Ohio | Public Utilities Commission

Application to Commit Energy Efficiency/Peak Demand Reduction Programs (Mercantile Customers Only)

Case No.: 13-1326 -EL-EEC

Mercantile Customer: **Miami University**

Electric Utility: **Duke Energy**

Program Title or Description: **HVAC**

Rule 4901:1-39-05(F), Ohio Administrative Code (O.A.C.), permits a mercantile customer to file, either individually or jointly with an electric utility, an application to commit the customer's existing demand reduction, demand response, and energy efficiency programs for integration with the electric utility's programs. The following application form is to be used by mercantile customers, either individually or jointly with their electric utility, to apply for commitment of such programs in accordance with the Commission's pilot program established in Case No. 10-834-EL-POR

Completed applications requesting the cash rebate reasonable arrangement option (Option 1) in lieu of an exemption from the electric utility's energy efficiency and demand reduction (EEDR) rider will be automatically approved on the sixty-first calendar day after filing, unless the Commission, or an attorney examiner, suspends or denies the application prior to that time. Completed applications requesting the exemption from the EEDR rider (Option 2) will also qualify for the 60-day automatic approval so long as the exemption period does not exceed 24 months. Rider exemptions for periods of more than 24 months will be reviewed by the Commission Staff and are only approved up the issuance of a Commission order.

Complete a separate application for each customer program. Projects undertaken by a customer as a single program at a single location or at various locations within the same service territory should be submitted together as a single program filing, when possible. Check all boxes that are applicable to your program. For each box checked, be sure to complete all subparts of the question, and provide all requested additional information. Submittal of incomplete applications may result in a suspension of the automatic approval process or denial of the application.

Any confidential or trade secret information may be submitted to Staff on disc or via email at ee-pdr@puc.state.oh.us.

Section 1: Mercantile Customer Information

Name: **Miami University**

Principal address: **101 South Fisher Drive Oxford, Ohio 45056**

Address of facility for which this energy efficiency program applies:

4955 Oxford Trenton Road Oxford Ohio 45056

Name and telephone number for responses to questions:

Megan Fox, 513-287-3367

Electricity use by the customer (check the box(es) that apply):

- ✓ **The customer uses more than seven hundred thousand kilowatt hours per year at the above facility. (See Attachment 1 – Appendix 1.)**
- □ The customer is part of a national account involving multiple facilities in one or more states. (Please attach documentation.)

Section 2: Application Information

A) The customer is filing this application (choose which applies):

- □ Individually, without electric utility participation.
- ✓ **Jointly with the electric utility.**

B) The electric utility is: **Duke Energy**

C) The customer is offering to commit (check any that apply):

- □ Energy savings from the customer's energy efficiency program. (Complete Sections 3, 5, 6, and 7.)
- □ Capacity savings from the customer's demand response/demand reduction program. (Complete Sections 4, 5, 6, and 7.)
- ✓ **Both the energy savings and the capacity savings from the customer's energy efficiency program. (Complete all sections of the Application.)**

Section 3: Energy Efficiency Programs

A) The customer's energy efficiency program involves (check those that apply):

□ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, and the date on which the customer would have replaced such equipment if it had not been replaced early. Please include a brief explanation for how the customer determined this future replacement date (or, if not known, please explain why this is not known)).

□ Installation of new equipment to replace equipment that needed to be replaced The customer installed new equipment on the following date(s):

✓ Installation of new equipment for new construction or facility expansion. The customer installed new equipment on the following date(s): **April 2013.**

□ Behavioral or operational improvement.

B) Energy savings achieved/to be achieved by the energy efficiency program:

1) If you checked the box indicating that the project involves the early replacement of fully functioning equipment replaced with new equipment, then calculate the annual savings [(kWh used by the original equipment) – (kWh used by new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: _____kWh

2) If you checked the box indicating that the customer installed new equipment to replace equipment that needed to be replaced, then calculate the annual savings [(kWh used by less efficient new equipment) – (kWh used by the higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: _____kWh

Please describe any less efficient new equipment that was rejected in favor of the more efficient new equipment.

3) If you checked the box indicating that the project involves equipment for new construction or facility expansion, then calculate the annual savings [(kWh used by less efficient new equipment) – (kWh used by higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: **282,345 kWh (See Attachment 1 - Appendix 2)**

Please describe the less efficient new equipment that was rejected in favor of the more efficient new equipment.

4) If you checked the box indicating that the project involves behavioral or operational improvements, provide a description of how the annual savings were determined.

_____

Section 4: Demand Reduction/Demand Response Programs

A) The customer's program involves (check the one that applies):

- ✓ **Coincident peak-demand savings from the customer's energy efficiency program.**
- □ Actual peak-demand reduction. (Attach a description and documentation of the peak-demand reduction.)
- □ Potential peak-demand reduction (check the one that applies):
  - □ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a tariff of a regional transmission organization (RTO) approved by the Federal Energy Regulatory Commission.
  - □ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a program that is equivalent to an RTO program, which has been approved by the Public Utilities Commission of Ohio.

B) On what date did the customer initiate its demand reduction program?

April 2013

C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):

105 KW (See Attachment 1 - Appendix 2)

Section 5: Request for Cash Rebate Reasonable Arrangement (Option 1) or Exemption from Rider (Option 2)

Under this section, check the box that applies and fill in all blanks relating to that choice.

Note: If Option 2 is selected, the application will not qualify for the 60-day automatic approval. All applications, however, will be considered on a timely basis by the Commission.

