food source for mold and when a moisture source becomes available, dormant mold may start to reproduce. Microbial growth will usually continue unabated until the moisture and/or nutrient sources are removed. HEPA-vacuuming, followed by biocide cleaning measures, will be required in the areas represented by these sample locations.

The tape lift samples collected on the Sub Junction Level contained mold spores ranging from none detected to 462,000 counts/cm<sup>2</sup>. *Cladosporium* (15 counts/cm<sup>2</sup>) was detected on a dark and patterned water stained area under the Fire Alarm panel, however, after biocide treatment, none was detected. *Ulocladium* (15 counts/cm<sup>2</sup>) was detected on the North wall behind the equipment racks, under the cove base, however, after biocide treatment, none was detected. *Alternaria* (15 counts/cm<sup>2</sup>), *Ascospores* (15 counts/cm<sup>2</sup>), *Bipolaris* (15 counts/cm<sup>2</sup>), *Cladosporium* (15 counts/cm<sup>2</sup>), and *Pithomyces* (15 counts/cm<sup>2</sup>) were detected above the elevator door. Mycelial fragments represented 16% (15 out of 92) of the total concentration detected. Biocide cleaning measures will be required in the area represented by this sample location. *Aspergillus* (46 counts/cm<sup>2</sup>) and *Cladosporium* (15 counts/cm<sup>2</sup>) were detected on a black spot on the ceiling by the smoke detector. No mycelial fragments were detected. After biocide treatment, none was detected. *Chaetomium* (462,000 counts/cm<sup>2</sup>), *Curvularia* (15 counts/cm<sup>2</sup>), *Stachybotrys* (216 counts/cm<sup>2</sup>) and *Ulocladium* (15 counts/cm<sup>2</sup>) were detected above the ceiling tile, on

the shaft liner, inside face. Mycelial fragments represented 83% (385,000 out of 462,246) of the total concentration detected. Remediation measures, to include drywall, gypsum board, and insulation removal, and biocide post-treatment, are required in the area represented by this sample location. No mold spore concentration levels were obtained on the yellow stain under the Fire Alarm panel and above the ceiling tile on the surface of the wall.

The tape lift samples collected on Level 11 contained mold spore concentrations ranging from none detected to 216 counts/cm<sup>2</sup>. *Ulocladium* (154 counts/cm<sup>2</sup>) was detected in the 11<sup>th</sup> Floor outer ring, back of the west wall of 11TS5, on the 5<sup>th</sup> panel from the south, in an area that had been biocide treated prior to sampling. Mycelial fragments represented 10% (15 out of 154) of the total concentration detected. After subsequent re-cleaning, *Pithomyces* (31 counts/cm<sup>2</sup>) was detected in the same area. Mycelial fragments represented 48% (15 out of 31) of the total concentration detected. After a 3<sup>rd</sup> biocide cleaning, however, all mold spore concentrations were below the limit of detection. *Alternaria* (77 counts/cm<sup>2</sup>), *Ascospores* (15 counts/cm<sup>2</sup>), *Cladosporium* (31 counts/cm<sup>2</sup>), *Epicoccum* (15 counts/cm<sup>2</sup>), *Pithomyces* (31 counts/cm<sup>2</sup>), and *Smuts* (31 counts/cm<sup>2</sup>) were detected above the elevator door. The mycelial fragment concentration was below the limit of detection. Biocide cleaning measures will be required in the area represented by this sample location. *Ascospores* (15 counts/cm<sup>2</sup>) and *Cladosporium* (15 counts/cm<sup>2</sup>) were detected in the stairwell on the north wall. No mycelial fragments were detected. Biocide cleaning measures will be required in the area represented by this sample location. No mold spore concentration levels were detected on the back of the west wall of 11TS5, on the 2<sup>nd</sup> panel from the south.

