22023

BOARD OF TRUSTEES OF COMMUNITY COLLEGE DISTRICT NO. 508
County of Cook and State of Illinois

CHILLER MAINTENANCE AND ACID CLEANING
KENNEDY KING COLLEGE

THE CHANCELLOR

REPORTS that there is a need to prepare the air conditioning system at Kennedy-King College for the summer season and this preparation includes an acid cleaning of 9 chiller systems; and

that the need for the acid cleaning was based on an inspection and report submitted by an independent chemist; and

that Kennedy-King staff obtained a proposal from Delta Heating, Air Conditioning and Refrigeration, Inc., Elk Grove Village, the Board approved District contractor for mechanical repair work, in the total amount of $23,637.58, for this work and have determined that the price is reasonable and acceptable based on a comparison of the cost for like work done in June, 1997; and

that immediate action is necessary to avoid program disruption.

THE CHANCELLOR

RECOMMENDS that the Board of Trustees ratifies the Chairman's pre-approval to issue a purchase order in the total amount of $23,637.58 to Delta Heating, Air Conditioning and Refrigeration Inc., 139 Crossen Avenue, Elk Grove Village for acid cleaning of nine chillers at Kennedy-King College.

FINANCIAL $23,637.58 - Plant Maintenance O & M Fund

Respectfully Submitted:

Wayne D. Watson
Chancellor

June 1, 2000

COLLEGE REVIEW: _____ REQ. NO. _____
President

CENTRAL OFFICE REVIEWS & DATES SIGNED:

Purchasing Date	Contract Compl.	Legal	Board Office
Finance Date 5/31/2000	Admin. Svcs. 5/5/00	Academic Aff.	Other

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22023

M E M O R A N D U M

ATTORNEY-CLIENT PRIVILEGED!!!

To: James A. Dyson, Vice Chairman
From: Respicio F. Vazquez, General Counsel
Date: March 17, 2000
Subject: Pre-Approval Request

Kennedy-King College is requesting your pre-approval to issue a purchase order (to be ratified at the upcoming board meeting) to Delta Heating, Air Conditioning and Refrigeration, Inc. in an amount not to exceed $23,637.58. KK is in need of acid cleaning of 9 of the chillers. There is an immediate need of providing students and staff a comfortable building to aid in their performance and productivity during the upcoming hot weather.

If you have any questions, please feel free to contact me at 312-553-2541 or page me at 312-689-9056. Thank you and I will wait to hear from you.

Res Vazquez

James A. Dyson

S:\LEGAL\RFV\BD508\Preapproval - Chiller Maintenance & Acid Cleaning.wpd

22023

KENNEDY-KING COLLEGE

Office of the President
Telephone: 773.602.5016
Fax: 773.602.5243

Fax

To: Respicio Vazquez From: Wellington Wilson

Fax: 2539 Pages: 2

Phone: Date:

Re: CC:

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply

• Comments: If there is a problem with the transmission of this facsimile, please contact our office at the number listed above.

MESSAGE:

6800 South Wentworth Avenue
Chicago, Illinois 60621

22023

KENNEDY-KING COLLEGE

One of the City Colleges of Chicago

Office of the President

MEMORANDUM

TO: Respicio Vazquez
General Counsel

FR: Wellington Wilson
Interim President

DATE: May 5, 2000

RE: Emergency Acid Cleaning of Chillers

The purpose of this memorandum is to request emergency acid cleaning of chillers here at Kennedy-King College. As a result of delayed maintenance, the chillers have not been cleaned in three years. To forestall cleaning could cause irreparable damage to the entire system.

Unfortunately, three factors have contributed to the college's delay in requesting cleaning: (1) the lack of a permanent Chief Engineer in the early fall to give advise on this matter, (2) the lack of a coordinated effort to prioritize building maintenance projects by the college's Building Manager and Chief Engineer, and (3) the budgetary shortfall of Kennedy-King College has prompted payment of bills on a needs basis by the Business Manager.

We have addressed these concerns with corrective actions that: (1) hired a permanent Chief of Engineers who reports to the President on a weekly basis on the status of the building and grounds, (2) changed the Building Manager's reporting responsibility from the Business Manager to the President. Also, the introduction of cooperative and three-way reporting (President, Chief of Engineers and Building Manger.) that prioritizes building projects, and (3) although the College is still in a budgetary shortfall, we have increased the number of members on the budgetary committee to monitor spending and bill payments.