A) The customer is applying for:

✓ **Option 1: A cash rebate reasonable arrangement.**

OR

□ Option 2: An exemption from the energy efficiency cost recovery mechanism implemented by the electric utility.

OR

□ Commitment payment

B) The value of the option that the customer is seeking is:

Option 1: A cash rebate reasonable arrangement, which is the lesser of (show both amounts):

✓ A cash rebate of **$12,750.00 (See Attachment 1 - Appendix 3).**

Option 2: An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider.

□ An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for ____ months (not to exceed 24 months). (Attach calculations showing how this time period was determined.)

OR

□ A commitment payment valued at no more than $_____. (Attach documentation and calculations showing how this payment amount was determined.)

OR

□ Ongoing exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for an initial period of 24 months because this program is part of the customer's ongoing efficiency program. (Attach documentation that establishes the ongoing nature of the program.) In order to continue the exemption beyond the initial 24 month period, the customer will need to provide a future application establishing additional energy savings and the continuance of the organization's energy efficiency program.)

Section 6: Cost Effectiveness

The program is cost effective because it has a benefit/cost ratio greater than 1 using the (choose which applies):

□ Total Resource Cost (TRC) Test. The calculated TRC value is: _____ (Continue to Subsection 1, then skip Subsection 2)

✓ Utility Cost Test (UCT). The calculated UCT value is **8.72 (See Attachment 1 - Appendix 4)**

Subsection 1: TRC Test Used (please fill in all blanks).

The TRC value of the program is calculated by dividing the value of our avoided supply costs (generation capacity, energy, and any transmission or distribution) by the sum of our program overhead and installation costs and any incremental measure costs paid by either the customer or the electric utility.

The electric utility's avoided supply costs were _____.

Our program costs were _____.

The incremental measure costs were _____.

Subsection 2: UCT Used (please fill in all blanks).

We calculated the UCT value of our program by dividing the value of our avoided supply costs (capacity and energy) by the costs to our electric utility (including administrative costs and incentives paid or rider exemption costs) to obtain our commitment.

Our avoided supply costs were **$342,257 (See Attachment 1 - Appendix 5).**

The utility's program costs were **$16,009(See Attachment 1 - Appendix 6).**

The utility's incentive costs/rebate costs were **$12,750 (See Attachment 1 - Appendix 3)**.

Section 7: Additional Information

Please attach the following supporting documentation to this application:

Narrative description of the program including, but not limited to, make, model, and year of any installed and replaced equipment.

A copy of the formal declaration or agreement that commits the program or measure to the electric utility, including:

1) any confidentiality requirements associated with the agreement;
2) a description of any consequences of noncompliance with the terms of the commitment;
3) a description of coordination requirements between the customer and the electric utility with regard to peak demand reduction;
4) permission by the customer to the electric utility and Commission staff and consultants to measure and verify energy savings and/or peak-demand reductions resulting from your program; and,
5) a commitment by the customer to provide an annual report on your energy savings and electric utility peak-demand reductions achieved.

Refer to Offer Letter following this application

A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results. Additionally, identify and explain all deviations from any program measurement and verification guidelines that may be published by the Commission.

DUKE ENERGY
Mercantile Self Direct Program
139 East Fourth Street
Cincinnati, OH 45202

513 629 5572 fax

May 29, 2013

Mr. Anthony Ferraro
Miami University
4955 Oxford Trenton Road
Oxford, OH 45056

Subject: Your Prescriptive Application for a Duke Energy Mercantile Self-Direct Rebate

Dear Mr. Ferraro:

Thank you for your Duke Energy Mercantile Self Direct rebate application. As noted in the Energy Conservation Measure (ECM) chart on page two, a total rebate of $12,750.00 has been proposed for your HVAC project completed in the 2013 calendar year. All Self Direct Rebates are contingent upon approval by the Public Utilities Commission of Ohio (PUCO).

At your earliest convenience, please indicate if you accept this rebate by

- providing your signature on page two
- completing the PUCO-required affidavit on page three.

Please return the documents to my attention via fax at 513-629-5572 or e-mail to SelfDirect@Duke-Energy.com. Upon receipt, Duke Energy will submit the necessary documentation to PUCO. Following PUCO's approval, Duke Energy will remit payment.

At Duke Energy, we value your business and look forward to working with you on this and future energy efficiency projects. We hope you will consider our Smart $aver® incentives, when applicable. Please contact me if you have any questions.

Sincerely,

Grady Reid, Jr
Product Manager
Mercantile Self Direct Rebates

cc: Deanna Bowden, Duke Energy
Rob Jung, Ecova

Please indicate your response to this rebate offer within 30 days of receipt.

☒ Rebate is accepted. ☐ Rebate is declined.

By accepting this rebate, Miami University affirms its intention to commit and integrate the energy efficiency projects listed on the following pages into Duke Energy's peak demand reduction, demand response and/or energy efficiency programs.

Additionally, Miami University also agrees to serve as joint applicant in any future filings necessary to secure approval of this arrangement as required by PUCO and to comply with any information and reporting requirements imposed by rule or as part of that approval.

Finally, Miami University affirms that all application information submitted to Duke Energy pursuant to this rebate offer is true and accurate. Information in question would include, but not be limited to, project scope, equipment specifications, equipment operational details, project costs, project completion dates, and the quantity of energy conservation measures installed.

If rebate is accepted, will you use the monies to fund future energy efficiency and/or demand reduction projects?

