

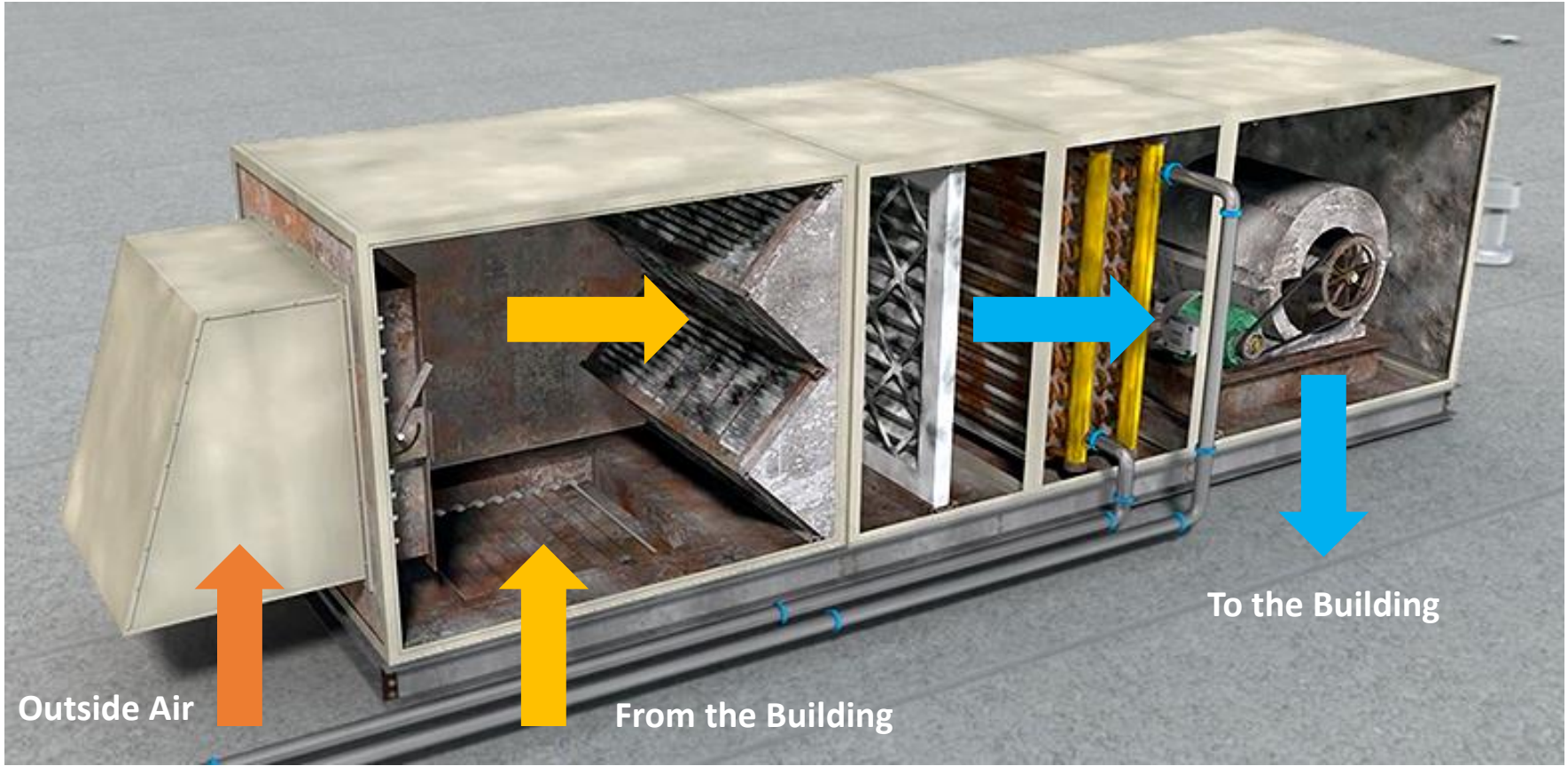


HVAC Air Handling Unit (AHU) Restoration

Overview

Anatomy of a CHW/HHW Air Handler Unit (AHU)

Fresh Air and Return Side



Supply Side

To the Building

Outside Air

From the Building



Why Restore units?