Again, our immediate need at this time is to provide students and staff a comfortable building to aid in their performance and productivity.

ji

6800 South Wentworth Avenue • Chicago, Illinois 60621 • 773.602.5016 • Fax 773.602.5243

22023

DELTA
HEATING – AIR CONDITIONING & REFRIGERATION, INC.
ENGINEERS & CONTRACTORS
139 Crossen Avenue • Elk Grove Village, Illinois 60007
(847) 427-1070 • Fax (847) 427-1075

April 19, 2000

Kennedy-King College
6800 S. Wentworth Avenue
Chicago, IL 60621

Re: Work Order #KK0307 - Revised

Gentlemen:

We propose to furnish the necessary labor and material to remove the cover's on both the condenser and absorber tube sections of Absorption Chillers #1, 2, 3, 5, 6, 7, 8 & 9. We will then acid clean and power brush the tubes. The systems will be flushed and the covers reinstalled with new gaskets.

Material List

50 gal's	Acid Cleaner	$750.00
100	3/4" Nylon Brushes	785.00
36	Gasket Sets	416.20
36	6" Victavlic Gasket	496.60
1 Lot	Misc. Material	250.00
		$2,697.80
	10% Profit	269.78
	Material Total	$2,967.58
Labor 530 Hours @ $39.00 per hour		$20,670.00
	Total Material & Labor	**$23,637.58**

If you wish to proceed with this work please issue a purchase order as soon as possible so that we may order the material and proceed with the work.

Sincerely,

Robert M. Dompke

22023

KENNEDY-KING COLLEGE

One of the City Colleges of Chicago

Office of the President

M E M O R A N D U M

TO: Gary Reis, Director of Purchasing

FROM: Wellington Wilson, President W.W.

DATE: April 19, 2000

SUBJECT: CHILLER REPAIR/CLEANING

In keeping with the needs for the daily operations of the college, it has become necessary to complete the acid cleaning project (see attachment). Therefore, I am requesting the support of your department to initiate this project on an emergency basis. If additional support is necessary, please contact myself at 773-602-5016 or Ken Battle at 773-602-5030.

Thank you for your assistance.

/slw

Attachments

6800 South Wentworth Avenue • Chicago, Illinois 60621 • 773.602.5016 • Fax 773.602.5243

22023

Telephone (773) 602-5030
Fax (773) 602-5097

KENNEDY-KING COLLEGE
PLANNING AND OPERATIONS
One of the City Colleges of Chicago
6800 South Wentworth Avenue
Chicago, Illinois 60621

Memorandum

To: **Wellington Wilson, President**

CC: **Nicki Green, Director Business and Operational Services**

From: **Ken Battle, Building Manager** KB

David Harris, Chief Engineer

Date: **04/19/00**

Re: **Emergency Chiller Cleaning**

In the summer of 1998, approval was given by the Public Building Commission (PBC) to overhaul nine of the eleven Chiller units that cool the college. This project was completed in April of 1999. As a result of this completion, Kennedy-King was able to operate the cooling system at 90% efficiency for the summer and fall session of 1999.

In the past, because of the type of cooling system and chemicals used, it was necessary to acid clean and punch the chillers prior to startup. This process is necessary to extend the longevity of the units and to maximize cooling potential. Because of this constant concern, Dave and I agreed to commission Harfst and Associates, (see attachment) a chemist with extended experience and knowledge of the Chiller system at Kennedy-King to test the condition of the system after the 1999 cooling season. It was determined, after testing two of the chillers, that the buildup had once again reached the level that requires the acid cleaning process. Delta Heating, the board approved HVAC Contractor, was then contacted to submit a proposal to complete this job.

The proposed cost of $23,637 is consistent with past expenditures (approx. $22,000) for like work. This proposal needs immediate approval so that we can complete this

project in time to activate the system for the cooling season. Again, without this project, KK will expose the cooling system to overheating and probable malfunctioning. We request your support with moving this project forward.

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Harfst and Associates, Inc.
William F. Harfst

P.O. Box 276
Crystal Lake, IL 60039

Telephone: (815) 477-4559
Fax: (815) 477-7824
E-mail: wfh@mc.net

January 7, 2000

Mr. David Harris
Chief Engineer
Kennedy-King College
6800 S. Wentworth Ave
Chicago, IL 60621

Subject: Chiller Inspection Report for December 1999

Dear Mr. Harris,

This letter is pursuant to my inspection of the waterside condition of the mechanical chiller condensers and absorbers at the conclusion of the 1999 cooling season. As the water treatment consultant for the City Colleges of Chicago, I have reviewed the operating performance and water chemistry control procedures for the cooling towers and absorption chillers. Please accept my findings, conclusions and recommendations following this inspection.