☒ YES ☐ NO

If rebate is declined, please indicate reason (optional):

Anthony Ferraro ANTHONY FERRARO 5/29/13

Customer Signature Printed Name Date

Proposed Rebate Amounts

Measure ID	Energy Conservation Measure (ECM)	Proposed Rebate Amount
ECM-1	Water-Cooled Centrifugal Chiller greater than 300 ton 0.58 kW_ton with 0.35 kW_ton IPLV (Qty: 1)	$12,750.00
Total		$12,750.00

Ohio | Public Utilities Commission

Application to Commit Energy Efficiency/Peak Demand Reduction Programs (Mercantile Customers Only)

Case No.: ____-____-**EL-EEC**

State of Ohio :

ANTHONY FERRARO, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

Miami University
[insert customer or EDU company name and any applicable name(s) doing business as]

2. I have personally examined all the information contained in the foregoing application, including any exhibits and attachments. Based upon my examination and inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete.

3. I am aware of fines and penalties which may be imposed under Ohio Revised Code Sections 2921.11, 2921.31, 4903.02, 4903.03, and 4903.99 for submitting false information.

Anthony Ferraro / Energy Engineer
Signature of Affiant & Title

Sworn and subscribed before me this 29th day of 2013,
Month/Year

ELIZABETH ANN DAVIDSON, Attorney at Law
NOTARY PUBLIC - STATE OF OHIO
My Commission has no expiration date, Section 147.03 O.R.C.

Signature of official administering oath

Print Name and Title

My commission expires on No expiration

Attachment 1 –Miami University

Appendix 1 – Electric History

19500677 01		
MIAMI UNIVERSITY		
4955 OXFORD TRENTON RD		
OXFORD, OH 45056		
Date	Days	Actual KWH
03/28/13	28	6,152,472
02/28/13	28	6,643,044
01/31/13	31	6,601,680
12/31/12	31	6,330,456
11/30/12	30	6,731,316
10/31/12	33	7,832,052
09/28/12	28	7,573,500
08/31/12	31	8,415,432
07/31/12	32	8,633,952
06/29/12	29	6,910,524
05/31/12	31	7,071,948
04/30/12	31	7,281,756
Total		**86,178,132**

Appendix 2 – Annual kWh and kW savings

Measure	Measure Amount	Unit of Measure	Annual kWh Gross with losses (per unit)	TOTAL Annual kWh Gross with losses	Saved Summer coincident kW with losses Per Unit	Total KW Gross with losses
Water-Cooled cent Chiller greater than 300 ton 0.58 kW_ton with 0.35 kW_ton IPLV	1500	tons	188	282,345	0.07	105

Existing Equipment Assumptions	New Equipment Assumptions	Baseline Annual kWh Savings Per Measure	Baseline Annual KW Savings Per Measure	Total kWh Savings	Total kW Savings
Base efficiency is assumed to be 0.58 kw/ton full load and .55 IPLV. A market average of building types and HVAC air distribution schemes are assumed.	Base efficiency is assumed to be0.58 kW/ton full load and with 0.35 kW/ton IPLV. A market average of building types and HVAC air distribution schemes are assumed.	175	0.02	262,500	30

Note: After consideration of line losses, total energy savings are **282,345 kWh and 105 summer coincident kW.** These values may also reflect minor DSMore software rounding error

Appendix 3 – Cash Rebate

Measure	Amount
Water-Cooled cent Chiller greater than 300 ton 0.58 kW_ton with 0.35 kW_ton IPLV	$12,750

Appendix 4 – Utility Cost Test

Measure	UCT
Water-Cooled cent Chiller greater than 300 ton 0.58 kW_ton with 0.35 kW_ton IPLV	8.72

Appendix 5 – Avoided Supply Costs

Measure	T&D	Production	Capacity	Measure Amount	Total Avoided Costs
Water-Cooled cent Chiller greater than 300 ton 0.58 kW_ton with 0.35 kW_ton IPLV	$24.64	$126.34	$77.19	1500	$342,257

Appendix 6 – Utility Program Costs

Measure	Measure Amount	Admin Costs	Total Costs
Water-Cooled cent Chiller greater than 300 ton 0.58 kW_ton with 0.35 kW_ton IPLV	1500	$10.67	$16,009

Ohio Mercantile Self Direct Program

Application Guide & Cover Sheet

Questions? Call 1-866-380-9580 or visit www.duke-energy.com.

Email this form along with completed Mercantile Self Direct Prescriptive or Custom applications, proof of payment, energy savings calculations and spec sheets to SelfDirect@Duke-Energy.com. You may also fax to 1-513-629-5572.

Mercantile customers, defined as using at least 700,000 kWh annually are eligible for the Mercantile Self Direct program. Please indicate mercantile qualification:

- ☒ a single Duke Energy Ohio account
- ☐ multiple accounts in Ohio (energy usage with other utilities may be counted toward the total)

Please list Duke Energy account numbers below (attach listing of multiple accounts and/or billing history for other utilities as required):

Account Number	Annual Usage	Account Number	Annual Usage
1950-0677-01-8	88,000,000		

Self Direct rebates are available for completed Custom projects that have not previously received a Duke Energy Smart $aver® Custom Incentive. Self Direct rebates are applicable to Prescriptive measures that were installed more than 90 days prior to submission to Duke Energy and have not previously received a Duke Energy Prescriptive rebate.