The tape lift samples collected on Level 10 contained mold spores ranging from 15 to 445,953 counts/cm<sup>2</sup>. *Ascospores* (15 counts/cm<sup>2</sup>) were detected in 10TS5, on the north wall under the cove base, on the back side of the 1<sup>st</sup> layer. While only a minimal concentration was detected, due to the location, remediation measures, to include drywall, gypsum board, and insulation removal and biocide post-treatment, are required in the area represented by this sample location. *Chaetomium* (445,830 counts/cm<sup>2</sup>) and *Ulocladium* (123 counts/cm<sup>2</sup>) were detected in 10TS5, on the southeast wall, on a raised colony area. Mycelial fragments represented 58% (258,258 out of 445,953) of the total concentration detected. Remediation measures, to include drywall, gypsum board, and insulation removal and biocide post-treatment, are required in the area represented by this sample location. *Alternaria* (631 counts/cm<sup>2</sup>), *Ascospores* (46 counts/cm<sup>2</sup>), *Basidiospores* (31 counts/cm<sup>2</sup>), *Cladosporium* (1294 counts/cm<sup>2</sup>), *Curvularia* (15 counts/cm<sup>2</sup>), *Epicoccum* (154 counts/cm<sup>2</sup>), *Rusts* (15 counts/cm<sup>2</sup>), and *Smuts* (46 counts/cm<sup>2</sup>) were detected in the stairwell on the south stair stringer. Mycelial fragments represented 7% (154 out of 2233) of the total concentration detected. Biocide cleaning measures will be required in the area represented by this sample location.

The tape lift sample collected on Level 6 contained a mold spore concentration of 15 counts/cm<sup>2</sup>. *Basidiospores* (15 counts/cm<sup>2</sup>) were detected in the stairwell on the south wall of the landing. Mycelial fragments represented 100% (15 out of 15) of the total concentration detected. Biocide cleaning measures will be required in the area represented by this sample location.

The tape lift sample collected on Level 4 contained mold spores at a concentration level of 7361 counts/cm<sup>2</sup>. *Alternaria* (231 counts/cm<sup>2</sup>), *Ascospores* (92 counts/cm<sup>2</sup>), *Aspergillus* (477 counts/cm<sup>2</sup>), *Basidiospores* (231 counts/cm<sup>2</sup>), *Chaetomium* (5914 counts/cm<sup>2</sup>), *Pithomyces* (108 counts/cm<sup>2</sup>), and *Smuts* (308 counts/cm<sup>2</sup>) were detected in 4TS3, in the northeast corner under the covebase. Mycelial fragments represented only 8% (585 out of 7361) of the total concentration detected, however, remediation measures, to include removal of cove base and biocide post-treatment, are required in the area represented by this sample location.

The tape lift samples collected on Level 3 contained mold spore concentrations ranging from none detected to 9733 counts/cm<sup>2</sup>. *Alternaria* (231 counts/cm<sup>2</sup>), *Aspergillus* (77 counts/cm<sup>2</sup>), *Cladosporium* (9240 counts/cm<sup>2</sup>), *Nigrospora* (31 counts/cm<sup>2</sup>), *Pithomyces* (62 counts/cm<sup>2</sup>), *Smuts* (77 counts/cm<sup>2</sup>) and *Ulocladium* (15 counts/cm<sup>2</sup>) were detected in 3TS1, on the south wall along the ceiling, directly across from the elevator door. Mycelial fragments represented only 3% (323 out of 9733) of the total concentration detected. After biocide cleaning, *Cladosporium* (15 counts/cm<sup>2</sup>) was detected in the same location, however, no mold spore concentration levels were detected after a 2<sup>nd</sup> biocide cleaning treatment. *Aspergillus* (678 counts/cm<sup>2</sup>), *Basidiospores* (15 counts/cm<sup>2</sup>), and *Cladosporium* (31 counts/cm<sup>2</sup>) were detected in 3TS1, on the ceiling above the Fire Alarm horn, however, after biocide treatment, none was detected. *Alternaria* (62 counts/cm<sup>2</sup>), *Aspergillus* (92 counts/cm<sup>2</sup>), *Basidiospores* (462 counts/cm<sup>2</sup>), *Chaetomium* (15 counts/cm<sup>2</sup>), *Cladosporium* (3034 counts/cm<sup>2</sup>), *Curvularia* (15 counts/cm<sup>2</sup>), *Pithomyces* (62 counts/cm<sup>2</sup>), and *Smuts* (46 counts/cm<sup>2</sup>) were detected in 3TS1, above the door to 3TS3. Mycelial fragments represented only 6% (231 out of 3788) of the total concentration detected. Biocide cleaning measures will be required in the area represented by this sample location. No mold spore concentration levels were detected in 3TS1, on the west end of the south wall, near the ceiling hatch. This area received two biocide treatments, but had not been previously tested. No mold spore concentration levels were detected in 3TS4 on the north wall.

