RECOMMENDATIONS REGARDING ADDITIONAL TESTING AT FLAGLER COUNTY SHERIFF'S OPERATIONS CENTER

-FINAL REPORT-

R.A.Sweeney & Associates

REVIEW AND RECOMMENDATIONS REGARDING ADDITIONAL TESTING AT FLAGLER COUNTY SHERIFF'S OPERATIONS CENTER -FINAL REPORT-

INTRODUCTION

The Flagler County Sheriff's Office (FCSO) retained the services of Dr. Robert A. Sweeney, the President of R.A.Sweeney & Associates, to initially review the results of all previous testing and analysis conducted at the FCSO offices in the Operations Center at 901 East Moody Boulevard, Bunnell, Florida 32110. Based on that evaluation he will formulate recommendations for any additional testing and/or analyses needed to facilitate the reoccupation of those offices without exposing the relocated staff to health risks from prior identified contaminants which included molds.

The FCSO selected Dr. Sweeney to perform these tasks because of his training and successful experiences in dealing with sick buildings. He earned his PhD in environmental toxicology from The Ohio State University, where much of his education was done in the Medical School. His coursework included a course in medical mycology (study of fungi). Over his professional career he has evaluated numerous buildings in which occupants had become ill after extended exposure to contaminants. He identified the materials that were the cause of the illnesses and made recommendations, that after they were implemented, reduced the contaminants below the levels that induced sicknesses. In several of these cases mold toxins were the primary cause of the building related illness (BRI).

REVIEWED INFORMATION

The FCSO furnished Dr. Sweeney with 129 Documents regarding the history of the Operational Center building including health issues of staff who had worked in that location as well as the results from testing designed to identify the cause(s) of those illnesses. The following is a list of the titles and date each was generated:

1993 /July 20	Treated Groundwater Discharge Building Permit for Flagler Memorial Hospital – RBA Assoc.
2000 /September 8	Limited Access Survey for Asbestos Materials for Flagler Memorial Hospital – Limited Access Survey for Asbestos Materials for Flagler Memorial Hospital – Pb03 Environ. Testing Limited Access Survey for Asbestos Materials for Flagler Memorial Hospital – Pb03 Environ. Testing
2002 2002/June	Building Vacated (hospital moved to new location in Fall 2002) Report of Building Construction/Renovation Study – Gibraltar Design
2006/August 22	City of Bunnell Ordinance 2006-23 Vacating Unnamed Street (Sheriff's Ops Center Site)
2006/August 24	Bradco Statement of Abatement of A.C.M. from the Building

2010/January 13 County Receipt of Construction Plans for Hospital Renovation – BETNR Construction

