

AtmosAir Sports Case Studies

Please click title below to be sent to data and summary

[Staples Center, Los Angeles, CA](#)

[USC John McKay Center](#)

[Denver Broncos Training Center](#)

[Dallas Cowboys 'The Star' Training Center](#)

[SOULCYCLE](#)

[New England Patriots Gillette Stadium Facilities](#)

[Bridgestone Arena Predators Locker Room](#)

[PNC Park - Pittsburgh Pirates Facilities](#)

AtmosAir Select Sports Clients:

- Staples Center (LA)
- TD Garden (Boston)
- Dallas Cowboys
- Jacksonville Jaguars
- University of Southern California
- University of California Los Angeles
- NFL Headquarters (New York)
- Milwaukee Bucks
- Little Caesars Arena (Detroit)
- Minnesota Wild
- Dallas Mavericks
- Northwestern University
- Wells Fargo Center (Philadelphia)
- Denver Broncos Training Center
- SOULCYCLE Spinning Facilities
- Chase Center (San Francisco - 2019)
- New Milwaukee Arena (2018)
- Chicago Cubs

AtmosAir Case Study: The Staples Center, Los Angeles



Indoor Air Quality and Energy Savings

AEG Worldwide had set a sustainability mission across their portfolio to increase green initiatives, save energy, and decrease their carbon footprint.

AEG decided to first test AtmosAir technology to see if it could reduce energy and improve indoor air quality (IAQ) in STAPLES Center, the world's most frequented arena. AEG VP of Engineering Bill Potorff decided to test AtmosAir efficacy in the Lexus Clubs and Suites, a 30,000 square foot area.



Indoor Air Quality Testing

The intention of the testing was to do a baseline measurement of contaminant levels within the space with the air handling and filter systems operated as they had been 'normally,' and then perform identical measurements using reduced outside air, lowering filter efficiency, and incorporating AtmosAir bi-polar ionization systems to the air handling systems serving the Lexus Club.

Staples Center IAQ Contaminant Testing Data			
Contaminant	Baseline Sampling- NO AtmosAir	AtmosAir Sampling - AtmosAir ON	Difference from Baseline Atmos Air (Performance)
PM10	25 ug/m3	19 ug/m3	-24%
TVOC	13 index	0 index	>-95%
Radon	0.5 pci/l	0.1 pci/l	-80%
Ozone	.015 ppm	.0 ppm	-99%
Ammonia	1.8 ppm	.9 ppm	-50%
Ethanol	670 ppb	30 ppb	>-95%
Iso Alcohol	2.6 ppb	1.0 ppb	-61%
Acetone	7.5 ppb	< 1 ppb	-99%
2-Butanone	1.3 ppb	1.0 ppb	-23%
Ethyl Acetate	1.4 ppb	.92 ppb	-34%
Toluene	1.9 ppb	<1 ppb	-99%



AtmosAir Case Study:

The Staples Center, Los Angeles

Indoor Air Quality and Energy Savings



Air quality measurements were taken using several devices and methods. CO₂, CO, PM₁₀, PM_{2.5}, TVOC, Radon and Ozone were measured using an Aircuity Optima 500 IAQ monitor which is equipped with an array of sensors to log those various readings. Ammonia was sampled via sorbent tube using NIOSH 6010 method, H₂S was sampled via sorbent tube using OSHA 1008 method. Methane and Propane were sampled via suma canister using EPA TO-15 method. Each element was sampled for four (4) consecutive hours and results are listed as averages over that period. Results of the air quality testing are on the chart on page 1.

Energy Savings Testing

To conduct energy savings testing, AEG set the Air Handling Unit #6 outside air from 40% outside air (11,200) to 14% outside air (4,000 CFM). This would equate to approx 5 CFM of outside air per person. Also the air handler's final filters, a Luwa brand filter, rated at an 85% efficiency was removed and only the pre-filters were kept in place which are rated at 30% efficiency filters.

Clean Air Group projected annual HVAC energy savings for AHU 6 to be:

AHU	Area Served	CFM	Occupancy	Current O/A	CFM PP	Adj O/A with AtmosAir	CFM PP	Energy Cost Savings Projection
6	Lexus Club	28,000	800	11,200	14	4,000	5	\$5,013

Clean Air Group projected annual HVAC filter savings for AHU 6 to be:

Original Filter Efficiency Rating	Quantity	Energy Cost per Filter	New Filter Efficiency	Energy Cost per Filter	Projected Filter Cost Savings
85%	24	\$2256 (\$94.00 X 24)	30%	\$1152 (\$48.00 X 24)	\$1,104