The tape lift sample collected on Ground level contained a mold spore concentration level of 92 counts/cm<sup>2</sup>. *Alternaria* (15 counts/cm<sup>2</sup>), *Basidiospores* (15 counts/cm<sup>2</sup>), *Cladosporium* (46 counts/cm<sup>2</sup>), and *Pithomyces* (62 counts/cm<sup>2</sup>) were detected on the gypsum wallboard cover between the stairs. Mycelial fragments represented 16% (15 out of 92) of the total concentration detected. Biocide cleaning measures will be required in the area represented by this sample location.

A summary of tape lift sampling results is shown in Table 1.

The bulk samples collected on the Sub Junction Level and Level 11 (Room 11TS5) contained mold spore concentrations below the limit of detection. The bulk samples collected in the 11<sup>th</sup> Floor Outer Ring contained mold spores ranging from 19,259 to 1,025,800 counts/gram. *Alternaria* (1481 counts/gram), *Aspergillus* (4444 counts/gram), *Cladosporium* (2963 counts/gram), *Pithomyces* (2963 counts/gram), *Smuts* (2963 counts/gram) and *Ulocladium* (4444 counts/gram) were detected in the northeast void. *Aspergillus* (947,600 counts/gram), *Cladosporium* (9200 counts/gram), *Epicoccum* (13,800 counts/gram), *Pithomyces* (4600 counts/gram), *Smuts* (13,800 counts/gram) and *Ulocladium* (27,600 counts/gram) were detected in the west void. Mycelial fragments

were below the limit of detection. This insulation, which serves as a smoke barrier, must be removed and replaced.

The bulk samples collected on Level 10 contained mold spores ranging from none detected to 2222 counts/gram. *Aspergillus* (2222 counts/gram) was detected in 10TS5, on the north wall under the cove base, on the back side of the 1<sup>st</sup> layer. The mycelial fragment concentration was below the limit of detection, indicating a dormant or non-germinating stage. Due to the location of the contamination detected, however, remediation measures, to include drywall, gypsum board, and insulation removal and biocide post-treatment, are required in the area represented by this sample location.

The bulk sample collected on Level 8 contained mold spore concentrations below the limit of detection.

The bulk samples collected on Level 7 contained mold spores ranging from none detected to 3704 counts/gram. *Aspergillus* (3704 counts/gram) was detected in 7TS5, in a yellowed fireproofing sample. The mycelial fragments were below the limit of detection. Similar yellowed fireproofing samples were collected in 7TS5 in the center of the room; in 7TS5 at the ceiling level; in 7TS5 on the metal deck; in 7TS5 on the west side of the elevator shaft; in 7TS5 on the middle of the beam on the north side of the elevator shaft; in 7TS1 above the west access panel; and in 7TS4 on the lower beam, on the west side of the elevator. All contained mold spore concentrations below the limit of detection.

The bulk sample collected on Level 6 contained mold spore concentrations below the limit of detection.

The bulk sample collected on Level 5 contained mold spore concentrations below the limit of detection.

The bulk samples collected on Level 4 contained mold spore concentrations below the limit of detection.

A summary of the bulk sampling results is shown in Table 2.