2012/September 27 Summary Appraisal Report - Hamilton & Jacobs

2013 /April 19	Option Agreement for Sale & Purchase with Flagler Crossroads
2013/May 6	Former Hospital Building Option Presentation to Commission
2013/May 6	Purchase of Former Hospital Building Staff Report
2013/May 22	Engineers Cost Estimates for Proposed Sheriff Building
2013/June 20	Real Estate Appraisal – Cooksey & Associates
2013/June 20	Real Estate Appraisal – Hamilton & Jacobs
2013/June 27	Final Phase 1 Environmental Site Assessment – UES
2013/July 17	Final Professional Consultant Services Report – UES
2013/July 17	Asbestos Report Exec. Summary - UES
2013/July 22	Appraisal Review – George Goodman
2013/July 26	Condition Assessment Report – DJ Designs
2013/July 30	Infectious Disease Opinion – Mark Wallace
2013/July 30	Operations Center Comparison
2013/August 1	Presentation at BOCC Workshop on Options for Sheriff Ops Center
2013/August 1	Minutes of County Commission Workshop on Former Hospital and
	Sheriff's Operations Center Options
2013/August 1	Minutes of Special Meeting and Vote to Purchase Former Hospital
2013/August 9	Bunnell Letter of Support for Former Hospital Purchase for the FCSO
001010	Operations Center
2013/September 16	County Purchased Former Hospital Building
2013/October 23	RSQ for Professional Services for Sheriff's Operations Center
2014 /May 4	Presentation to BOCC Regarding Hospital Wings
2014/June 13	Schematic Design Submittal - TTV Architects
2014/October 30	PART A and PART B - Invitation to Bid for Construction of New Sheriff's
	Operations Center
2014/December 1	Notice of Award and to Procure - CC Borden
2014/December 16	Borden Construction Contract
2014/December 17	Non-Hazardous Waste/Asbestos Manifest Request Receipt by City of Jax
	at Trial Ridge Landfill
2014/December 17	Friable Asbestos Manifest (demolition debris) Receipt at Trial Ridge
	Landfill (City of Jax) - Waste Mgmt
0045/17	Dance For incomposite Letter of Computation of Ashertes Abetemont
2015 /January 7	Darcco Environmental Letter of Completion of Asbestos Abatement -
2015/ January 9	former hospital and food bank building Notice to Proceed for Construction - CC Borden
2015/January 8 2015/February 20	First Amendment to CC Borden Construction Contract
2015/February 20 2015/March 30	Atlantic Engineering Services site visit - Report released March 31
2015/March 30	Second Amendment to CC Borden Construction Contract
2015/June 19	Rebuttal to Rotten Wood Facia Claims
2013/Julie 19	Nebullar to Nollell Wood Facia Ciaiiiis

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2015/October 2	Building Dept Inspection Report
2015/October 2	Certificate of Occupancy
2015/November 3	FCSO Operations Center Ribbon Cutting (Agenda)
2015/December 22	PART A and PART B Overall Building Plans with Bid Options Drawings
LO 10/DOGGIIIDGI ZZ	Received – TTV Architects
2016 /January 29	Operations Center Proposed Additions
2016/April 26	Certificate of Final Completion
2016/April 26	Final Completion Tab
2016/September 21	Inspection Report for Reroofing of Outbuilding
2017 /February 28	Permit for Demolition of Building Wings
2017/November 2	Email to County from Sheriff Ofc Acknowledging Quick Response on
2017/November 2	Room 129 Concerns
2017/November 7	
2017/November 7	Email to County with Bacteria Service Agreement for Mold Inspection – H2H Indoor Air Solutions
0047/NI	
2017/November 8	Email to County with Inspection Date – H2H (Date Later Changed from
	11/9/17 to 11/20/17)
2017/November 14	Email from County to Jack Bisland Regarding Inspection on 11/20/17 and
	Processes
2017/November 14	Email from County to Sheriff Office Regarding Requesting Inspection on
	11/20/17
2017/November 14	Email from Jack Bisland to County Confirming 11/20/17 Inspection Date
2017/November 14	Email from Sheriff Office to County Forwarding info to Sheriff Staly
	Testing and Processes
2017/November 14	Email from Sheriff Office Confirming 11/20/17 Inspection and Processes
2017/November 14	Email to H2H with Approval for 11/20/17 Inspection
2017/November 14	Email Confirmation from County to Sheriff Ofc for 11/20/17 inspection
2017/November 17	Email from Sheriff Office to County Acknowledging 11/20/2017 inspection
2017/November 27	Allergen Analysis for Fungi Spores & Particles Report – EMSL for H2H
2017/November 29	Rapid Detection of Molds Report – EMSL for H2H
2017/December 12	Commercial Indoor Air Quality Assessment Report– H2H
2017/December 13	Email to County from H2H with Commercial Indoor Air Quality
2017/December 10	Assessment Report
2017/December 19	Mold Remediation Protocol Report – H2H
2017/December 19	Email of Staff Receipt of Mold Remediation Protocol Report
2017/December 10	Email to Sheriff Ofc with Mold Remediation Protocol Report
2017/December 20	·
2017/December 20	Email to ServPro Requesting Estimate for Remediation
2018 /February 6	Environmental Mycotoxin Panel Report – Real Time Lab
2018/February 8	Email from H2H Regarding Testing Procedures
2018/February 8	Rapid Detection of Common Molds Report (Rm 129 and IT Room) –
20 Ton Ebruary 0	EMSL for H2H
2018/February 9	Water Culture Tests – EMSL for H2H
<u></u>	
2018/February 12	Email from H2H Regarding Testing
2018/February 14	Email from Health Dept Regarding Water Testing
2018/February 16	Invoice for Inspection Fee for Cultural Fungi Testing – H2H