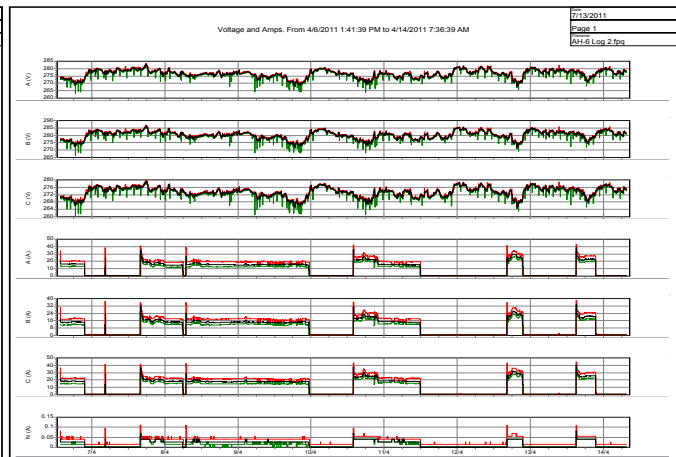
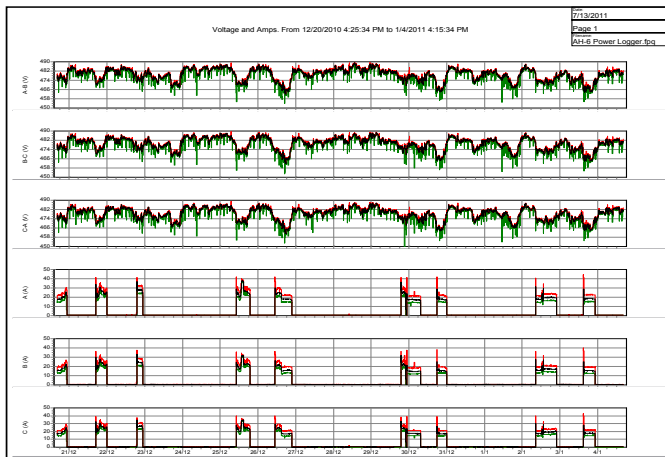
AtmosAir Case Study: The Staples Center, Los Angeles

Indoor Air Quality and Energy Savings



Staples Center Energy Testing Results:

In before a 'before and after' style test with very similar weather data, Staples Center Engineering conducted the before test using AtmosAir with reduced outside air, and only pre-filters installed. After the 48 hour test, engineering then ran the same test using their original outside air quantities with pre and final filters. The before (AtmosAir) test resulted in a 21% energy savings performance vs. the after test. Total energy used in the before test was 456.56 kWh, while energy consumed in the after test without AtmosAir was 583.59. With reduced outside air, and improved particulate filtration, the air handling unit did not have to work as hard, and use as much energy with less outside air to heat or cool. IAQ was also improved.



Staples Center - Air Handling Unit Power Logging Energy Savings Test - Total Energy Use		
	AtmosAir ON	NO AtmosAir
	"Before Test" (AtmosAir On)	"After Test" (AtmosAir Off)
Total Energy Used (kWh):	456.56	583.59

Staples Center - Air Handling Unit Power Logging Energy Savings Test - Weather Data		
	AtmosAir ON	NO AtmosAir
	"Before Test" (AtmosAir On)	"After Test" (AtmosAir Off)
Average Temperature:	66.67 °F	66 °F

AHU6 AtmosAir System Performance	
kWh Energy Savings	21%

Before and After Fluke Power Logging Readings resulted in a 21% decrease in energy demand.



AtmosAir Case Study:

The Staples Center, Los Angeles

Indoor Air Quality and Energy Savings



Financial Implications of Staples Center Lexus Club, Air Handling Unit 6 Energy Testing:

In comparing the power testing Bill Potorff concluded that 'In summary you have proven that your system does in fact provide cleaner air, and a savings in electrical energy. This system will help us in our efforts towards becoming more sustainable.' In previous AtmosAir testing we have already proven superior air quality with only pre-filters installed. This test equated to a savings of roughly 127 KWH or about \$16.51 every 48 hours for AHU6.'

Based on testing conditions, annual energy savings projections for this AHU would be \$2,971 annually. Including filter replacement costs in combination with the AtmosAir systems savings could be projected at \$4,075. At a reduction of 4,000 CFM that equates to \$0.94 savings per CFM of outside air. When filter cost savings are applied it results in a savings per CFM of outside air.

AHU 6 Reduction in O/A CFM	4,000
Projected Annual Savings	\$4,075
Savings per CFM of O/A Reduction:	\$1.02

Full Stadium Installation:

After a year of due diligence and product testing, Staples Center went on to install AtmosAir throughout the entire arena.

A schedule of the air handling unit information is provided on page 5.



AtmosAir Case Study:

The Staples Center, Los Angeles

Indoor Air Quality and Energy Savings



Staples Center Air Handling Unit Schedule							
AHU	Area Served	CFM	Occupancy	Current O/A	CFM PP	Adj O/A AtmosAir	CFM PP AtmosAir
1	Kings Locker	11,000	25	11,000	440	11,000	440
2	Press Office	11,000	75	11,000	5	375	5
3	Commisary	10,000	50	10,000	200	250	5
4	Box Office	2,300	20	600	30	100	5
5	Lakers Locker	10,000	30	10,000	333	10,000	333
6	Club / Dining	28,000	800	11,200	14	4,000	5
7	1st Office	18,750	110	2,550	23	550	5
8	2nd Office	20,000	80	3,290	41	400	5
9	Restaurant	19,000	438	12,000	27	2,190	5
10	Teamstore	11,000	110	2,800	25	550	5
11	3rd Office	24,000	130	3,200	25	650	5
12	Arena Bowl	76,000	3,333	38,000	5	16,665	5
13	Arena Bowl	76,000	3,333	38,000	5	16,665	5
14	Concourse	110,000	3,333	55,000	5	16,665	5
15	Arena Bowl	76,000	3,333	38,000	5	16,665	5
16	Arena Bowl	76,000	3,333	38,000	13	16,665	5
17	Concourse	110,000	3,333	55,000	13	16,665	5

Staples Center Total Supply CFM	Outside Air (CMF) before AtmosAir install	Outside Air (CFM) with AtmosAir	Outside Air Percentage Reduction (%)
689,050	339,640	130,055	62%

Outside Air Reduction totaled 62% or 209,585 CFM of outside air.