CHILLER INSPECTION

Absorption chillers No. 1 and No. 7 were drained and opened for routine annual inspection and maintenance. The heads on the condenser and absorber sections were removed to permit visual inspection of the waterside of the tube bundle. The tubes were not mechanically or chemically cleaned prior to my inspection.

The condenser and absorber tubes were coated with a uniform layer of mineral scale deposit. This material had an off-white appearance typical of calcium carbonate. Water from the cooling tower flows through the absorber and condenser sections of the chiller where it removes heat from the refrigerant. Under conditions of high hardness and alkalinity, the dissolved minerals in the cooling water will deposit on the hot heat transfer surfaces. This typically produces a

residual coating of calcium carbonate scale. The deposits on the condenser and absorber tubes are consistent with this scale formation mechanism.

The tube sheets and end plates had a surface layer of rust with some tuberculation. This is a common condition resulting from the reaction of the metal surface with moisture and dissolved oxygen and does not indicate a deficiency in the water treatment program.

I did not detect any foul odors or bacterial slimes that would suggest the presence of microbiological infestation.

COOLING TOWER INSPECTION

I inspected the Evapco cooling towers that serve Chillers No. 1 and No. 7. The basin of each tower contained an accumulation of loose mineral scale that had dried to a powdery residue. The plastic film fill in each tower also presented evidence of some scale buildup. Because of the design of the film fill, however, it is impossible to see very deep into the corrugations of the tower packing. This condition suggests that mineral deposits have formed in the cooling tower, but not to the extent that it significantly blocks water or air flow through the fill.

The galvanized steel on the tower is in good condition and does not indicate active corrosion or "white rust" conditions. I did not detect any algae growth or active bacteria in the tower basin or fill.

RECOMMENDATIONS

Past inspections of the chillers have revealed a thin layer of mineral scale deposit on the absorber and condenser tubes with some surface rust on the tube sheets and endplates. (See my report dated February 10, 1998) The operating engineers indicated that the chillers were able to carry the cooling load during the 1998/1999 season. This suggests that the scale deposits are not thick enough to interfere with normal operation.

Mineral scale deposits serve as a barrier to efficient heat transfer. Because of the insulating properties of calcium carbonate and other mineral scales, heat is not transferred efficiently from the refrigerant to the cooling water. As a result, the machine runs hotter. Under extreme conditions, normally during in the middle of

the cooling season, the chiller can overheat and shut down. For these reasons, the goal of the water treatment program is to produce scale-free heat transfer surfaces.

Based on my inspection of Chillers No. 1 and No. 7, the operating efficiency of this equipment would be increased by removing the scale deposits with an inhibited acid solution. The chemical cleaning must be performed by isolating the chillers from the cooling tower, however. Allowing the acid cleaner to flow through the cooling tower will result in removal of zinc from the galvanized steel, and will promote corrosive attack on the exposed steel structure. Exposing the galvanized steel to acid is not recommended, even if the cleaner is "inhibited". I recommend that you contact a chemical cleaning contractor that is skilled in the trade and has the appropriate equipment for performing this work. Acid cleaners are corrosive liquids that must be handled safely. Review these safety requirements with the contractor prior to commissioning the work.

The Evapco cooling tower fill and basin also contains an accumulation of mineral scale deposits. Because of the design of the plastic fill in these towers it is difficult to reach the interior surfaces of the fill to remove the scale. For the reasons mentioned above, acid scale removers should not be used in an attempt to dissolve the scale. Acceptable results are often obtained by pressure washing the fill with a suitable high pressure washer. Blasting the fill from the bottom and the top may provide acceptable results, or the fill may be removed to allow greater access to the deposits. As you recall, the old BAC cooling towers were so clogged with mineral scale deposits that the helicopter couldn't lift them off the roof during the installation of the new Evapco towers. Scale buildup of that degree in the Evapco towers will result in collapse of the plastic fill.

CHEMICAL FEED AND BLEED CONTROLLERS

During my inspection of the chillers I also reviewed the operation of the automatic chemical feed and bleed controllers. These controllers are installed on each of the cooling tower systems. The purpose of these units is to control the proportionate feed of chemical scale inhibitor into the cooling tower makeup and regulate the cooling tower bleed rate. This controls the cooling water chemistry to prevent scale buildup and corrosion in the chiller condenser and absorber.

