



Commercial & Industrial Services

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May 21, 2014

Att'n:

Director of Facilities Services

University

Richmond, VA. 23210

REFERENCE: ***Updated Priority List—New Survey's Required—New Facilities***

Dear Mr:

Based on our surveys of both new added facilities and the reassignment of existing facilities to different zone managers, we are submitting the following priority list for cooling tower projects.

NOTE: Numbers are budget only. Firm proposals will be submitted on request.

1. West Hospital –Marley Model NC5031GS S/N 016349-001-92

Issues: These 20 year old all galvanized steel towers look to have been refurbished sometime in the recent past but there are still issues to be addressed including the air inlets, heat transfer wetdeck, fan cowl and safety issues. The location of these towers in an alley between the buildings is not a choice one and we're sure fouling and noise can be a constant issue especially with the construction project going on in the building next to the towers. At some point there was a blue felt filter material installed on the four air inlets of these towers. This was probably a much needed step to help with keeping construction dust from entering the cooling towers and causing issues. These filters have now become completely caked with dirt and debris and now a problem themselves by limiting airflow into the towers and possibly affecting capacity. If construction dust is still an issue then replacement of this material should be considered. The heat transfer wetdeck and drift eliminators look like they were replaced at some point but there is a drift problem with these towers with excessive moisture in the plenum area exposing the power train to early failures and too much moisture leaving the tower through the fan thus increasing water usage. This problem will only get worse if the filtering material is replaced or removed from the tower allowing more CFM to enter. The problem with the drift could very well be the heat transfer wetdeck having too much scaling from dirt loading which can cause funneling through the pack and excess drift. We would request that another inspection be performed when these towers can be shut down (if possible) to get a closer look at wetdeck and eliminators when the unit is not running. If all looks okay from an installation and quality of material standpoint a simple solution would be to add another layer of drift eliminators. On one of the two cells there is a damaged fan cowl

the fan continues to hit. This can lead to serious damage. While the fan looks okay this constant hitting will eventually throw the fan out of balance leading to full failure. There are currently no safety cages on ladders to the top of the towers.

Recommendation: We would recommend that a more thorough inspection be made concerning the condition of the heat transfer wetdeck to determine next step. If wetdeck checks out then all the other items should be addressed including extra eliminators, fan cowl repair, balancing and safety cages installed.

Repair Budget: \$22,000

Refurbishment Budget: \$90,000 (to replace wetdeck and other repair items)

Safety Budget: \$7,000

Replacement Budget: \$120,000

2. Financial Services Bldg 700- BAC---M/N: F1843MM---S/N: U001687-001

Issues: This tower is 15 years old. It was originally surveyed 11/27/12 and the following issues were diagnosed. Lower fan section was rusted beyond repair. Upper casing leaks requiring new stainless steel coil.

Recommendations: It was recommended at that time to replace the tower. CTHX did not think the refurbishment would justify the cost since it exceeded the cost of replacing the tower.

Repair Budget: \$100,000.

Replacement: *Quoted 5/10/13---\$80,577---NOTE: May be a price increase on equipment due to the proposal being almost two years old. Would not think more than 5-10%.*

3. Student Common Ph. 2—BAC---M/N:VT1-N255-P—S/N: U037042301

Issues: This tower is 12 years old. While it is in good condition, some work has been on the tower including, upper casing panels below the fill have been painted. This will not hold up and eventually peel off. Drift eliminators & fill are both very brittle/broken. Panel hardware is showing rust on casing panels.

Recommendations: Paint on upper casing panels should be removed and coated with the proper material. Drift eliminators and fill should be replaced. Manufacturer recommends replacement every 10 years.

Repair Budget: \$33,500

4. TM Library New –Evapco Model USS312-654 S/N 8-344457

Issues: This 4 year old all stainless steel cooling tower is in good condition and only really has one immediate concern. The fan needs to be looked at for balancing purposes. It looks out of balance and is hitting the fan cowl. Doesn't appear to have any major damage but if left as is could lead to full failure. We highly recommend having the fan electronically balanced.