A few major benefits of Restoration vs Replacement:

- Cost (20-40% the cost of a new unit)
- 5 year warranty – New equipment (1 year on avg.)
- Difficult Locations – e. g. Tight Mechanical Rooms
- Equipment costs: Cranes, Temporary cooling units, etc.
- Less disruption: Done outside normal hours vs. disruptions (noisy, traffic patterns changed, comfort compromised)
- Sustainability: No freight, no landfill, small carbon footprint



HVAC Restoration Program Overview



STEP 1



HVAC Assessments

- Visual Conditions of Equipment
- Environmental Sampling & Analysis
- Supply & Return Ductwork Inspection
- Detailed Mechanical Inventory
- Maintenance Prioritization

STEP 2



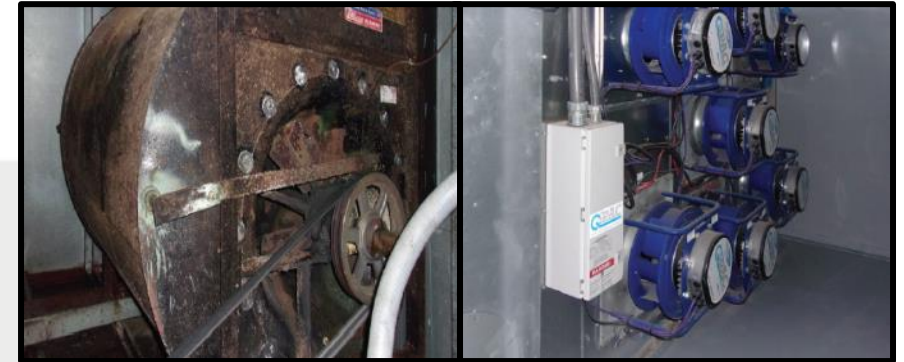
● Good Condition ● Restoration ● Replacement

HVAC Condition Reporting

- Red
- Amber
- Green



STEP 3



HVAC Restoration

Capex Savings = 60% – 80%

Assessments

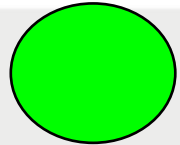
HVAC Condition Reporting



Build HVAC Restoration Program With Prioritization!

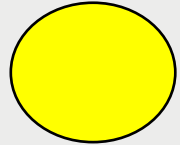


● Good Condition
 ● Restoration
 ● Replacement



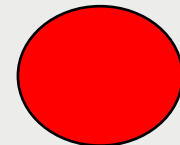
Good Condition – Score of 0-49

- Very little evidence of fouling/aging
- Maintenance + Repair Program



Restoration Condition – Score of 50-84

- Marginal fouling/aging
- Restoration Program



Replacement Condition – Score of 85-100

- Advance fouling/aging
- Replace Program before unit failure

#	AHU/ERU ID	Overall Score	#	AHU/ERU ID	Overall Score
1	AHU 201	28	17	ERU 602	53
2	AHU 1-5	31	18	AHU 3-1	54
3	ERU 601	35	19	AHU 4-4	56
4	AHU 605	37	20	AHU 1-7	58
5	ERU 604	38	21	AHU 2-3	58
6	ERU 603	40	22	AHU 4-3	63
7	AHU 4-1	42	23	AHU 602	67
8	AHU 607	45	24	AHU 2-2	69
9	AHU 601	46	25	ERU 4-2	69
10	AHU 4-2	46	26	AHU 1-1	73
11	AHU 1-3	46	27	AHU 1-2	81
12	AHU 606	47	28	ERU 1	86
13	AHU 2-1	48	29	AHU 3-3	87
14	AHU 1-6	48	30	ERU 2	88
15	AHU 604	50	31	AHU 1-4	92
16	AHU 603	52	32	AHU 3-2	96

Engineering

Restoration

HVAC Restoration Graphic (again)



PURE-*Steam*™

HVAC Hygienic Cleaning

- Disinfects Coils at up to 350° F & 350 psi
- Optimizes Airflow & Static Pressure
- Improves Energy Efficiency

1

ECM Fan Array Retrofit

- Built-in Redundancy
- No More Belts or Grease

5

PURE-*Coat*

Multicoat Siloxane Coating

- Anti-viral, Anti-microbial & Corrosion Resistant
- 10,000 Hour ASTM B-117 Salt Spray Test Certificate
- Low VOC Application

