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WONDER MAKERS
ENVIRONMENTAL

March 14, 2007

Mr. Howard Blankenship
Regional Vice President, Central Region
National Air Traffic Controller Association, NCE
14630 South Kaw Drive
Olathe, KS 66062

RE: Response to Project Action Plan for Mold and Moisture Mitigation MCI ATCT and Statement of Work; WM Project GC07-7366

Dear Howard:

This letter will serve as a response to the documents entitled *Project Action Plan for Mold and Moisture Mitigation MCI ATCT* dated 2/27/2007, the related *Statement of Work: Microbial Remediation, Federal Aviation Administration, Kansas City Airport Traffic Control Tower (MCI ATCT)* dated 2/22/07, and *MCI ATCT Mold and Moisture Project Action Plan Table* dated 2/27/07. The documents were provided as attachments to a memo from Tony Roetzel to Nancy Kort and Jo L. Tarrah dated 2/28/07.

The review of these documents shows several work practices and deficiencies that are outside the industry standard of care documents, and as such, could potentially lead to incomplete remediation, reoccurrence of fungal growth, and negative impacts to the occupants' health. The industry standard of care refers to governmental and professional guidance documents relating to the mold remediation industry, including:

- Occupational Safety & Health Administration (OSHA) *A Brief Guide to Mold in the Workplace*
- Health Canada *Fungal Contamination in Public Buildings: A Guide To Recognition And Management*
- American Conference of Governmental Industrial Hygienists *Bioaerosols: Assessment and Control*
- American Conference of Governmental Industrial Hygienists *Field Guide for the Determination of Biological Contaminants in Environmental Samples*
- Association of Specialists in Cleaning and Restoration (ASCR) *Recommended Professional Practice for Remediation of Mold Contamination in Building Interiors*
- The Institute of Inspection Cleaning and Restoration Certification (IICRC) *S500 Standard and Reference Guide for Professional Water Damage Restoration*

- The Institute of Inspection Cleaning and Restoration Certification (IICRC) *S520 Standard and Reference Guide for Professional Mold Remediation*
- New York City Department of Health *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*
- American Industrial Hygiene Association *Report of Microbial Growth Task Force*
- Environmental Protection Agency *Mold Remediation in Schools and Commercial Buildings*
- Texas Mold Assessment and Remediation Rules (25 TAC Sections 295.301-295.338)

A layman's explanation of the basic areas of agreement in the various documents that make up the standard of care for the mold remediation industry can be found in chapter five of Wonder Makers Environmental's *Fungal Contamination: A Comprehensive Guide for Remediation.*

Unfortunately, the Statement of Work and the Project Action Plan rely heavily on a single document: the New York City Guidelines. Such an approach neglects the wealth of information included in the other documents and the advances in the industry that have occurred since the NYC Guidelines were published.

What is even more troubling is that the specifications do not address some of the basic premises of mold remediation. It appears from the *MCI ATCT Mold and Moisture Project Action Plan Table* that mold remediation efforts will be conducted from June 18 to July 20, 2007. However, "corrective work implementation" related to the engineering analysis will not begin until October 15, 2007. This means that chronic water sources not related to the blocked floor drain will remain for several months *after* mold remediation efforts have been conducted. The vast majority of documents that make up the standard of care state that all water and humidity sources should be fixed before or during remediation to prevent the reoccurrence of fungal growth. This concept is also supported by the agency in Section 3.0 of the Guidance for the Management of Mold in FAA Facilities (Final Draft dated December 7, 2005) which notes that "Remediation not only includes removal or cleaning of mold contaminated surfaces; it also includes abatement of the moisture issues that created the growth conditions for the mold. In all situations, the underlying cause of the water accumulation must be rectified or fungal growth will undoubtedly reoccur." Given that mold growth in buildings is possible within a few days of finish materials becoming wet, the lag between mold remediation and identification of moisture sources (much less correction of water intrusion) is risky.

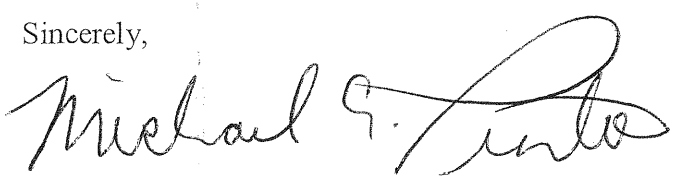
In addition, the work plan does not provide an objective standard to determine when the work has been successfully completed. Section 8.0 of the Statement of Work would allow clearance of the work areas based solely on a visual inspection. Many of the documents in the standard of care advise that post-remediation air sampling should be used for large scale projects (generally 100 square feet or more). Even the NYC Guidelines state that "Air monitoring should be conducted prior to occupancy to determine if the area is fit to reoccupy."

Two other significant concerns with the documents involve their approach to chemicals used during the project. In a number of places the documents instruct the contractor to wipe metal studs and components with a bleach solution. There is no discussion about neutralizing the surfaces after the bleach application. Application of bleach to metal surfaces without proper neutralization can contribute to corrosion of such surfaces.

Other areas of the documents mandate the use of a "concentrated Sporicidin disinfectant solution". Using any EPA registered chemical in a concentrated form rather than mixed according to label directions is a violation of the FIFRA regulations. More importantly, Sporicidin products contain 1-25% glutaraldehyde (depending on the specific style of the product), the material suspected of causing some of the health problems at the Detroit tower.

In the memo from Tony Roetzel dated February 28, 2007, he states, "The plan and its table of activities are considered working documents and will be revised when needed throughout the project to capture additional activities resulting from the completion of comprehensive engineering evaluation and/or other changes to the overall project." We hope that Mr. Roetzel is willing to incorporate these suggested improvements into the work plan documents prior to their implementation. Inclusion of these suggested improvements will provide a balanced work plan that reflects a comprehensive approach derived from all current industry information.

Sincerely,



Michael A. Pinto, Ph.D., CSP, CMP
CEO

Enclosure: Specific Concerns Regarding the Project Action Plan for Mold and Moisture Mitigation, MCI ATCT, and Statement of Work - Microbiological Remediation for Federal Aviation Administration Kansas City Airport Traffic Control Tower (MCI ATCT)

Specific Concerns Regarding Mold and Moisture Mitigation at MCI ATCT

Project Action Plan

1.0 Environmental Assessment

This section states that water-damaged materials must be dried, cleaned or removed, and that mold-damaged materials must be remediated in accordance with New York City Guidelines and FAA guidance documents. However, the statement of work later calls for the wiping of certain areas of the elevator shaft liner with a "concentrated Sporicidin disinfectant solution". This direction contradicts Section 3.1 (D) of the FAA's Mold Guidance document which states, "Porous materials (*e.g.*, ceiling tiles, insulation, and wallboard) should typically be removed and discarded, especially if they have been wet for more than 48 hours."

1.0.c Indicates that air monitoring will not be performed prior to remediation, yet Section 2.2 of the FAA guidance document says that air sampling for mold may be necessary if "there is evidence from a visual inspection or bulk sampling that the ventilation system may be contaminated". With visible mold identified in 41 different areas of the facility, air monitoring should be conducted to determine background levels and confirm whether the HVAC system is impacted.

That same paragraph indicates that air monitoring "may be performed for post-remediation clearance purposes if deemed appropriate ..." Determination of air monitoring criteria for post-remediation should be made prior to the release of the work plan for bids so that all contractors know the end point to which they will be held accountable.

2. Remediation and Short Term Restoration

Several positive steps are mandated by the agency, including the installation of paperless gypsum board as a replacement product, installation of access doors for inspection, and repair of any walls cored or cut open for inspection. This implies that the agency understands the value of invasive sampling to identify and quantify the extent of mold contamination in the building, a procedure that they have prohibited NATCA from completing at the Detroit tower.

3. Long Term Facility Corrective Action

As in the Detroit facility, the FAA has not yet determined the source of the water intrusion/condensation in the elevator shaft. Unfortunately, the similarity in design between the Kansas City and the Detroit towers has not benefited the agency in Kansas City as more than two years of effort in the Detroit tower has failed to conclusively identify the cause of the water intrusion or determine an appropriate response action to keep it from reoccurring.

5. Communications

This section indicates that project information will be provided to facility employees and local employee representatives. However, *timely* provision of information is necessary in order for the employees to have the ability to protect themselves.

6. Risk Management Plan
NATCA personnel should be involved in the development of the risk management plan to make sure that all employee concerns are addressed. The current document does not indicate that such input would be allowed.

Mold and Moisture Project Action Plan Table
The section of interim actions indicates that water-damaged ceiling tiles and pipe insulation are to be removed in March 2007. No specific work plan or risk assessment was provided for these activities. In addition, the plan indicates that Tech Ops would perform the work. Such remediation without utilizing proper engineering controls and work practices can create significant exposure/health problems. Recently, several individuals in the Detroit TRACON became ill when ceiling tile replacement was conducted in that area. Some individuals have reported long term sensitization from that exposure.

The current plan calls for mold remediation to begin in June and be completed in July 2007. Corrective work to deal with the water intrusion is not scheduled to begin until October 2007 with an end date of March 2008. This lag time may result in re-establishment of fungal colonies as noted in Section 3.0 of the FAA's Mold Guidance document.

Statement of Work
1.0 Work Summary
This section states that the contractor must remove and dispose of all microbiological-contaminated materials in accordance with the New York City Department of Health's *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*(GARFIE). It does not mention any of the other standard of care documents for the mold remediation industry. GARFIE does not serve as a stand-alone document that represents the current knowledge base of the mold remediation industry. For instance, GARFIE does not take into account the presence of hidden mold in determining the scope of a mold remediation project. The FAA's mold guidance document lists 39 specific references as "relevant guidance documents" in Appendix A. The document also summarizes OSHA's *A Brief Guide to Mold in the Workplace* in Section 3.2 and adds additional FAA specific requirements. As such, the language in the FAA's own guidance document indicates that the primary reference should be the OSHA guidelines rather than the New York City guidelines.

The contractor is required to minimize dust generation using dust prevention and suppression methodologies outlined in GARFIE. As previously stated, the sole use of GARFIE neglects a vast amount of information concerning dust minimization techniques that should be specifically spelled out in the work plan. Such techniques include removal of drywall using HEPA vacuums at the face of cutting, using dust capturing devices such as a Dust Muzzle or Kett Tool connected directly to a HEPA vacuum, working in proximity to the negative air machine, and the use of air scrubbers.

The work summary does indicate that isolation and negative pressure techniques will be used, which are the first steps toward protecting unimpacted areas from fungal contamination related to the remediation efforts.

1.1.5 Certifications
This section states that the contractor shall be certified by IAQA, IICRC, NADCA or equivalent. However, the IAQA only certifies individuals, not organizations for mold remediation. It is important that all of the workers who will be onsite have mold remediation training/certification since company certifications do not guarantee that the workers on the jobsite are competent.

1.4 Submittal Requirements
Although the required submittals are important, there is no requirement for the contractor to submit training/certification information for each of the employees who will be onsite. There is no indication that the contractor has to submit information that would allow the agency to determine whether the workers meet the minimum requirements for building security.

4.0 Regulated Area
The specifications require the contractor to establish and maintain negative pressure enclosures while doing mold remediation work. The normal rate of four room air changes per hour is doubled for work in the elevator shaft. This extra level of protection is appropriate. This section also allows negative air machines to be vented inside the building if they are directed through a second HEPA filter. This is a reasonable accommodation for the challenges posed by the tower's unique type of structure.

There is no requirement for the utilization of decontamination chambers. Such an oversight will substantially increase the risk of cross contamination to the occupied areas of the building.

6.0 Work Procedures
Section 6.2 requires the contractor to wet wipe non-porous furniture and fixtures with a "10% Chlorox [*sic*] solution or equivalent detergent solution". There are several problems with this directive besides the spelling error. Clorox is a bleach, which is not equivalent to detergents. More importantly, many industry professionals have determined that bleach solutions are not effective at denaturing mold spores. Because of its relatively long dwell time to be effective, irritating odor, corrosive nature, and proclivity to react with other materials, professional and mold remediation contractors are utilizing chemicals that have been specifically designed to be effective in mold remediation without the negative side effects found with bleach use.

Section 6.2 appears to have an error in requiring the contractor to wrap pre-cleaned furnishings and fixtures prior to their removal from the work area. Generally, pre-cleaning of materials potentially impacted by deposition of fungal spores is adequate if the items are to be removed. Double layer wrapping is generally reserved for items that are to stay in the work area, as indicated at the bottom of the section.

Section 6.3 requires that the contractor maintain a pressure differential of negative 0.02 inches of water. However, there is no explicit requirement for them to have magnehelic gauges or other devices.

Section 6.4 details the amount of materials to be removed in various areas of the building. The total quantity of mold-contaminated material to be removed from the tower is substantially in excess of 100 square feet. In fact, the amount of shaft liner to be removed from the subjunction level equipment room is approximately 611 square feet. Because of the multiple areas where material is to be removed and the large quantity to be removed, each work area should be treated as a "Level IV Extensive Contamination" project as described in the FAA's mold guidance document. This document (Section 3.2 (D)) requires decontamination areas at the entrance to each negative pressure enclosure.

The FAA document also requires that an experienced CIH design the work plan. There was no indication on the action plan or statement of work who authored the document.

Section 6.5 allows mold contamination totaling less than ten square feet to be cleaned rather than removed. The shaft liner is to be wiped with a "concentrated Sporicidin disinfectant solution". This is part of the scope of work that repeats some of the problems that caused reported health effects at the Detroit tower. More importantly, wiping the surface mold does nothing to address the potential for contamination on the inner layers of the gypsum shaft liner.

Section 6.6 directs the contractor to wet wipe the metal walls with 10% "Chlorox" solution without requiring any neutralization. As indicated previously, such a work practice can contribute to long term corrosion of the metal.

Sections 6.7 through 6.10 require a number of surfaces to be wet wiped with a "concentrated Sporicidin disinfectant solution". In addition to glutaraldehyde, Sporicidin contains a number of phenols. Both of these types of chemicals are significant irritants. This is one of the reasons that many individuals find Sporicidin to have an objectionable odor. It is interesting to note that the manufacturer's MSDS indicates that "If vapors are strong enough to be irritating to the nose or eyes the threshold limit value (TLV) is probably exceeded".

These same sections also require wiping of other surfaces with the 10% "Chlorox" solution. Utilizing multiple chemicals for cleaning/sanitization increases the risk that they will come in contact with one another with a potential for unanticipated reactions (odors, irritation, increased corrosion, etc.). There are plenty of tested products available that can be used for both purposes without the strong odor or potential for cross reactions. In particular, products with quaternary ammonium mixtures generally have less objectionable odors while offering similar levels of effectiveness.

Sections 7.0 Air Monitoring and Inspection and 8.0 Final Clearance
The work plan does not provide an objective standard to determine when the work has been successfully completed. Section 8.0 of the Statement of Work would allow clearance of the work areas based solely on a visual inspection. Many of the documents in the standard of care advise that post-remediation air sampling should be used for large scale projects (generally 100 square feet or more). Even the NYC Guidelines state that "Air monitoring should be conducted prior to occupancy to determine if the area is fit to reoccupy." The use of a visual inspection without supplemental air sampling to determine if the project was completed appropriately so as to avoid the potential for microscopic contaminants to impact occupied areas of the building is foolish. The Kansas City tower is a critical use facility where disruption of services due to occupant exposure to chemicals or biological contaminants could have dire consequences. The fact that some occupants have reported health effects that would indicate possible sensitization to biological contaminants should be a compelling rationale for mandating air samples prior to the dismantling of engineering controls.

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May 11, 2007

Mr. Howard Blankenship
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National Air Traffic Controller Association, NCE
14630 South Kaw Drive
Olathe, KS 66062

hblankenship@natca.net

RE: Review of Revised Statement of Work for Microbiological Remediation, MCI ATCT and Related Documents; WM Project GC07-7366

Dear Howard:

This letter will serve as a response to the documents entitled *Statement of Work: Microbiological Remediation for Federal Aviation Administration, Kansas City Airport Traffic Control Tower (MCI ATCT)* dated 3/29/07, *Supplemental Statement of Work: Microbiological Remediation and Partial Restoration for Federal Aviation Administration, Kansas City Airport Traffic Control Tower (MCI ATCT)* dated 3/29/07, a letter addressed to you from David A. Price, Air Traffic Manager, dated 4/12/07 RE: Information request of March 12, 2007, and a memo addressed to you from Howard Lyons, Staff Manager, dated 5/1/07 RE: Mold Remediation Briefing.

Specifically you asked us to review the revised and supplemental statements of work in order to determine if changes made since the 2/22/07 version have adequately addressed the numerous concerns raised in our 3/14/07 letter to you.

While a handful of changes were made, serious deficiencies and flawed clearance criteria still exist in the current versions, which could potentially lead to incomplete remediation, dispersion of fungal contaminants outside the work area, and negative impacts to the occupants' health.

Of greatest concern is the selective use of containment and negative pressure enclosures in areas where large scale remediation will be conducted (greater than 100 square feet). For instance, in 11TS5/11TS5A approximately 126 square feet of gypsum board and insulation will be removed, and in room 3TS5 213 square feet of gypsum board will be removed without containment, negative pressure enclosure, or decontamination unit. While the New York City guidelines (*i.e.*, *Guidelines on Assessment and Remediation of Fungi in Indoor Environments* or GARFIE) suggest using negative pressure enclosures for areas of over 100 square feet of *contiguous* contamination, it also states, "Widespread contamination poses much larger problems that must be addressed on a case-by-case basis."

We strongly disagree with the selective use of containment barriers and negative pressure enclosures in areas of significant contamination, as well as the reliance on only a single standard of care document. For example, OSHA and EPA guidance documents on mold indicate that full

negative pressure enclosures should be used when "total surface area affected greater than 100 (ft^2) or potential for increased occupant or remediator exposure during remediation estimated to be significant". It is obvious that the MCI tower meets both of these criteria.

In the Project Scope Briefing attached to the 5/1/07 memo it states, "In occupied and unoccupied areas of the MCI ATCT, all remediation specifications meet or exceed GARFIE guidelines." This does not appear to be the case. According to GARFIE, even during the remediation of small isolated areas (10 square feet or less) "all areas should be left dry and visibly free from contamination and debris." However, the *Mold Remediation Project Clearance Protocol* attached to the *Statement of Work* states, "Should visibly dusty environmental conditions exist inside the containment area, the sample collection period may be reduced to one-minute intervals, in order to reduce the collection of non-microbial particulates that can mask the presence of mold spores."

Among the majority of industry professionals and standard of care documents there is a consensus that visible dust and debris is not acceptable in the work area. The presence of dust, dirt, and contamination warrants re-cleaning prior to clearance sampling. The logic behind this is that fungal contamination may be present in the settled dust and if the contractor is not capable of cleaning visible dust, it is unlikely that they are capable of cleaning microscopic fungal spores. In addition, the reduction of sampling time/volume without making the same changes to the comparison samples would skew the data.

We are disappointed by the FAA's decision to deny NATCA access to meetings, calls, or other forums related to the mold remediation activities at the Kansas City ATCT. As GARFIE states under the *Conclusions* section, "Effective communication with building occupants is an essential component of all remedial efforts." Given the deficiencies of the statements of work to date, the additional input from NATCA could be beneficial in creating a work plan that rectifies the mold growth while at the same time protects the health of occupants.

If you have any further questions, do not hesitate to contact us.

Sincerely,

Michael A. Pinto, Ph.D., CSP, CMP
CEO

Enclosure: Specific Concerns Regarding Mold and Moisture Mitigation at MCI ATCT (Revised 5/08/2007)

cc: Kevin Peterson, ktbmp@stjoelive.com

Specific Concerns Regarding Mold and Moisture Mitigation at MCI ATCT
Revised 5/08/2007

**Note*: *Comments related to changes made to the 2/22/07 statement of work are underlined and in italics.*

Project Action Plan

1. Environmental Assessment

This section states that water-damaged materials must be dried, cleaned or removed, and that mold-damaged materials must be remediated in accordance with New York City Guidelines and FAA guidance documents. However, the statement of work later calls for the wiping of certain areas of the elevator shaft liner with a "concentrated Sporicidin disinfectant solution". This direction contradicts Section 3.1 (D) of the FAA's Mold Guidance document which states, "Porous materials (*e.g.*, ceiling tiles, insulation, and wallboard) should typically be removed and discarded, especially if they have been wet for more than 48 hours."