Self Direct Program requirements dictate that certain projects that may be Prescriptive in nature under the Smart $aver program must be evaluated using the Custom process. Use the table on page two as a guide to determine which Self Direct program fits your project(s). Apply for Self Direct projects using the appropriate application forms in conjunction with this cover sheet. Where Mercantile Self Direct Prescriptive applications are listed, please refer to the measure list on that application. If your measure is not listed, you may be eligible for a Self Direct Custom rebate. Self Direct Custom applications, like Smart $aver Custom applications, should include detailed analysis of pre-project and post-project energy usage and project costs. Please indicate which type of rebate applications are included in the table provided on page two.

Please check each box to indicate completion of the following program requirements:

☒ All sections of appropriate application(s) are completed	☒ Proof of payment.*	☒ Manufacturer's Spec sheets	☐ Energy model/calculations and detailed inputs for Custom applications

* If a single payment record is intended to demonstrate the costs of both Prescriptive & Custom projects, please include an additional document with an estimated breakout of costs for each Prescriptive and Custom energy conservation measure.

Application Type	Replaced equipment at end of lifetime or because equipment failed**	Replaced fully operational equipment to improve efficiency***	New Construction
Lighting	☐ MSD Custom Part 1 ☐ Custom Lighting Worksheet	☐ MSD Prescriptive Lighting	☐ MSD Prescriptive Lighting
		☐ MSD Custom Part 1 ☐ Custom Lighting Worksheet	☐ MSD Custom Part 1 ☐ Custom Lighting Worksheet
Heating & Cooling	☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	☐ MSD Prescriptive Heating & Cooling
			☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet
Window Films, Programmable Thermostats, & Guest Room Energy Management Systems	☐ MSD Custom Part 1 ☐ MSD Custom General and/or EMS Worksheet(s)	☐ MSD Prescriptive Heating & Cooling	☐ MSD Custom Part 1 ☐ MSD Custom General and/or EMS Worksheet(s)
Chillers & Thermal Storage	☐ MSD Custom Part 1 ☒ MSD Custom General Worksheet	☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	☐ MSD Prescriptive Chillers & Thermal Storage
			☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet
Chiller Tune-ups	☐ MSD Prescriptive Chiller Tune-ups	☐ MSD Prescriptive Chiller Tune-ups	☐ MSD Prescriptive Chiller Tune-ups
Motors & Pumps	☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	☐ MSD Custom Part 1 ☐MSD Custom General Worksheet	☐ MSD Prescriptive Motors, Pumps & Drives
			☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet
VFDs	Not Applicable	☐ MSD Prescriptive Motors, Pumps & Drives	☐ MSD Custom Part 1 ☐ MSD Custom VFD Worksheet
		☐ MSD Custom Part 1 ☐ MSD Custom VFD Worksheet	
Food Service	☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	☐ MSD Prescriptive Food Service
			☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet
Air Compressors	☐ MSD Custom Part 1 ☐ MSD Custom Compressed Air Worksheet	☐ MSD Custom Part 1 ☐ MSD Custom Compressed Air Worksheet	☐ MSD Prescriptive Process
			☐ MSD Custom Part 1 ☐ MSD Custom Compressed Air Worksheet
Process	☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	☐ MSD Prescriptive Process	☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet
		☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	
Energy Management Systems	☐ MSD Custom Part 1 ☐ MSD Custom EMS Worksheet	☐ MSD Custom Part 1 ☐ MSD Custom EMS Worksheet	☐ MSD Custom Part 1 ☐ MSD Custom EMS Worksheet
Behavioral* & No/Low Cost**		☐ MSD Custom Part 1 ☐ MSD Custom General Worksheet	

** Under the Self Direct program, failed equipment and equipment at the end of its useful life are evaluated differently than early replacement of fully functioning equipment. **All equipment replacements due to failure or old age will be evaluated via the Custom program.**

*** Please ensure that you include the age of the replaced equipment for measures classified as "Early Replacement" in your application as well as the estimated date that you would have otherwise replaced the existing equipment if you had not chosen a more energy efficient option.

**** Behavioral energy efficiency and demand reduction projects must be both measurable and verifiable. Provide justification with your application.

MERCANTILE SELF DIRECT Ohio Chillers / Thermal Storage Rebate Application

Questions? Call 1-866-380-9580 or visit www.duke-energy.com.
Email the complete, signed application with all required documents to SelfDirect@duke-energy.com or fax to 513-629-5572

Is this application: ☒ **NEW** (original) or ☐ **REVISED** (changes made to original application)

Building Type - Select One Only

☐ Data Centers	☐ Full Service Restaurant	☐ Office
☐ Education/K-12	☐ Healthcare	☐ Public Assembly
☒ Education Other	☐ Industrial	☐ Public Order/Safety
☐ Elder Care/Nursing Home	☐ Lodging	☐ Religious Worship/Church
☐ Food Sales/Grocery	☐ Retail (Small Box)	☐ Service
☐ Fast Food Restaurant	☐ Retail (Big Box)	☐ Warehouse
☐ Other:		

How did you learn about the Program? - Select One

☒ Duke Energy Representative	☐ Web Site	☐ Radio
☐ Contractor / Vendor	☐ Other _____	

Please check each box to indicate completion of the following program requirements:

☐ All sections of application	☐ Invoice with make, model number, quantity and equipment manufacturer	☐ Tax ID number for payee	☐ Customer/vendor agree to Terms and Conditions

Customer Information

Customer/Business	**Miami University**	Contact		**Anthony Ferraro**	
Phone	**513-529-3621**	**Account Number**		**1950-0677-01-8**	
Street Address (Where rebate should be mailed)		**101 S. Fisher Dr.**			
City	**Oxford**	State	**OH**	Zip Code	**45056**
Installation Street Address	**4955 Oxford Trenton Rd.**				
City	**Oxford**	State	**OH**	Zip Code	**45056**
E-mail Address	**ferrarav@miamioh.edu**				

Failure to provide the account number associated with the location where the installation took place will result in rejection of the application.