2

4

PURE-cell

HVAC Insulation System

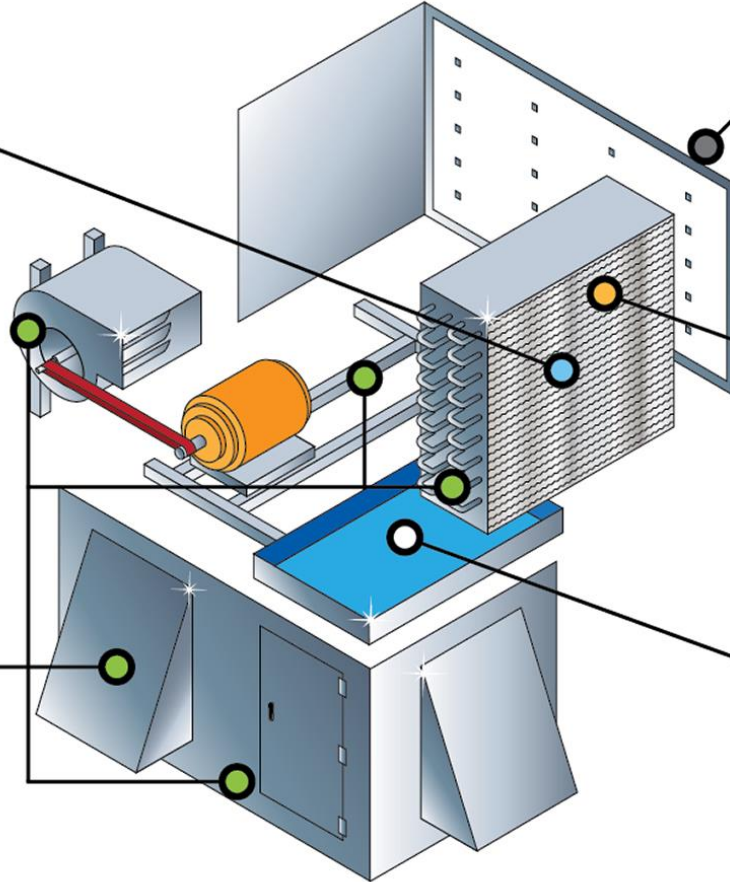
- Zero-Porosity
- Fiberglass Free
- Repels Moisture

3

PURE-*liner* 2.0

Drain Pan Protection

- Anti-viral, Anti-microbial & Corrosion Resistant
- Exceeds ASTM E84 NFPA 25/50 Standards
- Low VOC Application



HVAC Restoration Process: The Sustainable Solution



Restoration Video

Combines PURE-Steam and high-performance coatings with new insulation and retrofit options to effectively repurpose an AHU.

- Antiviral, Antimicrobial & Waterproof
- Fiberglass Free Insulation
- Optional Fan Array Retrofit
- 20%-60% Cost of New
 - Depending on Scope
- Pay with CAPEX, Save OPEX
- 5-year Warranty

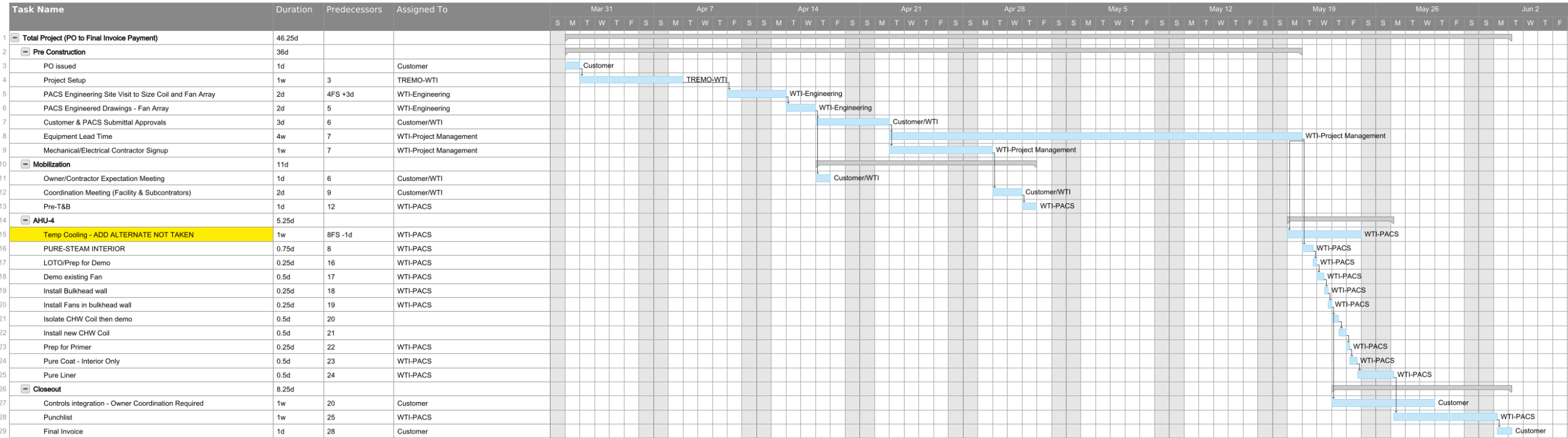


HVAC Fan Array



- Simple, Complete Retrofit
- ECM Fans
- Bulkhead/Array Assembly
- Single Point Power
- No VFD's, Grease or Belts
- Built-In Redundancy
- Access doors and dampers engineered as needed