The Sporicidin disinfectant solution has been substituted with a detergent solution in the elevator shaft. Section 7.10 of the SOW still calls for wet wiping the mold contaminated drywall and then cleaning the entire elevator shaft with a detergent solution. As previously mentioned this is not consistent with FAA's guidance document or the overall industry standard of care that require porous materials with long term water damage or fungal growth to be removed.

1.0.c Indicates that air monitoring will not be performed prior to remediation, yet Section 2.2 of the FAA guidance document says that air sampling for mold may be necessary if "there is evidence from a visual inspection or bulk sampling that the ventilation system may be contaminated". With visible mold identified in 41 different areas of the facility, air monitoring should be conducted to determine background levels and confirm whether the HVAC system is impacted.

From the four documents provided and listed in the initial letter, there is no indication that the FAA has conducted background sampling or conducted an evaluation of the HVAC system to determine if it has been impacted by fungal contamination. In Section 1.0, item 1. of the Supplemental Statement of Work (SSOW) it states the contractor will clean "HVAC supply, return, or exhaust grilles, registers, or diffusers." No mention is made of requirements to clean the interior of the ductwork or HVAC units servicing the building. Without a proper evaluation and/or cleaning of the entire HVAC system, it is possible that remediated areas could be re-contaminated by the deposition of fungal spores dispersed through the ductwork. Cleaning should be conducted following NADCA guidelines.

That same paragraph indicates that air monitoring "may be performed for post-remediation clearance purposes if deemed appropriate ..." Determination of air monitoring criteria for post-remediation should be made prior to the release of the work plan for bids so that all contractors know the end point to which they will be held accountable.

A document entitled "Mold Remediation Project Clearance Protocol, Kansas City Airport Traffic Control Tower" was included as an attachment to the 3/29/07 statement of work. The document was prepared by Barbara Herbert, CIH (NISCII).

This protocol allows for sampling to be conducted even if visibly dusty conditions occur inside the containment area. "Should visibly dusty environmental conditions exist inside the containment area, the sample collection period may be reduced to one-minute intervals, in order to reduce the collection of non-microbial particulates that can mask the presence of mold spores." As stated in the introduction letter, according to the documents that comprise the industry standard of care for mold remediation (including GARFIE), dust, debris, and visible contamination are not acceptable inside a containment or work area. Visible dust should warrant re-cleaning of the work area. Also, the variability of sample volumes (15 L in dusty areas, 75 L inside and outside of the work area, and 150 L out-of-doors) would lead to skewed data as it would be an apples to oranges comparison.

2. Remediation and Short Term Restoration
Several positive steps are mandated by the Agency, including the installation of paperless gypsum board as a replacement product, installation of access doors for inspection, and repair of any walls cored or cut open for inspection. This implies that the Agency understands the value of invasive sampling to identify and quantify the extent of mold contamination in the building, a procedure that they have prohibited NATCA from completing at the Detroit tower.

3. Long Term Facility Corrective Action
As in the Detroit facility, the FAA has not yet determined the source of the water intrusion/condensation in the elevator shaft. Unfortunately, the similarity in design between the Kansas City and the Detroit towers has not benefited the Agency in Kansas City as more than two years of effort in the Detroit tower has failed to conclusively identify the cause of the water intrusion or determine an appropriate response action to keep it from recurring.

In the first paragraph of the SSOW, the contractor is tasked "to correct certain moisture problems in the facility, to repair certain building components with water damage, (and) to water test areas of potential leaks." It appears that some of the moisture issues to be addressed are listed in 1.0, #4, 7, 8, and 10 of the SSOW. These activities include insulating selected pipes, modifying drain lines, sealing openings in handrail posts on the junction level, installing water-stops at drains in the subjunction level air shafts, and applying spray-on insulation on steel surfaces in the ASDE Penthouse and Vestibule to prevent condensation. While it is commendable and required by the industry standard of care to address water sources, no information has been provided to indicated that a change in schedule has been made to implement an engineering analysis prior to the remediation work. As such, additional sources may not be rectified as part of the remediation process, which could lead to the recurrence of fungal growth in areas that had been remediated.

5. Communications
This section indicates that project information will be provided to facility employees and local employee representatives. However, *timely* provision of information is necessary in order for the employees to have the ability to protect themselves.

The April 12, 2007 letter from David A. Price to Kevin Peterson states that NATCA's request to be allowed to sit in on all meetings, calls, or other forums regarding the study, assessment and remediation of mold contaminants at MCI was denied. In subpoint A it is stated that, "This request is denied as these are management meetings and the Union has no statutory right to be there."

While the Union may not have a statutory right to be present during the meetings, they have the right to a workplace free of environmental contaminants that could negatively impact their health. Based on the deficiencies in the previous and updated SOWs, NATCA input would be beneficial to help make sure that past decisions and errors occurring at other FAA facilities do not occur at MCI ATCT.

6. Risk Management Plan
NATCA personnel should be involved in the development of the risk management plan to make sure that all employee concerns are addressed. The current document does not indicate that such input would be allowed.

No information concerning the development of a risk management plan or the involvement of NATCA personnel in the creation of such a document has been provided to Wonder Makers Environmental.

Mold and Moisture Project Action Plan Table
The section of interim actions indicates that water-damaged ceiling tiles and pipe insulation are to be removed in March 2007. No specific work plan or risk assessment was provided for these activities. In addition, the plan indicates that Tech Ops would perform the work. Such remediation without utilizing proper engineering controls and work practices can create significant exposure/health problems. Recently, several individuals in the Detroit TRACON became ill when ceiling tile replacement was conducted in that area. Some individuals have reported long term sensitization from that exposure.

The current plan calls for mold remediation to begin in June and be completed in July 2007. Corrective work to deal with the water intrusion is not scheduled to begin until October 2007 with an end date of March 2008. This lag time may result in re-establishment of fungal colonies as noted in Section 3.0 of the FAA's mold guidance document.

Once again, the documentation provided does not indicate that a schedule change has been made to address this issue.

Statement of Work

1.0 Work Summary

This section states that the contractor must remove and dispose of all microbiological-contaminated materials in accordance with the New York City Department of Health's *Guidelines on Assessment and Remediation of Fungi in Indoor Environments* (GARFIE). It does not mention any of the other standard of care documents for the mold remediation industry. GARFIE does not serve as a stand-alone document that represents the current knowledge base of the mold remediation industry. For instance, GARFIE does not take into account the presence of hidden mold in determining the scope of a mold remediation project. The FAA's mold guidance document lists 39 specific references as "relevant guidance documents" in Appendix A. The document also summarizes OSHA's *A Brief Guide to Mold in the Workplace* in Section 3.2 and adds additional FAA specific requirements. As such, the language in the FAA's own guidance document indicates that the primary reference should be the OSHA guidelines rather than the New York City guidelines.

The work summary still lists GARFIE as the sole document used for the establishment of the SOW. Once again, GARFIE was not designed as a stand-alone document for the mold remediation industry, and, as such, the SOW and SSOW should have been developed using the variety of governmental and professional reference documents that constitute the industry standard of care.

The contractor is required to minimize dust generation using dust prevention and suppression methodologies outlined in GARFIE. As previously stated, the sole use of GARFIE neglects a vast amount of information concerning dust minimization techniques that should be specifically spelled out in the work plan. Such techniques include removal of drywall using HEPA vacuums at the face of cutting, using dust capturing devices such as a Dust Muzzle or Kett Tool connected directly to a HEPA vacuum, working in proximity to the negative air machine, and the use of air scrubbers.

Section 4.1 of the SSOW requires the contractor to use HEPA vacuums at the point of cutting or tools fitted with shrouds connected to HEPA vacuums to collect dust.

The work summary does indicate that isolation and negative pressure techniques will be used, which are the first steps toward protecting unimpacted areas from fungal contamination related to the remediation efforts.

As stated in the body of our letter, several areas of large scale remediation (in excess of 100 square feet) will be conducted without containment or negative pressure enclosures. In the MCI ATCT Mold Remediation Project Scope Briefing (attached to the May 1, 2007 memo from Howard Lyons), the fifth bullet point states that the areas will not require containment or negative pressure enclosures due to the quantity and/or location of the contaminated material. This exclusion of critical engineering controls based on location, even though the areas are in excess of 100 square feet, is illogical at best and allows for the cross contamination of unimpacted areas.

1.1.5 Certifications
This section states that the contractor shall be certified by IAQA, IICRC, NADCA or equivalent. However, the IAQA only certifies individuals for mold remediation, not organizations. It is important that all of the workers who will be on site have mold remediation training/certification since company certifications do not guarantee that the workers on the job site are competent.

Section 1.15 has not been modified to ensure that each worker has been trained and certified.

1.4 Submittal Requirements
Although the required submittals are important, there is no requirement for the contractor to submit training/certification information for each of the employees who will be on site. There is no indication that the contractor has to submit information that would allow the agency to determine whether the workers meet the minimum requirements for building security.

Section 1.4 of the SOW still does not require that proof of employee training be submitted for each worker.

4.0 Regulated Area
The specifications require the contractor to establish and maintain negative pressure enclosures while doing mold remediation work. The normal rate of four room air changes per hour is doubled for work in the elevator shaft. This extra level of protection is appropriate. This section also allows negative air machines to be vented inside the building if they are directed through a second HEPA filter. This is a reasonable accommodation for the challenges posed by the tower's unique type of structure.

There is no requirement for the utilization of decontamination chambers. Such an oversight will substantially increase the risk of cross contamination to the occupied areas of the building.

No section could be found in the SOW or SSOW specifically requiring a decon unit to be used for the remediation in the elevator shaft.

6.0 Work Procedures
Section 6.2 requires the contractor to wet wipe non-porous furniture and fixtures with a "10% Chlorox [*sic*] solution or equivalent detergent solution". There are several problems with this directive besides the spelling error. Clorox is bleach, which is not equivalent to detergents. More importantly, many industry professionals have determined that bleach solutions are not effective at denaturing mold spores. Because of its relatively long dwell time to be effective, irritating odor, corrosive nature, and proclivity to react with other materials, professional mold remediation contractors are utilizing chemicals that have been specifically designed to be effective in mold remediation without the negative side effects found with bleach use.

The requirement to utilize a bleach solution no longer appears in the SOW or SSOW.

Section 6.2 appears to have an error in requiring the contractor to wrap pre-cleaned furnishings and fixtures prior to their removal from the work area. Generally, pre-cleaning of materials potentially impacted by deposition of fungal spores is adequate if the items are to be removed. Double layer wrapping is generally reserved for items that are to stay in the work area, as indicated at the bottom of the section.

The requirement for double wrapping cleaned items to be removed from the work area no longer appears in the SOW or SSOW.

Section 6.3 requires that the contractor maintain a pressure differential of negative 0.02 inches of water. However, there is no explicit requirement for them to have magnehelic gauges or other devices.

Section 4.3 of the SSOW requires that the contractor utilize a combination sensing alarm and recording type pressure differential monitor to ensure negative pressure meets the minimum requirement of 0.02.

Section 6.4 details the amount of material to be removed in various areas of the building. The total quantity of mold-contaminated material to be removed from the tower is substantially in excess of 100 square feet. In fact, the amount of shaft liner to be removed from the subjunction level equipment room is approximately 611 square feet. Because of the multiple areas where material is to be removed and the large quantity to be removed, each work area should be treated as a "Level IV Extensive Contamination" project as described in the FAA's mold guidance document. This document (Section 3.2 (D)) requires decontamination areas at the entrance to each negative pressure enclosure.

It appears that a negative pressure enclosure will be utilized for removal of shaft liner in the subjunction level equipment room based on its listing in the mold remediation clearance protocol located in the SOW. There are no set sections in the SOW or SSOW that define which work areas will be remediated utilizing negative pressure enclosures. Instead, one must look at the clearance protocol and the Project Scope briefing attached to the May 1, 2007 memo listing what areas will ***not*** *use them in order to determine where containments will be required. Having a section outlining the remediation areas that will utilize NPE's would eliminate the need for backtracking and cross-referencing.*

The FAA document requires that an experienced CIH design the work plan. There was no indication on the action plan or statement of work who authored the document.

The updated SOW and SSOW (3/29/07) do not indicate the authors of the documents. The Mold Remediation Project Clearance Protocol was prepared by Barbara Herbert, CIH (NISCII). The fact that the clearance protocol doesn't specify what constitutes a successful visual inspection and allows visible dust to be present after the visual inspection shows that requiring mold remediation specifications be drafted by a CIH does not ensure that the specifications will meet the industry standard of care for mold remediation.

Section 6.5 allows mold contamination totaling less than ten square feet to be cleaned rather than removed. The shaft liner is to be wiped with a "concentrated Sporicidin

disinfectant solution". This is part of the scope of work that repeats some of the problems that caused reported health effects at the Detroit tower. More importantly, wiping the surface mold does nothing to address the potential for contamination on the inner layers of the gypsum shaft liner.

As previously stated, wet wiping fungally contaminated porous materials is ineffective at removing mold and is outside both the FAA's guidance document and the industry standard of care. Adding to the confusion, Section 1.2 "Removal and Remediation" of the SSOW states, "All gypsum board with any visible signs of mold or microbiological contamination or that is water-stained or damaged shall be removed or replaced." This statement is in line with the standard of care, but unfortunately was not carried over to all work practices in the SOW or SSOW.

Oddly the first picture on page 26 of the SSOW has a caption that reads "This is a typical photo of the shaft liner panels in the elevator shaft." A close look at the photo shows vertical lines of discoloration that appear to be water stains. If this is true, based on the statement above the entire shaft liner should be removed rather than wet-wiped.

Section 6.6 directs the contractor to wet wipe the metal walls with 10% "Clorox" solution without requiring any neutralization. As indicated previously, such a work practice can contribute to long term corrosion of the metal.

Sections 6.7 through 6.10 require a number of surfaces to be wet wiped with a "concentrated Sporicidin disinfectant solution". In addition to glutaraldehyde, Sporicidin contains a number of phenols. Both of these types of chemicals are significant irritants. This is one of the reasons that many individuals find Sporicidin to have an objectionable odor. It is interesting to note that the manufacturer's MSDS indicates that "If vapors are strong enough to be irritating to the nose or eyes the threshold limit value (TLV) is probably exceeded".

These same sections also require wiping of other surfaces with the 10% Clorox solution. Utilizing multiple chemicals for cleaning/sanitization increases the risk that they will come in contact with one another with a potential for unanticipated reactions (odors, irritation, increased corrosion, etc.). There are plenty of tested products available that can be used for both purposes without the strong odor or potential for cross reactions. In particular, products with quaternary ammonium mixtures generally have less objectionable odors while offering similar levels of effectiveness.

10% Clorox solution for wiping of surfaces no longer appears in the SOW, or SSOW. The updated version requires a detergent solution to be used for wet wiping of surfaces and cleaning of visible mold in the elevator shaft. While a detergent solution is recommended in GARFIE guidelines, it is not an industry recommended practice as the soap residue left behind can help support fungal growth, and is not capable of killing mold spores. Once again, there are a number of sanitizing agents designed specifically for mold remediation that do not have strong, objectionable odors, have shorter dwell times, work in heavy soil loading, and are not as reactive/corrosive.

While a detergent solution is the primary substance being used for wet wiping, the use of Sporicidin is still specified in the SOW (7.4 paragraph 4).

Sections 7.0 Air Monitoring and Inspection and 8.0 Final Clearance
The work plan does not provide an objective standard to determine when the work has been successfully completed. Section 8.0 of the Statement of Work would allow clearance of the work areas based solely on a visual inspection. Many of the documents in the standard of care advise that post-remediation air sampling should be used for large scale projects (generally 100 square feet or more). Even the NYC guidelines state that "Air monitoring should be conducted prior to occupancy to determine if the area is fit to reoccupy." The use of a visual inspection without supplemental air sampling to determine if the project was completed appropriately so as to avoid the potential for microscopic contaminants to impact occupied areas of the building is foolish. The Kansas City tower is a critical use facility where disruption of services due to occupant exposure to chemicals or biological contaminants could have dire consequences. The fact that some occupants have reported health effects that would indicate possible sensitization to biological contaminants should be a compelling rationale for mandating air samples prior to the dismantling of engineering controls.

See previous comments under "Project Action Plan 1.0c" regarding issues with the clearance criteria and sampling protocol.

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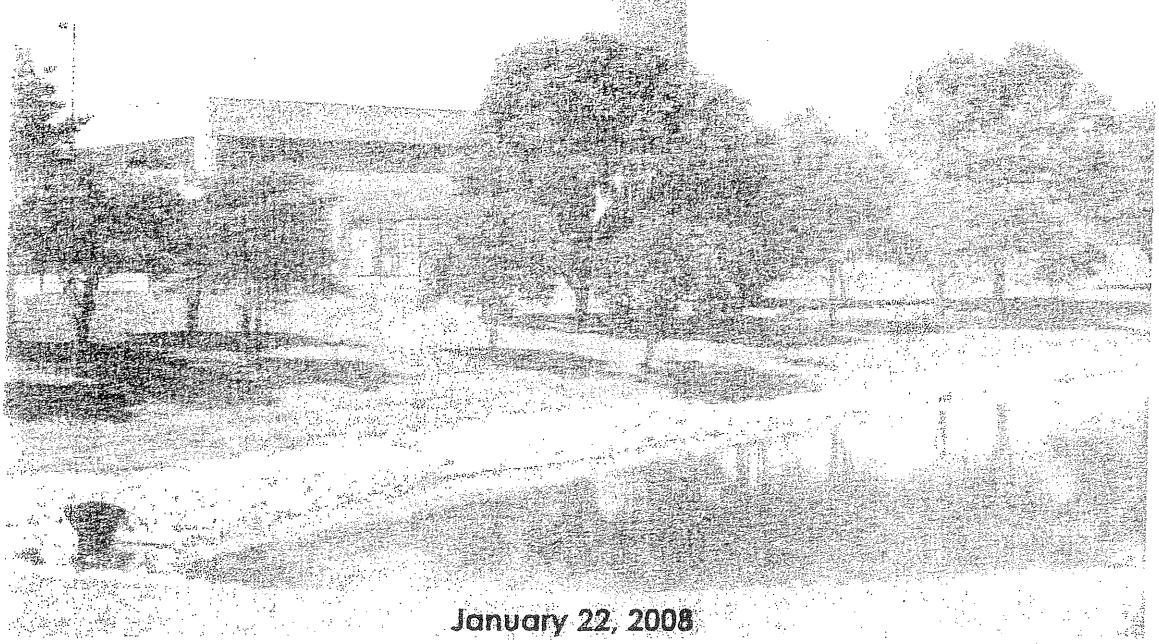
Report on Exterior Building Envelope And HVAC Conditions

Kansas City International Airport and TRACON Base Building Airport Traffic Control Tower



January 22, 2008

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KANSAS CITY INTERNATIONAL AIRPORT
AIRPORT TRAFFIC CONTROL TOWER
AND
TRACON BASE BUILDING
REPORT ON EXTERIOR ENVELOPE AND HVAC CONDITIONS

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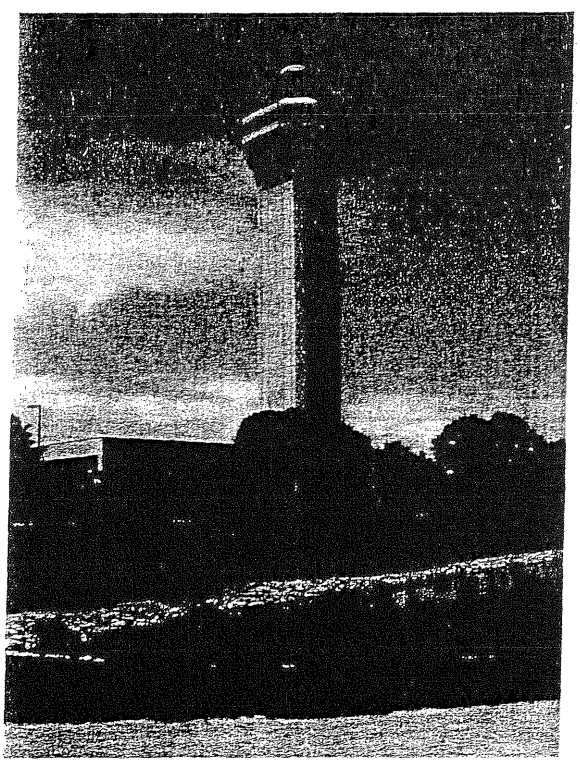
1.0 PURPOSE

The Airport Traffic Control Tower and TRACON Base Building at Kansas City Airport (MCI) has been experiencing significant water infiltration problems as well as interior moisture issues that have led to mold growth. The subject of mold and its associated environmental concerns has been addressed in other recent reports and is not the subject of this study. DMJMH&N visited the facility on July 9-12, 2007 to prepare a study that would assist the Federal Aviation Administration in determining potential causes for water infiltration and high interior humidity. It must be pointed out and noted that it was not raining at the time of the survey and DMJMH&N observed no actual water infiltration or condensation on the interior of the control tower and base building. This study and report focuses on observed conditions, discussions with local FAA staff and makes professional architectural and engineering judgments based on those discussions and our observations. The TRACON Base Building and Link are included in this study. The site investigation findings and observation are noted in the sections of this report along with conclusions and recommendations.