Table 1: Summary of Tape Lift Sampling Results

Location	Date Sampled	Spore Count (Counts/cm <sup>2</sup> )	Genus Level Constituent
Under Cab Level, west side of west stair wall	8/15/2006	15	<i>Smuts</i>
Under Cab Level, stair stringer	8/15/2006	15	<i>Alternaria</i>
Under Cab Level, stair stringer (Detergent treated)	9/1/2006	31	<i>Basidiospores</i>
Under Cab Level, CA2 Landing, west wall	8/24/2006	31	<i>Ascospores</i>
Under Cab Level, middle of west stair wall	8/24/2006	31 46 15 15	<i>Alternaria</i> <i>Ascospores</i> <i>Pithomyces</i> <i>Smuts</i>
Under Cab Level, middle of west stair wall (Detergent treated)	9/1/2006	15	<i>Ascospores</i>
Under Cab Level, east wall, south of return air vent	8/24/2006	31	<i>Ascospores</i>
By Door to Cab Level, south stair stringer	9/1/2006	15	<i>Alternaria</i>
Junction Level, above elevator door	7/20/2006	31 15 662 31 92 15 15 31	<i>Alternaria</i> <i>Ascospores</i> <i>Aspergillus</i> <i>Basidiospores</i> <i>Cladosporium</i> <i>Epicoccum</i> <i>Pithomyces</i> <i>Smuts</i>
Junction Level, top of stairs, top of stair stringer	9/1/2006	108 92 31 755 31 15 15 154	<i>Alternaria</i> <i>Ascospores</i> <i>Basidiospores</i> <i>Cladosporium</i> <i>Nigrospora</i> <i>Pithomyces</i> <i>Smuts</i> <i>Stachybotrys</i>
Between Junction and Sub Junction Levels, on the gypsum wallboard cover between stairs	8/24/2006	262 108 108 46 1140 108 15 293 92	<i>Alternaria</i> <i>Aspergillus</i> <i>Basidiospores</i> <i>Bipolaris</i> <i>Cladosporium</i> <i>Epicoccum</i> <i>Nigrospora</i> <i>Smuts</i> <i>Stachybotrys</i>

Between Junction and Sub Junction Levels, on horizontal aluminum ledge of window	9/1/2006	123 31 31 108 62 15 31	<i>Alternaria</i> <i>Ascospores</i> <i>Basidiospores</i> <i>Cladosporium</i> <i>Epicoccum</i> <i>Nigrospora</i> <i>Smuts</i>
Between Junction and Sub Junction Levels, on vertical aluminum ledge of window w/ water stain	9/1/2006	31 15	<i>Ascospores</i> <i>Epicoccum</i>
Between Junction and Sub Junction Levels, east wall under window	9/1/2006	46	<i>Aspergillus</i>
Sub Junction, stairwell landing, black spot on ceiling by smoke detector	8/24/2006	(Tape could not be analyzed)	
Sub Junction, stairwell landing, black spot on ceiling by smoke detector	9/1/2006	46 15	<i>Aspergillus</i> <i>Cladosporium</i>
Sub Junction, stairwell landing, black spot on ceiling by smoke detector (Biocide treated)	1/11/07	None Detected	
Sub Junction Level, yellow stain, under Fire Alarm panel	6/20/2006	None Detected	
Sub Junction Level, black patterned area, under Fire Alarm panel	6/20/2006	15	<i>Cladosporium</i>
Sub Junction Level, above ceiling tile, surface of wall	6/21/2006	None Detected	
Sub Junction Level, above ceiling tile, shaft liner, inside face	6/21/2006	462,000 15 216 15	<i>Chaetomium</i> <i>Curvularia</i> <i>Stachybotrys</i> <i>Ulocladium</i>
Sub Junction Level, north wall behind equipment racks, under cove base	6/21/2006	15	<i>Ulocladium</i>
Sub Junction Level, under Fire Alarm panel (Biocide treated)	7/13/2006	None Detected	
Sub Junction Level, north wall behind equipment racks, under cove base (Biocide treated)	7/13/2006	None Detected	
Sub Junction Level, above elevator door	7/20/2006	15 15 15 15 15	<i>Alternaria</i> <i>Ascospores</i> <i>Bipolaris</i> <i>Cladosporium</i> <i>Pithomyces</i>
11 <sup>th</sup> Floor outer ring, back of west wall of 11TS5, 5 <sup>th</sup> panel from south (Biocide treated – 1 <sup>st</sup> treatment)	7/12/2006	154	<i>Ulocladium</i>