2018/February 22	Rapid Detection of Common Molds Report (Rm 129 and IT Room) –
2019/Echruany 26	EMSL for H2H
2018/February 26 2018/March 2	Email from H2H Regarding Second Clearance Test Health Department Summary of Interviews with Operations Staff
2018/March 6	IAQ Assessment – Mold-Spec
2018/March 8	Mold Inspection Results – Mold-Spec
2018/March 9	Email from H2H Noting Waiting for DNA Results of IT Room
2018/March 12	Rapid Detecting of Common Molds Report (IT Room) – EMSL for H2H
2018/March 28	Email from H2H with Estimated Air Quality Tests for 211; Sample Lab
	Report; Onsite Testing Device; and EPA GuideEmail from H2H with
	Estimated Air Quality Tests for 211; Sample Lab Report; Onsite Testing
	Device; and EPA Guide
2018/March 28	H2H Cost Estimate for Indoor Air Quality
2018/April 3	Environmental Analysis for Mold, Dust Samples Collections
2018/April 4	Correspondence with Darcco for Removal of Asbestos in Outbuilding
2018/April 5	Notice of Demolition or Asbestos Renovation Form Signed by County for
	Wings
2018/April 10	Rapid Detection of Molds for IT Room - EMSL
2018/April 12	Commercial Indoor Air Assessment Report – H2H
2018/April 12	Notice from FDEP of Failure to Submit Written Notification of Demolition
2018/April 23 2018/May 3	Correspondence with FDEP Regarding Asbestos Removal Executed Consent Order - Former Hospital Demolition
2018/May 29	Emails String between Joe Mayer and Mark Strobridge ref Pulmonary
20 To/Iviay 29	Specialist
2018/May 29	Email from Sheriff to Employees
2018/May 29	Letter from Sheriff to County Regarding Building Concerns
2018/May 30	County Statement Regarding Operations Center
2018/May 30	Preliminary Report from Dr. Hejzlar
2018/May 31	County Staff Notes from USEPA Assistance
2018/June 4	Email from Sheriff Staff (Annie Conrad) Regarding Her Illness
2018/June 6	Memo from County to BOCC with Sheriff's Operations Center Update
2018/June 6	Sheriff Email to Employees with Update and Testing Info
2018/June 6	Work Estimate from Dr. Hejzlar
2018/June 7	County Request for Testing for Mold in Marijuana
2018/June 7	Email from Dr. Hejzlar Regarding Mold in Marijuana Testing
2018/June 7	Emails Regarding Medical Records from Sheriff Employees
2018/June 7	County Confirmation of Office Space at Courthouse
2018/June 7 2018/June 7	Request to Preserve Evidence from Building Email from Sheriff to Staff with Relocation Plan
2018/June 8	Request for Conference Call to Finalize Scope of Work for Phase 2
2018/June 8	Email from Michael Roper Regarding Preservation of Evidence
2018/June 8	Email from Sheriff Regarding Relocation Schedule
2018/June 8	Email from Sheriff Regarding Workers Comp Claims
2018/June 11	Notification of Date for Radiation Inspection of SOC
2018/June 11	Email from Sheriff to Staff Regarding Relocation Update
2018/June 12	Email from Sheriff to Staff Regarding Relocation Update