MCI ATCT and TRACON Base Building Facility

2.0 BACKGROUND

The MCI-ATCT was constructed during 1994-1995, per the FAA's prototype standard design for a 300-foot Major Activity Level Airport Traffic Control Tower by Leo A. Daily of Omaha, NE. This tower at Kansas City is 15 stories with an overall height of 249'-0" to the top of the ASDE Penthouse. The Cab of the control tower is an 850 sq ft, 8-sided, major activity level Cab. The Tower shaft below the Cab is unoccupied, with the exception of an Electronics Equipment Room and a Mechanical Equipment Room on the Subjunction Level, and a Smoking Room, Office, Breakroom and mechanical Equipment Room at the Junction Level The tower shaft is served by a 2,500 lbs geared traction elevator and a single, pressurized exit stairway.

The ATCT is connected to the Base Building via a 2-story Link structure.

3.0 GENERAL CONSTRUCTION

3.1 Architectural - Construction And Exterior Envelope

The tower shaft up to the Tenth Floor, at elevation 168'-0" above the Ground Floor, is constructed of a combination of load bearing pre-cast concrete panels and cast-in-place modules with interlocking structural reinforcing steel. Cast-in-place modules are faced with thin shell architectural pre-cast concrete panels with exterior finish to match adjacent structural panels. The basic shape of the structural shaft is 34' square with narrow slanted corners. The structural system above Tenth Floor transitions into steel frame construction that is clad on the exterior with architectural pre-cast concrete panels of concave shape flaring outwards, with the largest floor area at the Junction Level, 208'-0" above the ground floor. The Junction Level is an 8-sided shape derived from a 58' x 58' square with four 15'-6" deep 'shaved off' corners. There are four microwave antenna balconies at this floor. Access to these balconies is through a door in the Smoking Room and another door in the Men's Restroom. There are also four exterior walkways connecting the microwave balconies via hinged metal louver doors. As constructed, the walkways and microwave balconies share the same 4-inch thick concrete floor slab covered with some form of liquid applied waterproof coating. The exterior walkways have a 4" concrete topping over the 4" structural slab. The two south facing microwave balcony floor slabs have large triangular openings with steel grating. These grated openings are areaways for outside air for the HVAC equipment at Sub-junction Level directly below. All structural floor slabs with the exception of solid cast concrete at the Tenth Floor, are constructed of concrete topping over metal deck supported by steel beams. All structural steel framing and underside of metal decks are fireproofed with spray-on fibrous light-density fireproofing material.

The architectural pre-cast concrete panel cladding above Junction Level reverses its direction inward toward the Cab Floor which has a top of concrete elevation of 228'-0". These panels are wedge shaped to form the Cab Walkway enclosure that is 3 feet wide and parallel to the Cab exterior walls.

The Cab is faced with insulated metal panels of embossed finish, secured to the structural steel framing. The cab glazing and exterior fascia panels above the windows are sloped 15-degrees outward from the vertical plane. The glazing system is made up of 1.5" thick clear insulating glass units in an aluminum framing system attached

to and supported by the 4.5" by 8" (approximate) built-up steel Cab columns.

The ASDE Penthouse walls are clad with matching insulated metal panels over steel framing and sub-girts. The penthouse roof is constructed of 1/4" thick steel plate which is insulated on the inside. The method of insulating the ASDE Penthouse shown on the standard prototype drawings (walls on the outside and roof on inside) is not effective in insulating the Penthouse. There are areas around the entire perimeter where exterior temperatures are transmitted through the structural steel to the interior of the penthouse. On top of the Penthouse Roof is a 17" high steel collar on which the ASDE is mounted. The 17" collar is uninsulated as is the entire ASDE rotodome, therefore making it difficult to control the temperature and humidity inside the ASDE Penthouse.

Access to the ASDE Penthouse is through the Cab ceiling by pull down folding ladder and fixed steel ladder above. From the Penthouse there is an access door to the Cab roof which is surrounded by a 42" high parapet wall and steel tube raceway at elevation 246'-0". The steel raceway is for communication wiring and supports antenna mounts, obstruction lights and lightning protection air terminals.

3.2 Architectural - Exterior Finishes and Materials

All exterior facing concrete has an integral colored with a medium exposed aggregate finish. The entire ATCT shaft has been sealed/coated with an acrylic based Canyon Tone Stain. All joints between the structural pre-cast panels and the cast-in-place concrete below the Tenth Floor are solid grouted and sealed with silicone sealant. All joints between architectural pre-cast panels that are above the Tenth Floor Level are double sealed with silicone sealant over foam tube backer rods on the exterior and caulked on the interior.

Exterior walkways at Junction Level and Cab Walkway consist of a waterproofed membrane and concrete topping over the structural concrete slabs. These walkways as well as the microwave balconies have been treated with a liquid applied waterproofing membrane as described in section 3.1 above..

The microwave balconies at Junction Level are screened with large, tensioned fabrics that are UV and weather resistant designed to minimize microwave transmission loss.

Insulated metal panel cladding over the Cab and ASDE Penthouse is described in the Exterior Envelope section above.

3.3 Mechanical Systems Description

The outdoor design condition for this location is as follows:

- Summer design temperature is 96°F DB/ 74°F WB
- Winter design temperature is 6°F.

The tower is supplied with chilled and heating hot water from the base building. The main features of the existing HVAC system are:

- The Ground Floor has an elevator machine room, which is cooled by a ceiling mounted fan-coil unit. Building chilled water is used to cool the room. Elevator Lobby is served by a ceiling mounted fan coil unit with chilled and hot water pipes. The stair vestibule is heated by the ceiling mounted hot water unit heater.
- The Second Floor has finished space used as an office. The entire office area is air-conditioned by ceiling mounted fan-coil unit, using building chilled and hot water systems. The second floor also has unconditioned space in the electrical room (2TS4).
- The Third Floor Fire Pump Room (3TS5) is provided with outside air for ventilation during the summer and warmed with hot water heating coil (HWC-18) during the winter.
- The Fourth through Tenth Floors are unconditioned spaces. These floors are similar to that of the Third Floor.
- The Eleventh Floor is also similar to that of Third Floor, except rooms 11TS5 and 11TS5A are served by fan coil units.
- The Sub-junction, Junction and Cab levels are air-conditioned spaces, except for the mechanical rooms, which are heated by unit heaters.
- The stair shaft is an unheated space, stair vestibules are heated. The stair vestibule and stair itself are pressurized using pressurization exhaust fans and relief dampers. This pressurization system only works in the event of a fire/smoke condition.

4.0 OBSERVATIONS AND FINDINGS

4.1 General Exterior Envelope

The urethane sealant between architectural pre-cast panels of the tower and base building has been replaced. (See photos 4.1-1). This prevents rain water or melting snow to enter wall cavities and get inside the building structure. However, as the photos indicate, the new sealant had some lack of installation quality and appears to be already pulling away from the sides of the joints in some locations, thus creating voids in the sealed surface and potentially allows moisture intrusion into the building. Pre-cast panel interior caulking appears to be in good condition with no visible signs of excessive deterioration. This situation, however, make it's more difficult to trace water leaks, which are channeled to the inside of the structure between the two sets of seals.

The entire exterior surface of precast concrete on both the ATCT and Base Building has been coated with an opaque dampproofing coating. During a walk around the exterior of the Ground Floor, DMJMH&N observed several cracks on the surface of precast concrete panels at the base building (See photo 4.1-2).

The precast concrete panel exterior finish of both buildings is inherently susceptible to transmittance of water vapor if the exterior sealer has deteriorated beyond its useful lifetime. This requires professional advice from the manufacturer and could not be definitively addressed by DMJMH&N. The integrity of the exterior dampproof coating should be checked.

Additionally, there is concern at the vertical joints in the precast panels above the 10th floor. If water, either from the outside or inside, gets behind the sealant, it is trapped and can build up as a column of water. Installation of weeps at the bottom of the vertical sealant joints would allow trapped water to wick to the outside at the 10th floor, thus reducing potential for built-up water to run onto the floor at this level. A similar condition potentially exists at the grouted joints in the structural concrete below the 10th floor. These grouted joints have been covered with sealant in an effort to eliminate water infiltration. Build-up of water behind the sealant could be a problem similar to that described above. Installation of weeps at the bottom of the vertical sealant joints at the ground floor would allow trapped water to wick to the outside.

There are some metal louvers installed through the insulated panel wall that needed to be sealed. Unsealed gaps around louver perimeters are also a potential source of moisture and rain water intrusion

It is noted that the Cab walkway door has a gap on the latch side that allows water entry. In addition, the sill flashing tends to slope towards the threshold which also allows water infiltration (See photos 4.2.2-2 and 4.2.2-3).

Penetrations of the walkway present additional leak sources to the integrity of the waterproofing membrane (see photo 4.2.2-5). While not observed, it was noted by the FAA that water leaks into the Cable Access Level between one or more of the Cab Walkway drains and the floor slab, indicating a potential leak at the drain, or a leak somewhere else with the water traveling under the sandwiched waterproofing membrane then leaking at the drain.

A vent pipe exits at the cab walkway and moisture in the air coming from the vent pipe condenses and drips on to the walkway (See photo 4.2.2-6).

There are noticeable water stains on the wall and sloped ceiling of the cab stairs under the Cab sink area, apparently from previous leaks (See photo 4.2.2-7).

4.2.3 Cable Access Level

The perimeter wall of the Cable Access Room is comprised of metal studs and batt insulation faced with the kraft paper (vapor barrier) on the warm side of the wall. The outside of the wall is finished with water resistant gypsum wallboard. In several areas the vapor barrier has been compromised which will allow moisture to migrate to the cold side of the wall providing for the possibility of condensation. (See photo 4.2.3-1)

There are some metal louvers installed through the insulated panel wall that needed to be sealed. Unsealed gaps around louver perimeters and along the bottom of the insulated metal panels are also a potential source of moisture and rain water intrusion as evidenced by water stains on the steel behind the panels and louvers (see photo 4.2.3-2). It has also been observed by the FAA during the winter months that

observed. The gypsum board shaftliner panels had water streaks or stains at many locations (see photo 4.2.4-1). There were whitish stains on metal studs and tracks which could indicate possible water stains as a result of presence of moisture inside of the shaft. This could be caused by either condensation or a direct run of water over metal surface, under some extreme conditions. Since this shaft is located within the center of the tower and directly under the Cab, it doesn't seem to be possible that outside water would ever migrate directly to the top of the elevator shaft. Therefore, the most probable sources of moisture presence could be water leaking into the shaft at unoccupied floors below from melting frost or, possibly, from back draft from the elevator smoke relief which is ducted to the outside louver at Cab Walkway above.

4.2.5 Junction Level

It should be noted that the temperature and humidity in the corridor from the stairway to the lockers was unusually high at the time of this site visit.

DMJMH&N started the inspection in room J10. The floor drain in this room has several drain lines emptying into to it. The funnel for the floor drain was missing or never installed allowing water to splash and run across the floor and under the floor tiles, especially from the blowdown of the humidifier. As a result, the drain is very corroded and there are stains on the wall and floor. The water also finds it way down to the Sub-Junction level below as evidenced by the visual corrosion on pipes above the ceiling (see photos 4.2.5-1, 4.2.5-2).

J12 is a Mechanical Room with a partially clogged floor drain that requires cleaning to be able to support the four condensation lines emptying into it. The installed drain is not appropriate for accepting indirect waste lines. Also, there are leaking pipes in need of repair (see photo 4.2.5-3, 4.2.5-4). The leaks may also be caused by breaches in the vapor barrier jacket on the chilled water piping.

Door J8A head is missing the weather stripping which allows air and water leaks as noted by the staining on the door.

We accessed the Microwave balconies from both the Men's Restroom access door and the access door in the Smoking Room. This allowed for inspection of all four microwave

balconies and exterior walkways. The surfaces of the concrete slab at the exterior walkways and the balconies were treated with some form of a waterproofing coating that appeared to be in good condition; however, it has been observed by others that there are leaks in the sub-junction level below, especially in the area of Walkway #1 on the north side of the tower. Therefore, it must be assumed that there is a problem with the waterproofing membrane sandwiched between the structural concrete slab and the concrete topping on the walkways.

Along the exterior walkways are glazed guardrails mounted to the 3"x3" sq. steel tube posts which are spaced at 48-inch on center. At the top of these posts, there are holes approximately 5/8" in diameter on opposite sides of each post to act as vent holes. These posts are welded directly to the top flange of the I-beam below, which is supporting edge of walkway slab. The wind driven rain can cause water intrusion inside the tube and then to the inside of structure below (See Photos 4.2.5-5). However, it has been reported that these holes were plugged and sealed right after the site visit, thus not contributing to water intrusion anymore.

It was noted that in several places along the Junction Level Walkway that the gaskets for the storefront framing have deteriorated, creating gaps along the bottom of the insulating glass unites (See photo 4.2.5-6).

Janitor Room, #J11: Water damage to the floor adjacent to the service sink (see photo 4.2.5-7). It appears that water has leaked through the slab to areas below such as the Subjunction Level corridor ceiling and one of the light fixture lenses had water stains. Water may be getting under the service sink and leaking through at the penetration in the slab for the drain line or possibly getting under the wall and around the edge of the slab at the elevator opening or at a pipe penetration in the adjacent chase.

4.2.6 Sub-Junction Level

The Mechanical Room at the Sub-Junction Level is located directly below the Junction Level South Walkway and Mechanical Room J12. Photos clearly indicate rusted floor drain and leaking pipe causing leaking and staining at the 11th Level (See photos 4.2.6-1, 4.2.6-2, and 4.2.6-3).

room SJ1 will condense (and freeze) on the cold interior surface of the pre-cast panels. This condensation (or melting ice) will drain down the inside of the precast panels all the way to the 10th Floor. Inspection of this concealed space under the Junction Level walkways by others from interior of the Sub-Junction Level has revealed some water stains and moisture intrusion.

DMJMHN did not observe this but, it was brought to our attention that door SJ8 to the exterior air shaft apparently has a poor seal that has caused condensation and damage to the adjacent gypsum board wall.

4.2.7 Eleventh Floor

DMJMH&N accessed this level thru the stairway coming from Sub-Junction Level above. Stairwell walls appeared to be in good condition, no staining was observed at or above of the floor landing. The entire stairwell is enclosed with 2-hr fire rated walls and designed to be pressurized. Access to stair landings is through the 4-feet wide pressurized vestibules that are typical at all levels. Water stains and discoloration were found on the concrete floor and gypsum board wall of the stair vestibule. Apparently a fire sprinkler line leak had been repaired and it was assumed to be the cause of the stains. The stair vestibules at all levels are very warm apparently due to the continuous recirculation of hot water through the unit heaters.

At this level all interior spaces are surrounded by the shaft wall similar to the Sub-Junction Level above, creating a narrow void space between the exterior pre-cast concrete and the shaft wall. DMJMH&N accessed this void space through an access panel at the south wall of Corridor 11TS1. There was construction debris throughout this space that revealed evidence of moisture intrusion which has been cleaned out. The moisture was probably from the surface condensation or joints of the pre-cast concrete walls (see photo 4.2.7-1). This space was observed to have heavy condensation and frosting on the inside of the pre-cast walls during the winter months. Water stains have streaked the walls. The FAA noted that "the fire safing has heavy concentrations of mold and must be removed and replaced. The fire safing was repeatedly wetted and dried after exposure to leaks from building joints, leaks from the floor drain above and from [illegible] condensation and melting frost on the interior face of

the precast panels" Investigating and mitigating mold issues is outside the scope of this study and report.

Due to this being a very narrow space with structural bracing at each end of the wall it was impractical to inspect the entire perimeter of the inside of the pre-cast panels. The west wall of room 11TS5 was known to have leaks. This could be attributed to the leaking floor sink above in the Sub-Junction Level under the raised flooring. The pipe insulation at the east wall fan coil unit is water stained and should be checked for leaks.

The Mechanical and Electrical rooms at the east side east of the elevator hoistway were inspected and both rooms were dry and very warm inside.

Room 11TS5 has water stains on the concrete slab along the bottom of the gypsum wallboard in the proximity of the column enclosure and visible rust on the diagonal bracings coming from under the sprayed-on fireproofing. There are two precast concrete wall connections which penetrate the shaft wall into the room and also have signs of corrosion probably the result of condensation (See photos 4.2.7-2).

Frost and ice were seen on the walls and floors in the area outside the shaft wall on the 11th floor (see photo 4.2.7.3) on January 18, 2007.

4.2.8 Tenth Floor

The Tenth Floor interior wall configuration is almost identical to the Eleventh Floor above; with all interior spaces surrounded by a shaft wall, creating the narrow void space between the shaft wall and the exterior pre-cast wall. Moisture condenses on the inside of the pre-cast panels similar to the 11th floor above.

The stair vestibule 10TS6 (typical for all levels from 2nd to 11th) is very warm due to the hot water recirculation piping for the unit heater.

Typical for all mechanical chases at levels from 3rd to 11th are very warm, likely due to the uninsulated hot water piping in the plumbing chase.

The top of the floor slab at this level also signifies the top of the straight and vertical tower shaft below. At this level the transition is made to the concave shaped architectural pre-

cast panel exterior enclosure. Therefore, a conclusion can be drawn that there is a first horizontal joint with sealant and caulking along bottom of these panels. Since interior walls are completely closed, DMJMH&N could not make visual observation of these joints; however, there were several water stains on top of concrete slab in the proximity of the perimeter walls. This is not a conclusive statement that water may be leaking from the bottom of exterior pre-cast panels, just a possibility, as water and moisture could also permeate down from the levels above. One of the potential problems is with water getting behind the sealant at the vertical joints which is described in more detail in paragraph 4.1.

Following inspection of the stairway at this floor, DMJMH&N entered Room 10TS5 which is an unoccupied space in the northwest portion of the Tower shaft. There was a noticeable difference in the air temperature between this room and the Elevator Vestibule. Unoccupied Room 10TS5 was cool, since it is not conditioned, while the adjacent elevator vestibule was warm. Room 10TS5 has full height interior walls covered with painted gypsum wallboard and exposed structural framing with metal deck above covered with sprayed-on fireproofing.

In Room 10TS5 there were water stains on the concrete slab along the bottom of the gypsum wallboard in the proximity of the column enclosure (See photo 4.2.8-1). Additionally, Room 10TS5 has water damaged to the gypsum board at several locations along the base.

Room 10TS5, observations by others noted that after warmer outside temperatures on January 19, 2007, frost on the precast panels began to melt and water began to accumulate on the floor slab at the north wall (see photo 4.2.8-2). Observations have also shown entire surfaces of the interior side of precast panels at this level and above (as well as several levels below) covered in frost or condensation to the point where water runs off the panels and causes building materials to get wet. Any leaks from above and the majority of water from frost melting accumulate on the 10th floor because the slab caps off the straight section of the tower levels.

4.2.9 Ninth Floor

The Ninth Floor is the first Tower shaft floor (counting from the top down) that has uninsulated and unfinished exterior

concrete walls. This is a double height floor with the intermediate beams at elevation approx. 12 feet above floor and steel grating in the upper portion of the Electrical Chase.

The west end of room 9TS1 has very visible water stains on the perimeter of the corridor ceiling. The west wall is the exposed exterior pre-cast concrete wall. The floor tile at the west end of the corridor has water stains and white residue at the joints. (See photos 4.2.9-1 and 4.2.9-2)

A visual inspection was made by others through the ceiling access panel in the 9TS6 stair vestibule that showed water stains on the north, east, and west walls above the ceiling. The worst condition was in the northeast corner.

In Room 9TS4, others had observed melting frost and condensation on the north and east walls January 19, 2007 (see photo 4.2.9-3).

4.2.10 Eighth Floor

A visible inspection was made through the access panel in the 8TS1 corridor ceiling. There was visible water stained fireproofing on the underside of the 9th floor metal deck.

