



Based on the results from this study, the **hospital** implemented **GPS Air's NPBI technology** in **all HVAC systems** including patient rooms, operating rooms (OR), emergency rooms (ER), neonatal intensive care units (NICU), bone marrow transplant recovery rooms, and the burn center.

Harvard Environmental based in Bear, Delaware was engaged by a children's hospital located in the northeast to test specific areas within the hospital for the presence of airborne microbial spores, bacteria, and particulate matter. The testing was performed before and after the installation of GPS Air's NPBI™ soft ionization technology in the 2nd floor catheter laboratory.



Background

As a trial in early 2018, this client installed GPS Air's soft ionization bars as a replacement to their UVC lights in a large air handling unit feeding one of the ORs. The engineering team found the coils with GPS Air's soft ionization bars were cleaner than the coils with UVC at the completion of the trial. The facility engineers were concerned with the safety of the UVC system, the cost to replace the lamps every year and the fact the ballasts were often failing.

The hospital administration team was looking for solutions that would work as well or better than the UVC system, but without the safety concerns and ongoing maintenance expense of the UVC system. The administration team included the facility engineering manager, maintenance engineers and infectious disease staff. After this trial was completed, the facility engineers removed all the UVC systems and replaced them with GPS Air's soft ionization bars.

Testing Overview

The testing included the collection of mold (viable and non-viable), bacterial, and particulate air samples at the following four hospital locations:

1. Exterior – Loading Dock
2. Catheter Lab – Exam Room
3. Catheter Lab – Control Room
4. Catheter Lab – Hallway

Pre-installation samples and readings were collected on January 28th, 2021.

Post-installation samples and readings were collected on April 21st, 2021.

Refer to Figures 1 and 2 for the actual results found in Harvard Environmental's final report to the owner.

Conclusion

The air quality in the facility prior to incorporating GPS Air's soft ionization systems was acceptable per the standards they follow in healthcare. However, the hospital administration wanted to make the air as clean as possible and not just meet a minimum criteria. It should be noted that for the post-installation testing versus pre-installation testing, the outdoor (exterior) level of mold spores was 870% higher, viable molds were 260% higher and the bacteria levels were 107% higher. Generally, when outdoor levels increase, there is a direct correlation to higher levels indoors, but that was not observed in this study.

GPS Air's soft ionization systems not only agglomerated the particles thereby **making the filters more efficient** and **lowering particle counts** across all measured particle sizes, **GPS Air's soft ionization systems reduced all measured parameters.**

This installation has been operating over 5 years and this client continues to recommend GPS Air's technology to other medical facilities.

Figure 1. Summary of the Particle Tests

	Date		Particles Size in Microns					
			0.3	0.5	1.0	2.5	5.0	10.0
Exterior	28-Jan-21 Average	Location 001	2013	156	22	15	3	3
	21-Apr-21 Average	Location 001	4083	262	65	37	6	2
		% Change		103	67	191	149	94
Interior Exam Room	28-Jan-21 Average	Location 002	95	10	5	6	1	0
	21-Apr-21 Average	Location 002	1	1	1	1	0	0
		% Change		-99	-93	-89	-90	-100
Interior Control Room	28-Jan-21 Average	Location 003	128	46	39	44	14	6
	21-Apr-21 Average	Location 003	6	2	1	1	0	0
		% Change		-96	-96	-97	-98	-98
Interior Hallway	28-Jan-21 Average	Location 003	1302	1127	831	824	266	98
	21-Apr-21 Average	Location 003	44	7	3	4	1	2
		% Change		-97	-99	-100	-100	-99
Interior Average	28-Jan-21	Interior Avg	509	394	292	291	94	35
	21-Apr-21	Interior Avg	17	3	2	2	1	1
		% Change		-97	-99	-99	-99	-99

Figure 2. Summary of the Mold and Bacteria Tests

	Date	Sample Number	Sample Type (Spores/m ³) (CFU/m ³)		
			Spore Trap	Viable Molds	Bacteria
Exterior	28-Jan-21	001	91	50	75
	21-Apr-21	001	884	180	155
		% Change		871	260
Interior Exam Room	28-Jan-21	002	26	0	70
	21-Apr-21	002	0	0	25
		% Change		-100	0
Interior Control Room	28-Jan-21	003	39	0	380
	21-Apr-21	003	0	0	80
		% Change		-100	0
Interior Total	28-Jan-21	Interior	65	0	450
	21-Apr-21	Interior	0	0	105
		% Change		-100	0