11 <sup>th</sup> Floor outer ring, back of west wall of 11TS5, 5 <sup>th</sup> panel from south (Biocide treated – 2 <sup>nd</sup> treatment)	7/20/2006	31	<i>Pithomyces</i>
11 <sup>th</sup> Floor outer ring, back of west wall of 11TS5, 5 <sup>th</sup> panel from south (Biocide treated – 3 <sup>rd</sup> treatment)	7/28/2006	None Detected	
11 <sup>th</sup> Floor outer ring, back of west wall of 11TS5, 2 <sup>nd</sup> panel from south (no visible mold)	7/28/2006	None Detected	
11 <sup>th</sup> Floor, above elevator door	7/20/2006	77 15 31 15 31 31	<i>Alternaria</i> <i>Ascospores</i> <i>Cladosporium</i> <i>Epicoccum</i> <i>Pithomyces</i> <i>Smuts</i>
11 <sup>th</sup> Floor, stairwell, north wall	9/1/2006	15 15	<i>Ascospores</i> <i>Cladosporium</i>
10TS5, southeast wall, raised colonies	7/11/2006	445,830 123	<i>Chaetomium</i> <i>Ulocladium</i>
10TS5, north wall under cove base, back side of 1 <sup>st</sup> layer	7/11/2006	15	<i>Ascospores</i>
10 <sup>th</sup> Floor, stairwell, south stair stringer	9/1/2006	631 46 31 1294 15 154 15 46	<i>Alternaria</i> <i>Ascospores</i> <i>Basidiospores</i> <i>Cladosporium</i> <i>Curvularia</i> <i>Epicoccum</i> <i>Rusts</i> <i>Smuts</i>
Landing below 6 <sup>th</sup> Floor, stairwell, south wall	9/1/2006	15	<i>Basidiospores</i>
4TS3, northeast corner under cove base	7/13/2006	231 92 477 231 5914 108 308	<i>Alternaria</i> <i>Ascospores</i> <i>Aspergillus</i> <i>Basidiospores</i> <i>Chaetomium</i> <i>Pithomyces</i> <i>Smuts</i>
3TS1, south wall along ceiling, directly across from elevator door	7/13/2006	231 77 9240 31 62 77 15	<i>Alternaria</i> <i>Aspergillus</i> <i>Cladosporium</i> <i>Nigrospora</i> <i>Pithomyces</i> <i>Smuts</i> <i>Ulocladium</i>
3TS1, on ceiling above Fire Alarm horn	7/13/2006	678 15 31	<i>Aspergillus</i> <i>Basidiospores</i> <i>Cladosporium</i>

3TS1, above door to 3TS3	7/13/2006	62 92 462 15 3034 15 62 46	<i>Alternaria</i> <i>Aspergillus</i> <i>Basidiospores</i> <i>Chaetomium</i> <i>Cladosporium</i> <i>Curvularia</i> <i>Pithomyces</i> <i>Smuts</i>
3TS4, north wall	6/22/2006	None Detected	
3TS1, south wall along ceiling, directly across from elevator door (Biocide treated)	7/20/2006	15	<i>Cladosporium</i>
3TS1, on ceiling above Fire Alarm horn (Biocide treated)	7/20/2006	None Detected	
3TS1, south wall on west end near ceiling hatch (Biocide treated)	7/28/2006	None Detected	
3TS1, south wall along ceiling, directly across from elevator door (Biocide treated - 2 <sup>nd</sup> treatment)	7/28/2006	None Detected	
G5, on the gypsum wallboard cover between stairs	9/1/2006	15 15 46 15	<i>Alternaria</i> <i>Basidiospores</i> <i>Cladosporium</i> <i>Pithomyces</i>

