CERTIFICATE OF COMPLETION & REPORT

Section 1: Scope

Project Description: **Deep Coil Cleaning Program** [redacted]

Scope of Work: Provide "Deep Coil Cleaning Program" project for HVAC coil cleanings; to include deep Eco Coil Clean, clear water rinse & EcoSustain Preventative application. Purpose of cleanings is to improve energy efficiency, improve Indoor Air Quality, and extend the life expectancy of units, as well as documentation of findings to demonstrate effectiveness of the program. [redacted] Readings were taken on random units when available.

Section 2: Results

Narrative & Findings:

The estimated return on investment savings for this project is 3-6 months based on averages we've seen in other facilities and results taken on these units. These savings are gained by increasing the heat transfer efficiency between recirculated air and chilled water in the tubes and in addition, we will increase the volume of air (velocity) by reducing the back-pressure on the coil. The heat transfer gain we typically have seen with these churches is between 1 – 4 degrees of transfer gained. With both the improved heat transfer and increased air velocity we've **seen an overall energy efficiency improvement and savings of 777.85%!**

The application of the EcoSustain (MicroBiocide) will prevent bacteria, mold, and mildew from growing on the coils, reducing the fouling potential of the coils (especially during the humid seasons) – maintaining energy efficiency much longer than conventional cleaning methods. The EcoSustain will enable higher efficiency for a longer period of time.

Notes on what we saw: Everything went very well. The units had a heavy amount of dust and debris fixed on the coils and fins. Cleaning these units will elongate the lifespan of these units due to decreased run times. We were able to get penetration through the coils and had great results. All the units completed cleaned up really nicely and saw really nice increase in overall temperature gains as well as airflow. The fine layer of dust on the coils acts as an insulator on the coils and the air passing over the coils isn't able to reach its max cooling ability because of it. There was a noticeable difference visually to the coils, but even more in the energy gains and potentially overall air quality. The condensate drain lines were clogged on an average of 3 units/facility. On several of the units we weren't able to access the drains to make sure it wasn't clogging. Regardless, the cleaning along with the application of the EcoSustain (MicroBiocide will help prevent future clogs. The smaller evaporative units had an "A-Frame" style coil and backside wasn't visible, so we used a flexible wand in order to gain access and clean the back side of the unit with steam and adjustable pressure, so as not to overwhelm the drain pan. We had to cut access into quite a few of these units and we sealed them back up with the appropriate silver ducting tape along with any extra screws for proper sealing. Readings were tricky to get due to being able to get the thermostats to cooperate when the building is in "unoccupied", but we were able to get a few readings.

At a minimum, I would recommend these units be completed on an annual basis.

Review of Energy Gains from the Program

Energy Savings/Gains
These numbers are based upon a 24/7 operation.

Unit	lbs./yr. CO2 reduction	% Gain	Calculated $ Saved
[redacted] - AHU	33,101 lbs.	146.9%	$1,344.19
[redacted] – AHU	25,804 lbs.	871.4%	$1,047.88
[redacted] - RTU	10,411 lbs.	66.8%	$422.78
[redacted] - RTU	12,369 lbs.	4,220.5%	$502.31
[redacted] - RTU	24,739 lbs.	610.5%	$1,004.62
[redacted] RTU	18,367 lbs.	58.1%	$745.85
[redacted] - RTU	11,559 lbs.	170.4%	$469.41
[redacted] AHU	16,533 lbs.	78.2%	$671.38

This calculator determines efficiency gains with fixed variables. Depending on the value of the "fixing" of variables, actual savings may be larger or smaller than Overall Costs Savings/year based on actual operating parameters. Most HVAC systems modulate airflow and/or chilled water flow to maintain preset temperatures. Using the Deep Coil Cleaning Program Cleaning Procedures, ***Overall results produced More Air and Colder Air.***

Brad Sylvester
AC³E Hospitality Services
[redacted]

Before and After Pictures Below

PICTURES TAKEN BEFORE & AFTER DCC PROGRAM

This is a before and after look at a rooftop package unit at [redacted]. This is typically what we saw on these types of units.

This is the access panel cut into the AHU @ [redacted].

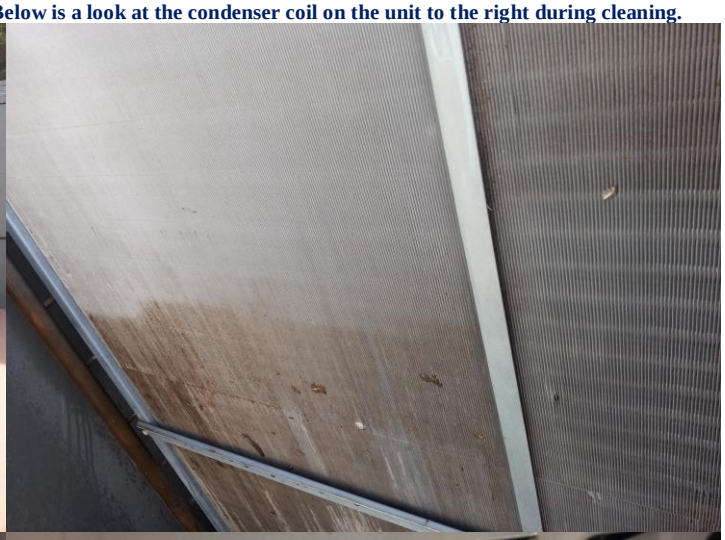
Above is a before and after look at the coils inside the access panel we cut. Below is a look at the coil during the cleaning.

Above is a look at how we had to access the coils on the above ceiling units at [redacted]. Below is the access to the coils and after being sealed back up.

This is a before and after look at one of the Main Air Handlers at [redacted]. These are older units with "coin style" coils that are typically very tough to get penetration through the coils. We were able to get penetration through the coils despite the heavy debris.

This is a main AHU at [redacted] with a bunch of accumulated debris that we cleaned out of the unit before cleaning the coils. The brown is old insulation.


Above is a before and after look at the coils in the main AHU at [redacted]. Below is a look at the condenser coil on the unit to the right during cleaning.


Above is a before and after look at the condenser coils at [redacted].

Above is a before and after look at a condenser unit that had a tremendous amount of leaves and debris all over the units restricting airflow.

Above is a look at what we typically saw at the 5 churches where we cut access panels.

This is a before and after look at a unit at [redacted]. These units were really dirty and saw some oxidation exposed after the cleaning.