2018/June 13	Email from Sheriff to Staff Regarding Relocation Update
2018/June 14	Radiological Survey by Florida Dept of Health
2018/June 15	Letter from Sheriff to Dr. Bichler re: Medical Records of Employees of the
	FCSO
2018/June 18	Zdenek Hejzlar Recap of June 15 Sampling
2018/June 18	Email from Sheriff to Staff with Testing Progress Update
2018/June 21	Statement of Qualifications for Mold Assessment - Dr. Hejzlar
2018/June 26	Emails Regarding Request for Medical Records
2018/July 12	ESi Report (full report with attachments linked at the top of this page)
2018/July 16	ESi PowerPoint presentation to the Flagler County Board of County
	Commissioners
2018/July 17	Email Regarding CDC Health Evaluation Consultation
2018/July 18	Email to CDC Team
2018/July 18	Email Attachment - Request for a Health Hazard Evaluation
2018/July 18	Email Attachment - HHE Request Attachment
2018/July 18	Email Attachment - ESi Report - Indoor Air Quality Investigative Report
2018/July 23	Radon Testing Report
2018/July 23	Associated Radon Services Invoice

He also was furnished with the results of extensive testing designed and conducted in at the Operations Center by H2H Indoor Solutions (H2H) and Engineering Systems Inc (ESi). The HSH report, titled "Commercial Indoor Air Assessment", was submitted to Flagler County on 12 Dec. 2017. The ESi document, "Indoor Air Quality Investigations", was dated 12 July 2018. Dr. Sweeney expressed his appreciation to ESi Senior Managing Consultant Dr. Zdenek Hejzlar for providing him with the redacted figure from the above ESi Report showing the room layout in the Operations Center and what HVAC system air handlers and duct work serviced each of those spaces. That diagram had been removed for security reasons.

ASSESSMENT OF H2H AND ESI REPORTS

The information conveyed in the above reports, including testing methods employed, conclusions and recommendations had a direct influence on the need for and nature of additional testing at the Operations Center Formulated by R.A.Sweeney and Associates. The following is a critical evaluation of the H2H and ESi reports submitted to Flagler County.

Both H2H and ESi limited their samplings for molds and volatile organic compounds (VOCs) to one collection per area assessed. It is unlikely that the composition of these parameters is uniform in these spaces. More informative results would have been generated if more than 1 collection was taken in each collection site; preferable 3 in the larger rooms. As H2H accurately stated on page 47 of their report "findings, results, and conclusions as part of our assessment are only representative of conditions at the time of the H2H visit and do not represent conditions at other times." To get a more accurate picture of the molds and VOCs in and outside of the Op Center, the sampling should have been repeated over several days.

There is an inherent limitation in trying to assess the impacts on organisms of components, such as air pollutants, in their environment when samples from the latter are gathered during a

brief duration during the time when human beings are being exposed to the material being collected. In the case of the Operation Center staff, they worked up to 7 ½ hours per day typically for 5 days a week for the duration of their assignment to that building in the areas being sampled. They are the "canaries in the coal mine" breathing the air and having their epidermis exposed to the components being measured. Therefore, consideration should be given to any adverse health impacts on people by the materials of concern.

With respect to human responses to exposures to mycotoxins, symptoms can vary widely. Some people will exhibit no clear effects. Others exhibit mild to severe nasal stuffiness, throat irritations, coughing, eye irritations and/or skin irritations. In the most extreme cases, lethargy and memory loss can occur (www.cdc.gov/mold/dampness- Facts.htm). It has been Dr. Sweeney's general experience in dealing with buildings that have some degree of mold contamination, about 40 - 70 % show no immediate effects. The other 30 - 60 % show one or more of the above listed symptoms. Among the latter there will be some that show more serious conditions which could necessitate being confined to bed. Recovery time (the duration when those showing illnesses) also can vary. For some, following removal from the mold contaminated environment, recovery can occur in less than a week. For the most severely impacted, return to normal health could require much longer durations. Within the medical profession concern has been expressed frequently about longer term exposure mycotoxins on immune systems (Edmondson, D. A. 2009. Immune response among patients exposed to molds. Int. J. Mol. Sci. 10(12): 5471-5484). People with already compromised immune systems from other causes could exhibit a marked health decline. Previously healthy individuals could experience mild discomfort which never the less could adversely impact the quality of their lives. The best medical advice is to avoid places where mycotoxins are present.