AtmosAir Case Study:

The Staples Center, Los Angeles

Indoor Air Quality and Energy Savings



Conclusion:

The Staples Center was the first full arena installation for Clean Air Group and AtmosAir technology.

If we factor the savings per CFM of O/A reduction discovered in the Lexus Clubs energy testing completed by Staples Center (\$1.02 per O/A CFM), we can roughly translate that savings to be a \$213,776 savings per year when modeling savings for the entire arena.

Savings per CFM of O/A Reduction:	\$1.02
Full Arena O/A CFM Reduction	213,777
Projected Annual Savings	\$213,776

It is important to note that the weather during the AtmosAir test was very mild (average temperature of 66 degrees Fahrenheit). It is also important to note that Staples Center did not meter their gas or water savings. With air handling units having to work less there is significant gas and water savings in addition to electrical energy consumption. We estimate that total HVAC related energy savings is greater than 20% in mild climates and greater than 40% in extreme climates.

In conclusion, indoor air quality (IAQ) from baseline measurements to measurements taken with AtmosAir systems installed, and outside air and filter efficiency reduced, improved with AtmosAir systems installed, especial-ly gaseous elements, VOC's and TVOC. Particulate Matter was also reduced significantly.

Since the initial Staples Center install, indoor air quality and reduced energy costs has gained traction. Atmo-sAir has gained steam in the sports facility operations world. AtmosAir is currently installed in Detroit's new Little Caesars Arena, New England Patriots' Gillette Stadium, Dallas Cowboys' Training Center, USC's John McKay Center, Kansas City Chiefs' Training Center, Jacksonville Jaguars Training Center at Everbank Field, TD Garden in Boston, MA, the Atlanta Braves' SunTrust Park in Cobb County, Georgia, Chicago Cubs' Sloan Park in Mesa, Arizona, Pittsburgh Pirates Locker Rooms at PNC Park, Northwestern's Walter Ryan Training Center, Milwaukee Bucks facilities, Soulcycle spinning studios, UCLA's John Wooden Center, among others.



Tony Abate

Subject: FW: ATMOS Air Bipolar Ionization Test Result...
Attachments: History _ Weather Underground 10_31_11.pdf; History _ Weather Underground 10_27_11.pdf; History _ Weather Underground 10_28_11.pdf; History _ Weather Underground 10_29_11.pdf; History _ Weather Underground 10_30_11.pdf; AH6 102711_110811_Data.xls; AH6 Atmos Air Test.fpq

Importance: High

From: Bill Pottorff [mailto:bpottorff@aegworldwide.com]
Sent: Saturday, January 21, 2012 2:58 PM
To: Tony Abate; Mike Upton
Cc: slevine@atmosair.com; Jennifer Regan; Grant Higgins; Lee Zeidman; Paul Flanagan
Subject: ATMOS Air Bipolar Ionization Test Result...

Importance: High

Gentlemen. I just spent the whole morning crunching numbers. So here are my results.

Our Fluke Power Monitor remained connected to Air Handler 6 for the duration of the "before" and "after" test. It should be noted that the first portion of the test was in the "Atmos Air" condition. That being outside air dampers locked to minimum positioning, and bag filters removed. Only pre-filters were left installed. This test ran for 48 hours and 10 minutes with the air handler running the entire time.

Total energy used for this period was 456.56 KWH

The test began at 13:34 on October 27th and concluded at 13:44 on October 29th.

Total energy used for the second portion of the test was 583.59 KWH

This equates to a savings of roughly 127 KWH or about \$16.51 every 48 hours.

The second portion of the test began immediately after re-installing the bag and pre-filters, and returning the outside air dampers to automatic operation.

This was 13:53 on October 29th. Again the unit ran for 48 hours and 6 minutes with this portion of the test concluding on October 31, at 13:59

Weather was similar for all days taking into account temperature and humidity. (Historical weather data attached.) This is also from relatively 'free cooling' periods. Savings will be greater in extreme climate.

In summary you have proven that your system does in fact provide cleaner air, and a savings in electrical energy. I will review the contract early next week and crunch the numbers based on the cost of the equipment based on estimated savings. No need to purchase bag filters for this air handler *was not* factored into the savings.

Lee/Jennifer/Paul - This system in place in other sports facilities and can help us in our efforts towards becoming more sustainable. In previous tests at Staples Center we have already proven superior air quality with only pre-filters installed. Here's a link to their site: <http://www.atmosair.com/>

Paul, this may be a good option for your buildings.