Vendor Information

Vendor		Contact			
Phone		Fax			
Street Address					
City		State		Zip Code	
E-mail Address					

If Duke Energy has questions about this application, who should we contact? ☐ **Customer** ☐ **Vendor**

Payment Information

Who should receive rebate payment?	☒ Customer	☐ Vendor (Customer must sign below)
I hereby authorize payment of rebate directly to the vendor:	Customer Signature (written signature)	
	Date	**4/23/2013**
Provide Tax ID Number for Payee	Customer Tax ID #	**31-6402089**
	Vendor Tax ID #	

Terms and Conditions

I have read and hereby agree to the Terms & Conditions and Program Requirements.

Customer Signature	Anthony Ferraro	Vendor Signature	
Date	**4/23/2013**	Date	
Title	**Energy Engineer**	Title	

Rebates are subject to change and may be discontinued at the sole discretion of Duke Energy. Equipment must be installed and operable to be eligible for rebates. As Federal Energy Policy Law changes, equipment efficiency requirements are subject to change.

The Equipment below is (check one):

☒ New Equipment / New Construction
☐ Early replacement of existing equipment or replacement of failed equipment must apply for Self Direct Custom program.

See Page 4 of form for required efficiency levels and equipment eligibility

Air Cooled Chillers

Make/Model # Scroll/Screw Type	# of Units	AHRI Tons/Unit	Full-load kW/ton*	Rebate $/ton	IPLV kW/ton*	Rebate $/ton	Building Type	Date Installed & Operable (mm/yy)	Total Rebate

*** Chiller performance and IPLV must be tested under AHRI conditions - submit documentation of compliance**

The Equipment below is (check one):

☐ New Equipment / New Construction
☐ Early replacement of existing equipment or replacement of failed equipment must apply for Self Direct Custom program.

See Page 4 of form for required efficiency levels and equipment eligibility

Water Cooled Chillers

Description	Make/Model #	# of Units	AHRI Tons/Unit	Full-load kW/ton*	Rebate $/ton	IPLV kW/ton*	Rebate $/ton	Building Type	Date Installed & Operable (mm/yy)	Total Rebate
☐ Screw/Scroll Chiller ☒ Centrifugal Chiller	Trane CVHF 1470	1		0.546	$2.50	0.331	$6.00	3 story brick	04/2013	$12,750.
☐ Screw/Scroll Chiller ☐ Centrifugal Chiller										
☐ Screw/Scroll Chiller ☐ Centrifugal Chiller										

*** Chiller performance and IPLV must be tested under AHRI conditions - submit documentation of compliance**

Centrifugal Chiller

Job Information



Miami University South Chiller
Cincinnati
(A34)Dan Schondelmayer

Tag	Chiller 2	Model Number	CVHF1470
Quantity	1		

Certified in accordance with the Water-Chilling Packages Using the Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590.

Sound pressure measured in accordance with AHRI Standard 575-94.

ASHRAE 90.1 - 1999	**Complies**
ASHRAE 90.1 - 2007	**Complies**
ASHRAE 90.1 - 2007 Add. M	**Complies**
ASHRAE 90.1-2010	**Complies**

Unit Information

Model	**CVHF**	Compressor size	**1470**
Impeller size	**318**	Orifice size	**2150**
Motor size	**1062**		
Motor frequency	**60 Hz**	Motor voltage	**480**
Incoming line frequency	**60 Hz**	Incoming line voltage	**480**
Evap shell size	**250E**	Cond shell size	**250L**
Evap bundle size	**2480**	Cond bundle size	**2500**
Evap tube type	**IMCU**	Cond tube type	**IMCU**
Evap tube thickness	**0.025"**	Cond tube thickness	**0.028"**
Evap passes	**Two pass evap water box**	Cond passes	**Two pass cond water box**

Design Information

Cooling capacity	**1500.0 tons**	HCFC-123 refrigerant charge	**2700 lb**
Primary power	**818.4 kW**	Shipping weight	**54020 lb**
Primary efficiency	**0.546 kW/ton**	Operating weight	**68320 lb**
IPLV	**0.331 kW/ton**	Free cooling option	**No**
Low voltage AFD type	**Unit mounted low voltage AFD**	Control Power Transformer	**Yes**
Unit heat rejected to ambient	**13.97 MBh**	Application type	**Standard cooling**
AFD heat rejected to ambient	**29.57 MBh**		

Evaporator Information

Evap leaving temp	**44.00 F**	Evap pressure drop	**20.74 ft H2O**
Evap flow rate	**3600.0 gpm**	Evap fluid type	**water**
Evap entering temp	**53.95 F**	Evap fluid concentration	**N/A**
Evap flow/capacity	**2.40 gpm/ton**	Evap water box type	**marine**
Evap fouling factor	**0.00010 hr-sq ft-deg F/Btu**	Evap water box pressure	**150 psig**