While Dr. Sweeney has neither interviewed Op Center staff who claimed to have been made ill by working in that building nor has he conferred with any medical staff who examined these individuals, the symptoms these people exhibited did correspond with those identified as being adversely affected by mycotoxins. Likewise, the percentage of staff with such symptoms is in line with what he has observed among people working in buildings with confirmed mold contamination.

The Mold Spec Sampler employed had major bias with regards to the size of material collected. On page 10 of the ESi report it was related that "desiccated mold fragments that are smaller (than typical mold spores) may not be captured and could escape detection". This limitation of the procedure employed by both H2H and ESi to collect spores is the most critical deficiency in both reports by these organizations. In terms of mold impacts on human health, the size of the molds and mold fragments is directly linked to their potential for causing health problems (www.epa.gov/pm.../health and environmental effects -particulate matter-pm). "Inhalation is the most important mechanism of exposure to live and dead fungi, fungal fragments or components. Most fungal spores have an aerodynamic range of 2 – 10 microns which are in the size range that allows particles to be deposited in the upper and lower respiratory tract" (Brant, M. 2006). Mold prevention strategies and possible health effects in the aftermath of hurricanes and major flooding. (MMWR.55(RR08) 1-27). It should be noted that MMWR is a Center for Disease Control (CDC) publication. The CDC and the US Environmental Protection Agency (EPA) are the recognized authorities in the United States on the impacts of molds on people. Because they are smaller, mold fragments can be inhaled deeper into respiratory systems. "Mold does

not need to be alive to cause an allergenic reaction. Spore coatings cause the same reactions as live spores" (www.epa.gov/mold/mold course). Many of those who worked in the Op Center exhibited medical symptoms that are typical for those exposed to mycotoxins. The most likely way in which those poisons entered the bodies are those made ill was by inhalation of mold fragments. Neither ESi nor H2H measured the mold fragments that are the most likely vehicle for carrying mycotoxins into lower respiratory systems. In fact, their sampling procedure largely excluded the collection of those medically critical important particles. Therefore Dr. Sweeney rejects the statement on page 39 of their report that the Op Center is not adversely impacted with mold.

Dr. Sweeney believes that the current configuration of the Op Center HVAC system is responsible for an increased quantity of toxic mold fragments in the air of that building. As related by Dr. Hejzlar, the vents for the make-up air lack filters. This allows outside air, in which ESi found high mold spore counts, to enter the ducts prior to the UV component. Exposure to UV light is intended to kill pathogens including mold spores. However once killed, each spore fragments into numerous pieces (microparticles) many of which carry mycotoxins. Those small bodies can pass more readily through the primary HVAC system's **non**-HEPA filters. (HEPA = High-Efficiency Particulate Air). When the air in the receiving areas is recycled back into the HVAC systems, the mycotoxin coated microparticles continue to pass thru the filters that are not rated to impede their flow. The result is the continuous buildup of toxic particles in the air of the receiving spaces. This may explain why Sheriff department staff, who experienced illnesses caused by mycotoxins, recovered when transferred to other county buildings with differently configured HVAC systems. The latter do not facilitate the creation of such toxic cycles. While working in a clean air environment, the immune systems of the people initially made ill by mycotoxins can self-repair.