Thanks,

b

PROTECTING THE HEALTH OF OUR STUDENT- ATHLETES

RUSSELL ROMANO, MA ATC
ASSOCIATE ATHLETIC DIRECTOR
FOR ATHLETIC MEDICINE
UNIVERSITY OF SOUTHERN CALIFORNIA



DESIGNING AND BUILDING USC JOHN MCKAY CENTER

- \$70 Million
- 110,000 Square Foot Facility
- Meeting Rooms, Coaches Offices, Football Locker Room, Academic Center, Weight Room and Athletic Training Room
- Opened July 2012



DESIGN FROM AN ATHLETIC TRAINER'S PERSPECTIVE

- Injury/Illness Prevention
- Clinical
Evaluation/Diagnosis
- Immediate and Emergency
Care
- Treatment and
Rehabilitation
- Administrative Duties



INFECTION CONTROL CONCERNS

- Skin and Soft Tissue Infections (MRSA)
- Norovirus
- Influenza
- Mononucleosis
- Upper Respiratory Infections



MY MRSA EXPERIENCE

Journal of Athletic Training 2008,43(3):141-145
© by the National Athletic Trainers' Association, Inc.
www.nata.org/athletictraining

original research

Outbreak of Community-Acquired Methicillin-Resistant *Staphylococcus aureus* Skin Infections Among a Collegiate Football Team

Russ Romano, Doanh Lu, Paul Holton

University of Southern California, Los Angeles, CA

Russ Romano, ATC; Doanh Lu, MD; and Paul Holton, MD, contributed to conception and design, acquisition and analysis and interpretation of the data, and drafting, critical revision, and final approval of the article.
Address correspondence to Russ Romano, ATC, University of Southern California, Department of Athletic Medicine, 2801 West 84th Way, Los Angeles, CA 90089-0802. Address e-mail to rromano@usc.edu.

Context: Methicillin-resistant *Staphylococcus aureus* (MRSA) was once primarily a hospital-acquired organism, but now community-acquired MRSA (CA-MRSA) is causing outbreaks among otherwise healthy sport participants.
Objective: To investigate MRSA skin and soft tissue outbreaks within a collegiate football team and the effect of infection control measures over 3 years.
Design: Retrospective analysis.

Setting: College.
Patients or Other Participants: Collegiate football team.
Interventions: Infection control measures included education, educating Coaches for Disease Control and Prevention recommendations, hand hygiene, benzalkonium 3% soap, disposable towels, and hand sanitizers.

Main Outcome Measures: Number of MRSA infections and hospitalizations.

Results: Complicated skin and soft tissue infections (those requiring surgical debridement and/or hospitalizations) were diagnosed in 2 (1.8%) of 107 players in 2002, 17 (15.8%) of 107 players in 2003, and 1 (0.9%) of 124 players in 2004.

Conclusions: Outbreaks of CA-MRSA in sports teams are very serious, and recognition is crucial. Treatment includes incision for proper drainage, bacterial culture and sensitivity, and appropriate antibiotic therapy. Infection control measures include educating athletes and staff, educating Coaches for Disease Control and Prevention recommendations, identifying CA-MRSA carriers with nasal cultures, introducing handwashing 3% soap immediately in the showers, making alcohol-based hand sanitizers available on the field, restricting weight bearing and mobilization equipment, and using disposable towels on the field during practices and games.

Key Words: Infectious disease, culture, sports team.

Collegiate sport participants are at increased risk for skin and soft tissue infections (STIs) because of the frequency of skin trauma and crowded conditions during the training season. Traditionally, the 2 most common bacterial causes of these infections are *Staphylococcus aureus* and *Streptococcus pyogenes* (Group A streptococcus). In recent years, a new pathogen, community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA), has been identified and described as having a high impact, although its true incidence is not known.¹ These new *Staphylococcus aureus* clones are believed to be more virulent and have been responsible for several outbreaks among collegiate and professional sport teams.^{2,3} The high morbidity associated with these outbreaks call for more effective strategies for disease control and prevention.

We present a 3-year retrospective study of an outbreak of CA-MRSA STIs in a collegiate football team and discuss the strategies used to contain the outbreak, their implementation, and their effectiveness.

METHODS

During the 2002 football season, 2 players were hospitalized with severe STIs caused by MRSA. We enhanced surveillance of all team members for the rest of that season and

subsequent seasons. All athletes with skin lesions were evaluated by the team's athletic trainers. Those with possible infections were evaluated by one of the team physicians or by the student health center. Bacterial cultures of skin lesions were sent to a central laboratory, and available specimens were cultured by the local public health department. Representatives from the public health department collected MRSA isolates from several cultures and sent results for pulsed field gel electrophoresis analysis.

We defined a definite case as a culture-confirmed MRSA infection in a facility that occurred between August 2002 and December 2004. Probable cases were defined as athletes with abscesses occurring during the period that were not cultured but whose clinical complaints occurred prior to the site, "toe-dip hit" as a cause, rapid onset) suggested CA-MRSA infection. An examination of hygiene practices at the team center, including towel use and changing, was undertaken. On-site monitoring of hygiene practices at the facilities, including laundering of towels, was also performed.