Condenser Information

Cond entering temp	**85.00 F**	Cond pressure drop	**15.11 ft H2O**
Cond flow rate	**4500.0 gpm**	Cond fluid type	**water**
Cond leaving temp	**94.35 F**	Cond fluid concentration	**N/A**
Cond flow/capacity	**3.00 gpm/ton**	Cond water box type	**marine**
Cond fouling factor	**0.00025 hr-sq ft-deg F/Btu**	Cond water box pressure	**150 psig**

Centrifugal Chiller

Job Information



Miami University South Chiller
Cincinnati
(A34)Dan Schondelmayer

Tag	**Chiller 2**	Model Number	**CVHF1470**
Quantity	**1**		

Electrical Information

Motor LRA	**8598 A**	Compressor motor RLA	**1182.40 A**
Primary RLA (Incoming line)	**1054.6 A**	Min circuit ampacity	**1327 A**
Un-corrected power factor	**0.89**	Max overcurrent protection	**2000 A**

Information for LEED Projects

Cooling capacity	**1500.00 tons**	Primary power	**818.40 kW**
HCFC-123 refrigerant charge	**2700.0 lb**	IPLV	**0.331 kW/ton**

Note: Although Trane recognizes and respects the decision by the U.S. Green Building Council to mandate a default assumption of a 2% Refrigerant Leakage Rate (Lr) for all manufacturers of centrifugal chillers, the value used in the calculations for achieving Energy and Atmosphere Credit 4 of LEED-NC (version 2.2), Trane has exhaustively documented and guarantees a low 0.5% leak rate for HCFC-123 CenTraVac centrifugal chillers (models CVHE, CVHF, and CVHG). This documented 0.5% refrigerant leakage rate, as well as our average 1.7 Lb/Ton refrigerant charge, are just some examples of Trane's commitment to safeguarding the environment.

The LEED Green Building Rating System™, developed by the U.S. Green Building Council, provides independent, third-party verification that a building project meets the highest green building and performance measures.

Proposal

(Valid for 30 days from Proposal date)

Prepared For: Miami University	***Date:*** October 19, 2011 ***Proposal Number:*** N2-64743-1
Job Name: Miami University South Chiller	***Engineer: Thermal Tech Engineering***
Delivery Terms: Freight Allowed and Prepaid - F.O.B. Factory	***Payment Terms:*** Net 30 Days

Trane U.S. Inc. is pleased to provide the following proposal for your review and approval.

Tag Data - Centrifugal Water Chillers (Qty: 1)

Item	Tag(s)	Qty	Description	Model Number
A1	CTV	1	Centrifugal Chiller (CTV)	CVHF1470

Product Data - Centrifugal Water Chillers

Product Overview:

1470 Ton Nominal Trane Model CVHF Chiller – [World's Most Efficient Water Chiller]
Multi-Stage [High Efficiency]
Direct Drive [Fewer Moving Parts Best Reliability]
Hermetic Compressor [Lowest sound; Heat rejected to refrigeration cycle]
Low Pressure [Lowest Refrigerant Leakage]
Multi Stage Economizer [Best Full Load and Part Load efficiency]
Fixed Plate Orifice [Best Reliability]

General Items:

Centrifugal liquid chiller CVHF with 2 stage compressor R-123 refrigerant – Low Pressure Design
Compressor size: 1470 Nominal Tons
Adaptiview controls
Incoming hertz: 60
Compressor hertz: 60
Incoming line voltage: 480 volt
Compressor voltage: 480 volt 3 phase
Trane Factory Technician Startup Assistance
1st –2nd Year parts [whole unit] warranty
1st –2nd Year labor [whole unit] warranty
1st –2nd Year refrigerant [whole unit] warranty

Standard Compliance

Complies with ASHRAE 90.1 - 1999
Complies with ASHRAE 90.1 - 2007

Evaporator

Evaporator shell size: 250 Extended
Evaporator bundle size: 2480 nominal tons
Evaporator tube wall: .025 inch thick [root to root]
Evaporator waterbox passes: Two pass
Evaporator waterbox pressure: 150 psig (1034 kPa)

Condenser and Starter options

Condenser shell size: 250 Long
Condenser bundle size: 2500 nominal tons
Condenser tube wall: .028 inch (0.7 mm) thick
Refrigerant Cooled Unit mounted VSD
Rupture Guard refrigerant relief valve [field installed by others]

Performance Data - Centrifugal Water Chillers

Tags	CTV
Nameplate kW (kW)	865.90
Primary cooling capacity (tons)	1500.00
Minimum circuit ampacity (A)	1397.37
Maximum overcurrent protection (A)	2000.00
Primary kW/t (kW/ton)	0.577
NPLV (kW/ton)	0.363
Evaporator entering fluid temp (F)	53.94
Evaporator leaving fluid temp (F)	42.00
Evaporator fluid flow rate (gpm)	3000.00
Evaporator pressure drop (ft H2O)	14.51
Condenser entering fluid temp (F)	85.00
Condenser leaving fluid temp (F)	94.42
Condenser fluid flow rate (gpm)	4500.00
Condenser pressure drop (ft H2O)	14.36
HCFC 123 refrigerant charge (lb)	2700.0
Compressor RPM (rpm)	3555
Shipping weight (lb)	54272.0
Operating weight (lb)	68572.0
Chiller heat rejected to ambient (MBh)	14.78
AFD heat rejected to ambient (MBh)	31.15
AHRI 550/590-03 classification (Each)	Certified
Impeller optimization (Each)	Yes
Evaporator maximum fluid flow rate (gpm)	6514.40
Evaporator minimum fluid flow rate (gpm)	888.30
Condenser maximum fluid flow rate (gpm)	8533.40
Condenser minimum fluid flow rate (gpm)	2327.30
Evaporator shell weight	**20,083 lbs**
Evaporator marine waterbox	**8,600 lbs**
Condenser shell weight	**17,200 lbs**
Condenser marine waterbox	**9,400 lbs**
Compressor/Motor weight	**13,932 lbs**

