CHAPTER/REGIONAL TECHNOLOGY AWARD APPLICATION SHORT FORM

(Revision January 2016)

INTRODUCTION:

This Short Form has been developed to stimulate more participation in chapter and regional competition. ***This form is not intended to replace the full Society Technology Award Application form****. Regional winners using the short form will be required to complete the full Technology Award Application form before their applications can be forwarded for Society Competition. (This form does not require extensive narrative, plans or photographs.)*

INSTRUCTIONS:

A. The individual submitting the Technology Award Application must be a current member of ASHRAE who had a significant role in the design or development of the project.

B. Complete the "Short Form" and use it as the cover page.

C. Provide a system schematic/diagram not larger than 11" x 17" in size. In addition, attach a brief narrative (maximum of 2 pages). The narrative should include the gross and net building areas applicable to the project, a description of the major building areas (i.e.,operating rooms, laboratories, computer rooms, industrial processes, offices, warehouses) and a brief discussion regarding the following five criteria (if a criterion is not applicable, state accordingly):
- Energy Efficiency
- Indoor Air Quality
- Innovation
- Operation & Maintenance
- Cost Effectiveness
- Environmental Impact

D. Submit your schematic, brief narrative, and completed form to your Chapter Technology Transfer Committee Chapter (CTTC) Chair for judging at the chapter level in accordance with their instructions.

E. The ASHRAE Technology Award program is intended for built projects. First place winning projects should be eligible for submission to the Society level competition on September 1st of the following Society calendar year. Therefore, a project submitted to a Chapter or Regional competition shall be occupied prior to September 1st of the current Society year in order to satisfy the Society level competition requirement of one full year of occupancy.

First place winners in each category from chapter competition will be submitted by the CTTC Chapter Chair to the CTTC Regional Vice Chair for judging in the Regional Technology Awards competition. At the discretion of the CTTC Regional Vice Chair, this may require completion of the full Society Technology Award Application form if the chapter submission was done on the Short Form Application.

The CTTC Regional Vice Chair will invite first place winners in each category from regional competition to submit them for judging in the Society level Technology Awards competition. The regional winners will be given the opportunity to incorporate new information or otherwise improve their submittal before submitting it to the society level competition (e.g., by addressing comments from regional judges). At the discretion of the judging panels at the chapter and regional competitions, more than one first place winner may be awarded in each category.

For the regional competition, submit the number of copies requested by the Regional CTTC Vice Chair. The CTTC Regional Vice Chair may require entries into the regional competition to be done on the full Society Technology Award Application form. In any case, all submissions to the Society level competition must be done on the full Society Technology Award Application form.

F. It is highly recommended that each entrant confirm by letter (and retain a copy for record) to the owner that the owner has granted permission to submit this project to competition.

NOTE: ASHRAE Technology Awards are the HVAC&R industry's most prestigious honor for efficient energy use in buildings and environmental system performance. While the awards do not certify responsible charge or professional license status, they do recognize outstanding design innovation and successful implementation.

CHAPTER/REGIONAL TECHNOLOGY AWARD - SHORT FORM

1. Category - Check one and indicate New, Existing, or Existing Building Commissioning (EBCx)

☒ Commercial Buildings	☒ New	☐ Existing or	☐ EBCx
Institutional Buildings:			
☐ Educational Facilities	☐ New	☐ Existing or	☐ EBCx
☐ Other Institutional	☐ New	☐ Existing or	☐ EBCx
☐ Health Care Facilities	☐ New	☐ Existing or	☐ EBCx
☐ Industrial Facilities or Processes	☐ New	☐ Existing or	☐ EBCx
☐ Public Assembly	☐ New	☐ Existing or	☐ EBCx
☐ Residential (Single and Multi-Family)			

2. Name of building or project: Fairfield Inn & Suites

City/State: Altoona, Iowa

3. Project Description: Geothermal heat pump chiller with 4-pipe vertical fan coil units.

Project Study/Design Period: 03/2017 (Begin date (mm/yyyy)) to 03/2018 (End date (mm/yyyy))

Percent Occupancy at time of submission: 100%

4. Entrant (ASHRAE member with significant role in project):

a. Name: Mark T. LaCroix (Last / First / Middle)

Membership Number: 5216515

Chapter: Iowa

Region: VI

b. Address (including country): 300 4th Street

West Des Moines (City) Iowa (State) 50265 (Zip) United States (Country)

c. Telephone: (O) 515.664.1683 d. Email: mlacroix@kclengineering.com

e. Member's Role in Project: Mechanical Engineer

f. Member's Signature:

5. Engineer of Record: Mark T. LaCroix

By affixing my signature above, I certify that the information contained in this application is accurate to the best of my knowledge. In addition, I certify that I have discussed this entry with the owner and have received permission from the owner to submit this project to the ASHRAE Technology Awards Competition.