There was some indication of moisture intrusion observed on the south wall above the fireproofed beam in the same space above the ceiling. In the stair vestibule 8TS6, through the access panel a large area of discoloration (moisture intrusion) was observed on the west wall gypsum board.

Electrical Chase, Room 8TS4 was generally warm but dry. There was some evidence of deposit of efflorescence along the grouted joints and water stains. This is typical in all of the Electrical rooms floors Nine through Three (See Photo 4.2.10-1).

It was noted by others that condensation and frosting were seen on the west wall of room 8TS5, on January 18, 2007 (see photo 4.2.10-2).

4.2.11 Seventh Floor

This level has been constructed almost identical to Eight Shaft Level above, with fireproofing applied to its underside.

The interior air was hot and humid, and there were stains on fireproofed beams and floor deck above, possibly caused by moisture coming from above.

4.2.12 Sixth Floor

Floor layout and wall construction the same as the Seventh Floor. This floor was hot and similar moisture related problems.

In room 6TS3, the end caps of the hot water pipes are dripping (see photo 4.2.12-1).

4.2.13 Fifth Floor

The Fifth Floor layout and wall construction is the same as the Sixth Floor above.

There were visible water stains on the vertical concrete walls (See photo 4.2.13-1).

4.2.14 Fourth Floor

This floor is dedicated to the stair pressurization fan, outside air intake louver and related ductwork.

Wind driven rain spills over the intake louver and migrates down to (2) 20"x8" outside supply air ducts (see photo 4.2.14-1, 4.2.14-2). Water stains appear on the 2nd floor level and ground floor level (see photo 4.2.14-3).

4.2.15 Third Floor

This floor has the fire pump in 3TS5, yet is very similar in layout to the Fourth Floor above.

Room 3TS5, has a badly corroded floor drain too small for the use. Three pipes drain to floor drain and probably cause overflow of water which leaks through the slab to ceiling of floors below (see photo 4.2.15-1).

Information gathered by the FAA inspection indicated that the water damage was caused by the discharge of water in room 3TS5 during maintenance and testing of the fire pumps. This room has multiple cracks in the concrete slab which have allowed water to leak to the floor below or into the elevator shaft.

4.2.16 Second Floor

The Second Floor of the ATCT is connected to the Base Building Second Floor thru the Link structure at its east facing wall. This level had a functioning office space in Room 2TS5. This same space is typically unoccupied at upper floors. There were several moisture related problems on this level. In the office there were several large water stains on the acoustical ceiling tiles on the west side of the elevator shaft and water streaks and stains on the elevator shaft walls (see photo 4.2.16-1). Information gathered by an FAA inspection indicated water damage to the ceiling tiles and interior walls were caused by discharge of water in room 3TS5 during maintenance and testing of fire pumps.

Also, stains can be seen on the west wall in Room 2TS5 from water infiltration at the 4th Floor outside air intake louver.

4.2.17 Ground Level

At this level there is an elevator lobby directly accessible from the Ground Floor level of the Link. The tower stairway provides direct discharge to the outside and is not accessible from the elevator lobby.

We accessed the Ground Floor Electrical Room, GTS3, from the elevator lobby. The north and east walls of this room were uninsulated with exposed concrete and the room was unpainted with a bare concrete floor.

In Room G4, chilled water pipes at AHU-16 are dripping (See photo 4.2.17-1, 4.2.17-2).

Apparent water damage at west wall is from the fourth floor outside air intake louver leaks that have migrated to the first floor (see photo 4.2.17-3).

4.2.18 Excessive Interior Humidity – General Discussion

Moisture and humidity in the ATCT are the result of several factors:

- Moisture infiltration from the exterior environment
  - → Humidity through walls
  - → Leaks in exterior envelope
- Water leaks within the building
  - → Pipe leaks

→ Poorly functioning drains

- Building occupants
  - → Moisture from breathing
  - → Cooking
- Moisture added via humidifiers

Since the tower has been sealed on the outside (both the joints and the concrete surface) we believe that actual water infiltration is not a likely cause for the moisture on floors 11 and below. Also, while there have been pipe leaks of various types that have caused problems on the upper floors, again, we do not believe this to be a significant contributing factor to the moisture, condensation and frost (in the winter) on floors 11 and below. Finally, with the limited number of staff in the tower, people are not seen as a major source of humidity. This leaves us with water vapor (from the exterior environment and internally from humidifiers) in the air as the prime contributing factor to the moisture and condensation problems on floors 11 and below

There are humidifiers on the Junction and Sub-junction levels and the water vapor will tend to equalize itself between different areas just as air pressure will do. This means that the moisture in the Junction and Subjunction levels will tend to migrate down (or out of) the shaft, gradually dissipating to the floors below. This conclusion is consistent with the conditions in the tower because the condensation (and icing) gradually decreases below the 11th floor (Sub-junction Level) and below the 7th floor is almost non-existent. In the warmer months, when the outside air contains a lot of moisture, this compounds the problem of the humidifiers. The result of the excessive moisture in the tower is mold growth when the temperatures are warm and condensation when the temperatures are cold.

During the warm humid months, when the air is capable of holding large amounts of moisture, dehumidification is recommended. However, during colder months, when the air holds less moisture, heat and ventilation are recommended. As an example, if it were 32-degrees outside with a relative humidity of 80%, when that same air is warmed to 70-degrees, the relative humidity is only 17%. The exchange of high humidity air with low humidity air will lower overall humidity in the tower shaft. However, the practicality of installing supply and return air ducts throughout the tower shaft is

questionable. As a result, heating and/or dehumidification will be the recommend year round solution to the problems experienced on floors 3 through 11.

4.3 Link and Base Building

4.3.1 Exterior Conditions

Inspection of the exterior elevations of the Link and Base Building revealed numerous water stains at and around building aluminum storefront framing. Typically stains and visible streaks originated at the glazing head at interface with pre-cast concrete panels. At the time of this inspection all glazing panes along the exterior perimeter had received a continuous bead of sealant, applied over existing gasketing. According to the user statements, wet sealing of windows stopped the majority of water leaks to the interior. There are still visible stains on the surface of the aluminum framing caused by water running down the pre-cast panels and toward the window, along slanted portions of the pre-cast concrete panels. There is a kerf at the bottom of the pre-cast panels, intended to prevent the flow of water toward the windows. However, the main cause for concern are the corners of the mitered and sloped pre-cast panels below second floor overhang. This panel configuration channels rainwater directly toward the aluminum corner posts of the first floor window frames (see photos 4.3.1-1, 4.3.1-2 and 4.3.1-3). The second floor window framing appeared to be in much better condition.

There is also concern with the direct attachment of clamping rings for support of down conductor conduits. If they are not properly sealed and/or gasketed, this may be a source of water intrusion to the inside of the storefront framing, thus to the interior of the building envelope (see photo 4.3.1-4). Similar attachment of clamps to the face of the pre-cast, if left unsealed, can cause water intrusion into the concrete, and during the winter season may eventually cause deterioration due to a freeze-thaw cycle (see photo 4.3.1-5). We also noticed numerous unsealed penetrations through the pre-cast panels, such as unused bolts (see photo 4.3.1-6), telephone boxes (see photo 4.3.1-7), and electrical outlets (see photo 4.3.1-8).

Other areas of concern on the exterior are deteriorating weatherstripping on the hollow metal doors along the north

elevation and equipment yard, some double doors that lacked astragals at the meeting stiles (see photo 4.3.1-9), and gathering debris at the bottom of the first floor pre-cast panels (see photo 4.3.1-10) which may prevent water flow away from the building and its eventual intrusion into the building interior. At several exterior doors along the north elevation, improper threshold types and installation as well as deteriorated door weatherstripping have been the cause of major intrusion of rain water and melting snow into the building interior (see photos 4.3.1-11 and 4.3.1-12).

Inspection of the Link exterior curtain wall revealed missing and/or deteriorated gasketing at glazing corners, which may cause water intrusion into the interior and eventual deterioration of insulating glass units (see photos 4.3.1-13 and 4.3.1-14). Open and unsealed joints between snap-on covers and vertical mullions were observed, through which rain-driven water and melting snow will find its way into the interior (see photos 4.3.1-15 and 4.3.1-16). There is also evidence of water intrusion through the storefront entrance doors at Link (see photos 4.3.1-17 and 4.3.1-18). A possible cause for this is the construction of the entrance canopies where there is an open gap between the Link's curtain wall and the back of the canopy structure (see photo 4.3.1-19).

4.3.2 Roof

The DMJMH&N team accessed the low roof over the mechanical wing from the exterior steel ladder. Surface inspection of this roof indicated that there were no major problems, with some minor exceptions. The sealant between pre-cast panels along the east wall of the high bay is punctured in several places (see photos 4.3.2-1 and 4.3.2-2). This condition may allow water intrusion to the inside of the high bay wall structure and subsequently damage the interior wall finishes and ceilings. It was not possible to assess the conditions of the roof membrane under the concrete pavers. However, an area of concern is the visible occurrence of moss and/or some sort of organic matter along roof parapets and corners (see photo 4.3.2-3).

Following inspection of the low roof, the DMJMH&N team accessed the high roof via the stair ladder and roof access hatch. This roof has many problems where there is potential for deterioration of the single-ply EPDM roofing membrane that is covered with concrete pavers. In many areas the roof

pavers were bent, broken and crumbling with some sort of visible, moss-like, organic growth under the pavers. This situation prevailed along the roof parapets and corners (see photos 4.3.2-4 and 4.3.2-5). These conditions were also apparent at and around almost every roof drain (see photos 4.3.2-6 and 4.3.2-7). Removal of some of the roof pavers revealed a deteriorated protection layer, with debris and organic matter visible under the pavers (see photo 4.3.2-8). This situation raises questions of the integrity of the single-ply roofing membrane, which is significant when combined with documented leaks at the second floor ceiling coming from the roof above. Removal of the pavers and inspection of the entire roof membrane was beyond the scope of this project. However, there is enough evidence to suggest roofing membrane failure in some areas.

Some other areas of concern included conditions along parapet walls that are covered with EPDM flashing membrane. There are numerous points where plastic clips were installed along the parapet wall on the side that is facing the roof. Most of the clips are no longer used and are crumbling (see photo 4.3.2-9) or pulled out together with mastic and the parapet flashing, thus creating points of water and moisture intrusion under the roofing membrane below (see photo 4.3.2-10). At many pipe-thru roof penetrations, the rubber flashing is inadequate because it was installed too short. Typical EPDM boot flashing should extend a minimum of 8 inches above the top of the adjacent roofing surface before clamp and sealant can be installed (see photos 4.3.2-11 and 4.3.2-12).

At the southwest portion of the high roof there is a skylight with a group of nine plastic domes (see photo 4.3.2-13). There is some evidence of sealant failure along the skylight perimeter flashing (see photo 4.3.2-14), as well as water stains at the low point of the skylight domes. This may cause water leaks to the building interior if seals and/or gasketing failure occurs at intersections of skylight frame and top pressure plates (see photo 4.3.2-15). The curb around the skylight has a relatively low profile, and its height above the roof membrane is further reduced by the depth of the concrete pavers. In the winter season the snow may build up along the sides of the curb and over the low points of the skylight domes. Along the top of the curb flashing there are drip holes which may allow

uncontrolled water intrusion while snow build-up starts to thaw (see photo 4.3.2-16).

Inspection of the Link roof did not reveal any major problems, yet there is a concern of possible improper slope on the portion of the Link roof adjacent to the tower structure. Photo 4.3.2-17 appears to show a slight roof line depression along the curb at the expansion joint between the Link and the ATCT. There should be a uniformly continuous high point across the entire width of the Link, forming a cricket which should slope toward the roof drain. This may cause ponding of water under the pavers and potential failure of the roofing membrane.

Another typical problem which occurs at all other roof areas is deterioration and build-up of organic matter around roof drains (see photo 4.3.2-18).

4.3.3 Second Floor

Following the inspection of the roof, the team investigated the interior of the second floor. Since there was evidence of water stains on the suspended ceiling panels at the first floor corridor along grid line 3, the second floor inspection began with the Radar, TRACON and Communication Rooms, where there is an access floor panel system. There are two floor sinks under the raised floor in proximity to CRAC units in the Radar Room, #204. After lifting of floor panels we discovered major water stains on the concrete slab due to leaking pipes and clogged drains. (see photos 4.3.3-1, 4.3.3-2 and 4.3.3-3). Also in Radar Room #204 there were water stains on the suspended ceiling panels in proximity to grid line D & 5.

Following inspection of the Radar and TRACON Rooms, the DMJMH&N team entered Room #221 AF Communication Workshop where there was extensive water staining on the suspended acoustical ceiling panels (see photo 4.3.3-4). When the ceiling panels were removed for further inspection of the space above there was no direct evidence of water dripping on the acoustical ceiling; however, there was noticeable rusting along the roof metal deck perforated flutes (see photos 4.3.3-5 and 4.3.3-6). Since there was no other source of water leakage in the immediate proximity to the stained ceiling panels, it is reasonable to suspect that rust on the metal deck could be a result of the roofing failure above. It should be noted that perforations along the metal deck

flutes are meant to facilitate curing of the insulating concrete fill above the deck. While most of the perforations were whitish and relatively clean, the visible rust on some flutes could only be caused by the water migrating from above. There were similar water stains over the 24 x 24 acoustical ceiling panels along Corridor #225 between the Women's Restroom #220 and above the entrance to the Locker Room #218 (see photos 4.3.3-7 and 4.3.3-8).

There were also water stains over the gypsum board ceiling in the Breakroom #217 and around recessed "can" light fixtures (see photos 4.3.3-9 and 4.3.3-10). According to the FAA these stains were caused by the leaking skylight above, which was subsequently repaired and the leaks eliminated.

During inspection of all perimeter offices, it was noted that in almost every room with exterior windows the gypsum wallboard at the bottom of the window jambs was soft and deteriorated, and plastic laminate window stools and wallcoverings were delaminating due to moisture (see photos 4.3.3-11 through 4.3.3-16). All window framing was displaying water stains due to rain water intrusion, which were common prior to wet sealing of glazing from outside.

4.3.4 First Floor

First floor inspection revealed numerous and multiple water stains on gypsum walls, over acoustical ceiling panels, and on floors. The DMJMH&N team commenced inspection of this floor with AMT Room #126 where there is a cable tray penetration to the second floor above. The north wall of Room #126 displayed water stains coming from the cable tray opening above (see photo 4.3.4-1). Subsequent inspection of the second floor revealed a path of water from the nearby floor sink, which found its way to the floor opening for the cable tray (see photos 4.3.4-2, 4.3.4-3 and 4.3.4-4).

Inspection of the space above the ceiling in Corridor #128 in the proximity of Room #126 revealed corroded and leaking pipe connections (see photo 4.3.4-5).

Inspection of the rooms dedicated to building services revealed numerous leaking and corroded pipes, valves and connectors, water stains on the floor, corroded floor sinks, etc. (see photos 4.3.4-6 through 4.3.4-9) . Most of the leaks were occurring within Mechanical Room #121 which is

directly below the Tracon and Communication rooms on the second floor. There are multiple duct and pipe penetrations through the recessed floor slab above. When leaking water and other liquid substances evaporate, moisture will permeate up the floor and through unsealed openings, thus contributing to the overall level of humidity within the building.

After inspection of building services areas, the team visited perimeter offices beginning with the A.F. Manager Room #110. There were numerous water stains on the carpet at and around the column enclosure at the southeast corner of the room (see photo 4.3.4-10). In addition there were large stains and oxidation on the vertical window mullions running down from the window head above (see photos 4.3.4-11 and 4.3.4-12). Water infiltration into the gypsum board at exterior walls caused delamination of plastic laminate and fabric wallcovering at window sills (see photo 4.3.4-13). According to the FAA, water leaks through the window framing stopped after the wet sealing of the exterior glazing. However, there is still evidence of moisture at the bottom of corner columns. This may be due to the configuration of the mitered corner pre-cast concrete panels at slanted soffits above window heads. It is very apparent that this configuration channels rain water from above into the upper corner of the window framing below.

Further inspection of the perimeter office areas revealed similar problems with water stains on the window framing and delamination of wall coverings and plastic laminate at almost all intersections of window jamb and wood stools at window sills (see photos 4.3.4-14 and 4.3.4-15).

Janitor Room, #134: Water damage was noted on the tile floor in front of the service sink as well as water stains on the gypsum board walls adjacent to the ceramic tile wainscot. The service sink has cracks on the front and an adjacent electrical receptacle was damaged and water stained (see photo 4.3.4-16).

5.0 CONCLUSIONS

The timing of the site visit did not allow for first hand verification of water and moisture intrusion. However, the residual signs and damage of materials still present provided evidence of significant problems which have occurred. A combination of existing construction and Kansas City weather conditions provide opportunities for water and moisture intrusion to the interior of the tower shaft and base building. A major contributor to excessive moisture problem would be through the exterior envelope at roof areas and sealed joints between architectural pre-cast panels, and to a lesser degree through grouted joints between pre-cast and cast-in-place concrete walls. The tower was recently resealed and generally joints appear to be in very good condition. The tower humidity levels during the winter months are a result of internal moisture sources. Even moderate humidity inside buildings can produce wetting by condensation on exterior walls and on the building structure because of moist air contacting surfaces below the dew point. Internal sources of moisture in the tower are

- Personnel
- Building humidification systems
- Poorly functioning floor drains
- Water from snow melt leaking into the buildings

The floor drains in Junction Level room J10 and Subjunction Level SJ1 do a poor job of draining the pipes directed at them. These drains flooded multiple times and caused water infiltration at several floors below causing deterioration of building materials. In general, we also noticed leaking in piping systems to some degree in both tower and base building. Many of the plumbing lines to the floor sinks were not located properly and end up splashing water to the surrounding areas or they miss the sink entirely.

The most dramatic effect of moisture in the tower is during the winter when condensation creates a build-up of frost on the concrete panels at the inside spaces. The worst problem at the base building is evidenced by the water leaks at the window frames. The impact of this moisture intrusion and damage is illustrated in the base building from moisture condensation behind the impermeable wallcoverings like the vinyl and rubber base. The occurrence of condensation places limits on the humidity that can be carried in the buildings in winter. Other consequences of water and moisture intrusion are mold and deterioration of materials.

Likely contributing factors were as follows:

- Poor maintenance of exterior envelope. This issue has been addressed by the FAA resealing the exterior joints of the pre-cast panel system at the Tower and Base building.
- Roofing and flashing deterioration (especially at the Base Building).
- Inappropriate insulation
- Lack of insulation
- Insufficient mechanical circulation of warm air in unconditioned spaces.
- Mechanical humidification.
- Fan induced pressure differences. Significant pressure imbalances between adjacent rooms forces warm moist air into unconditioned spaces where it condensed.
- Improperly sealed wall penetrations, which acted as conduits for air transported moisture movement into cold cavity spaces.
- Plumbing leaks
- The rate at which moisture is supplied to the air within the building by conditions such as plumbing leaks, overflow at floor drains, and roof leaks, etc.

In addition to maintenance related items, there are also problems related directly to the design prototype used as a basis for construction of this tower and base building.

- Configuration of architectural pre-cast panels at the top of the tower makes it difficult to identify failed joints and then to repair any failed sealant at joints.
- Fascia to soffit transition configuration of architectural pre-cast panels at the base building creates a challenging joint to prevent leaks. Lack of a good drip edge directs water from the fascia to this joint or down the soffit surface to the top of the window frame, which lacks a metal drip, then depends on good sealant to prevent water and moisture entering the framing system and wall cavity.
- Raised concrete curbs along walkways are of profile that is too low to stop rainfall water from overflow and finding its way to the interior of structure.

- The balcony handrails juxtaposition to the pre-cast panels does not allow for proper roofing and flashing conditions.
- There are many exterior concrete walkways and microwave balconies which constitute a roof over interior spaces, therefore, potential for leakage to interior is greatly enhanced.
- Lack of waterproof floors in the mechanical rooms
- Installation of drain lines and traps in unconditioned spaces.
- Lack of access to concealed spaces especially those with plumbing lines.
- Size, shape and use of pre-cast panels and joints leads to cracking, and joint failure contributing to moisture infiltration.
- Very cold weather during the period with some intermittent warm days producing freezing and thawing. This action causes cracks and pockets in pre-cast panels. This same weather condition combined with high humidity levels and low surface temperature of pre-cast panels in unconditioned spaces produces condensation on interior tower panels.