Total Net Price *(Excluding Sales Tax)*..... $ 339,792.00

ADD for true 0.035" root to root condenser tube wall thickness.....$ 11,900.00
ADD Separable Shells and compressor doweling for field teardown.....$ 7,545.00
ADD Hinges on both sides of Evaporator Water Box.....$ 5,132.00
ADD Hinges on both sides of Condenser Water Box.....$ 5,132.00
ADD Customer witness performance test with 3 point % unload.....$ 7,430.00

Please ADD 2% price escalation per quarter after 1st quarter 2012

Note: Due to teardown of chiller insulation is not included in this price.

Sincerely,

Nathan Hull - Trane U.S. Inc.
10300 Springfield Pike
Cincinnati, OH 45215-1118
Phone: (513) 771-8884 Cell: (513) 313-1763 Fax: (513) 772-7281

This proposal is subject to your acceptance of the attached Trane terms and conditions.

CenTraVac Chiller CTV-1

Single Point Part Load Calculator

Row #	% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	kW	Amps	Efficiency
1	100.0	1500.0	42.00	3000.0	53.94	14.51	85.00	4500.0	94.42	14.36	865.9	1190.6	0.577
2	75.0	1125.0	42.00	3000.0	50.96	14.52	80.00	4500.0	86.92	14.42	550.8	912.3	0.490
3	60.0	900.0	42.00	3000.0	49.16	14.53	75.00	4500.0	80.44	14.46	379.0	758.5	0.421
4	50.0	750.0	42.00	3000.0	47.97	14.53	65.00	4500.0	69.40	14.48	234.6	674.0	0.313
5	35.0	525.0	42.00	3000.0	46.18	14.54	60.00	4500.0	63.04	14.46	138.1	650.1	0.263

FCLT-LAX	MODL-CVHF	NTON-1470	CNIF-ADPV
INDP- NO	IHRZ- 60	HRTZ- 60	SRTY-UAFD
IVLT-480	ENCL-STD	VOLT-480	CPKW-1062
CPIM-313	EVSZ-250E	EVBS-2480	EVTM-IMCU
EVTH- 25	EVVF- NO	EVWP- 2	EVWN- 14
HGEV-HGBT	CDSZ-250L	CDBS-2500	CDTM-IMCU
CDTH- 28	CDVF- NO	CDWP- 2	CDWN- 14
HGCD-HGBT	TSTY-STD	ORSZ-2245	TEST-AIR
TTOL-AIR	WCNM-BNMP	FTST-YES	ASTT- NO
INSL- NO	OPTI-CPDW	RPGD-YES	

CenTraVac Centrifugal Chiller, Version 31.08, REVL 55129

CenTraVac Chiller CTV .035

Single Point Part Load Calculator

Row #	% Load	Capacity	Evap LWT	Evap FR	Evap EWT	Evap PD	Cond EWT	Cond FR	Cond LWT	Cond PD	kW	Amps	Efficiency
1	100.0	1500.0	42.00	3000.0	53.94	17.46	85.00	4500.0	94.42	27.22	865.2	1199.1	0.577
2	75.0	1125.0	42.00	3000.0	50.96	17.47	80.00	4500.0	86.92	27.76	549.5	918.4	0.488
3	60.0	900.0	42.00	3000.0	49.16	17.48	75.00	4500.0	80.44	28.29	377.9	764.3	0.420
4	50.0	750.0	42.00	3000.0	47.97	17.49	65.00	4500.0	69.40	29.35	234.8	678.8	0.313
5	35.0	525.0	42.00	3000.0	46.18	17.50	60.00	4500.0	63.04	29.98	138.6	651.2	0.264

FCLT-LAX	MODL-CVHF	NTON-1470	CNIF-ADPV
INDP- NO	IHRZ- 60	HRTZ- 60	SRTY-UAFD
IVLT-480	ENCL-STD	VOLT-480	CPKW-1062
CPIM-315	EVSZ-250E	EVBS-2280	EVTM-IMCU
EVTH- 25	EVVF- NO	EVWP- 2	EVWN- 14
HGEV-HGBT	CDSZ-250L	CDBS-2300	CDTM-TECU
CDTH- 35	CDVF- NO	CDWP- 2	CDWN- 14
HGCD-HGBT	TSTY-STD	ORSZ-2245	TEST-CWT3
TTOL-STD	TPUL-ARI	FTST-YES	ASTT- NO
OPTI-CPDW	RPGD-YES		

CenTraVac Centrifugal Chiller, Version 31.08, REVL 55129

TRANE

Trane U.S. Inc.