RESULTS

All subjects were otherwise healthy college-aged males who were active participants on the football team. A review of the

- 2002 2 Infections
- 2003 17 Infections
- 2004 1 Infection

USC INFECTION CONTROL MEASURES

1. Implement the Centers for Disease Control and Prevention guidelines for MRSA* control.
2. Educate staff, coaches, administrators, and athletes regarding the Centers' guidelines.
3. Encourage frequent hand hygiene by all medical staff and athletic trainers.
4. Use alcohol-based hand sanitizers when soap and water are not available.
5. Promote player hygiene through education and frequent reinforcement.
6. Use disposable towels during practices and games.
7. Ensure that the water used for laundry and showers is at least 140° F (60°C).
8. Use 3% hexachlorophene or 4% chlorhexidine in shower soap dispensers intermittently during the season.
9. Utilize unit-dose massage lotions and gels rather than large containers with pumps.
10. Do not allow athletes with open wounds or suspicious skin lesions in whirlpools.
11. Disinfect taping tables, treatment tables, and rehabilitation and weight room equipment frequently.
12. Increase surveillance of "spider bites," pimples, and boils that could be early signs of MRSA infection.
13. Incise and drain pimples and boils presenting as painful spider bites, and perform wound cultures.

*MRSA indicates methicillin-resistant *Staphylococcus aureus*.

AIR QUALITY

- Virus
- Bacteria
- Fungi
- VOCs
- Particles
- Pollutants



INDEPENDENT CASE STUDY

- Baseline and Post Installation Testing
- 5 Locations within the John McKay Center
- Elements Tested
 - Temperature
 - Relative Humidity
 - Carbon Dioxide
 - Particles (PM10)
 - Particles (PM2.5)
 - Total Volatile Organic Compounds
 - Carbon Monoxide
 - Radon
 - Ozone



INDEPENDENT TEST RESULTS

TVOC

<u>Area</u>	<u>Without AtmosAir</u>	<u>With AtmosAir</u>	<u>+/- %</u>
<i>Athletic Training</i>	<i>12index</i>	<i>0index</i>	<i>- 100%</i>
<i>Locker Room</i>	<i>6index</i>	<i>0 index</i>	<i>- 100%</i>
<i>Weight Room</i>	<i>15 index</i>	<i>2 index</i>	<i>- 87%</i>
<i>1st Floor</i>	<i>17index</i>	<i>0 index</i>	<i>- 100%</i>
<i>2nd Floor</i>	<i>14 index</i>	<i>0 index</i>	<i>- 100%</i>

INDEPENDENT TEST RESULTS

PM 10 particles

<u>Area</u>	<u>Without AtmosAir</u>	<u>With AtmosAir</u>	<u>+/_ %</u>
<i>Athletic Training</i>	<i>14 µg/m³</i>	<i>2 µg/m³</i>	<i>- 86%</i>
<i>Locker Room</i>	<i>17 µg/m³</i>	<i>7 µg/m³</i>	<i>- 59%</i>
<i>Weight Room</i>	<i>18 µg/m³</i>	<i>4 µg/m³</i>	<i>- 78%</i>
<i>1st Floor</i>	<i>12 µg/m³</i>	<i>6 µg/m³</i>	<i>- 50%</i>
<i>2nd Floor</i>	<i>11 µg/m³</i>	<i>7 µg/m³</i>	<i>- 37%</i>

INDEPENDENT TEST RESULTS

PM 2.5 particles

<u>Area</u>	<u>Without AtmosAir</u>	<u>With AtmosAir</u>	<u>+/_ %</u>
<i>Athletic Training</i>	<i>9 µg/m³</i>	<i>2 µg/m³</i>	<i>- 78%</i>
<i>Locker Room</i>	<i>12 µg/m³</i>	<i>6 µg/m³</i>	<i>- 50%</i>
<i>Weight Room</i>	<i>12 µg/m³</i>	<i>3 µg/m³</i>	<i>- 75%</i>
<i>1st Floor</i>	<i>6 µg/m³</i>	<i>3 µg/m³</i>	<i>- 50%</i>
<i>2nd Floor</i>	<i>5 µg/m³</i>	<i>5 µg/m³</i>	<i>Unchanged</i>

INDEPENDENT TEST RESULTS

- Conclusions
- Air Quality throughout the building was very good
- Test results showed significant reductions in Particles and TVOC in the areas tested
- With Atmos Air Systems operating, system performance was validated
- AtmosAir is an important infection control measure

THANK YOU



AtmosAir Case Study:

Paul D. Bowlen Memorial Broncos Centre



Sanitation and Energy Savings

The Denver Broncos installed AtmosAir in their training facility to improve indoor air quality and mitigate potential infectious disease identified frequently in athletic sport facilities.

Published research and testing has shown AtmosAir's bi-polar ionization is a continuous disinfection technology that aids in the reduction of skin and soft tissue infections (MRSA), norovirus, influenza, mononucleosis, and upper respiratory infections.

Testing results of the AtmosAir installation in the training facility were strong:

AtmosAir Testing - Volatile Organic Compounds			
	Pre AtmosAir	Post AtmosAir	% Difference
East Cooler	>150 index	21 index	-86%
West Cooler	>150 index	22 index	-85%
AtmosAir Testing - Airborne Particles Testing			
	Pre AtmosAir	Post AtmosAir	% Difference
East Cooler	10	5	-50%
West Cooler	12	3	-75%

Volatile Organic Compounds are gaseous elements that can cause odors and irritations. Chemicals, materials off-gassing, etc. typically produce VOCs. TVOC exposure can sometimes be irritating.

PM 2.5 is particulate matter 2.5 microns or less in size. These are particles that are small enough to be breathed in and enter the lungs. These can be dust, spores and allergens. They can be produced by occupants and activities or entrained into a space from outdoor air. They can cause irritations and allergic reactions and also due to their small size have the ability to embed into the lungs cause respiratory distress.