Draft AHU Restoration



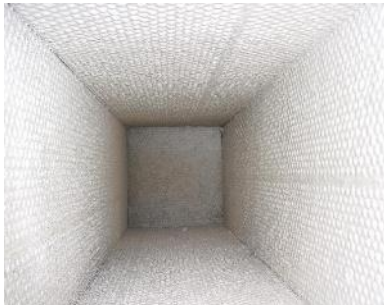
Duct Cleaning

PURE-Duct Environmental Duct Cleaning Program

PUREDUCT



Mechanically engineered methods for total air conveyance system cleaning including VAV and Reheat terminal boxes.



- Reduces Bacteria & Mold
- Removes Dust & Particulates
- Improves Airflow & Ventilation
- Minimizes Allergies & Asthma
- Certifications & Reporting

HVAC Restoration: Environmental Duct Cleaning



BEFORE

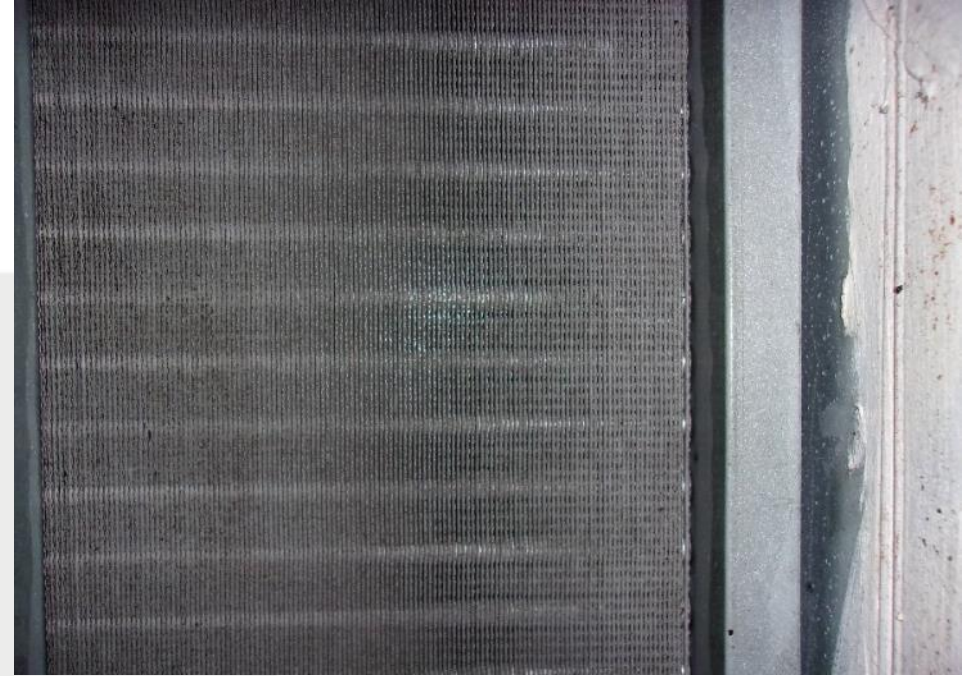


AFTER

HVAC Restoration: Environmental Duct Cleaning & Encapsulation



BEFORE




AFTER

Case Studies & Success stories



HVAC Restoration Program Overview – Documented Value

HCA  Methodist Hospital Specialty & Transplant in San Antonio, TX
Healthcare® Main POC: Amanda Stephens – Director of Facilities Management



\$1,800,000. Capital Cost of (2) New HVAC Units

\$399,253. Cost of (2) HVAC Restoration Units
- 22% Cost of New

Documented Savings = \$1,400,747, or 77.8%

AHU 1 and AHU 12 Restoration

- Both units serve ORs
- HVAC Restoration:
 - ✓ Steam Cleaning
 - ✓ Interior Coatings and metal work
 - ✓ Exterior Coatings and metal work
 - ✓ PURE-Cell Insulation
 - ✓ Fan Array
 - ✓ Long-range capital plan (25) HVAC units