In their report H2H erroneously stated that only *Curvolaria*, which was found in some of their mold collections from the Op Center, caused allergenic reactions. However later in their paper they tempered this by relating that other mold genera can cause health problems. Among the other molds that have been proven to cause diseases are *Altamira*, *Ascospores*, *Aspergillus*, *Chaetomium*, *Cladosporium*, *Penicillium*, and *Stachybotris*. Most of these were found in Op Center samples. When the spores from these genera die and fracture, tens of thousands of less than 1-micron mycotoxin carriers – spore fragments/microparticles - can be released. These can pass through the most common HVAC system filters and be inhaled into the human lungs.

The ESi report said on page 38 that the volatile organic carbon (VOC) test results did not reveal any levels above the current accepted guidelines. However, in Table 7, page 36, they reported finding 2000 ppb VOCs in room 129. They had related in Table 6, page 35, that exposure to 1500 – 3000 ppb VOCs can cause drowsiness, headaches, and general malaise. Those symptoms were exhibited by some Op Center staff. The validity of the VOC sampling results also is compromised by the same issues regarding the mold collections. Those are limited sampling per space and time. This raises the question of the reported result truly representing the amounts of VOCs present within the different Op Center spaces that were sampled.

However, it is reasonable to accept that molds in the center were a major source of the VOCs that were measured because molds emit blends of VOCs. Mold VOCs have been shown to be toxic. Numerous tests with mammalian tissue have demonstrated that fungal VOCs have toxic

effects. People exposed to VOCs have increased incidents of respiratory distress, skin irritations, headaches, and visual impairment (Bennett, J.W. and A. A. Inamdar. 2015. Are some fungal volatile organic compounds mycotoxins? Toxins 7(9): 3785-3804). It also is relevant that the primary way most VOCs enter a human body is through the skin. If a room is sufficiently warm to require fans, it is reasonable to assume that the occupants are perspiring through open spores. VOCs that are deposited on skin are continuously absorbed. Therefore, the measurement of the instantaneous quantity of VOCs in the air is not a valid assessment of the possible effects of those compounds on the room occupants as is the rate and quantity of VOC uptake. That process was not measured among the Op Center occupants. Given the amounts of VOCs in the Op Center atmosphere that could be continuously adsorbed over substantial durations by the occupants, Dr. Sweeney rejects that the applicability of the current accepted guidelines for establishing safe atmospheric levels of VOCs for humans are applicable to the Op Center when there is the potential for long-term exposures to people of those compounds in warm and humid conditions. In brief, the current VOC levels contribute to making the Op Center unsafe for occupancy.

This re-examination and evaluation of the test results justifies the Flagler County Sheriff's decision to pull his staff out of the Operation Center and not reoccupy until the building is medically safe.

NEED FOR ADDITIONAL SAMPLING / ANALYSES

Additional sampling and analyses should be conducted on the Op Center rooms in which former occupants experienced medical issues that in the scientific literature are attributed to exposures to mycotoxins. No collections and measurements should be made until after the HVAC system is upgraded to more efficiently remove mold spores and fragments. At the same time the rooms also need to be thoroughly cleaned before re-testing.

Molds and particulates should be gathered in machines that sample the air in a 10-minute segment every hour over an 8-hour duration. These systems inhibit mold growth on their filters for a more accurate assessment of the mold present during the collection durations. At least 2 and preferably 3 of these devices should be operated simultaneously in the area to be sampled. Multiple collections for VOCs should be done at the same time and in the same sample rooms as the mold and particles testing. This entire sampling regime should be repeated on a different day.

There is no need to identify which mold genera are collected since most spores generate VOCs and mycotoxins. The most important materials to be gathered are the mold fractions since they are the most medically important sample components. These are the microparticles that can be drawn most deeply into respiratory systems.

Vacuums with combination HEPA – charcoal filters should be employed. These should be the highest rated units for removing mold spores and spore fragments. They should come with a money-back guarantee that they meet or exceed their capturing efficiency. The vacuums should remain at the Op Center for use by the cleaning staff. The formerly used vacuums should be removed from the building. The cleaning staff need to be informed of the importance

to do an excellent job each time that they service the building. Supervisors need to check that this directive is being met.