AtmosAir Case Study:

Paul D. Bowlen Memorial Broncos Centre



Sanitation and Energy Savings

The goal of the AtmosAir system is to measurably improve indoor air quality while insuring that the facility and players stay healthy.

In football facilities staphylococcus, MRSA and bacteria are constantly prevalent. Athletic trainers and equipment managers do their best to wipe down surfaces and keep the facility clean.

AtmosAir has been tested to have greater than a 95% kill rate on MRSA and staphylococcus by ATL Laboratories.

AtmosAir is installed in various healthcare and training facilities including: New England Patriots facilities, Dallas Cowboys Facilities, Hospital for Special Surgery (NY), VCU Health System, Stryker Laboratories, Wilson Memorial Hospital (NY), VA Maryland Health Care System, Carolinas Health Care System, Syracuse VA Medical Center, Walter Reed Medical Hospital, Staples Center, USC's John McKay Center, Kansas City Chiefs' Training Center, Jacksonville Jaguars Training Center at Everbank Field, TD Garden in Boston, MA, the Atlanta Braves' SunTrust Park in Cobb County, Georgia, Chicago Cubs' Sloan Park in Mesa, Arizona, Pittsburgh Pirates Locker Rooms at PNC Park, Northwestern's Walter Ryan Training Center, Milwaukee Bucks facilities, Soulcycle spinning studios, UCLA's John Wooden Center, among others.



AtmosAir Case Study:

Dallas Cowboys

Indoor Air Quality, Health, and Wellness



Dallas Cowboys

Dallas' goals were to be proactive with the overall environment inside locker rooms i.e. allergens, the danger of airborne illness such as Staph and MRSA, and other bacteria. System initially tested on a trial basis in locker room areas.



Trainers, staff, and players were unaware of system installations commenting on improved air quality. Quantitatively, the trainers gave out less Cetirizine (Zyrtec, treats hay fever and allergy symptoms).

Since the initial installation, AtmosAir has been installed throughout the entire 100,000 sq ft training facility including coaches' office, rehab areas, meeting rooms, and administrative areas. Systems were paid back in less than a year due to HVAC cost savings. Not one case of MRSA or H1N1 Flu has been reported since system installation.

In addition AtmosAir has been specified in the newly designed Dallas Training Center in Frisco, Texas slated to open in 2016.





June 26, 2009

Steve Levine
Clean Air Group/AtmosAir
418 Meadow Street, Suite 201
Fairfield, CT 06824

Steve:

I'm writing this letter to you to share my positive experience with your AtmosAir system and to give my personal recommendation to anyone that suffers from allergies as I do, that they should experience the positive difference AtmosAir makes in the air you breathe.

AtmosAir was installed first in Jim Maurer's home. Jim is the head athletic trainer of the Dallas Cowboys. After Jim's success at home, we had the system installed in the locker rooms, training rooms, meeting rooms and rehab areas of the training center. The players, coaches and athletic trainers noticed an immediate difference. In fact, some of our players that have allergies commented that they could breathe easier and the air was fresher and cleaner with no odors. For a locker room, that was amazing to hear.

We now have installed AtmosAir throughout the Dallas Cowboys training facility so everyone can enjoy crisp, clean air in the entire facility. Last year we also installed the system in my home and that is where I receive the greatest personal benefit, as I now can sleep and breathe better through the night. The system eliminated dust, mold spores and odors. I can personally attest the system really works.

This is truly a great product. Thank you for taking care of the Dallas Cowboys and my personal residence.

Sincerely,

Stephen Jones

SJ:sm



Steve Levine
President
Clean Air Group
418 Meadow St.
Fairfield, CT 06824

Dear Steve,

I wanted to send a letter of recommendation for your Atmos Air purification system which I recently had installed in our training facility at Valley Ranch. I wanted to let you know that we have enjoyed what appears to be better air quality throughout the 2007 season.

The system has apparently eliminated the dust particles, mold spores and locker room odors as you predicted. Many of my players develop allergies over the season and we have seen fewer incidences since the Atmos Air Purification system was installed. We are looking forward to continued use of the system and are anxious to verify some energy cost savings over the next year.

Since I have installed a home unit at your suggestion I have seen a difference in air quality at my home. Recently, a colleague of mine with another professional sports team also installed a unit in his home and has seen a dramatic change for his children with regard to their asthma conditions.

Steve, from my personal experience at home and the use of the system at Valley Ranch I look forward to recommending the Atmos Air System to my colleagues and players for their home use also. Thanks for your assistance and let me know if I can help as a reference.

Sincerely,

Jim D. Maurer
Head Athletic Trainer
Dallas Cowboys Football Club

AtmosAir Athletics Selected Clients

SOULCYCLE

40+ Facilities (Completed in Design Phase)



SOULCYCLE uses AtmosAir as a measure to control skin and soft tissue infections (MRSA) as well as other bacteria within their facilities within the United States.

AtmosAir has been specified in ten SOULCYCLE facilities, and will continue to design systems for many SOULCYCLE facilities opening around the country.

Town Sports International Holdings

Multiple locations (CT, NY)



Town Sports International uses AtmosAir as a measure to control skin and soft tissue infections (MRSA) as well as other bacteria within their facilities within the Northeast United States.