Project Description:

The Fairfield Inn, owned and operated by the Heart of America Group, is a first of its kind facility both aesthetically and functionally. Located in the bustling Prairie Crossing development in Altoona, Iowa, the Fairfield looks different to guests – and it also feels different. This facility uses a geothermal heating and cooling system throughout the entire hotel, including 107 guest rooms, meeting rooms, common spaces, and pool. KCL Engineering's team designed and over-saw the construction of this unique geothermal system with fan coil units in a hotel setting, which is not in any previous HOA property. This heating and cooling system eliminates the traditional design using a Packaged Terminal Air Conditioner (PTAC) unit in each room and the common compressor noise and temperature variances. The result is a more comfortable guest experience and an exemplary engineering system that Heart of America Group began implementing in subsequent hotels.

Systems Description:

The building has a geothermal field located under the parking lot with heat pump chiller central plant and 4-pipe vertical fan coil units serving individual spaces. Simultaneous chilled water and hot water are generated by the heat pump chiller. Any excess of either is rejected to the well field. Ventilation air is being provided by two roof mounted, high efficiency dedicated outdoor air units; delivering dry, neutral temperature fresh air to each floor. The Geothermal header is located in the underground geothermal vault. Primary central plant equipment including the geothermal loop pumps, hot water pumps and chilled water pumps as well as the heat pump chiller, and hydronic components are located in the hotel mechanical room which fits in the space of a single hotel room. The system has stand-alone controls with remote monitoring and alarms. The heating plant has a gas boiler for backup heat. Hotel rooms have wall mounted thermostats; options for occupancy control and remote controls are available.

Energy Efficiency:

The efficiency of the geothermal system compared to a standard PTAC unit is approximately 4 times more efficient. By generating simultaneous hot water and chilled water the system makes use of all waste heat by either heating spaces needing it or by charging the well field with excess heat. Additionally during optimal conditions the system is able to directly economize by using well field water to cool without operating the heat pump chiller's compressors.

Indoor Air Quality:

The implementation of a dedicated outdoor air system which provides pre-conditioned fresh air to each space greatly increases the indoor air quality in the hotel. Dehumidification, preconditioning and filtration of fresh air provide a better and healthier guest experience and create a higher quality indoor environment. Continuous run guest exhaust systems also ensure that rooms and corridors are pressurized in order to control air movement within the hotel.

Innovation:

The design on this project takes into account the lowest life cycle cost taking into account maintenance, energy and comfort implications that are often overlooked for first cost savings. Our engineering design sophistication has resulted in a better, quieter, more energy-efficient HVAC system in each room to improve the guest experience. Instead of spending energy to simultaneously heat and cool the heat pump chiller simultaneously heats and cools using the well field to store the imbalance between these loads. The result is a far more efficient system with a 20 year life span and efficiency compared to the PTAC alternative with 5-10 year life span.

Operation and Maintenance:

Due to the centralized compressors of the heat pump chillers and the far superior life expectancy of the installed systems the maintenance is not only located in one convenient location but it occurs less frequently. The central chiller is a single point of maintenance; while a more complex system, it removes the ongoing replacements that take place in most hotels with PTAC equipment and replaces it with a standard annual maintenance contract on the chiller system. (Filter changes are unchanged, similar for both systems).

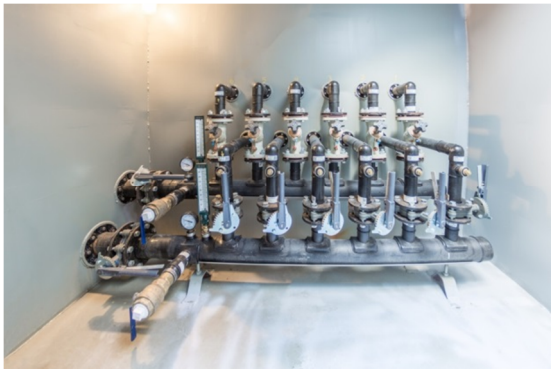
Cost Effectiveness:

The geothermal system in place at the Fairfield Inn & Suites has the lowest cost of ownership. There is a 50% energy savings over PTAC units in each room. There are financial incentives for the geothermal installation depending on location, including: energy company rebates (over $100,000 from Mid-American Energy on this project), state tax credits, federal tax credits, etc. For Fairfield Inn & Suites in Altoona, IA these amounted to over $200,000, offsetting most of the upgrade cost between the heat pump chiller and traditional PTAC units. The rest will be quickly paid off in energy savings over the next few years. Beyond the financial incentives to an owner for investing in a geothermal system, the replacement and maintenance costs are also much lower and guest comfort is increased, resulting in more repeat business and happier guests.

Environmental Impact:

When it comes to environmental impact, energy savings is paramount. We are focused on energy by providing the best efficiency system with balance of first cost and long term system cost. By choosing equipment with a longer life span, we are reducing the amount of waste over the life of the building in equipment replacement costs compared to a PTAC system with a 5-10 year replacement of each individual unitary device. Additionally the heat pump chiller uses an environmentally safe refrigerant, food grade environmentally safe glycol and the system uses a closed loop system thus not consuming water during operation.

Fairfield Inn



Geothermal Vault

Heat Pump Chiller

Typical Guest Room