There is considerable controversy regarding the cost/benefits of duct cleaning. If there are funds available, the duct cleaning procedures as approved by the CDC should be followed. Combination HEPA and charcoal filters also need to be installed on the ducts that convey the make-up air as part of the HVAC system. A schedule needs to be put in place and adhered to strictly for changing the filters at a time less than the recommended interval. The filters on the air handling units of each of the 4 HVAC units that service the Op Center need to be changed to HEPA grade. The time that these are changed should be less than or at least equal to the duration recommended by the manufacturer.

It is Dr. Sweeney's determination that the UV components on HVAC system can do more harm by causing more spore fracturing than benefits in killing other potential pathogens. The UV components on the HVAC systems in the Op Center should be disconnected or removed, whichever is most cost-effective.

Moisture in HVAC systems and the air of the receiving building promotes the growth of mold. A concerted effort should be made to keep the relative humidity below 50%, preferable near 40% if possible.

The most highly rated combination HEPA – charcoal filtering units should be purchased and placed in each room where mycotoxin induced illnesses were experienced by some of the occupants. The filters in these floor level devices need to be checked and replaced on a schedule recommended by the manufacturer.

After the above recommended changes are made to the HVAC system, this air conditioning/heating – cooling system needs to be operated for 2 weeks with the make-up air ducts blocked. At the end of that duration testing/air sampling should occur during 2 separate 8-hour periods over 2 days. All filters should then be removed and inspected for material collected. The HVAC system is then run with the make-up air ducts open (unblocked) and the testing/sampling should be repeated consistent with the first round of sampling. Filters should be removed and inspected and changed. This will allow testing to determine if the building has been purged of mycotoxins. Repeating the testing after 2 weeks of running with make-up air intakes open and being filtered will determine that mycotoxins/mold are not being added into the HVAC system and thus the areas being sampled.

The intent of the measurements of spores, spore particles and VOCs after the initial 2 weeks of operating the HVAC system with more efficient filters, no UV components and the intake of make-up air blocked is to ascertain if an acceptable low or no level of important potentially harmful contaminants has been achieved. The purpose of the second round of operating under normal conditions after the filtered make-up air has been re-introduced into the HVAC flow is to determine if that change increased the pertinent contaminant levels. The results of the 2 rounds of samplings can then be compared/contrasted with the levels found to be safe for human occupancy according to standards set by the Center for Disease Control (CDC) and other agencies involved with environmental health.

RECOMMENDED SAMPLING REGIME:

- 1. Thoroughly clean building.
- 2. Complete recommended changes to HVAC systems (install HEPA-carbon filters on all units, remove or disable UV components, install HEPA-carbon filters at make-up air intakes).
- 3. Run HVAC system WITH MAKE-UP AIR DUCTS BLOCKED, (closed system) for 14 days.
- 4. On Day 15 sample (with HVAC system running) for 10-minute segments every hour for an 8-hour duration. 2-3 sampling devices/area tested. Sample all areas in which Sheriff Dept. staff reported adverse health reactions.
- 5. On Day 16 repeat testing as per Step 4.
- 6. Remove, inspect and change all HEPA-carbon filters.
- 7. Unblock make-up air ducts.
- 8. On Day 17 run HVAC system as per "normal" operation for 14 days (with **filtered** makeup air being allowed into the system).
- 9. On Day 32 sample with system continuing to run in normal operating mode exactly as per Step 4.
- 10. On Day 33 repeat testing as per Step 4.
- 11. Analyze results from closed and non-closed operation of HVAC system.
- 12. Compare results with CDC standards for human occupancy.

The above described mold and VOC sampling and analysis needs to be complete before the building should be re-occupied by Sheriff department staff. Reoccupation can proceed only after the results from the above sampling program clearly shows acceptably safe levels of molds, mold particulates and VOCs for human habitation.

Date: ___August 20, 2018,

Respectfully submitted by Robert A. Sweeney, PhD

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