AtmosAir Case Study:

Dallas Cowboys and New England Patriots

Indoor Air Quality, Health, and Wellness



New England Patriots

New England had similar goals as the Dallas Cowboys. The Kraft Group specified AtmosAir to be installed in their training center where virus can be spread frequently.

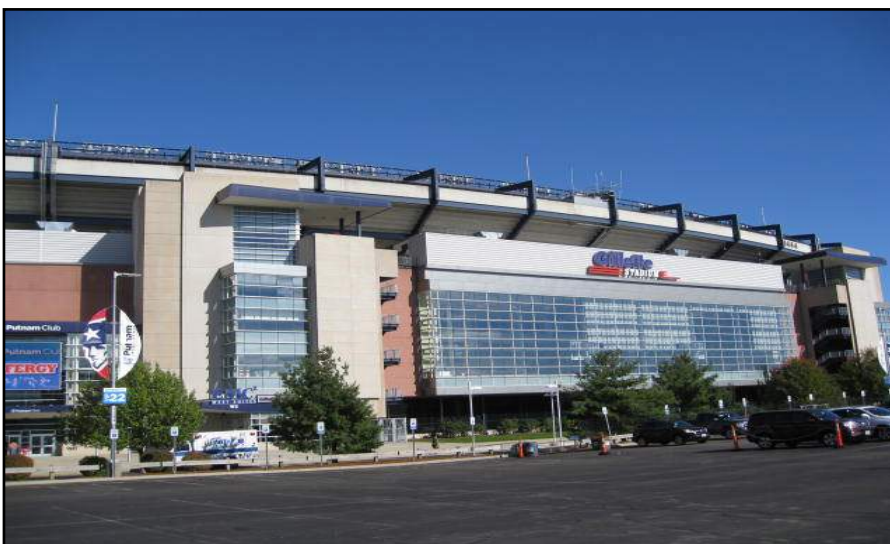


Qualitatively the trainers including Head ATC has said that with AtmosAir he has given out out less Cetirizine (Zyrtec, treats hay fever and allergy symptoms).

AtmosAir is used to combat the danger of airborne and surface illness such as Staph and MRSA. New England is looking to add more air handlers equipped with AtmosAir in upcoming renovations at Gillette Stadium.

"Coach Belichick and I thoroughly discussed AtmosAir and we thought it could present an edge before many teams had the technology. I can attest that our players were healthier due to the AtmosAir installation."

-Dave Granito, New England Patriots Trainer





April 15, 2016

Re: Indoor Air Quality Testing Summary Predators Locker Room

Intent

The purpose of the testing was to take air quality readings in the Predators locker room. Tests were conducted to see what effect AtmosAir systems have on IAQ within the space.

Test Conditions

Testing was performed within the locker room. The locker room was generally unoccupied with no accommodation made for the air testing and all mechanical systems were operated as typical. Testing was performed in 2 phases, one test done prior to AtmosAir system operation done 9/14/15 and a second test with the AtmosAir unit operating was done 3/30/16. Each test was conducted for a minimum of 24 hours. An AtmosAir model 508FC was installed and powered on 9/15/15.

An Aircuity Optima 500 Monitor was used to perform the air quality testing. The following elements were measured:

- Temperature
- Relative Humidity
- Carbon Dioxide
- Particles (PM10)
- Particles (PM2.5)
- TVOC (Total Volatile Organic Compounds)
- Radon
- Carbon Monoxide
- Ozone

AtmosAir™ Solutions Offered By Clean Air Group
418 Meadow Street, Suite 204 • Fairfield, CT 06824
PH: (203) 335-3700 • FX: (203) 335-1075
www.AtmosAir.com



Results

See below a summary chart showing the average values of the various sensor readings taken.

Baseline readings taken prior to the AtmosAir system operating

	Comfort and Ventilation				Air Cleanliness			Building Pollutants		
	CO2 (ppm)	Temperature (°F)	Relative Humidity (%)	**CFM (Outdoor Air PP)	PM 10 (µg/m3)	PM 2.5 (µg/m3)	TVOC (index)	CO (ppm)	Radon (pCi/l)	Ozone (ppm)
Predators Locker Room	488	81	29	119	9	9	25	0	0.1	0.008
Typical/Comfort	< 1100	71 - 74	20 - 60	> 15	< 40	< 20	< 10	< 3	< 2	< 0.1
Recommended	< 1100	68 - 78	20 - 60	> 15	< 40	< 20	< 35	< 9	< 4	< 0.1

Readings taken with the AtmosAir system operating

	Comfort and Ventilation				Air Cleanliness			Building Pollutants		
	CO2 (ppm)	Temperature (°F)	Relative Humidity (%)	**CFM (Outdoor Air PP)	PM 10 (µg/m3)	PM 2.5 (µg/m3)	TVOC (index)	CO (ppm)	Radon (pCi/l)	Ozone (ppm)
Predators Locker Room	385	73	39	233	10	9	1	0	0.1	0
Typical/Comfort	< 1100	71 - 74	20 - 60	> 15	< 40	< 20	< 10	< 3	< 2	< 0.1
Recommended	< 1100	68 - 78	20 - 60	> 15	< 40	< 20	< 35	< 9	< 4	< 0.1

AtmosAir™ Solutions Offered By Clean Air Group
418 Meadow Street, Suite 204 • Fairfield, CT 06824
PH: (203) 335-3700 • FX: (203) 335-1075
www.AtmosAir.com



Breathing is BelievingSM

Conclusions

TVOC levels were reduced by over 95% with AtmosAir systems operating. TVOC (Total Volatile Organic Compounds) are made up of gaseous compounds and are odorous. TVOC is the major reason for locker room odors. Reduction in TVOC will improve perceptual air quality with less stale air that is fresher. Also control of TVOC is the major reason for mechanically bring in outside make up air, using air purification to reduce and control TVOC can allow for reduced outside air and offers energy savings potential.