**Table 2: Summary of Bulk Sampling Results**

Location	Date Sampled	Spore Count (Counts/gram)	Genus Level Constituent
Sub Junction Level, yellow stain, under Fire Alarm panel	6/20/2006	None Detected	
Sub Junction Level, north wall behind equipment racks, under cove base	6/21/2006	None Detected	
Sub Junction 3 Shop, south wall	6/21/2006	None Detected	
Sub Junction, northwest wall, under cove base	6/22/2006	None Detected	
11TS5, Fireproofing (normal appearance)	6/22/2006	None Detected	
11 <sup>th</sup> Floor Outer Ring, northeast void	12/29/2006	1481 4444 2963 2963 2963 4444	<i>Alternaria</i> <i>Aspergillus/</i> <i>Penicillium</i> <i>Cladosporium</i> <i>Pithomyces</i> <i>Smuts</i> <i>Ulocladium</i>
11 <sup>th</sup> Floor Outer Ring, west void	12/29/2006	947,600 9200 13,800 4600 13,800 27600	<i>Aspergillus/</i> <i>Penicillium</i> <i>Cladosporium</i> <i>Epicoccum</i> <i>Pithomyces</i> <i>Smuts</i> <i>Ulocladium</i>
10TS5, Fireproofing (normal appearance)	6/22/2006	None Detected	
10TS5, Metal deck fireproofing, north side of elevator shaft (yellow appearance)	7/20/2006	None Detected	
10TS5, steel beam fireproofing, west side of elevator shaft (yellow brown appearance)	7/20/2006	None Detected	
10TS5, paper from exposed layer of gypsum board, south wall elevator shaft, 9' above floor finishes	7/20/2006	None Detected	
10TS5, north wall under cove base, back side of 1 <sup>st</sup> layer	7/11/2006	2222	<i>Aspergillus/</i> <i>Penicillium</i>
8TS3, beam fireproofing, southeast corner (yellow brown appearance)	7/20/2006	None Detected	
7TS5, fireproofing (yellow appearance)	7/12/2006	3704	<i>Aspergillus/</i> <i>Penicillium</i>
7TS5, beam fireproofing in center of room (yellow appearance)	7/20/2006	None Detected	

7TS5, beam fireproofing at ceiling level (yellow appearance)	7/20/2006	None Detected	
7TS5, metal deck fireproofing (yellow appearance)	7/20/2006	None Detected	
7TS5, beam fireproofing, west side of elevator shaft (yellow appearance)	7/28/2006	None Detected	
7TS5, middle of beam fireproofing, north side of elevator shaft (yellow appearance)	7/28/2006	None Detected	
7TS1, beam fireproofing above west access panel (yellow appearance)	7/20/2006	None Detected	
7TS4, fireproofing along north wall (yellow brown appearance)	7/20/2006	None Detected	
6TS5, lower beam fireproofing, west side of elevator (light yellow appearance)	7/20/2006	None Detected	
5TS5, middle of beam fireproofing, south wall, north side of elevator shaft (yellow appearance)	7/28/2006	None Detected	
4TS4, fireproofing on north wall (white stained appearance)	7/28/2006	None Detected	
4TS5, deck fireproofing, northwest wall (yellow, brown and white appearance)	7/28/2006	None Detected	
4TS5, fireproofing on west wall (yellow and white appearance)	7/28/2006	None Detected	

**23b**



WONDER MAKERS  
ENVIRONMENTAL

June 23, 2009

Mr. Vince Sugent  
7768 Pleasant Lane  
Ypsilanti, MI 48197

RE: Review of Kansas City Airport Traffic Control Tower (MCI ATCT) Mold Evaluation, Completed June 19 – September 1, 2006, Wonder Makers Environmental Project GC09-8593

Dear Vince:

As part of the FAA's response to your whistleblower complaint to the Office of Special Counsel, the Agency submitted a number of documents to support their contention that the mold and other indoor air quality problems at the Detroit Metro Tower were handled properly. A review of the first set of FAA submittals revealed a number of referenced documents that were missing. Over the past weeks we have been examining the second set of documents submitted by the FAA and offering our insights regarding the Agency's response to mold at DTW and other facilities.

This is a review of a mold evaluation that was conducted at the Airport Traffic Control Tower in Kansas City, Missouri, (MCI ATCT). During our review we uncovered a number of problems with the mold evaluation. For example, the cover page states that the project took place between June 19 and September 1, 2006; however, some of the bulk samples in the report are dated December 29, 2006. There is no indication in the report as to who conducted the evaluation or who collected the tape and bulk samples that are included. Also, two attachments to the report are listed but they were not included with the report. Those attachments are the Aerotech Laboratories Total Fungal Spore Tape Reports and the Aerotech Laboratories Total Fungal Spore Bulk Sample Reports.

Overall, this report contains incorrect data as to when parts of the project actually took place, a lack of information as to the qualifications of who conducted the investigation, and missing attachments. Based on the quality of the information in the report, it is not surprising that the FAA did not act promptly to deal with the water intrusion and mold contamination problems in the MCI ATCT.