Repair Budget: \$2,000

5. Temple Hall –Evapco Model USS29-724 S/N 6-3005697

Issues: This 6 year old all stainless steel cooling tower is in good condition and only really has one immediate concern. There are three upper casing leaks that should be addressed before strip sealer migrates and leaks become more significant.

Repair Budget: \$2,500

6. Bio Tech – Evapco Model AT-12-924B S/N 94-1723

This 15 year old galvanized tower is in decent condition but is showing typical aging issues with corrosion apparent in the plenum section and cold water sump curb panels. The tower should be re-inspected when it can be shut down and drained to better inspect the cold water basin and heat transfer wetdeck. Based on its age and current corrosion it would be recommended to consider full refurbishment sometime in the next 2-5 years based on what is found at the next inspection.

7. Sanger Hall – Marley Model NC6102B S/N 073122-001-95

These 3 towers with stainless steel hot and cold water basins are in decent to good condition considering their age (17 years) but have some of the following concerns including side casings, heat transfer wetdeck, hot water basins and gear boxes. The galvanized side casing panels are experiencing significant corrosion throughout with a concentration in the area behind the heat transfer wetdeck. These panels will need to be repaired or replaced. The heat transfer wetdeck is in decent shape but does have areas of scale and fouling which could be affecting performance. Based on age it would be our recommendation to consider replacement of the wetdeck in the next couple of years. There are water balancing issues with the six hot water basins that should be looked into. It may be that the flow control valves just need to be adjusted for proper flow or it could be possible that the valves need to be replaced. Currently two basins have very high levels, 2 are normal and 2 are very low (3rd cell farthest from door) with most nozzles not receiving any flow at all. This could definitely be causing performance issues and affecting capacity. Two of the three gear boxes (in cells 1 &2) had a lot of moisture in the seal area but could have been from rain the night before. This should be looked at again.

8. Sanger Hall 2 – Evapco Model AT424-436 S/N 6-290322

These 6 year old towers (3 cells) with stainless cold water sumps are in good condition with only concern being the scaled up condition of the air inlet shields which could be affecting air flow through the tower and affecting capacity. The frames of the shields are Stainless steel allowing for the interior PVC media to be replaced without replacing the frames as well. This should probably be planned for replacement sometime in the next two years. There is also one broken handle for access door to upper casing in one cell.

9. Sanger Hall 2A – Evapco Model AT12-186 S/N 89-3672

This 6 year old galvanized tower is in the worst condition of the towers at Sanger and is the only one completely constructed out of galvanized steel. The tower was operating and we didn't have the ability to fully inspect the cold water basin, heat transfer wetdeck and/or power train. There was a damaged air inlet shield that had fallen out of place which was causing operational issues with severe drift issues between this tower and the three cell Evapco (Sanger 2). For a full report we will need to re-inspect this tower when

it can be fully shut down and drained (if possible). Areas of concern from what we saw externally would be corrosion in plenum and cold water sump, leaks, air inlet shields and heat transfer wetdeck. On information we have at this point we see this tower being a major candidate for refurbishment in the next couple of years based on what we find at next inspection.

10. Smith Hall – Evapco Model AT24-618B S/N 97-0102

These 15 year old all galvanized towers appear to be in good condition but because they were in operation we could not fully inspect the heat transfer wetdeck or cold water sumps. We would like to come back when the tower can be down and drained to better inspect the galvanized sump to determine future recommendations. Items we did notice that should be addressed is the excessive scale build-up of the Air Inlet Shields (including two that weren't installed) and excessive corrosion on one fan shaft and motor base adjusting rods (unit farthest from door).

These new surveys and reports will provide CTHX the additional data and information required to keep ____ survey manual up to date on their towers. We look forward to working with the facility maintenance members of ____ and in providing the necessary data for extending the life and increasing the efficiency of the cooling towers serving the ____ staff and students. If any questions arise after review please contact CTHX.

Yours truly,

Kent DeHaven
Project Manager