Design of the tower shaft was based on the assumption that most floors will be unoccupied; therefore exterior walls at levels up to the Ninth Floor were specified as uninsulated and not provided with mechanical conditioning or ventilation. This approach, while reducing the initial construction cost, did not consider the long term and environmental impact of these decisions.

6.0 RECOMMENDATIONS

This section on recommendations is formatted similar to Section 4, OBSERVATIONS AND FINDINGS AS FOLLOWS:

- General Exterior Envelope
- ATCT
- Base Building

6.1 General Exterior Envelope

6.1.1 Repair Joints Between Pre-cast Concrete Panels

Maintain the recently resealed joints at the Tower and Base Building. Provide continuous examination of joints for drying, cracking and pulling away from the surface of the joints. Install wicks at the bottom of each vertical joint (10th Floor) between pre-cast panels to drain any build-up of water to the outside. Weeps should also be installed at the ground level at the bottom of each vertical sealed joint.

6.1.2 Waterproof Exterior Concrete

The Control Tower and Base Building were originally coated with Canyon Tone Stain by United Coatings. This is a water-based acrylic penetrating pigmented sealer with a 5-year manufacturer's warranty. It is recommended that the FAA contact the manufactures representative and have the exterior of the control tower and base building evaluated for it's current integrity and to provide recommendations for the possible cleaning of the existing surface with reapplication of another coat of sealer. Our cost section will have these costs included in the event that the manufacturer makes such a recommendation.

6.2 Control Tower

6.2.1 Cab Roof and ASDE Penthouse

Install rigid insulation to the exterior of the bent steel curb to and tapered insulation (R-30) on the roof of the Penthouse and then wrap the insulation over the corner of the roof down to the insulated metal panel walls. Cover new vertical and horizontal insulation with single-ply membrane roofing.

Provide extended shroud at ASDE rotodome and, if possible, provide a seal between the rotodome and the curb with overlapping rubber flaps or a continuous brush strip.

Reseal penetrations in the Penthouse siding and around louvers.

Verify capacity of the electric unit heater (68,300 BTU) and verify that it is working properly. Thermostat should be set at a minimum of 45-degrees F. during the winter.

In Room PH1, verify that the control damper (CD-128) of exhaust fan EF-12 is a low leakage damper with insulated blades. If it is, verify proper operation. If not, it is recommended to replace it with a low leakage damper with insulated blades.

Properly repair all patches in the cab roof single-ply membrane in accordance with the manufacturer's instructions. An option would be to completely replace the single-ply roofing membrane. Provide and install walkway pads as approved by the membrane manufacturer. A roofing consultant should be retained to inspect the integrity of this roofing and flashing.

Install a recirculation fan in the space above the cab ceiling with supply and return air grilles. See Catalog Cut.

Replace damaged or stained ceiling tiles in cab.

6.2.2 Cab Walkway

Remove concrete topping/walking surface and waterproof membrane on the entire cab walkway. Remove and replace walkway area drains with new drains. Clean and prepare concrete surface for new single-ply PVC roofing. Install tapered insulation and single-ply PVC roofing with proper flashing at base of insulated metal panels and louvers around the inside and outside perimeter. Install continuous sheet of walkway surface to protect roofing membrane.

Properly secure unistrut for lightning protection down conductors to the insulated metal panel walls to eliminate bolts in the surface of the walkway.

The walkway floor drains may be freezing allowing water to

recommend that heat tape be applied to these drain pipes to keep the drains operational and to eliminate water intrusion at the drains.

The walkway door sill should be removed and adjusted to slope to the outside. Reinstall the sill in a full bed of mastic and sealed at the door frames with silicone sealant. Provide larger weatherstripping at the gap between the latch side of the door and adjacent frame. If necessary a flashing strip could be added to the exterior of the door to cover the gap.

Inspect, clean and close openings around and in all louver frames and all insulated metal panels, with continuous bead of silicone sealant.

Provide splash pan/block under the sanitary sewer vent then clean and repaint perimeter metal as necessary.

Repaint walls and ceiling of cab stairway.

6.2.3 Cable Access Level

Repair all damaged vapor barrier on the inside of the perimeter wall of the Cable Access Room, CA1.

Clean up and check for proper drainage at area drains around outer perimeter concrete slabs.

Verify that the control damper (CD-124) for the elevator shaft ventilation is a low leakage damper with insulated blades. If it is, verify proper operation. If not, it is recommended to replace it with a low leakage damper with insulated blades.

Verify that the control damper (CD-127) for the cab smoke exhaust system is a low leakage damper with insulated blades. If it is, verify proper operation. If not, it is recommended to replace it with a low leakage damper with insulated blades.

Repair insulation on elevator smoke relief duct and other ductwork as required.

6.2.4 Elevator Shaft

There are no recommendations for the interior of the elevator shaft. Recommendations on the exterior of the shaft are addressed on the individual floors as necessary.

6.2.5 Junction Level

Verify proper operation of HVAC system to eliminate the unusually high temperature (and humidity) in the area of the cab stairs and Locker Room.

In Room J10, replace the floor drain with a floor sink and properly direct all drain lines into the floor sink to prevent water from running onto the floor. Remove vinyl tile, clean floor and seal concrete floor with an epoxy type floor coating

In Room J12, replace floor drain with a floor sink (see catalog cut) and properly direct all drain lines into the floor sink to prevent water from running onto the floor. Identify and repair leaks in piping systems. Remove and replace insulation jacket on chilled water piping where exposed piping is subject to water condensation. Clean concrete floor and seal with an epoxy type floor coating

Room J14, Verify that the control damper in the stairwell is a low leakage damper. If it is, verify proper operation. If not, it is recommended to replace it with low leakage damper.

In the Smoking Room, provide proper weather-stripping and seals at Door J8.

Remove concrete topping/walking surface and waterproof membrane on all 4 walkways. Remove and replace walkway area drains with new drains. Clean and prepare concrete surface for new single-ply PVC roofing. Install tapered insulation and single-ply PVC roofing with proper flashing at base of insulated metal panels, storefront framing, and curbs at exterior and louver doors to microwave balconies. Install continuous sheet of walkway surface to protect roofing membrane. Provide proper flashing and waterproofing of the base of each guardrail post. Replace the narrow strip of sealant between the face of post and concrete curb with PVC compatible pitch pockets.

Based on FAA reports since the site visit we are assuming that the holes at the balcony guardrail posts have been sealed and do not contribute to water leaks any more.

Inspect entire storefront system on the Junction level and replace/repair all missing or damaged gaskets.

In Janitor Room #J11: provide the following:

- Remove vinyl tile flooring, clean concrete floor and seal concrete floor with an epoxy type floor coating with integral cove up to 4-inches AFF.
- Remove and replace service sink.
- Remove ceramic tile wainscot and gypsum wallboard on all 3 sides surrounding the service sink. Replace with cementitious backer board and new ceramic tile wainscot up to 7'-0" AFF.
- It is also recommended that a waterproof membrane be installed up to 48-inches minimum AFF over the metal studs in accordance with TCNA installation method W244.

6.2.6 Sub-Junction Level

Heat trace and insulate exposed drain pipes (from the Junction Level) in the unconditioned spaces where they are subjected to freezing temperatures. Reference photo 4.2.6-3.

Maintain cleanliness of floors in SJ6 and SJ8 to insure proper drainage to floor drains.

Rooms SJ6 and SJ8, install protective coating similar to Cafco Top-Cote by Isolatek International, applied per manufactures instructions and UL guidelines over existing fireproofing to help protect it from exposure to the elements due to being in the areas below grating on the Junction Level.

Room SJ7, verify that the control damper for SVF-1 is a low leakage damper with insulated blades. If it is, verify proper operation. If not, it is recommended to replace it with a low leakage damper with insulated blades. Clean and seal concrete floor with an epoxy type floor coating.

Room SJ1, replace floor drain below the raised floor with a floor sink (see catalog cut) and properly direct all drain lines into the floor sink to prevent water from running onto the floor. Since this is a concealed area we would also recommend the installation of a water/moisture sensor to detect any moisture on the area adjacent to the new floor sink.

To help insure that humidity levels are kept at the minimum levels required, it is recommended to install humidity sensors in

Room SJ1 with associated controls that will prevent the humidifier from operating above required levels.

To help minimize transmitting moisture vapor outside of Room SJ1, we recommend sealing all holes and penetrations in the walls below the raised floor, within the room and above the ceiling. All of these surfaces should then be painted with a good quality semi-gloss paint to help act as a vapor barrier.

Provide proper seals on access door SJ8.

Install access panel in ceiling of vestibule SJ4 to allow access to the plumbing for service sink on the Junction Level.

Due to the humidification that is added to the air on this level, it is a challenge to prevent that moist air from contacting the cold exterior concrete wall during the winter months. It is recommended that the perimeter area be heated to help raise the temperature of the concrete wall above the dew point and to install dehumidifiers to reduce the humidity in the air. We recommend the installation of 2 unit heaters on opposite sides of the tower and oriented to help circulate the heated air around the perimeter space. The dehumidifier has a built-in condensate pump which should be connected to the sanitary sewer line. See Appendix B for catalog cuts. The recommended locations for the unit heaters would be on the east and west sides of the tower, gaining access to the perimeter space through the recently installed access panels.

6.2.7 Eleventh Floor

Heat trace and insulate exposed drain pipes (from the Sub-Junction Level) in the unconditioned spaces where they are subjected to freezing temperatures. (Reference photo 4.2.6-8).

The preference would be to open this floor up by removing all of the walls. However, due to the requirement for floor-to-floor fire rating, it is not recommended to remove the perimeter shaft walls. Similarly, the functions in the various rooms do not allow for the 2-hour rated partition wall to be removed.

To prevent warm moist air from contacting the cold exterior pre-cast concrete walls, it is recommended that the perimeter area be heated to help raise the temperature of the concrete wall above the dew point and to install dehumidifiers to reduce the humidity in the air. The dehumidifier has a built-in

sanitary sewer line in the plumbing chase. See Appendix B for catalog cuts. The recommended locations for the units would be on the south side of the stairway where there is approximately 6-feet between the shaft wall of the stairs and the exterior concrete wall.

6.2.8 Tenth Floor

As with the 11th Floor, the preference would be to open this floor up by removing all of the walls, but due to the requirement for floor-to-floor fire rating, it is not recommended to remove the perimeter shaft walls. However, since there are no functions in any of the rooms, it is recommended to remove all of the partitions and associated doors between Rooms TS1/TS3, TS3/TS4, TS4/TS5 and TS5/TS1. Additionally, the ceiling in the elevator lobby should be removed in conjunction with the removal of the walls. This will help improve air circulation and prevent stagnation between different spaces.

A rated enclosure with access doors would be required around the cable chase, extending from slab to slab. Verify that the integrity of the plumbing chase is maintained.

To reduce humidity, and therefore condensation on the walls, it is recommended to install a unit heater and dehumidifier in the newly created large open space. The dehumidifier has a built-in condensate pump which should be connected to the vertical sanitary sewer line in the plumbing chase. See Appendix B for catalog cuts.

Remove and replace sections of damaged drywall and wall base.

Provide control valve at the unit heater in stairway vestibule to prevent unnecessary hot water recirculation.

6.2.9 Ninth Floor through Fifth Floor

All of these floors are double height floors (23'-6"). It is recommended to remove all walls and doors creating rooms TS03, TS04 and TS05. To open up the remainder of the floor, the extension of the rated walls from the corners of the Stair Pressurization Shaft and the Smokeproof Vestibule Shaft to the concrete walls should be removed. A new 2-hour wall (Type-B) is required on the west side of the Smokeproof Vestibule

must up upgraded to a 2-hour. wall. The Stairway Pressurization Shaft is already a 2-hour (Type B) rated enclosure. The only remaining walls would be the elevator shaft and the walls around the stairs and ventilation shafts. Finally, the ceiling in the elevator lobby should be removed in conjunction with the removal of the walls.

A rated enclosure with access doors would be required around the cable chase, extending from slab to slab. Verify that the integrity of the plumbing chase is maintained.

To prevent warm moist air from contacting the cold exterior pre-cast concrete walls, it is recommended that this newly created large open space be heated to help raise the temperature of the concrete wall above the dew point and to install dehumidifiers to reduce the humidity in the air. The dehumidifier has a built-in condensate pump which should be connected to the vertical sanitary sewer line in the plumbing chase. See Appendix B for catalog cuts.

Provide control valve at the unit heater in stairway vestibule to prevent unnecessary hot water recirculation.

In Room 6TS3, repair leaking end caps on hot water piping.

6.2.10 Fourth Floor

Replace the 4' x 7' louver in west wall with new storm resistant louver (see catalog cut). Install a metal pan below louver.

Repair the damaged access door to the intake louver to prevent air leakage. Seal gaps and insulate the access door

Remove wall between Rooms TS4 and TS5. Construct a rated enclosure with access doors around the cable chase, extending from slab to slab.

To reduce humidity, and therefore condensation on the walls, it is recommended to install a unit heater and dehumidifier in the newly created Room TS4/TS5. The dehumidifier has a built-in condensate pump which should be connected to the vertical sanitary sewer line in the plumbing chase. See Appendix B for catalog cuts.

Provide control valve at the unit heater in stairway vestibule to prevent unnecessary hot water recirculation.

Verify that that the control dampers (CD-120, CD-121, and CD-105) on the outside air intake louver are low leakage dampers. If they are, verify proper operation. If not, it is recommended to replace them with low leakage dampers.

6.2.11 Third Floor

Replace floor drain with a floor sink (see catalog cut) and properly direct all drain lines into the floor sink to prevent water from running onto the floor.

Seal concrete floor with an epoxy type floor coating.

Remove wall between Rooms TS4 and TS5. Construct a rated enclosure with access doors around the cable chase, extending from slab to slab.

Install a dehumidifier and connect the condensate pump drain to the new floor sink.

Provide control valve at the unit heater in stairway vestibule to prevent unnecessary hot water recirculation.

Room 3TS3, verify that control dampers (CD-104 and CD-115) for SVF-2 are low leakage damper with insulated blades. If they are, verify proper operation. If not, it is recommended to replace them with low leakage dampers with insulated blades.

6.2.12 Second Floor

In Room 2TS5, repaint the walls with water stains and replace stained or damaged ceiling tiles.

Provide control valve at the unit heater in stairway vestibule to prevent unnecessary hot water recirculation.

6.2.13 Ground Floor

Repair leaking pipes or valves at AHU-16. Check for condensation on exposed chilled water piping and replace insulation jacket if required.

6.3 Base Building

6.3.1 Exterior Conditions

Install a continuous metal flashing around the perimeter of the Base Building at the bottom of the sloped pre-cast panels to divert water away from the window at the head condition. It is especially important for this flashing to run continuously at the corners.

Since the FAA provided wet seals on all of the exterior windows, multiple leaking conditions appear to have been resolved. However, it is recommended that the FAA contact a specialty window/storefront consultant to evaluate the existing framing system and provide opinions and possible recommendations for the FAA's consideration.

All clamp attachments penetrating the storefront framing (e.g. down conductor conduits, antennas, etc.) should be tightened and properly sealed with silicone sealant. Additionally, penetrations/attachments to the pre-cast panels should be properly sealed with silicone sealant (e.g. bolts, telephone boxes, electrical outlets, etc.)

All exterior doors should receive new weather-stripping, seals and astragals (at double doors), with all door thresholds also being replaced. Care should be taken during the winter to prevent the build-up of snow against the doors. Examples of thresholds are located in Appendix B.

Replace missing or deteriorated gaskets at the Link storefront framing.

Provide proper seals between the entrance canopies and the Link curtain wall.

6.3.2 Roof

Fully inspect and replace/repair any fractured or deteriorated sealant in the pre-cast panels.

For both the high and low roof areas, it is recommended to remove all of the concrete pavers and the associated protection fabric. It is then recommended that the FAA contact a roofing consultant to conduct a thorough evaluate the exposed single-ply membrane and provide

is recommended, we suggest that the FAA consider the use of a PVC single-ply membrane in lieu of the EPDM single-ply membrane.

Repair and/or replacement of the roofing should also include the single-ply parapet flashing and removal of unused attachment clips.

We would recommend that the FAA consider only replacing the concrete pavers on the Link, which is the area most susceptible to falling ice and debris from the control tower.

Clean and reseal all roof drains. Repair/replace as recommended by the roofing consultant.

Provide new flashing boots at roof penetrations to extend a minimum of 8" above the roof surface.

We recommend increasing the curb height at the skylight to a minimum of 12" above the roof surface. Remove cover plates at skylight, reseal domes and reinstall metal cover plates.

Where the Link joins the control tower, after removal of concrete pavers, verify proper roof slopes and crickets for drainage.

6.3.3 Second Floor

Properly route pipes to floor sink under the raised floor in Room 204 to prevent the water from splashing/migrating onto the concrete floor. Since this is a concealed area we would also recommend the installation of a water/moisture sensor to detect any moisture on the area adjacent to the floor sink.

Replace stained ceiling tiles throughout Second Floor.

Repaint ceiling in Break Room due to numerous water stains.

As necessary in perimeter offices, remove and replace:

- Damaged gypsum wallboard. Replace with glass-matt faced gypsum wall board.
- Vinyl wall coverings. Replace with fabric wall covering.
- Plastic laminate window stools.
- Wall base.

6.3.4 First Floor

Replace stained ceiling tiles throughout First Floor.

Repair leaking pipes/valves above corridor near Room #126.

In Mechanical areas, globally inspect for and replace leaking pipes and valves. Additionally, provide or replace insulating jackets at areas of condensation.

As necessary in perimeter offices, remove and replace:

- Damaged gypsum wallboard. Replace with glass-matt faced gypsum wall board.
- Vinyl wall coverings. Replace with fabric wall covering.
- Plastic laminate window stools.
- Wall base.

In Janitor Room #134 provide the following:

- Remove vinyl tile flooring, clean concrete floor and seal concrete floor with an epoxy type floor coating with integral cove up to 4-inches AFF.
- Remove and replace service sink.
- Remove ceramic tile wainscot and gypsum wallboard for the entirety of the 2 walls adjacent to the service sink (approximately 10 lineal feet). Replace with cementitious backer board and new ceramic tile wainscot up to 7'-0" AFF.
- It is also recommended that a waterproof membrane be installed up to 48-inches minimum AFF over the metal studs in accordance with TCNA installation method W244.
- Relocate electrical receptacle around corner, closer to the door.

27b

WONDER MAKERS
ENVIRONMENTAL

July 6, 2009

Mr. Vince Sugent
7768 Pleasant Lane
Ypsilanti, MI 48197

RE: Review of Kansas City ATCT and TRACON Base Building Report on Exterior Envelope and HVAC Conditions; 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 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 the Kansas City International Airport Airport Traffic Control Tower and TRACON Base Building Report on Exterior Envelope and HVAC Conditions conducted by DMJM H&N/AECOM dated January 22, 2008. As has been the case with many of the documents provided to NATCA, a significant portion of this report is missing, including:

- Appendix A Photographs
- Appendix B Catalog Cuts
- Appendix C Calculations
- Appendix D Estimate and Priority List

Despite the missing appendices, one is able to ascertain from the report that water and moisture intrusion have significantly affected the Kansas City ATCT and TRACON base building.

It is important to note that the report specifically excluded mold as "a subject of this study" (Section 1.0) because that item has been addressed in previous reports. Since the authors did not specify which reports they reviewed to justify the exclusion we have no way of knowing whether there are other documents that we should be requesting from the FAA.

Nor is there any indication in the report that the investigators surveyed occupants or took the controllers health complaints into consideration as they conducted their review.

Another concern is that the inspectors did not mention any of the impacts of previous remediation in the structure. This oversight is critical because without the benefit of an objective history of the structure to guide them the previous remediation and restoration efforts may have left the inspectors with a false impression of the extent of water-damage and mold problems since critical visual clues would have been removed .

The DMJM H&N/AECOM report concludes that "residual signs and damage of materials still present provide evidence of significant problems which have occurred." It goes on to conclude, "A combination of existing construction and Kansas City weather conditions provide opportunities for water and moisture intrusion to the interior of the tower shaft and base building. A major contributor to excessive moisture problem would be through the exterior envelope at roof areas and sealed joints between architectural pre-cast panels, and to a lesser degree through grouted joints between pre-cast and cast-in-place concrete walls. The tower humidity levels during the winter months are a result of internal moisture sources. Even moderate humidity inside buildings can produce wetting by condensation on exterior walls and on the building structure because of moist air contacting surfaces below the dew point."