3 Year HVAC Budgetary Plan					
Unit Number	Restoration - Best	Unit Cost	2023/24 Plan	2025 Plan	2026 Plan
AHU-18	Restoration - Best	4,488	\$12,568		
AHU-13	Restoration - Best	14,350	\$113,427		
AHU-26	Restoration - Best	20,625	\$16,772		
AHU-21	Restoration - Best	20,365	\$126,865		
AHU-23	Restoration - Best	17,689	\$127,489		
AHU-25	Clean - Better	12,969	\$7,045		
AHU-6	Restoration - Best	21,000	\$148,973		
AHU-7	Restoration - Best	18,700		\$143,334	
AHU-2	Restoration - Best	18,000		\$127,645	
AHU-11	Clean - Better	10,213	\$7,182		
AHU-3	Restoration - Best	16,670		\$124,899	
AHU-4	Restoration - Best	21,000		\$150,472	
AHU-12A	Restoration - Best	12,506			\$61,335
AHU-8	Restoration - Best	18,175			\$116,317
AHU-18	Restoration - Better	2,423			\$13,911
AHU-3	Restoration - Best	23,250			\$113,683
AHU-5	Restoration - Best	22,475			\$146,170
AHU-17	Clean - Better	20,076	\$7,045		
AHU-22	Clean - Better	1,344	\$7,045		
AHU-PH-1	Clean - Better	4,417	\$7,045		
FCU-1	Restoration - Better	2,083			\$8,256
AHU-27	Clean - Better	26,042	\$7,045		
FCU-6	Clean - Better	2,083			\$5,193
FCU-1	Clean - Better	6,084			\$1,084
AHU-28	Clean - Better	12,333	\$7,045		
Total (25 Units)		845,207	\$586,566	\$564,450	\$539,956
Annual Budgeted Amount					



HVAC Restoration Program Overview – Documented Value

HCA+ Memorial Health in Savannah, GA
Healthcare® Main POC: Norman Epps – Regional Manager, Engineering



\$300,000. Capital Cost of (1) New HVAC Units

\$133,340. Cost of (1) HVAC Restoration Units
- 44% Cost of New

Documented Savings = \$166,660. or 55.5%

AHU 1 Restoration

- Unit serves administrative areas - 5,000 CFM RTU
- HVAC Restoration:
 - ✓ Steam Cleaning
 - ✓ Pure-Liner Drain Pan Protection
 - ✓ PURE-Cell Insulation
 - ✓ Interior Coatings
 - ✓ Fan Array
 - ✓ Interior Coatings
 - ✓ Fan Array
 - ✓ New Coil
 - ✓ Replace door gaskets
 - ✓ Replace intake section



HVAC Restoration Program Overview – Documented Value

CommonSpirit: in Henderson, NV



\$4,500,000. Capital Cost of (7) New HVAC Units
(261,992 total CFM x \$17.18/CFM)

\$1,610,817. Cost of (7) HVAC Restoration Units
(261,992 total CFM x \$6.15/CFM) - 35% Cost of New

Documented Savings = \$2,889,183.00, or 64.2%

HVAC #	Unit Size (CFM)	HVAC Restoration Cost (CFM) \$	
AHU-2	43,260	\$ 251,195	\$ 5.81
AHU-3	38,627	\$ 167,842	\$ 4.35
AHU-4	36,041	\$ 336,216	\$ 9.33
AHU-5	42,695	\$ 379,023	\$ 8.88
AHU-6	25,301	\$ 141,846	\$ 5.61
AHU-8	38,127	\$ 166,844	\$ 4.38
AHU-9	37,941	\$ 167,851	\$ 4.42
Total	261,992	\$ 1,610,817	\$ 6.15



HVAC Restoration Program Overview – Documented Value

Other Large Healthcare System: around Jacksonville, FL

HVAC Restoration: AHU #131, AHU #141, AHU #151

- ✓ High Performance Cabinet Coating
- ✓ Fan Array Retrofit Installation
- ✓ Drain Pan Coating
- ✓ Upgraded Filtration System
- ✓ New HVAC Model + Serial Number

\$1,139,550 Est. Cost of New HVAC Unit
(75,970 total CFM x \$15.00/CFM)