Background information in the mold evaluation report identified numerous areas throughout the MCI ATCT that were found to be susceptible to the forming of condensation or frost on the interior surface of exterior walls. This condensation or frost resulted in building materials becoming wet and then mold developing on those materials. It was also stated in the report that significant amounts of water were found



under the raised floor in the Sub Junction Equipment Room as a result of a clogged floor drain. The report speculates that mold growth could be occurring on the concealed layers of the fire-rated gypsum wallboard within the ATCT. The report goes on to state that a thorough and destructive investigation was needed to determine all areas of accumulated mold and areas conducive to mold growth. However, a thorough and destructive mold investigation did not take place during this mold evaluation. To our knowledge there has not been such a detailed investigation conducted within the MCI ATCT.

One of the most serious problems with the MCI mold evaluation document is that it minimizes the importance of extremely elevated levels of "target organisms". Many mold remediation professionals consider *Stachybotrys*, *Chaetomium*, *Memnoniella*, *Fusarium*, and *Trichoderma* to be target organisms because they are generally found only in buildings with significant water damage and they have the potential for producing severe health effects. Surface samples confirmed the presence of active colonies of target mold types at locations within the ATCT during the mold evaluation including:

**Table 1: Tape Lift Sampling Results with Confirmed Colonies of Target Organisms**

Location	Date Sampled	Spore Counts (counts/cm <sup>2</sup> )	Genus Level Constituent
Sub Junction Level, above ceiling tile, shaft liner, inside face	6/21/2006	462,000	<i>Chaetomium</i>
10TS5, southeast wall, raised colonies	7/11/2006	445,830	<i>Chaetomium</i>

A number of samples collected during the mold evaluation had high concentrations of *Aspergillus/Penicillium*-like spores. Many mold remediation professionals consider *Aspergillus/Penicillium*-like spores to be indicators of water-damaged buildings. The presence of these spores at the levels indicated in some areas of MCI ATCT will likely cause allergic reactions and/or more serious health effects in most people.

**Table 2: Bulk Sampling Results Confirming *Aspergillus/Penicillium* Colonization**

Location	Date Sampled	Spore Counts (counts/gram)	Genus Level Constituent
11th Floor Outer Ring, west void	12/29/2006	947,600	<i>Aspergillus/Penicillium</i>
11 <sup>th</sup> Floor Outer Ring, northeast void	12/29/2006	4,444	<i>Aspergillus/Penicillium</i>
10TS5, north wall under cove base, back side of 1 <sup>st</sup> layer	7/11/2006	2,222	<i>Aspergillus/Penicillium</i>
7TS5, fireproofing (yellow appearance)	7/12/2006	3,704	<i>Aspergillus/Penicillium</i>

The evaluation of the MCI ATCT confirms the presence of active fungal colonies through both visual identification and confirmatory sampling. Unfortunately, the

numerous recommendations for remediation measures, including biocidal cleaning and HEPA vacuuming, do not reflect the industry standard of care for dealing with interior mold contamination. The inspectors made recommendations for different remediation approaches based on the level of contamination found in bulk or tape samples. This approach is in direct opposition to the consensus recommendation from numerous authoritative industry documents that agree that interior mold growth should be physically removed. As such, the only time that the recommended HEPA vacuuming or biocidal cleaning would be appropriate is when the fungal contamination is found on non-porous surfaces. In all cases cited in the tables above the fungal colonies were recovered from porous materials such as ceiling tiles, drywall, and fireproofing.

There is a well-respected axiom in the mold remediation industry that bad mold remediation is often worse than no remediation. In this case the occupants of the MCI structure were subjected to the same combination of delays and poor planning that have characterized the FAA's response to mold at DTW. Even though the responses recommended in this facility evaluation were poorly conceived, the importance of dealing with the situation was made clear to the FAA. Despite this, remediation of mold-contaminated materials within the MCI ATCT was not initiated until October 2, 2007, over a year after the mold evaluation and recommendations. During this time period MCI ATCT personnel continued to suffer adverse health effects associated with exposure to mold in their work place. There are credible reports that occupants at the Kansas City tower are still suffering from mold and indoor air quality problems similar to the plight of the Detroit employees who have seen their health deteriorate even after a number of ill-conceived remediation projects were completed.

This evaluation of MCI makes it clear that the FAA's management of indoor air quality complaints is critically flawed at a national level rather than the result of poor decisions made by local or regional managers.

Sincerely,



Michael A. Pinto, CSP, CMP  
CEO