The report points out numerous internal sources of moisture in the tower and then states, "The most dramatic effect of moisture in the tower is during the winter when condensation creates a build-up of frost on the concrete panels at the inside spaces." The report then states, "Other consequences of water and moisture intrusion are mold and deterioration of materials."

The DMJM H&N/AECOM report points out ten maintenance related items that are likely contributing factors to excessive moisture within the air traffic control tower and TRACON base building. The report then goes on to list ten additional excessive moisture problems related directly to the design prototype of the facility. The final paragraph in the conclusions of the report states, "Design of the tower shaft was based on the assumption that most floors will be unoccupied; therefore exterior walls at levels up to the ninth floor were specified as uninsulated and not provided with mechanical conditioning or ventilation. This approach, while reducing initial construction cost, did not consider the long term and environmental impact of these decisions."

The inspectors offered a large number of wide-ranging recommendations to address the problems in the facility. Many of these recommendations are similar to ones that they made in response to an inspection at Detroit. Of particular interest is the recommendation that the unoccupied floors of the tower at Kansas City have both heaters and dehumidifiers installed because the moisture infiltration and condensation is occurring throughout the year from different sources. This same recommendation was made for the Detroit tower but the FAA chose to implement only a partial solution by installing heaters rather than both heating and dehumidifying equipment.

The long term environmental impact in this facility and other Leo J. Daly-designed facilities is that they have become breeding grounds for mold contamination. Because of the design, water intrusion and excessive moisture build-up inside the facilities has led to

numerous building materials becoming water-damaged and subsequently contaminated by mold. While the FAA has allowed this water damage and mold contamination cycle to continue, NATCA personnel within these facilities have suffered adverse and sometimes devastating health effects due to exposure to the mold-contaminated materials within the facilities. These health effects have been most pronounced in Detroit, but well-documented at other towers as well, such as Kansas City.

It is clear from this report and many other documents grudgingly provided by the FAA that a large number of facilities suffer from similar design flaws that have led to conditions that negatively impacted the health of the building occupants. Clearly, the connection can now be confirmed that the failure by the FAA to properly deal with mold contamination within its airport traffic control tower facilities has lead to harm to NATCA personnel working within these facilities. The ramifications to the flying public are also considerable given that exposure to fungal contaminants has been linked with neurological problems such as memory loss, headaches, etc.

The evidence continues to mount that the FAA was made aware of significant problems in a number of its facilities but failed to focus on its primary mission, the safety of its employees and the flying public.

Sincerely,

Michael A. Pinto, CSP, CMP
CEO

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Corpus Christi, Texas
Airport Traffic Control Tower
(CRP ATCT)

Mold and Moisture Assessment

Conducted: November 14-15, 2007

Report Prepared By: Barbara Hebert, NISC CIH
Texas Department of State Health Services
Mold Assessment Consultant
License Number: MAC1025
Expiration Date: 9/20/2009

Attachment 1: EMSL Analytical, Inc. Mold Spore Bulk Analysis Report

INTRODUCTION:

A mold and moisture assessment was conducted in the CRP ATCT, associated Base Building, and Environmental Services Unit (ESU) Building on November 14-15, 2007, as requested by Michelle Lott, Program Implementation Manager for Occupational Safety and Health (OSH) Compliance Programs. The assessment was performed jointly with Mr. Ed Winkler, Civil Engineer, Engineering Services.

Water damage and visible mold growth were discovered in various rooms of the ATCT, Base Building, and ESU Building, primarily caused by moisture infiltration through building panel sealants and/or window systems; condensation on chilled water pipe insulation and heating, ventilation, and air conditioning (HVAC) system ductwork; air infiltration; possible HVAC system deficiencies; and miscellaneous building leaks.

The evaluations conducted in the Base and ESU Buildings were limited in scope and were primarily a review of areas previously inspected and identified by All Points Environmental, LLC, Corpus Christi, Texas, during their September 12, 2007 assessment.

The evaluation was also limited in scope in that the investigation relied on visual observations made during a walkthrough of the facility and it focused on known problem areas or typical areas where problems have been found in similar facilities. Destructive or intrusive methods such as the large-scale removal of vinyl cove base, or core drilling and removing sections or various layers of gypsum board, were not utilized. At several suspect locations, the bottom of the vinyl cove base was pried loose enough to allow visual inspection yet not cause any cosmetic damage to the facility. In most cases, the gypsum board was found to be elevated slightly up from the floor slab, which generally eliminated the possibility of wicking up water.

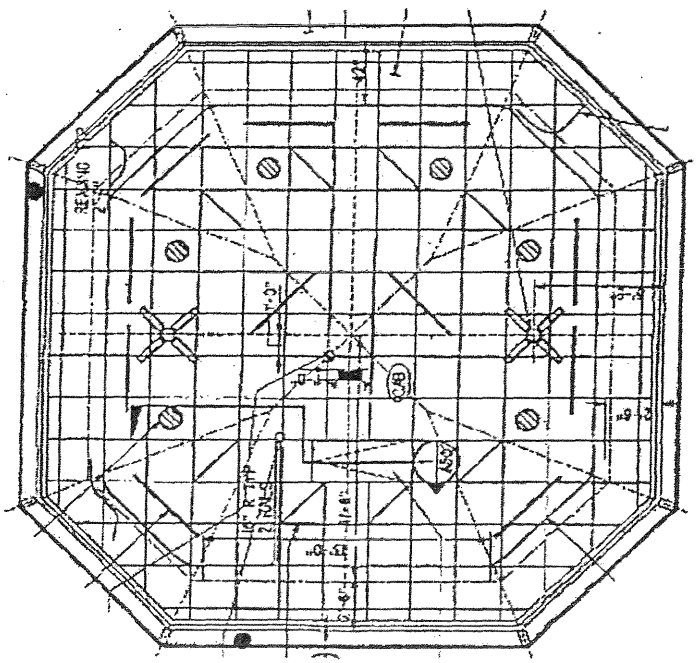
Bulk samples were collected from suspect materials in two locations of the ATCT. Direct examination fungal analysis was performed by EMSL Analytical, Inc. This laboratory is accredited by the American Industrial Hygiene Association under the Environmental Microbiology Laboratory Accreditation Program (EMLAP). It is additionally accredited by the Texas Department of State Health Services (TDSHS).

As required by the TDSHS regulations, the findings from this document will be used to prepare a mold remediation protocol, whereby remediation methods, personal protective equipment, engineering controls, project layout, and post-remediation clearance evaluation methods and criteria will be specified.

FINDINGS:

The assessment findings are summarized as follows:

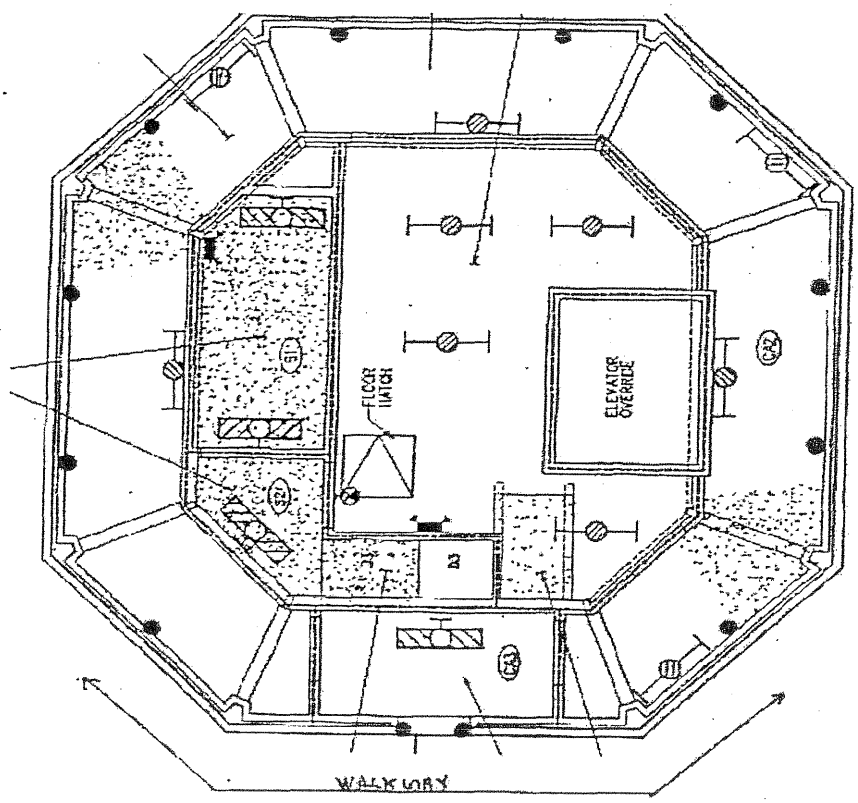
CAB LEVEL



Contractor Action Required: •

Housekeeping Action Required: •

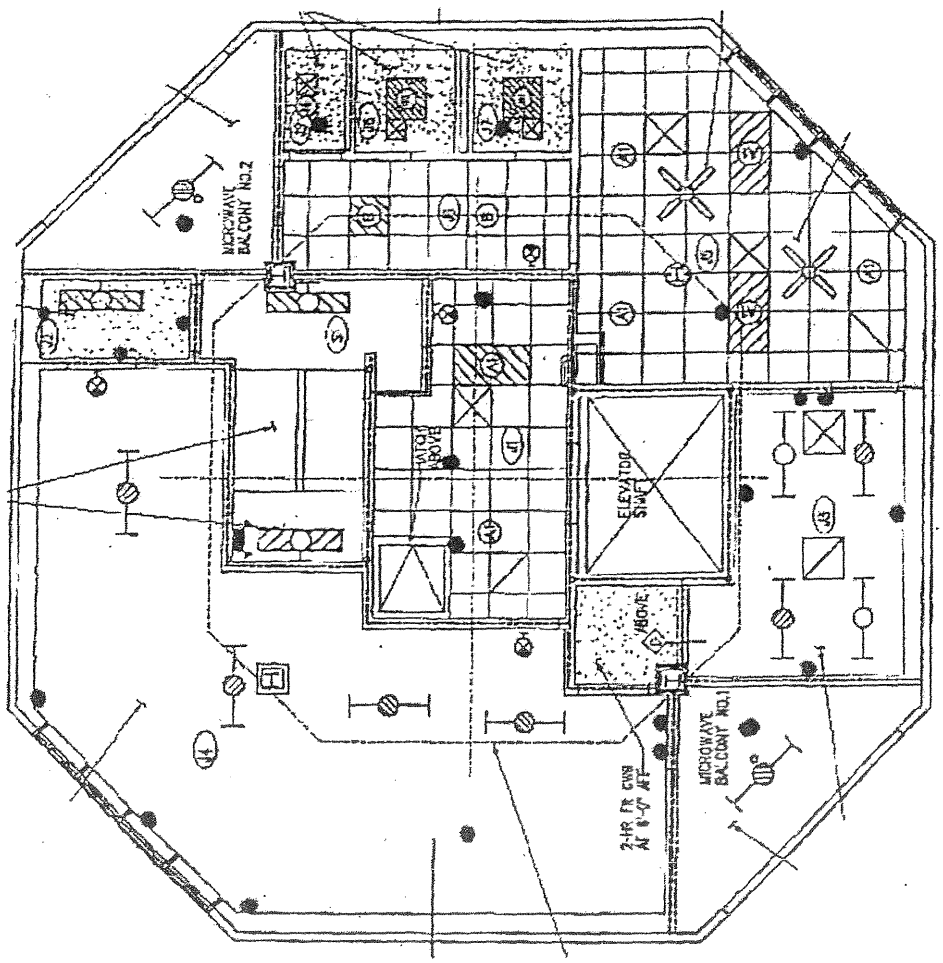
CABLE ACCESS LEVEL



Contractor Action Required: •

Housekeeping Action Required: •

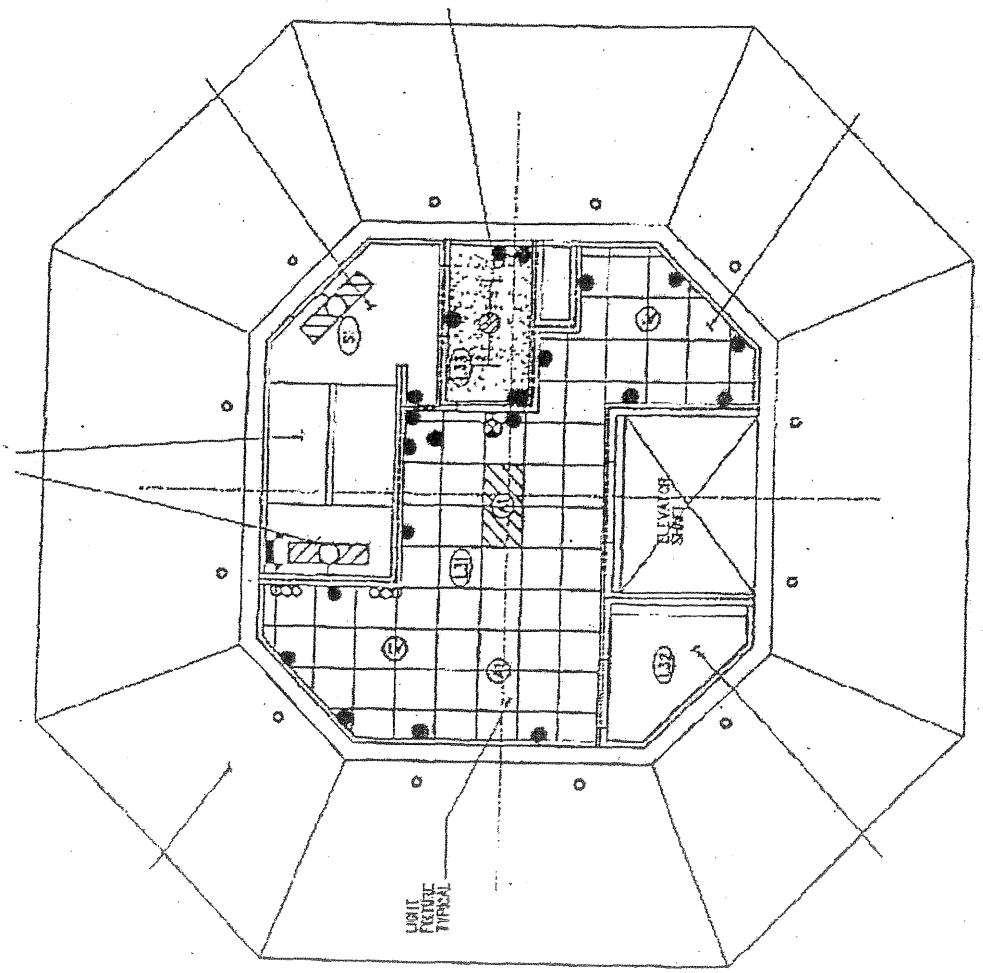
JUNCTION LEVEL



Contractor Action Required: •

Housekeeping Action Required: •

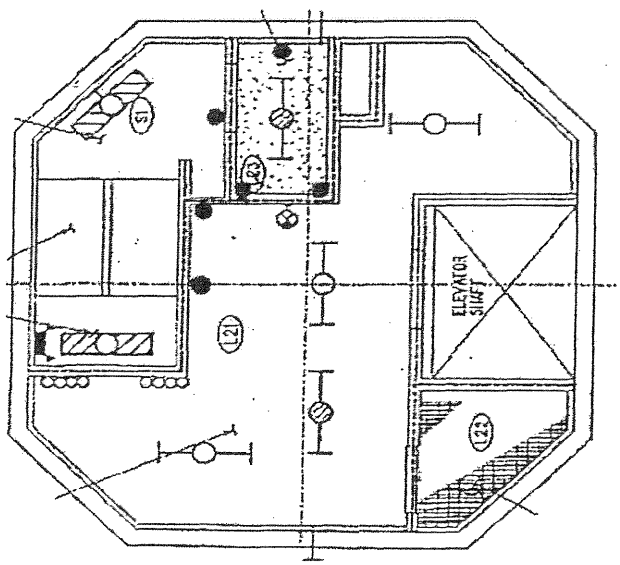
INTERMEDIATE LEVEL 3



Contractor Action Required: •

Housekeeping Action Required: •

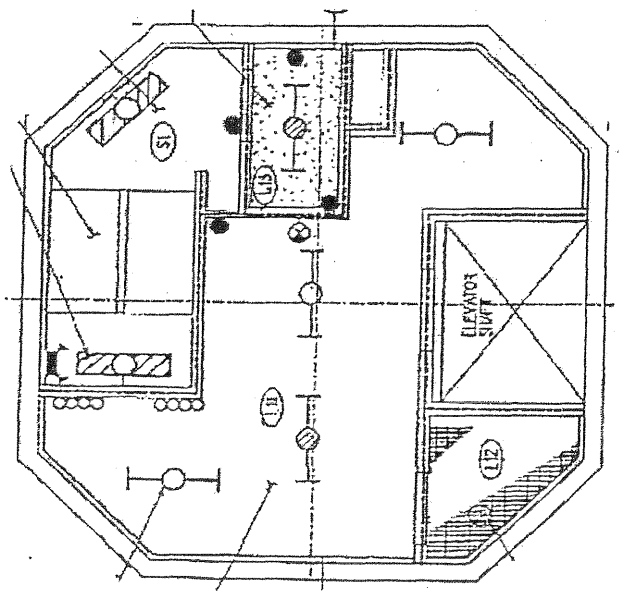
INTERMEDIATE LEVEL 2



Contractor Action Required: •

Housekeeping Action Required: •

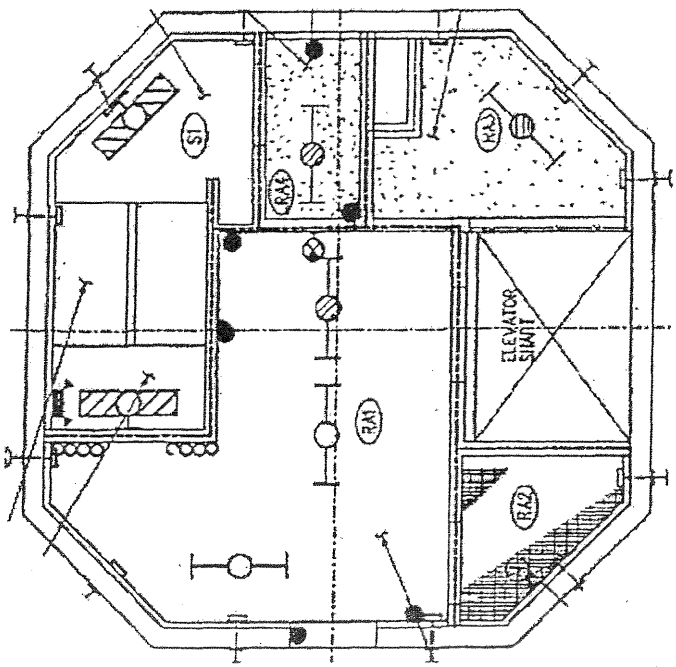
INTERMEDIATE LEVEL 1



Contractor Action Required: •

Housekeeping Action Required: •

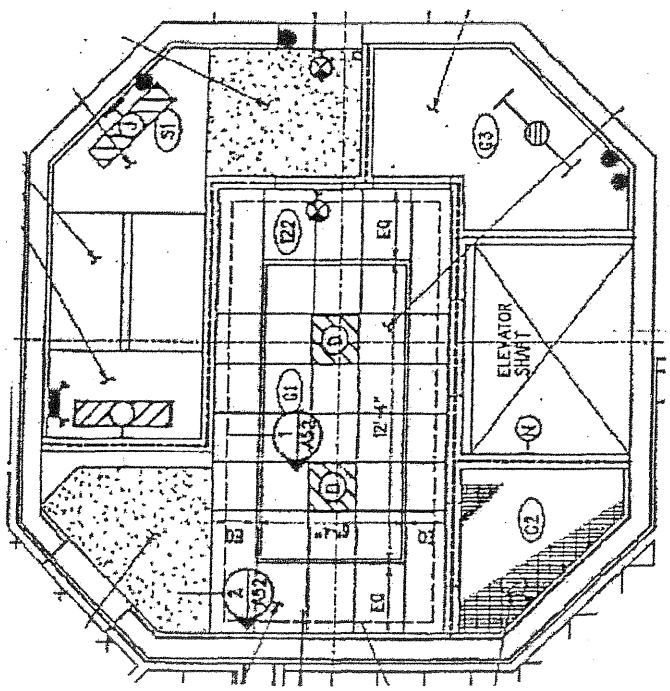
ROOF ACCESS LEVEL



Contractor Action Required: •

Housekeeping Action Required: •

GROUND LEVEL



Contractor Action Required: •

Housekeeping Action Required: •

ATCT FINDINGS:

Control Cab Roof - All sealant at joints in the metal cap flashing at the roof perimeter showed signs of excessive deterioration such as cracking. Sealant failure at this location could contribute to leaks in the control cab wall system. Sealant at the perimeter of the through wall hood at the penthouse showed signs of failure. The joint between the bottom of the insulated metal panels and the base flashing was filled with sealant. Typically this joint is open to direct water in the panel seams to the exterior. As installed, water could be trapped in the wall system.