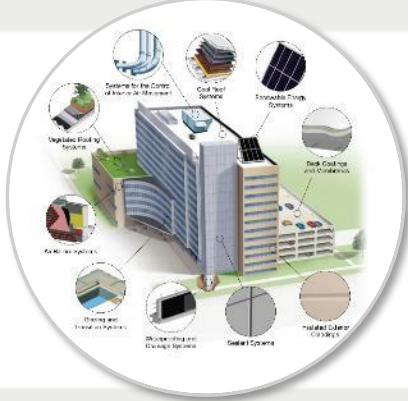
\$442,000 Cost of HVAC Restoration
(75,970 total CFM x \$5.82/CFM) - 38% Cost of New

Projected Savings = \$697,550, or 61.2%



Warranty

HVAC Warranty Offering



5 Year Warranty

**One Partner – Single Source
Consistent Quality Deliverables**

HVAC Restoration



- Restored Equipment
- 5 Year Standard Parts/Labor Warranty
- No New Engineering Requirements
- Work With Existing Healthcare Codes
- Phased Approach, Less Logistical Challenges
- High Performance Coatings - Longer Asset Life
- Fan Array (Redundancy for Backup)
- Less Workflow Disruption

HVAC Replacement



- 1 Year Standard Parts/Labor Warranty
- New Engineering/Design Requirements
- New Healthcare Code Requirements
- More Logistical Challenges/Expenditures
- No Standard High-Performance Coatings
- No Standard Fan Array (Redundancy Setup)
- More Facility Disruption

HVAC NEW
LIFE™

**Before and
After**



HVAC Restoration: Fan Array Retrofit



BEFORE



AFTER

HVAC Restoration: Fan Array Retrofit

BEFORE



AFTER



HVAC Restoration: High Performance Coatings



BEFORE



AFTER

HVAC Restoration High Performance Coatings



BEFORE

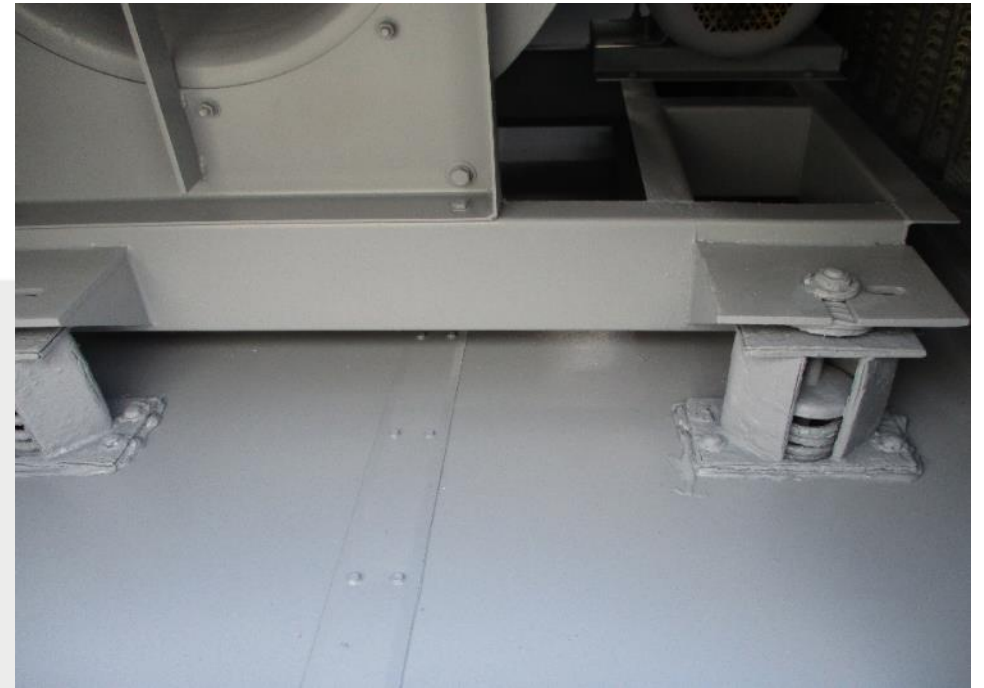


AFTER

HVAC Restoration: High Performance Coatings



BEFORE



AFTER

HVAC Restoration: High Performance Coatings



BEFORE



AFTER

HVAC Restoration High Performance Coatings



BEFORE



AFTER

HVAC Restoration: Coating and Insulation



BEFORE



AFTER

HVAC Restoration: Coating and Insulation



BEFORE



AFTER

HVAC Restoration: Coating and Insulation



BEFORE



AFTER

HVAC Restoration: Damper Retrofit



BEFORE



AFTER

HVAC Restoration: Component Fabrication



BEFORE



AFTER

Q&A