Sincerely,

A handwritten signature in black ink, appearing to read "Anthony M. Abate". The signature is written in a cursive, flowing style.

Anthony M Abate CIE CMI

AtmosAirTM Solutions Offered By Clean Air Group
418 Meadow Street, Suite 204 • Fairfield, CT 06824
PH: (203) 335-3700 • FX: (203) 335-1075
www.AtmosAir.com



May 23, 2017

RE: AtmosAir Indoor Air Quality Testing, Pittsburgh Pirates Locker Room

Intent

The intention of this study was to measure the IAQ within the locker room area, where AtmosAir bi-polar ionization air purification systems have been installed into the air handling unit serving the locker area.

Project Scope

The AtmosAir system was installed into AHU-IB3 which serves the North Shore Pirates locker room. One (1) AtmosAir 508FC system was installed in the main supply duct for that unit.

Test Conditions

Air testing was performed to measure air quality readings in the locker area. Before air testing with the AtmosAir system powered off was done on April 17th. After air testing with the AtmosAir system operating was done on April 18th. Readings were taken continuously for a minimum of 2 hours for each round of testing.

**AtmosAir™ Solutions Offered By Clean Air Group
418 Meadow Street, Suite 201 • Fairfield, CT 06824
PH: (203) 335-3700 • FX: (203) 335-1075
www.AtmosAir.com**



One Gray Wolf Advanced Sense IQ-610 monitor along with a Gray Wolf PC-3016 particle counter was used to record and log the air testing results. The elements that were tested are listed below:

- Temperature
- Relative Humidity
- Carbon Dioxide
- TVOC (Total Volatile Organic Compounds)
- Carbon Monoxide
- Ozone
- Differential Pressure
- Particles: PM .03, PM .05, PM 1, PM 2.5, PM 5 and PM 10

The air testing device was placed in the locker room in the typically occupied space.

Results

See below summary charts showing the results of the air quality readings taken.

Readings taken without AtmosAir systems operating 04/17/17

Element	CO2	Temp	RH	TVOC	Ozone	CO
Avg. Values	427 ppm	72 F	27.82%	33.11 ppb	.097 ppm	2.15 ppm
Guidelines	5000 ppm	68 to 78 F	30 to 60%	500 ppb	.10 ppm	9 ppm
Element	PM .03	PM .05	PM 1	PM 2.5	PM 5	PM 10
Avg. Values	N/A	0.934 ug/m3	1.478 ug/m3	2.359 ug/m3	3.791 ug/m3	5.768 ug/m3
Guidelines	N/A	N/A	N/A	35 ug/m3	N/A	150 ug/m3

Readings taken with AtmosAir systems operating 04/18/17

Element	CO2	Temp	RH	TVOC	Ozone	CO
Avg. Values	482 ppm	75 F	22.69%	12.69 ppb	.079 ppm	1.87 ppm
Guidelines	5000 ppm	68 to 78 F	30 to 60%	500 ppb	.10 ppm	9 ppm
Element	PM .03	PM .05	PM 1	PM 2.5	PM 5	PM 10
Avg. Values	N/A	0.641 ug/m3	0.853 ug/m3	1.169 ug/m3	1.595 ug/m3	1.842 ug/m3
Guidelines	N/A	N/A	N/A	35 ug/m3	N/A	150 ug/m3

AtmosAir™ Solutions Offered By Clean Air Group
418 Meadow Street, Suite 201 • Fairfield, CT 06824
PH: (203) 335-3700 • FX: (203) 335-1075
www.AtmosAir.com



Conclusions

In comparing the readings, looking at the indicators of air cleanliness the following differences were measured:

Element	TVOC	PM .03	PM .05	PM 1	PM 2.5	PM 5	PM 10
Before 4/17	33.11	N/A	0.934	1.478	2.359	3.791	5.768
After 4/18	12.69	N/A	0.641	0.853	1.169	1.595	1.842
% Difference	-62%	N/A	-31%	-42%	-50%	-58%	-68%

The readings show that with AtmosAir systems operating, definite improvements to air quality were measured, in both reduction to TVOC and particles. TVOC are gaseous elements that come from people and their activities, building materials and furnishings and off gasses from chemical use. TVOC are typically a source of airborne irritants and odors. Particles come from dust, spores and allergens and can be entrained in from outside air or generated within a space by people and their activities. Particles can cause allergic symptoms and small particles PM 2.5 and below can embed in the lungs and cause respiratory distress in certain individuals.

Sincerely,

Anthony M Abate CIE, CMI
Clean Air Group Inc.

AtmosAir™ Solutions Offered By Clean Air Group
418 Meadow Street, Suite 201 • Fairfield, CT 06824
PH: (203) 335-3700 • FX: (203) 335-1075
www.AtmosAir.com