Control Cab - Staining was observed on Window #10 mullions. Air Traffic personnel reported that repeated water leaks have occurred in this area for six or more months and the Break Room on the Junction Level has had leaks for at least the past two years. Staining was observed on the glass by Window #7 and Window #8 mullions.

Room CA1 - No moisture related issues or mold were observed in this room.

Room CA2 - Water stains and mold were observed on the walls and behind the vinyl cove base throughout this area, with the heaviest damage noted by the column enclosures. In the unfinished/unconditioned space around the exterior perimeter, significant mold, water damaged insulation, and rust and water corroded metal studs were observed.

Room CA3 - Water stains and mold were observed on the walls and behind the vinyl cove base throughout this area. In the unfinished/unconditioned space around the exterior perimeter, significant mold, water damaged insulation, and rust and water corroded metal studs were observed. Water damage was observed on both sides of the door to the outside walkway.

Cable Access Level Exterior Walkway - Severely deteriorated sealant was observed in all joints between all precast panels. The lightning protection cables penetrated vertical caulk joints between precast panels at the surface of the walkway in two places. A pipe or conduit cast into the walkway was cut off flush with the walkway and the waterproof coating was peeling at this location and others on the walkway. Cracks were observed where the walkway surface intersected the vertical parapet wall. Penetrations of the interior walkway wall, such as junction boxes, were not adequately sealed along the top or sides. The threshold did not appear to have adequate sealant between it and the concrete below or at the intersection with the doorframe outside the stops. The slope of the threshold toward the exterior appeared minimal. These items all contribute to the leaks at this level and below.

Cab Level Stairs - Heavy dust was observed on the return air vent.

Room J1 Lobby - Five stained ceiling tiles were observed in this room. The source of the moisture may have been from condensation on HVAC ductwork or a water leak from the floor above that dripped onto the ductwork and down to the ceiling. Two stained egg-crate panels were observed in this room. The source of the staining was determined to be oil from a hydraulic hatch above. Dirty supply and return air diffusers and grilles were observed in this room.

Room J2 - Yellow staining and mold were observed on the entire west wall and a portion of the gypsum board ceiling in the southwest corner of the room. A small band of mold was found on the east wall on both sides of the doorframe. Mold was observed on chilled and heating water supply and return pipe insulation; on fan coil unit #8; and on the door to Room J4.

Room J3 - Heavy water stains and mold were found on the east wall, behind the vinyl cove base, and below the raised floor. Water stains and discoloration were found on the floor covering near the door to Room J5 and the doorframe showed some rusting at the floor line from water exposure. Discolored and spotted areas were observed on the south, west, and north walls below the raised floor and a bulk sample was collected. A minor trace of mold was detected. Mold was found on the chilled water pipe insulation below the raised floor.

Room J4 - Mold was observed on the chilled water supply and return pipe insulation; HVAC units #2 and #3 and ductwork; and on the east door to Microwave Balcony #1. Mold and dust were observed on fan coil units #12 and #13. Mold was observed on the entire east wall on both sides and above the door. Mold was observed on the southwest wall behind the vinyl cove base below the outside louver panels. The lockset on the door to the Microwave Balcony #1 was broken and

did not latch, which allows outside air into the room.
Microwave Balcony #1 - Excessive amounts of nesting materials and bird droppings were observed. These items can be food sources for mold and can cause other health problems.
Microwave Balcony #2 - Excessive amounts of nesting materials and bird droppings were observed. These items can be food sources for mold and can cause other health problems.
Room J5 - Water stains and residue were found on the east window mullions, framing, and wooden sill. Two stained ceiling tiles were observed in this room. The source of the moisture may have been from the fire protection water line above or condensation from the HVAC ductwork. Numerous ceiling tiles had been removed apparently due to past leaks and several trash cans were in place to catch leaks. The hot and cold water shut off valves in the sink base cabinet showed signs of corrosion and past leaks.
Room J7 - All walls and floor in this room are ceramic tile. Water stains and puckering were observed on the gypsum board ceiling between the supply and return air vents.
Room J8 - All walls and floor in this room are ceramic tile. No damage was observed on the gypsum board ceiling.
Room J9 - All walls and floor in this room are ceramic tile. Puckering was observed on the gypsum board ceiling between the supply and return air vents.
Room L31 - Water stains were observed on the west wall and on the portion of the north wall between the west wall and the door to Room L33. A small amount of surface mold was found on the west wall, on top of and on the sides of, the fire extinguisher panel. Spotted areas were observed on all of the walls below the raised floor except the east side at the cable chase and elevator shaft. A bulk sample was collected of this spotted material on the west wall below the raised floor, directly below the fire extinguisher panel. A small amount of mold was detected. Three stained ceiling tiles were observed in this room. Based on information provided by local facility personnel, the source of the moisture was due to a past leak that had since been repaired.
Room L33 - A stripe of mold was observed on the south wall on the east side of the door to Room L31, which extended onto the east wall for the entire height of the door. Mold was found on the south, east, and north walls below the raised floor. Mold was found on the door to the stairwell lobby and on fan coil unit #7.
Level 3 Stairwell Landing - Mold was found on the wall and behind the vinyl cove base in the recess south of the door to Room L33.
Level 2 Stairwell Landing - Mold was observed on the door and frame to Room L23.
Room L23 - Spots of mold were observed on the south wall above and on both sides of the door to Room L21. The mold on the wall extended onto the adjacent east and west walls. Mold was found on the door to Room L21. Mold was observed on the chilled water supply and return pipe insulation. Mold was found on fan coil unit #6.
Room L21 - Yellow rust stains were observed on the west wall and the portion of the north wall between the west wall and the door to Room L23. Peeling paint was observed on the west wall. Mold was observed on the chilled water supply and return pipe insulation.
Level 1 Stairwell Landing - Mold was observed on the door and frame to Room L13.
Room L13 - A stripe of mold was observed on the south wall on the east side of the door to Room L11, which extended onto the east wall. Mold was observed on the chilled water supply pipe insulation. Dust was found on fan coil unit #5.
Room L11 - Water stains were observed on the north wall between the west wall and the door to Room L13. Mold was observed on the overhead portions of the chilled water supply and return pipe insulation.
Room RA1 - Yellow stains and mold were found on the west wall from the vinyl cove base up to the fire extinguisher cabinet. Water stains and mold were observed on the portion of the north wall between the west wall and the door to Room RA4. Water stains and peeling paint were observed on the portion of the west wall in the recess at the door to the roof. Rust debris was present on the floor and a small amount of mold was observed behind the vinyl cove base on the portion of the

south wall by the door to Room RA2. Mold was observed on the chilled water supply and return pipe insulation.
Room RA4 - A stripe of mold was observed on the south wall on the east side of the door to Room RA1, which extended onto the east wall for the entire height of the door. Mold was observed on the chilled water supply and return pipe insulation. Mold was found on fan coil unit #3.
Ground Level Stairs - Mold was observed on the west wall in the recess to the outside door #105, on the adjacent north wall, and on the entire northwest wall.
Pump Room G3 - Mold was observed on the east wall and behind the vinyl cove base. Yellow stains and mold were observed on the northeast wall and behind the vinyl cove base.
ATCT Stairs S1 - Dust was observed on all of the stair stringers throughout the stairwell.

ATCT ACTION:

Contractor: •

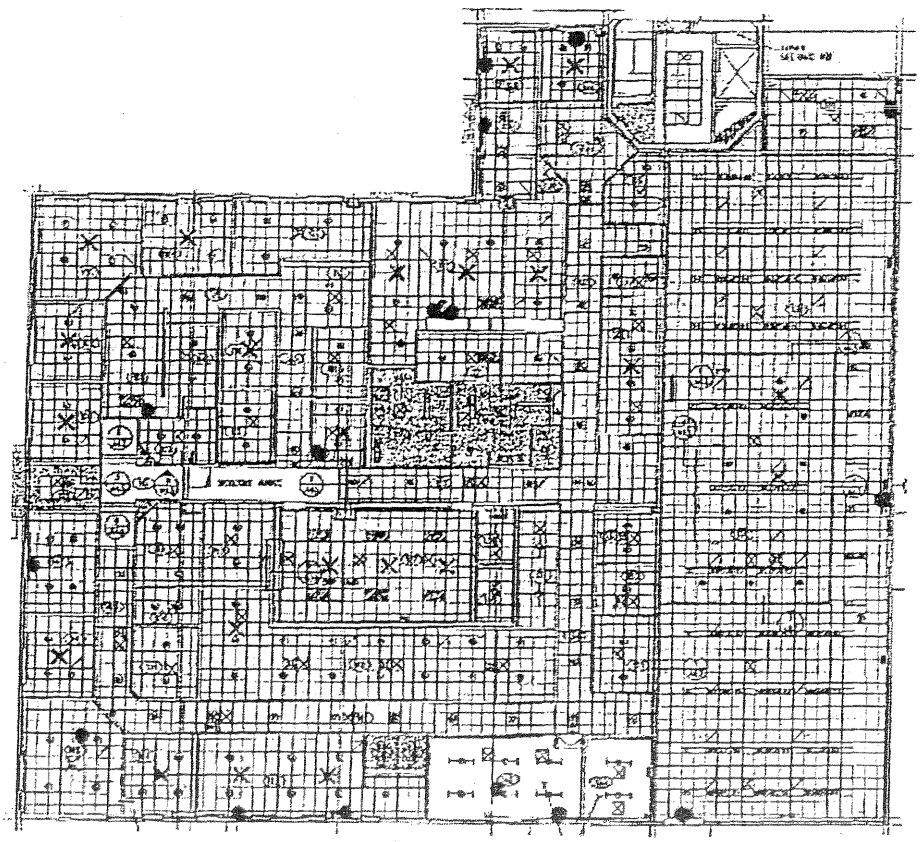
Control Cab and Room J5 - Evaluate and determine the source of the moisture infiltration by the windows.
Room CA2 - Remediate and restore approximately 480 square feet of gypsum board along the entire perimeter of this room.
Room CA3 - Remediate and restore approximately 60 square feet of gypsum board along the entire perimeter of this room. Remediate and restore approximately 6 square feet of gypsum board on both sides of the door to the outside walkway.
Cab Level Stairs - Clean return air vent by high efficiency particulate air filter (HEPA) vacuuming followed by damp wiping with a detergent solution.
Room J2 - Remediate and restore approximately 29 square feet of gypsum board on the entire west wall. Remediate and restore approximately 25% of the gypsum board ceiling in the southwest corner of the room near the chilled water and heating water pipe insulation. This ceiling has a 2-hour rating. The removal of multiple layers of gypsum board may be required. Remediate and restore approximately 5 square feet of gypsum board on both sides of the door to S1. Remediate and restore all contaminated chilled and heating water supply and return pipe insulation. Clean the surface of fan coil unit #8 by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Clean the surface of the door to Room J4 by damp wiping with an approved cleaning solution.
Room J3 - Remediate and restore approximately 140 square feet of gypsum board on the east wall, from the floor to the underside of the beam. Clean the surfaces on the south, north, and west walls below the raised floor by damp wiping with an approved cleaning solution. Remediate and restore all contaminated chilled water pipe insulation.
Room J4 - Remediate and restore approximately 68 square feet of gypsum board on the east wall (surface layer) on both sides and above the door to Microwave Balcony #1. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 8 square feet of gypsum board on the southwest wall below the outside louvers. Remediate and restore approximately 0.25 square feet of gypsum board on the south wall behind the vinyl cove base next to fan coil unit #13. Remediate and restore all contaminated chilled water supply and return pipe insulation. Clean the surfaces of HVAC units #2 and #3 and approximately 30 linear feet of ductwork by damp wiping with an approved cleaning solution. Clean the surfaces of fan coil units #12 and #13 by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Clean the east door to Microwave Balcony #1 by damp wiping with an approved cleaning solution.
Microwave Balcony #1 - Clean floors by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Initiate bird exclusion measures.
Microwave Balcony #2 - Clean floors by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Initiate bird exclusion measures.
Room J7 - Repair or replace water damaged gypsum board ceiling.

Room J9 - Repair or replace water damaged gypsum board ceiling.
Room L31 - Clean the entire west wall, both above and below the raised floor, by damp wiping with an approved cleaning solution. Clean the north wall, between the west wall and door to Room L33, by damp wiping with a detergent solution.
Room L33 - Remediate and restore approximately 5 square feet of gypsum board on the entire south wall below the raised floor. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 4 square feet of gypsum board on the east wall below the raised floor, beginning in the southeast corner and extending to the west. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 1.5 square feet of gypsum board on the north wall below the raised floor, beginning in the northeast corner and extending from the corner joint to stud. Remediate and restore approximately 0.7 square feet of gypsum board on the south wall on the east side of the door to Room L31 above the raised floor, between the southeast corner and doorframe. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 10 square feet of gypsum board on the east wall above the raised floor, from the southeast corner to next stud. Inspect concealed layer or assume an additional quantity is also contaminated. Clean the surface of fan coil unit #7 by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Clean the door to the stairwell lobby by damp wiping with an approved cleaning solution.
Level 3 Stairwell Landing - Remediate and restore approximately 25 square feet of gypsum board in the recess south of the door to Room L33.
Level 2 Stairwell Landing - Clean the contaminated surfaces on the door and frame to Room L23 by damp wiping with an approved cleaning solution.
Room L23 - Remediate and restore approximately 1.4 square feet of gypsum board on the south wall above and on both sides of the door, between the southeast corner and doorframe, the southwest corner and doorframe, and between the ceiling and doorframe. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 10 square feet of gypsum board on the east wall, floor to ceiling from the southeast corner to next stud. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 10 square feet of gypsum board on the west wall, floor to ceiling from the southwest corner to next stud. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore all contaminated chilled water supply and return pipe insulation. Clean the surface of fan coil unit #6 by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Clean the contaminated surface on the door to Room L21 by damp wiping with an approved cleaning solution.
Room L21 - Clean the entire west wall and portion of the north wall between the west wall and door to Room L23 by damp wiping with a detergent solution. Remediate and restore all contaminated chilled water supply and return pipe insulation. Remove peeling paint on west wall, patch and repaint.
Level 1 Stairwell Landing - Clean the contaminated surfaces on the door and frame to Room L13 by damp wiping with an approved cleaning solution.
Room L13 - Remediate and restore approximately 0.7 square feet of gypsum board on the south wall on the east side of the door to Room L11 between the southeast corner and doorframe. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 10 square feet of gypsum board on the east wall, floor to ceiling, from the southeast corner to next stud. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore all contaminated chilled water supply pipe insulation. Clean the surface of fan coil unit #5 by HEPA vacuuming followed by damp wiping with a detergent solution.
Room L11 - Clean the portion of the north wall between the west wall and door to Room L13 by damp wiping with a detergent solution. Remediate and restore all contaminated chilled water

supply and return pipe insulation.
Room RA1 - Remediate and restore approximately 28 square feet of gypsum board on the entire west wall. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 9 square feet of gypsum board on the north wall between the west wall and the door to Room RA4. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 2 square feet of gypsum board on the portion of the south wall between the door to Room RA2 and the door to the roof. Clean the portion of the west wall in the recess at the door to the roof with a detergent solution. Remediate and restore all contaminated chilled water supply and return pipe insulation.
Room RA4 - Remediate and restore approximately 0.7 square feet of gypsum board on the south wall on the east side of the door to Room RA1 between the southeast corner and doorframe. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore approximately 10 square feet of gypsum board on the east wall from the southeast corner to next stud. Inspect concealed layer or assume an additional quantity is also contaminated. Remediate and restore all contaminated chilled water supply and return pipe insulation. Clean the surface of fan coil unit #3 by HEPA vacuuming followed by damp wiping with an approved cleaning solution.
Ground Level Stairs - Remediate and restore approximately two square feet of gypsum board on the west wall in the recess to the outside door #105, approximately 11 square feet on the adjacent north wall, and approximately 19 square feet on the entire northwest wall.
Pump Room G3 - Remediate and restore approximately 7 square feet of gypsum board on the east wall. Remediate and restore approximately 33 square feet of gypsum board on the northeast wall.
ATCT Stairs - Clean all stair stringers by HEPA vacuuming followed by damp wiping with a detergent solution.

Housekeeping: •
Room J1 - Remove and replace damaged ceiling tile. Additional investigation is required to determine the source of the moisture. Clean oil stains from egg-crate panels by damp wiping with a detergent solution. Clean supply and return air diffusers and grilles by damp wiping with a detergent solution.
Room J3 - Clean floor covering near the door to Room J5 by damp wiping with a detergent solution.
Room J4 - Repair lockset on east door to Microwave Balcony #1.
Room J5 - Remove and replace damaged ceiling tile. Additional investigation is required to determine the source of the moisture.
Room L31 - Remove and replace damaged ceiling tile. Local facility personnel reported that the cause of the moisture has been corrected therefore, no further Contract repair is required.
ATCT - Clean all windows and framing to remove staining and verify if leaks still exist.

BASE BUILDING



Contractor Action Required: •

Housekeeping Action Required: •

BASE BUILDING FINDINGS:

By entrance to Room 102 - Four stained ceiling tiles were observed in this area. The source of the moisture may have been from building leaks into the skylight.
Room 112 - Two stained ceiling tiles were observed in this room. The source of the moisture may have been from condensation from the HVAC ductwork.
Room 122 - An active water leak was found under the sink in this room. Water was standing on the base of the cabinet and mold and water damage were visible on the bottom and back of the cabinet. Items stored under the sink were wet. The drain and water lines were inspected. The leak was traced to the sprayer and flexible hose attached to the faucet. The leak was at the base of the sprayer and water was found to drip at this connection any time the water was turned on to the faucet. Facility personnel were informed of the problem and the need for immediate attention.
Room 124 - Water stains were observed on the north window glass and framing.
Room 129 - Water stains were observed on the west window mullion and framing.
Room 131 - Water stains and mold were observed on the south and east outside doors.
Room 132 - Water stains and mold were observed on the east outside door. Mold was observed on the doorframe where the weather stripping seal had deteriorated and left gaps.
Room 142 - Water stains and mold were observed on the south outside door and on the ductwork for air handling unit (AHU) #1. Mold was observed on the chilled water supply and return pipe insulation. Water stains were found on drain pipe insulation.
Room 143 - Mold was observed on both exterior doors and frames.
Room 145 - Two stained ceiling tiles were observed in this room, one of which was very large and one was very small. The source of the moisture for the large stain was a leak on the heating water piping. The source of the moisture for the small stain appeared to be condensation where the ductwork transitions from being insulated on the outside to being internally insulated.
Room 147 - Water stains were observed on the carpet under the plants.
Room 156 - Water stains were observed on the west window glass and framing and on the outside door glass and framing.

BASE BUILDING ACTION:

Contractor: •
Rooms 124, 129, and 156 - Evaluate and determine the source of the moisture by the windows.
Room 122 - Remove the back and bottom of the cabinet to inspect the concealed gypsum board. If contamination is found, remediate and restore approximately four square feet behind the sink on the south wall. If visible mold is found on the underside of the bottom and/or rear of the back panel of the cabinet, remove contaminated components and replace if the vast majority of the cabinet can be salvaged. Otherwise, the discard the cabinet and replace in its entirety.
Room 131 - Clean the contaminated surfaces on the south and east outside doors by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Replace and add additional weather stripping.
Room 132 - Clean the contaminated surfaces on the east outside door and frame by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Replace weather stripping.
Room 142 - Clean the contaminated surfaces on the south outside door and AHU #1 ductwork by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Remediate and restore all contaminated chilled water supply and return pipe insulation. Remove and replace stained drain pipe insulation.
Room 143 - Clean the contaminated surfaces on the exterior doors and frames by HEPA vacuuming followed by damp wiping with an approved cleaning solution.