3600 PAMMEL CREEK ROAD
LA CROSSE, WI 54601-7599

REMIT TO:

Trane U.S. Inc.
PO BOX 845053
DALLAS, TX 75284-5053

TYPE	INVOICE
NUMBER	31426622
DATE	12/16/2012
PAGE	1 of 2
PURCHASE ORDER NUMBER	P0091878
PROJECT/JOB NAME	Miami University South Chiller
ORIGINAL SYSTEM NUMBER	1953288_KOD
CUSTOMER ACCOUNT#	2008981
PREVIOUS #	

SOLD TO:
MIAMI UNIVERSITY
ATTN: ACCOUNTS PAYABLE
ACCOUNTS PAYABLE
107 ROUDEBUSH HALL
OXFORD, OH 45056

SHIP TO/SERVICE LOCATION:
MIAMI UNIVERSITY
Orbit
2550 River Rd
DAYTON, OH 45439

ORDERING LOCATION	CREDIT JOB/PROJECT#	SALES ORDER # / CALL# / CONTRACT #
	N212060	N2G061

PAYMENT TERMS	DUE DATE	FOB	FREIGHT TERMS	SHIP / CLOSE DATE	SHIP VIA	SHIPPING REFERENCE
N30	1/17/2013	SHIP POINT	FA-PPD	12/14/2012	ATS SPECIA	261636

ITEM	DESCRIPTION	UOM	MULT	QUANTITY	UNIT PRICE	EXTENDED AMOUNT
1	LAX -------- CVHF 1470 :Centrifugal Chiller (CTV) Model Number: LAX -------- CVHF 1470 Serial Number: L12L04533 Tag Number: Chiller 2			1.00		
2	Accessory line item 2: Model Number: Accessory line item 2			1.00		
3	Accessory line item 3: Model Number: Accessory line item 3			1.00		
4	2716-1150-17-20:Year 2nd-5th Parts Werranty Unit Model Number: 2716-1150-17-20			1.00		
5	2716-2110-17-20:1st year labor warranty whole unit Model Number: 2716-2110-17-20			1.00		

RECEIVED
JAN 03 2013
ACCOUNTS PAYABLE

TRANE

Trane U.S. Inc.

3600 PAMMEL CREEK ROAD
LA CROSSE, WI 54601-7599

REMIT TO:

Trane U.S. Inc.
PO BOX 845053
DALLAS, TX 75284-5053

TYPE	INVOICE
*NUMBER	31426622
DATE	12/18/2012
PAGE	2 of 2
PURCHASE ORDER NUMBER	P0091878
PROJECT/JOB NAME	Miami University South Chiller
ORIGINAL SYSTEM NUMBER	1953288_KOD
CUSTOMER ACCOUNT#	2008981
PREVIOUS #	

SOLD TO:

MIAMI UNIVERSITY
ATTN: ACCOUNTS PAYABLE
ACCOUNTS PAYABLE
107 ROUDEBUSH HALL
OXFORD, OH 45056

SHIP TO/SERVICE LOCATION:

MIAMI UNIVERSITY
Orbit
2660 River Rd
DAYTON, OH 45439

ORDERING LOCATION	CREDIT JOB/PROJECT#	SALES ORDER # / CALL# / CONTRACT #
	N212060	N2G061

PAYMENT TERMS	DUE DATE	FOB	FREIGHT TERMS	SHIP / CLOSE DATE	SHIP VIA	SHIPPING REFERENCE
N30	1/17/2013	SHIP POINT	FA-PPD	12/14/2012	ATS SPECIA	261636

ITEM	DESCRIPTION	UOM	MULT	QUANTITY	UNIT PRICE	EXTENDED AMOUNT
6	2716-2150-17-20:2nd-5th year labor warranty whole unit Model Number: 2716-2150-17-20			1.00		
7	2716-3150-17-20:2nd-5th year refrigerant warranty Model Number: 2716-3150-17-20			1.00		
8	Startup allowance			1.00		
9	Standard air run and vibration			1.00		

*PLEASE REFERENCE NUMBER 31426622 WITH YOUR PAYMENT **PAY IN 10 DAYS FOR 0.50% DISCOUNT; ACCOUNT MUST BE CURRENT

SPECIAL INSTRUCTIONS:

SUBTOTAL	TAX	FREIGHT	TOTAL
368,101.00	0.00	0.00	368,101.00

Currency: USD

0.50% DISCOUNT:
*PAYMENT WIN 10 DAYS OF INVOICE DATE
*ACCOUNT MUST BE CURRENT TO QUALIFY

Digitally printed on environmentally friendly paper; produced using fewer trees and chemicals and less energy.

Certificate of Product Ratings

AHRI Certified Reference Number: 201842 Date: 5/1/2013 †Status: Active

Product: Water-Cooled Chilling Packages

Model Designation: CVHF1720

Manufacturer: TRANE

Trade/Brand name: CENTRAVAC 60 HERTZ

Rated as follows in accordance with AHRI Standard 550/590-2011 for Water Chilling Packages using the Vapor Compression Cycle (Water-Cooled) and subject to verification of rating accuracy by AHRI-sponsored, independent, third party testing:

Refrigerant Used:	R-123;
Compressor Designation:	1470, 1720
Compressor Type:	Centrifugal
Software Version Number:	Rev Level 55147
Country Of Origin:	USA
Hertz:	60

† Models with an 'Active' status are those that are currently in production. Models with a 'Discontinued' status are those that the manufacturer has elected to stop producing, yet stock is still available. Models with an 'Obsolete' status are those that the manufacturer is required to stop manufacturing due to an AHRI certification program test failure.

* Ratings followed by an asterisk (*) indicate a voluntary rerate of previously published data, unless accompanied with a WAS, which indicates an involuntary rerate.

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CERTIFICATE VERIFICATION

The information for the model cited on this certificate can be verified at www.ahridirectory.org, click on "Verify Certificate" link and enter the AHRI Certified Reference Number and the date on which the certificate was issued, which is listed above, and the Certificate No., which is listed below.

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CERTIFICATE NO.: 130119214511477428