I had inspected each of the cooling tower controllers during my plant visit on July 26, 1999. Rather than repeat my comments and recommendations in the body of this report, I am attaching a copy of my report dated August 11, 1999. It is my

conclusion that the control equipment is faulty and subject to repeated failure because of its age. This condition has failed to control the cooling tower bleed rate and chemical residuals within recommended limits resulting in the deposition of mineral scale in the absorption chillers. For these reasons, I recommend that you replace the existing chemical feed and control systems with new equipment.

SUMMARY AND CONCLUSIONS

The absorber and condenser sections of Chillers No. 1 and No. 7 contain a surface layer of mineral scale deposit that impedes heat transfer. In addition, the Evapco cooling tower contains loose deposits in the basin and a scale residue in the plastic film fill. These deposits interfere with efficient cooling system operation.

The scale build up is caused by failure to maintain the water chemistry within recommended limits. The root cause of this failure is the faulty operation of the old chemical feed and bleed system. This equipment is subject to repeated breakdowns because of its age. This problem is best solved by replacement of the existing controllers with new chemical feed equipment including a microprocessor controller, water meter, chemical tanks, chemical pumps, and bleed solenoid valve.

During the cooling season, the water chemistry in each tower should be monitored with daily tests to verify the proper operation of the chemical feed and bleed system. This includes:

- Controlling the cycles of concentration below 3.0 by maintenance of adequate bleedoff
- Maintenance of chemical scale and corrosion inhibitor levels in the tower water
- Regular addition of chlorine bleach to the tower to control the growth of algae and bacteria.

These steps will prolong the life of plant equipment and insure reliable operation of the cooling system during peak operating periods.

I trust that this report adequately summarizes my findings, conclusions and recommendations following my on-site inspection of Chillers No. 1 and No. 7.

HARFST AND ASSOCIATES, INC.

Please feel free to contact me should you have any questions or require further information.

Very truly yours,

HARFST AND ASSOCIATES, INC.

William F. Harfst

22023

Memorandum

Date: 3/3/00
TO: Mr. Ken Battle, Building Manager
Subject: Acid cleaning chillers, Blowdowns, Feeders on A/C
From: Mr. D.A. Harris, Chief Engr.
xc: Mr. Weilington Wilson, President
Ms. Nicki Green, Bus. Manager

Given the conditions of the chillers and keeping with the general maintenance program of punching the chiller tubes each year. It has been established that the chillers need to be Acid cleaned. This process is a major undertaking and dangerous. I am Suggesting that this be done by a professional contractor. It is imperative that this process take place in the near future. The results of not performing this procedure will cause poor transfer of the cooling process, Blockage, over heating, poor efficency, Shut down and possible damage to the Pumps.

I am also suggesting that the blowdown stations and feeder systems be Repaired and/or Replaced in order to ~~make~~ prevent major scale and deposits from building up. I am Attaching the latest Evaluation Report from Hartfst and Asso. which support this Request. Alone with a bid that was submitted by Delta Heating the board Approved Heating & Cooling contractor. This bid is for Acid cleaning the following units #1, 2, 3, 5, 6, 7, 8, 9 & 10. At a Cost of 23 637.58

Date 4/18/00
TO: Mr. Ken Battle, Building Manager
Subject: Acid cleaning Chillers, Blowdowns, Feeders on A/C.
From: Mr. David Harris, Chief Engr.
xc: President Wilson
Ms. N. Green, Bus. Manager

I'm writing in response to the questions that was raised about the condition and cost of the chillers to be Acid Cleaned. A thin layer of Calcium and Mineral deposits was discovered on the Absorbers along with some Rust. It was determined (1998 season) to start up the System As is. After the 1999 season this condition had gone beyond an exceptible level as far as the build-up. We made (2) units available to HARFST And Asso. (the chemist for ccc) for a evaluation. I also contacted Delta Heating to also evaluate the chillers and give me a cost to Acid clean. They Agreed that it is imperative to Acid clean the tubes in order to get Any type of Efficency. This process of Acid cleaning should be done on A As Needed Bases given the condition of the Blow downs etc. This could Happen Every other year. Delta Heating has Acid cleaned these units before in the last three years. The Quote is 23,637.58
The A/C units are #1,2,3,5,6,7,8,9+10.