Housekeeping: •

By entrance to Room 102 - Remove and replace damaged ceiling tile. Cause could not be determined, however, roof leak on skylight could be the source of the moisture. Check skylight for leaks during rains (especially heavy or driving rains) or water test and inspect. After replacement of tiles, observe for signs of leaks and if any appear, inspect ductwork, roof, etc., for cause.

Room 112 - Remove and replace damaged ceiling tile. Cause could not be determined. After replacement of tiles, observe for signs of leaks and if any appear, inspect ductwork, roof, etc., for cause.

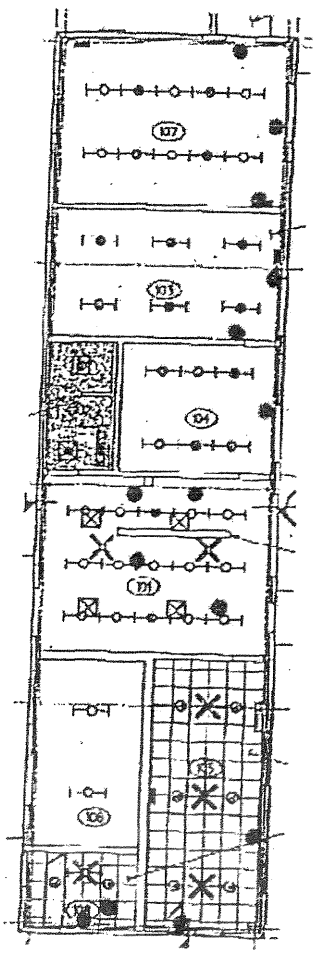
Room 122 - Repair active leak on spray attachment for the Break Room faucet.

Room 145 - Remove and replace damaged ceiling tile. The source of the moisture has been corrected for one of the areas. Repair leaks in heating water piping. Observe ductwork and determine if condensation occurs where there is a transition from an externally insulated duct to an insulated duct.

Room 147 - Steam clean carpet and install drip pan under plants. Minimize water usage.

Base Building - Clean all windows and framing to remove staining and verify if leaks still exist.

ESU BUILDING



Contractor Action Required: •

Housekeeping Action Required: •

ESU BUILDING FINDINGS:

Room 101 - Mold was observed on the air diffusers, on HVAC ductwork, on the door to Room 104, and on the left side and below the sink. Mold was observed on the chilled water supply and return pipe insulation. Mold was observed on the heating water supply and return pipe insulation near the entrance to Room 104.
Room 103 - A small amount of mold was observed on the east outside door and on the door to Room 104. Mold was observed on all of the chilled water supply and return pipe insulation.
Room 104 - A small amount of mold was observed on the east outside door. Mold was observed on the chilled water return pipe insulation above CRU #5.
Room 105 - Water stains were observed on the south window glass and framing. One window insulated glass unit was broken. The wallpaper was puckered in the southwest corner by the window frame near the floor. Mold was observed on three air diffusers by perimeter walls. Mold was observed on the chilled water supply and return pipe insulation.
Room 107 - A small amount of mold was observed on the east and north outside doors. A water stain was observed on the door to Room 103.
Room 108 - Mold was observed on the air diffusers by the south and west walls. A stained ceiling tile was observed in this room. The source of the moisture may have been from condensation from the mold-contaminated chilled water return pipe insulation directly above this area.

ESU BUILDING ACTION:

Contractor:
Room 101 - Clean the contaminated surfaces on the air diffusers, on the HVAC ductwork, on the door to Room 104, and surrounding the sink by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Remediate and restore all contaminated chilled and heating water supply and return pipe insulation. Inspect heating water insulation at through wall penetration and seal penetration to prevent air movement from Room 104 to Room 101.
Room 103 - Clean the contaminated surfaces on the east outside door and on the door to Room 104 by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Remediate and restore all contaminated chilled water supply and return pipe insulation.
Room 104 - Clean the contaminated surface on the east outside door by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Remediate and restore all contaminated chilled water return pipe insulation. Fully insulate valve to prevent condensation. Allow reentry to access balancing valve.
Room 105 - Clean the contaminated surfaces on the air diffusers by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Remediate and restore all contaminated chilled water supply and return pipe insulation. Evaluate and determine the source of the moisture by the window. Since it is likely that additional contamination will be found after the wallpaper is removed, replace all gypsum board in contact with the window framing with a paperless gypsum board, and terminate it with J molding and a gap at the window framing filled with sealant. Replace broken insulated glass unit in window.
Room 107 - Clean the contaminated surfaces on the east and north outside doors by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Clean the water stained surface on the door to Room 103 by damp wiping with a detergent solution.
Room 108 - Clean the contaminated surfaces on the air diffusers by HEPA vacuuming followed by damp wiping with an approved cleaning solution. Remediate and restore all contaminated chilled water supply and return pipe insulation. Remove all of the wallpaper on the exterior walls and evaluate for mold and moisture.

Housekeeping:
Room 108 - Remove and replace damaged ceiling tile. Additional investigation is required to

determine the source of the moisture.
ESU Building - Clean all windows and framing to remove staining and verify if leaks still exist.

CONCLUSIONS/RECOMMENDATIONS:

Water damage and visible mold growth were discovered in various rooms of the ATCT, Base Building, and ESU Building, primarily caused by moisture infiltration through building panel sealants and/or window systems; condensation on chilled water pipe insulation and heating, ventilation, and air conditioning (HVAC) system ductwork; air infiltration; possible HVAC system deficiencies; and miscellaneous building leaks.

It is recommended that sealant repairs be made to the exterior concrete panels and that, windows, window systems, and door seals be evaluated in order to eliminate future moisture intrusion issues.

It is recommended that the contaminated areas found during this evaluation be remediated in accordance with the guidelines established by the New York City Department of Health for the Assessment and Remediation of Fungi in Indoor Environments (GARFIE), the Central Service Area Guidelines for Managing Mold in FAA Facilities, issued June 13, 2006, and "FAA Guidance for Mold in FAA Facilities", issued September 25, 2006.

Attachment 1

EMSL Analytical, Inc. Mold Spore Bulk Analysis Report

EMSL Analytical, Inc.

2501 Central Parkway, Suite C-17 Houston, TX 77092
Phone: (713) 686-3635 Fax: (713) 686-3645 Email: [illegible]

Attn:	Barbara Hebert	EMSL Order:	150706536
	Federal Aviation Administration	Customer ID:	FAAM78
	901 Locust	Received:	11/20/07
	Room 200-A	Analyzed:	11/27/07
	Kansas City, MO 64106	Report Date:	11/27/07
Proj:	CRP ATCT Mold		

Microscopic Examination of Fungal Spores, Fungal Structures, Hyphae, and Other Particulates from Bulk Samples (EMSL Method: M041)

Lab Sample Number: Client Sample ID: Sample Location:	150706536-0001 CRP-B1 Room J2	150706536-0002 CRP-B2 Room L31			
Spore Types	Category	Category			
Agrocybe/Coprinus	-	-			
Alternaria	-	-			
Ascospores	-	-			
Aspergillus/Penicillium	-	-			
Basidiospores	-	-			
Bipolaris		-			
Chaetomium	-	-			
Cladosporium	Rare	-			
Curvularia	-	-			
Epicoccum	-	-			
Fusarium	-	-			
Ganoderma		-			
Myxomycetes	-	Rare			
Pithomyces	-	-			
Rust	-	-			
Scopulariopsis	-	-			
Stachybotrys	Rare	Rare			
Torula	-	-			
Ulocladium		-			
Unidentifiable Spores	Rare	Low			
Zygomycetes	-	-			
Pithomyces	Rare	-			
Fibrous Particulate	-	-			
Hyphal Fragment	-	-			
Insect Fragment	-	-			
Pollen	-	-			

Category Count: Rare: 1 to 10 Low: 11 to 100 Medium: 101 to 1000 High: >1000

No discernable field blank was submitted with this group of samples.

* Sample contains fruiting structures and/or hyphae associated

[illegible]

[illegible]

Initial report from [illegible]

For information on the fungi listed in this report please visit the Resources section at www.emsl.com

28b

WONDER MAKERS

ENVIRONMENTAL

June 18, 2008

Darrell Meachum
Southwest Region Vice President
1001 W. Euless Blvd., Ste 215
Euless, TX 76040

nswrvp@natca.net
817.540.6661

RE: Evaluation of Corpus Christi ATCT Mold & Moisture Engineering Analysis and Mold and Moisture Assessment; WM project GC08-8202

Dear Darrell:

Wonder Makers Environmental has had an opportunity to review the Corpus Christi ATCT Mold & Moisture Engineering Analysis, authored by Ed Winkler, Civil Engineer, Infrastructure Support Center – Kansas City dated December 18, 2007, and the attached Mold and Moisture Assessment authored by Barbara Hebert, NISC, CIH. Winkler's document offers a summary of Hebert's assessment report, along with estimated costs for implementing her recommendations for remediation.

Following is our review of these documents including concerns and recommendations for action to be taken by NATCA in response to the documents and subsequent comments made by Agency representatives regarding this project. I have also attached a copy of an email sent to Kraig Kidd dealing specifically with the question of whether or not the water intrusion issue must be complexly addressed before any mold remediation work can begin.

Background Information

This Mold and Moisture Assessment of the Corpus Christi, TX (CRP) ATCT occurred on November 14–15, 2007. The assessment was conducted by Winkler and Hebert. The request for this survey was made by two independent departments within the Agency. Further details can be found in the Background section of Winkler's report. The assessment focused on the ATCT, Base Building and the ESU Building. According to Winkler, a previous report by All Points Environmental, LLC was used as a guide for this assessment. (Note: Wonder Makers Environmental has not had an opportunity to review the All Points document.) Attachments 1 and 2 provide a brief bulleted list of their findings and corrective actions.

The building of the ATCT was completed in 2002 and, according to the report, its design is a modification of the Radian standard tower design. The survey included building exteriors and interiors. The exterior of the ATCT is made of pre-cast panels. Joints between the panels are

supposed to be sealed with caulk or other sealants to prevent moisture from storms and humidity from coming into the building.

During the interior survey of the building Winkler notes that destructive or intrusive testing of gypsum wallboard was not done. The entire survey was strictly visual.

Compared to other mold related inspections contracted by the FAA each of these reports is relatively thorough. A summary of the Causes of Water Intrusion in the ATCT and Recommendations for Fixing the Moisture Intrusion Problems at the CRP ATCT can be found in attachments 1 and 2 of this document. These brief documents capture the most important information from the Engineering Analysis report you forwarded.

In general, both reports indicate that there are two primary sources of water intrusion in these buildings. The first is storm water that is entering the building through seal cracks and other exterior penetrations. The second is higher than normal humidity levels in different areas of the building. The humidity is providing enough moisture to cause mold growth on doors and other non-porous surfaces, and it is also causing condensation to form on metal finish materials such as ventilation ducts.

Since we have not had an opportunity to review all project related material (*e.g.*, earlier inspection reports, a site specific remediation plan [required by Texas state regulations]) we have focused our concerns on the remedial actions that were suggested based on the information provided to us at this time.

Concerns and Recommendations

1. Hebert states at the end of the Introduction section in her report:

   > As required by the TDSHS regulations, the findings of this document will be used to prepare a mold remediation protocol, whereby remediation methods, personal protective equipment, engineering controls, project layout, and post-remediation clearance evaluation methods and criteria will be specified.

   Since you have not provided us with a mold remediation protocol we assume that such a document does not exist at this time. It is important that you see this document before any work begins at the CRP ATCT. Such document should be reviewed to ensure compliance with the Texas Mold Assessment and Remediation Rules and the industry standard of care.

2. Hebert indicates that there is approximately 996.25 ft^2 of gypsum wallboard with visible signs of fungal growth in the ATCT. She has identified the quantity and location of contamination in each room of the ATCT. This is in accordance with the Texas Mold Assessment and Remediation Rules. While Hebert acknowledges that there may be more mold behind gypsum wallboard, she does not attempt to quantify this material. The EPA in its document entitled *A Guide for Mold Remediation in Schools and Commercial Buildings* encourages investigators to consider the hidden mold (unseen colonies that are likely to be in wall cavities) when determining engineering controls for remediation projects.

Wonder Makers Environmental has found that when water is coming from the back side of the wall cavities, as is the case with the exterior walls of this facility, the actual quantity of mold is generally five to ten times greater than the amount of mold observed on the front side of the drywall. As a result, even though Hebert says in many instances, "Inspect concealed layer or assume an additional quantity is also contaminated", it is important to attempt to quantify this amount in order to determine the levels of engineering controls and PPE needed during remediation of these areas.

Two bulk samples of suspect material growing on gypsum wallboard were collected, one in room J3 and one in room L31. Laboratory analysis indicates the presence of Stachybotrys in these samples. This variety of mold is known by many industry professionals as a "target fungal type". Target fungal types require high moisture content or water activity to grow, have the ability to naturally produce toxins, and degrade cellulose-containing materials. Spores from these target organisms are not typically found in non-impacted indoor environments. The recovery of target spores from an indoor air sample is a strong indication of water damage or significant moisture problems and a mold source within the structure.

It is interesting that Herbert wants the surfaces in these two rooms with confirmed mold cleaned rather than removed. This contradicts her recommendation to remove the other areas of mold contaminated gypsum wallboard, totaling 996.25 ft^2, that have only visible evidence mold growth rather than laboratory confirmation of it. The gypsum wallboard in rooms J3 and L31 should be removed in accordance with Texas laws and the industry standard of care.

3. Hebert identified three rooms, J7, J9 and L21, with damaged gypsum board. In rooms J7 and J9 she indicates that the gypsum board ceiling near the near the supply and return vents is stained and puckered. The likely source of moisture is condensation from the vent ducts. If this is the case it is likely that mold is growing on the back surface of the gypsum board though there is no visual evidence of fungal growth on the front side.

   It is recommended that further investigation of the gypsum board be conducted to determine if there is fungal growth on the back side. If mold is present the gypsum board must be remediated and restored.

4. In room L21 Hebert indicates that the paint is peeling on the west wall. Peeling paint can be an indication of water damage from a variety of sources. The cause could be humidity, in which case the moisture that is causing the damage came from the front side of the drywall. However, it is possible that moisture from the back side of the gypsum board has caused the paint on the front to start peeling.

   Further investigation behind this wall is recommended before it is assumed that mold is not present. If mold is present the gypsum wallboard must be remediated and restored.

5. Water damaged ceiling tiles were observed in the following rooms:
   - ATCT
     - J1 lobby
     - J5
     - L31
   - Base Building
     - By entrance to Room 102
     - Room 112
     - Room 145
   - ESU Building
     - Room 108

   Drop-in ceiling tiles are generally made from pressed cellulose (paper) and clay. As a result, water-damaged ceiling tiles generally harbor mold either on the surface or internally since the tile is natural growth medium. Unless surface testing is conducted on the tiles, all water-damaged ceiling tiles that are made from a cellulose material should be removed by trained personnel in accordance with Texas laws and the industry standard of care.

6. Hebert talks about cleaning HVAC systems and ductwork in the ATCT.

   This should be done by licensed HVAC contractors in accordance with Texas Mold Assessment and Remediation Rules. We further recommend that employees working for the HVAC contractor have certifications with the National Air Duct Cleaning Association (NADCA).

Summary

Overall, both reports appear to have been a legitimate effort on the part of Winkler and Hebert to conduct an assessment of the moisture and mold conditions at CRP ATCT, Base Building and ESU Building. Nevertheless, the quantification of fungus-contaminated material that should be addressed appears to be understated since the inspection was based strictly on a visual examination. As such, it is important to carefully review any work plan that is developed for this location to ensure that appropriate engineering controls are in place in each area where contamination is to be remediated so that the remediation procedures meet the Texas regulations and the industry standard of care for a critical use facility such as an air traffic control tower.

As noted previously, Texas has comprehensive mold remediation legislation. It has very specific requirements for who can do assessments and remediation, as well as how the work is to be performed. (See attachment 3 for highlights.) Control tower representatives should be vigilant to ensure that the Texas regulations are not only built into the written remediation work plan, but actually instituted during the remediation activities.

Finally, it is interesting to note that while the Agency conducted a more thorough review of the CRP structures, they have balked at similar requests from NATCA at other facilities, including DTW and MCI. It is difficult to understand why the Agency offers its employees the benefit of a more detailed review in one structure while imposing a limited review in another, particularly when exterior structural deficiencies are the common cause of mold infestation in each of these

buildings. We strongly recommend that NATCA start demanding that the Agency use the CRP survey as a minimum starting point for similar investigations at FAA facilities throughout the country.

Please do not hesitate to contact us if you have any additional questions. We look forward to reviewing the rest of the project related information for the Corpus Christi tower.

Sincerely,

Michael A. Pinto, CSP, CMP
CEO

Attachments:
1. Documented Causes of Water Intrusion at CRP ATCT
2. Recommendations for Fixing the Moisture Intrusion Problems at the CRP ATCT
3. Summary of Texas Mold Assessment and Remediation Rules
4. June 19, 2008 email from Troy Wilkinson to Kraig Kidd

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Attachment 1

Documented Causes of Water Intrusion at CRP ATCT

- Penetrating sealer on pre-cast concrete did not have sufficient or uniform coverage
- Joint sealant showed signs of failure or poor installation
- Building design does not prevent water from running down the sides of the structure and into cracks
- Where the exterior walkway attaches to the building, the connections to the building are prone to leaks
- Lightning protection runs between joints in the concrete panels
- The use of separate panels for the sloped panel below the CAB windows and the vertical panel on the interior wall of the walkway vs. an "L" shaped panel
- Joint width is not uniform making it difficult to seal the joints
- Leaking windows
  - ◊ Control Cab
  - ◊ Junction level
  - ◊ Several Base Building windows
- Cable access level – 4 of 8 corners not sealed properly near structural steel
  - o Could see daylight from inside the building
- Poor design and operation of HVAC system – Room J3 65% humidity
- Condensation on metal duct work
  - o 60% of chilled water piping insulation has mold or visible signs of water damage due to condensation.

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Attachment 2

Recommendations for Fixing the Moisture Intrusion Problems at the CRP ATCT

- Remove and replace all contaminated materials.
- Replace exterior sealants
- Relocate or re-route lightning protection
- Repair and reseal exterior walkway
- Inspect and reseal roofs
- Fix defective windows
- Inspect Junction Level mechanical louver
- HVAC analysis
  - Humidity should be maintained below 50%
  - Duct cleaning
- Replace pipe insulation
- Remove vinyl wall coverings
- Remove bird droppings

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Attachment 3

Summary of Texas Mold Assessment and Remediation Rules

Following is a list of requirements from the Texas regulations that apply to work planned for the CRP ATCT and other buildings

- Licensed mold assessors must provide clients with an assessment report that determines the sources, locations and extent of mold growth in a building, to determine, the condition(s) that caused the mold growth.
- The assessment report is then used to develop a mold remediation protocol that must be provided to the client before mold remediation begins. This must specify;
    - the rooms or areas where the work will be performed
    - the estimated quantities of materials to be cleaned or removed
    - the methods to be used for each type of remediation in each type of area
    - the PPE to be used by remediators
    - the proposed types of containment
    - the proposed clearance procedures and criteria.
- Remediation work/ mold removal must be done by a Texas state licensed mold remediation contractor.
- The contractor must develop a written mold remediation work plan from the assessor's remediation protocol.
- A negative pressure enclosure is required if mold has contaminated 25 contiguous square feet or more of materials to be removed in the project.
- Formal notification must be made to the state of Texas no later than 5 working days (not calendar days) before the start of the project.
- Chemicals used during remediation must be EPA registered and used in accordance with manufacturers instructions.
- Photo documentation of the mold project with before and after pictures is required and copies must be provided to the customer.
- Signs must be posted at the entrances of containment that state NOTICE: Mold Remediation Project in Progress.
- Containment can not be removed/dismantled until a mold assessment consultant provides written notice that it has achieved clearance.
    - Section 295.324 Post –Remediation Assessment and Clearance
        a) **Clearance criteria**. For a remediation project to achieve clearance, a licensed mold assessment consultant shall conduct a post-remediation assessment using visual, procedural, and analytical methods. If walk-in containment is used during remediation, the post-remediation assessment shall be conducted while the walk-in containment is in place. The post-remediation assessment shall determine whether;
            1) the work area is free from all visible mold and wood rot; and
            2) all work has been completed in compliance with the remediation protocol and remediation work plan and meets clearance criteria specified in the protocol.

b) **Underlying cause of mold**. Post-remediation assessment shall, to the extent feasible, determine that the underlying cause of the mold has been remediated so that it is reasonably certain that the mold will not return from that remediated cause.